PUBLIC

SOURCE WATER DELINEATION & ASSESSMENT REPORT
2015 UPDATE

Mountain Water Company
Public Water System
PWSID # MT0000294

Prepared for:

MOUNTAIN WATER COMPANY
P.O. Box 8246
Missoula, Montana 59807

Prepared by:

RESPEC
1535 Liberty Lane, Suite 110D
Missoula, Montana 59808

RESPEC Project # 2252

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This Delineation and Assessment Report was completed by RESPEC Consulting & Services for:

MOUNTAIN WATER COMPANY, PWSID # MT0000294
Missoula County, Montana

Contact: **Ross Miller, Mountain Water Company**
P.O. Box 4826
Missoula, Montana 59806
(406) 721-5570

PURPOSE

This Updated Source Water Delineation and Assessment Report (SWDAR) reevaluates the vulnerability and susceptibility of the groundwater wells and the surface water reservoir composing the municipal water supply operated by Mountain Water Company (MWC) in Missoula, Montana. SWDARs are technical and certification requirements for the delineation and assessment of source water mandated by the Montana Source Water Protection Program (MSWPP) and the federal Safe Drinking Water Act (SDWA). Updates are not required, but are recommended to ensure that operators of drinking water supplies recognize the system's vulnerability and take measures to prevent degradation and/or contamination of the drinking water source. This Updated SWDAR has been prepared for the Mountain Water Company and the Montana Department of Environmental Quality to provide a current assessment of conditions and seek source water protection certification for the drinking water supply. Its use for any other purpose can only be authorized with the written consent of Mountain Water Company.

The Missoula Aquifer, MWC's primary source of water, is a prolific groundwater source, yielding over 7,000 gallons per minute in high production wells and has estimated hydraulic conductivities that exceed 20,000 feet/day in select portions of the valley. While the Missoula Aquifer is an abundant and high quality source of water, urban and suburban development throughout the Missoula Valley presents certain risks to its quality. The coarse gravel that makes up the unsaturated and saturated portions of the geologic material filling the valley offers little filtering and retention capacity for contaminants. Both accidental releases and purposeful discharges of chemicals, sanitary wastewater, and storm water can impact the water quality in portions of the Missoula Valley.

This Updated SWDAR delineates source water areas to drinking water wells and surface water intakes and evaluates the risk from potential contaminant sources in the delineated areas. The delineation was completed in the 2003 SWDAR, but has been updated to include four new supply wells to the system. The risk assessment has been updated based on new data on potential contaminant sources and reevaluation of the susceptibility to individual wells and surface water intakes.

1.0 BACKGROUND

1.1 Setting

Mountain Water Company's system is the largest public drinking water source in Montana that relies primarily on groundwater. The MWC system extends to all developed portions of the City of Missoula and includes portions of the urbanized areas outside the incorporated limits of Missoula. (**Figure 2**, **MWC Service Area**). The primary source of water for the system is the Missoula Aquifer, an unconfined alluvial aquifer that lies below the City and extends throughout the Missoula Valley. MWC also maintains a surface water source in the Rattlesnake Creek drainage, but the system is not active and is maintained as an emergency back-up system.

1.1.1 Population

Missoula County has a population of 109,299 people, with its principal city, Missoula, having a population of 66,788 people (US Census, 2010). The MWC service area encompasses approximately 32 square miles and includes a population of approximately 66,000 people (MWC, 2013). Currently, MWC provides water to 18,170 residential and 3,564 commercial accounts (Streeter, 2014). **Table 1-1** provides a population summary for Missoula County, the City of Missoula and the MWC service area along with population changes since 2000.

Table 1-1 Regional Population Summary [1]

Area	2000	2010	% change
Missoula County	95,802	109,299	+14
City of Missoula	57,053	66,788	+17
MWC Service Area	61,020	66,000[2]	+8

[1]US Census Bureau, 2010
[2]Mountain Water Company, 2013

1.1.2 Transportation

Primary transportation routes include U.S. Interstate 90, Highways 12/93, and Montana Highway 200 (**Figure 1, Vicinity Map**). Interstate 90 travels across the northern end of the Missoula urban area for approximately four miles from Hellgate Canyon to Reserve Street on the west. Highway 12/93 travels 7.4 miles through the Missoula urban area from the Bitterroot River crossing (Buckhouse Bridge) in the southwest to the Reserve Street interchange in the northwest. Highway 200 runs from Hellgate Canyon to the east and north along the Blackfoot River to the Powell County line.

All of the major highways and several secondary truck routes are used to transport hazardous materials. Interstate 90 has the highest volume and occurrence of transported hazardous materials (MCOEM, 2000).

Air transportation is provided via Missoula International Airport, located in West Missoula. Due to FAA regulations, the transport of hazardous materials by air is limited. However, a significant amount of petroleum products and hazardous materials are used for aircraft service and

maintenance (MCOEM, 2000).

Montana Rail Link (MRL) operates the rail transportation system. The main rail line runs east-west through the Missoula urban area from Hellgate Canyon to Reserve Street. A spur line connecting the Missoula Valley with the Bitterroot Valley to the southwest also runs through the Missoula urban area (**Figure 1**). A high volume of hazardous materials is moved into and through the MWC service area each day by rail. Petroleum products that were once transported by the Yellowstone Pipeline before 1995 are currently loaded onto railroad cars at the oil terminal and transported via train between Missoula and Thompson Falls. The transport of regulated and hazardous material in, out and through Missoula is primarily via the main east-west route following the Clark Fork River.

1.1.3 *Socioeconomic/Land Use*

Economic activity in Missoula County is heavily weighted toward services, primarily health care and retail trade (see **Table 1-2**). In 2012, services accounted for 35% of employees in the County and 27% of county-wide payroll. Health care services made up more than half of the annual payroll under the services category. Retail trade accounted for 14% of employees in Missoula County, but only made up 10% of county-wide payroll. Government related employment represented 17% of Missoula County employees and over 20% of payroll. Finance, Insurance, and Real Estate businesses represented the fourth highest sector in percent payroll (6.3%). The five largest employers in the Missoula area are Community Medical Center, St. Patrick's Hospital, DirecTV Customer Service, Express Employment Professionals, and Wal-Mart (Montana Dept. of Labor and Industry, 2013). The largest consumers of MWC supplied water are the University of Montana, the City of Missoula and Garden City Property Management (Streeter, 2014).

The City of Missoula is the hub of the Missoula Valley and the most intensive land uses are located in the eastern portion of the Missoula Valley around the Missoula City Center. Commercial development radiates from the city center along primary transportation routes. Industrial areas are generally outside the city limits to the northwest, but also include closed wood products facilities at the former Stimson Lumber Millsite in Bonner and former Smurfit-Stone Container facility near Frenchtown. Residential areas generally fill in the areas of the valley with highest concentrations surrounding the city center, with lesser densities in the western portions of the Missoula Valley.

Table 1-2. Economic Activity in Missoula County by Industry

MISSOULA COUNTY						
ECONOMIC ACTIVITY BY INDUSTRY (ANNUAL AVERAGES 2012)						
	PLACES		EMPLOYEES		ANNUAL PAYROLL	
	TOTAL	%	TOTAL	%	TOTAL	%
TOTAL ALL INDUSTRIES	**4,467**		**54,956**		**1,945,163,468**	
AGRI., FORESTRY, FISH	65	1.46%	404	0.74%	20,111,580	1.03%
MINING	11	0.25%	53	0.10%	3,278,661	0.17%
CONSTRUCTION	455	10.19%	2389	4.35%	99,312,918	5.11%
MANUFACTURING	123	2.75%	1794	3.26%	65,570,075	3.37%
TRANS., COMMUN., UTILITIES	115	2.57%	2746	5.00%	112,834,821	5.80%
WHOLESALE TRADE	239	5.35%	1810	3.29%	87,286,149	4.49%
RETAIL TRADE	540	12.09%	7800	14.19%	193,614,058	9.95%
FINANCE, INSURANCE, REAL ESTATE	409	9.16%	2466	4.49%	122,464,498	6.30%
HEALTHCARE SERVICES	459	10.28%	9185	16.71%	380,870,159	19.58%
OTHER SERVICES	1986	44.46%	19116	34.78%	520,588,838	26.76%
NONCLASSIFIABLE	125	2.80%	1423	2.60%	22,801,390	1.17%
GOVERNMENT	110	2.46%	9150	16.65%	404,128,027	20.78%

Montana Department of Labor & Industry, 2013

1.2 **Geographic Setting**

1.2.1 *Topography and Geology*

Northwest and northeast of the MWC service area, the regional topography consists of rolling hills and mountains reaching approximately 8,500 feet in elevation. The topography to the southwest and southeast is characterized by a broad river valley. The MWC service area lies at the eastern edge of a west-southwest trending intermontane basin called the Missoula Valley. The elevation of the MWC service area ranges from 3,114 feet to 4,711 feet. **Figure 1** provides the Missoula Valley topography and hydrologic features.

The surrounding mountains are composed of Precambrian-age bedrock that extend below the Missoula Valley, forming a large bowl-shaped structure thousands of feet below the valley floor. The bowl-shaped structure is filled with fine sediments 1,000 to 2,000 feet thick. Overlying the fine sediments is a relatively thin layer of alluvial material, approximately 100 to 200 feet thick, which is composed of coarse sand, gravels, and boulders. This upper geologic layer is known as the Missoula Aquifer and is the primary source of water for the MWC system.

1.2.2 *Climate*

The Missoula area is semi-arid with an average annual precipitation of 14.09 inches. The highest amount of precipitation occurs in May and June (WRCC, 2014a). Missoula has a dominant pacific maritime climate with continental climate influences (Woessner, 1988). The

average minimum temperature of 16°F occurs in December while the average maximum of 85°F occurs in July (WRCC, 2014a). The average annual wind speed, as measured at the Missoula International Airport, is 4.7 miles per hour (WRCC, 2014b).

1.2.3 *Hydrology*

Two major river systems enter the Missoula Valley: the Clark Fork River enters the valley at its east end and is joined by the Bitterroot River flowing northwest from the south end of the valley. The peak flow of these two rivers occurs in April through June. The Clark Fork is the primary stream flowing through the MWC service area and is gauged both above and below Missoula.

The Clark Fork River as it enters Missoula (USGS Gauging Station 12340500) has recorded annual peak flows as low as 3,500 cubic feet per second (cfs) and as high as 32,300 cfs. The lowest daily mean ever recorded on the Clark Fork as it enters Missoula was 340 cfs on September 27, 1937. Based on 84 years of record, the Clark Fork as it enters Missoula has averaged 2,938 cfs annually (USGS, 2012a).

One mile downstream of its confluence with the Bitterroot River, the combined Bitterroot and Clark Fork below Missoula (USGS Gauging Station 12353000) has recorded a peak flow of 55,100 cfs. The lowest daily mean flow ever recorded on the Clark Fork below Missoula was 580 cfs on January 19, 1933. Based on 83 years of record, the Clark Fork below Missoula has averaged 5,323 cfs annually (USGS, 2012b).

The Clark Fork River is a losing stream from Milltown Reservoir to approximately Reserve Street and provides significant recharge to the Missoula Aquifer (Woessner, 1988; Miller, 1991). Groundwater north of the Clark Fork is influenced by recharge from streams draining the north foothills. Groundwater flow direction north of the Clark Fork parallels the river and flows west-southwest towards the confluence of the Clark Fork and Bitterroot Rivers. West of Reserve Street, groundwater begins to flow into the Clark Fork River (Woessner, 1988; Miller, 1991). Groundwater south of the Clark Fork River flows to the south and west towards the Bitterroot River and the confluence of the Clark Fork and Bitterroot Rivers. **Section 1.3**, **Source Water**, provides a more detailed description of the properties of the Missoula Aquifer.

1.3 **Source Water**

1.3.1 *Groundwater*

Thirty-six active MWC supply wells pump water from the Missoula Aquifer. The Missoula Aquifer was designated an EPA Sole Source Aquifer in 1988. The Missoula Aquifer is bounded to the east by Mount Sentinel, to the southeast by the South Hills, to the southwest by the Bitterroot and Clark Fork Rivers, and to the north by the Rattlesnake Hills (Woessner, 1988; Miller, 1991). The Missoula Aquifer has a saturated thickness of 50 to 120 feet and a depth to water of approximately 50 to 70 feet (Hydrometrics, 1992). The aquifer is unconfined, making it vulnerable to release events and contamination from land use activities.

The Missoula Aquifer is composed of three water-bearing zones. Unit One is comprised of

mostly cobbles to boulders and in general, lies just above the water table. Unit Two is a discontinuous layer composed of fine-grained materials and may retard migration of downward groundwater flow in select areas. Unit Three is composed of coarse sediments and is the principal water-bearing unit for high capacity MWC wells. In general, MWC wells completed in Unit Three produce between 1,000 and 7,000 gallons per minute (gpm) (Hydrometrics, 1992).

Groundwater recharge to the Missoula Aquifer is primarily from underground flow from the Hellgate and Bitterroot groundwater systems and loss from the Clark Fork River. Minor recharge contributions come from precipitation and irrigation in the valley, Grant Creek, Rattlesnake Creek, Butler Creek in the North Hills, and Pattee Creek in the South Hills in the southern portion of the valley. The lowest hydraulic conductivity values in the Missoula Aquifer are found at the base of the South Hills and the base of the North Hills. The highest conductivity in the Missoula Aquifer is found at the mouth of Hellgate Canyon, where the hydraulic conductivity is as high as 21,000 feet per day (Land & Water, 1994).

The Bitterroot and Hellgate groundwater systems are tributary systems to the Missoula Aquifer. Groundwater in the Hellgate groundwater system recharges the Clark Fork until just downstream of the former Milltown Dam site, where the Clark Fork becomes a losing stream through Hellgate Canyon and into the Missoula Valley (Land & Water, 1994). The Bitterroot groundwater system recharges the Missoula Aquifer in the MWC service area south of the crossing of Highway 93 over the Bitterroot River.

1.3.2 *Surface Water*

MWC maintains a surface water system on Rattlesnake Creek (HUC 17010204/MT76M002120) located in Section 2 of Township 13 North, Range 19 West in the Rattlesnake Valley. Rattlesnake Creek was gauged from 1959 to 1967 and recorded a mean annual discharge of 110 cubic feet per second during that period (Woessner, 1988). Rattlesnake Creek is an alluvial drainage that receives water in its upper reaches from snow melt and groundwater. Rattlesnake Creek appears to be a losing stream through most of its reaches.

A dam, reservoir, and distribution system are located on Rattlesnake Creek approximately four miles upstream of the confluence of the Clark Fork River and Rattlesnake Creek. MWC maintains water rights on Rattlesnake Creek and on eight lakes in the Rattlesnake Wilderness north of Missoula. The Rattlesnake surface water supply system formerly operated as the primary source of water for MWC. The 1983 discovery of an intestinal parasite, *Giardia lamblia*, in Rattlesnake water resulted in the suspension of use of MWC's Rattlesnake facility. The Rattlesnake surface water source is maintained and provides a back-up water source to MWC's groundwater system. A more complete discussion of the Rattlesnake Creek surface water system is included in **Section 2.2**.

1.4 Wastewater & Waste Management

Wastewater within the MWC service area is discharged into both private septic systems and the public sewer system. There are two public wastewater collection systems in the greater

Missoula area, including the City of Missoula Wastewater Treatment Facility and the Lolo Wastewater Treatment Facility serving the Town of Lolo, south of the Missoula Valley.

1.4.1 *City of Missoula Wastewater Division*

The City of Missoula Wastewater Division operates the wastewater collection and treatment system within the city. Domestic, commercial and industrial wastewater is collected primarily by gravity sewer mains, but lift stations are located throughout the valley to overcome the level topography of the valley floor. Over 300 miles of gravity wastewater lines, 23 above and below ground major lift stations and 26 community tanks, aid in transporting wastewater to the Wastewater Treatment Facility on Clark Fork Drive in west Missoula (MCWD, 2014). The City of Missoula reports that there are approximately 18,000 connections for sewer service (Sullivan, 2014). Wastewater is processed through primary (sedimentation) and secondary (biological and chemical) treatment before being discharged into the Clark Fork River. Accumulated solids are disposed of at EKO Compost for recycling. The City of Missoula Wastewater Treatment Facility treats about 7.5 million gallons of wastewater per day prior to discharge into the Clark Fork River (Sullivan, 2014).

The Wastewater Treatment Facility provides radio telemetry monitoring in addition to periodic manual inspection at each lift station. Each lift station has high level float indicators to ensure proper functioning of the lift station. The large capacity lift stations have back-up power generation in the event of power failure (Connell, 2002). There are three MWC supply wells within 500 feet of sewer lift stations. The Bank Street well (MWC-30) is located approximately 320 feet to the north of a sewer lift station. The Maurice Street well (MWC-34) is located approximately 220 feet to the northwest of a lift station and the Lower Miller Creek Road well (MWC-40B) is located approximately 400 feet northeast of a city wastewater lift station (**Section 2.1.3**).

1.4.2 *Lolo Wastewater System*

The Lolo Wastewater Treatment Facility is a secondary treatment plant with an activated sludge system. Approximately 11 miles of sewer line and three lift stations transport wastewater from approximately 800 residential/commercial sewer connections in Lolo. The Lolo Wastewater Treatment Facility treats approximately 250,000 gallons of wastewater per day. The Lolo lift stations have electronic monitoring of high-level float indicators and power failure (**Table 4-4**) (Neese, 2014).

1.4.3 *Individual & Community On-Site Wastewater Systems (Septic systems)*

Development outside of the City of Missoula and community wastewater systems rely on individual and community on-site septic system for discharging sanitary wastewater. Within the greater Missoula Valley (Lolo to Bonner to Frenchtown), there are over 6,700 individual residential septic systems and approximately 700 systems that serve commercial, multi-family, and mobile home parks (MCCHD, 2014).

1.4.4 Storm Water

In the Missoula Valley, storm water from public roadways and private parking lots are managed and discharged into injection wells (dry wells). The City of Missoula has an estimated 4,100 storm water injection wells on city streets and there are an estimated 2,500 private injection wells for managing storm water in parking lots. Storm water flowing into these injection wells is untreated and discharged into the vadose zone approximately 10 feet below the ground surface. There are a few areas in the Missoula Valley that collect storm water and discharge to surface water including: the Missoula downtown area, the South Hills, Reserve Street, Broadway Avenue, and commercial/industrial development located near the airport. These areas have storm water collection systems that collect storm water runoff and discharge with little or no treatment to area surface waters. The City of Missoula has a Small Municipal Separate Storm Sewer System (Small MS4) permit to discharge storm water to area surface waters and groundwater and is discussed later in Section 4.4.

1.4.5 Solid Waste

Solid waste in the MWC service area is disposed of and collected by Republic Services at their privately owned Class II solid waste disposal facility in Missoula. Republic's solid waste facility is located north of the city limits, north of U.S. Highway 90 between Grant Creek and Rattlesnake Creek drainages and borders the MWC service area. Groundwater from the facility flows south by southwest and Republic actively monitors groundwater as it flows down-gradient from the facility. There are no MWC supply wells within approximately ¾ mile of the landfill.

2 PUBLIC WATER SUPPLY

2.1 Wells and the Missoula Aquifer

2.1.1 *Distribution System*

As of December 2013, MWC had 18,170 residential connections and 3,564 commercial connections for non-irrigation water use. Water is provided via 42 (36 currently active) public water supply wells (**Figure 2**). **Table 2-1** lists the 42 MWC wells, their location, well construction information, and pump capacity. **Table 2-2** describes water level and relative production data from each well. Well logs are included in **Appendix A**.

Fourteen water storage tanks and eleven reservoirs provide nearly nine million gallons of water holding capacity for MWC's public supply system (**Figure 2**). Water from each well is treated by a chlorine-treatment injection pump at the well prior to distribution (MWC, 2013).

MWC has an on-going service expansion plan that grows with new development within and in adjacent areas to the City of Missoula. In the event of an emergency, MWC generators and diesel storage supply can provide power to operate the water system without electricity for approximately 30 days.

2.1.2 *General Groundwater Quality*

Water from the Missoula Aquifer is generally calcium bicarbonate-type. The mineral content in groundwater increases in the direction of groundwater flow. Mineral concentrations in groundwater fluctuate seasonally close to the Clark Fork and remain relatively stable throughout the rest of the aquifer (Woessner, 1988).

Groundwater from the Missoula Aquifer meets all federal drinking water standards. In general, water quality decreases in the down-gradient direction towards the Bitterroot River. Concentrations of calcium, magnesium, bicarbonate and total dissolved solids increase down-gradient from the eastern boundary of the Missoula Aquifer, likely due to dissolution of carbonate minerals through the aquifer (Woessner, 1988).

The 2012/2013 Annual Water Quality Report for Mountain Water Company did not report exceedances of federal Maximum Contaminant Levels (MWC, 2013). A summary of the analytical results as depicted in the report are shown in **Table 2-2**.

Table 2-1. Description of MWC Public Water Supply Wells

Description of MWC Public Water Supply Wells						
MWC WELL NO	PWSID SOURCE NO	WATER RIGHT #	ELEVATION (ft)	TOTAL DEPTH (ft)	GWIC WELL LOG ID	FLOW RATE (gpm)
1	294-004	76M-W040143	3197	122	151949	1125
2	294-002	76M-W040144	3179	90	69155	1000
3A	294-003	76M-W040145	3197	116	151950	1250
3B	294-037	76M-P053867	3197	192	132854	2450
4	294-41	76M-W040146	3263	86	132849	500
8	294-008	76M-W040148	3172	117	132857	1000
9	294-009	76M-W040149	3166	132	69353	1000
10	294-010	76M-W040150	3213	146	132850	950
11	294-011	76M-W040151	3198	118	132860	1350
12	294-42	76M-W040152	3264	107	132848	525
13	294-013	76M-W040153	3387	127	68519	800
16	294-016	76M-W040155	3166	120	132828	550
17	294-17	76M-W026368	3233	360	132891	850
18	294-018	76M-W040156	3160	105	66872	850
19	294-019	76M-W040157	3193	110	151948	1100
20	294-020	76M-W040158	3180	143	132839	1100
21	294-021	76M-W040159	3209	137	132851	1250
22	294-022	76M-W040160	3177	92	132841	1075
23	294-023	76M-W040161	3199	116	132025	185
24	294-024	76M-W040162	3200	120	69412	320
25	294-025	76M-W040163	3186	146	132861	825
26	294-026	76H-W040164	3182	125	132834	950
27	294-027	76M-W040165	3172	125	132844	525
29	294-029	76H-W040166	3152	136	67046	950
30	294-030	76M-P000706	3184	158	132845	3200
31	294-031	76M-P005452	3188	135	69073	3400
32	294-032	76M-P005604	3207	139	69077	3800
33	294-033	76M-P006616	3203	147	69078	3800
34	294-034	76M-P010378	3198	134	69063	6700
35	294-035	76H-P014489	3175	145	132858	2425
36	294-036	76M-P023029	3206	131	68567	1000
38	294-39	76H-P070436	3163	125	154873	1775
39	294-40	76H-C022285	3163	125	66867	1750
40A	294-43	76H-P067585	3154	105	67309	220
40B	294-44	76H-P067586	3154	118	127528	220
40C	294-45	76H-P096947	3154	210	67310	250
41	294-46	P091259	3136	218	68413	1200
42	294-47	P031907	3136	171	68599	1140
43	294-48	76M-30070369	3242	130	235803	555

Table 2-2. Water Quality Summary from MWC Wells, 2012/2013 (MWC, 2013)

PRIMARY STANDARDS Health-related INORGANIC CHEMICALS	Federal MCL	MCLG	Units of Measurement	MWC Range (including highest value)	Average for MWC Wells	Date of Last Measurement MWC
Arsenic	10	0	ppb	ND - 4	ND	2011/2012/2013
Barium	2	2	ppm	0.2 - 0.5	0.22	2011/2012/2013
Fluoride	4	4	ppm	ND - 0.2	0.14	2011/2012/2013
Lead	AL=15	NA	ppb	ND-2	ND	2011/2012/2013
Total Nitrite/Nitrate (as N)	10	10	ppm	0..18 – 2.85	0.69	2013

LEAD AND COPPER RULE MONITORING	Federal Action Level*	Number of Samples	Units of Measurement	MWC Range (including highest value)	**'Amount Detected at 90th Percentile	Date of Last Measurement MWC
Copper	1.3	30	ppm	0.015 – 1.2	0.35	2013
Lead	15	30	ppb	ND - 5	3	2013

DISTRIBUTION SYSTEM PRIMARY STANDARDS	Federal MCL	MCLG	Units of Measurement	MWC Range (including highest value)	Average for MWC Wells	Date of Last Measurement MWC
Chlorine Residual	MRDL=4	MRDLG=4	ppm	0.32-0.46	0.37	2013
Total Trihalomethanes (TTHM's)	80	NS	ppb	1.1-3.1	2.0	2013
Haloacetic Acids (HAA-5)	60	NS	ppb	0.52-0.60	0.55	2013

SECONDARY STANDARDS Aesthetic, Non-health Related CHEMICAL PARAMETERS	Federal MCL	MCLG	Units of Measurement	MWC Range (including highest value)	Average for MWC Wells	Date of Last Measurement MWC
Chloride	250	NS	ppm	3 - 25	9	2011/2012/2013
Manganese	50	NS	ppb	ND-2	ND	2011/2012/2013
Sulfate	250	NS	ppm	4 - 22	16	2011/2012/2013
Total Dissolved Solids (TDS)	500	NS	ppm	135 - 290	201	2011/2012/2013
Zinc	5,000	NS	ppb	ND - 20	ND	2011/2012/2013

PHYSICAL PARAMETERS	Federal MCL	MCLG	Units of Measurement	MWC Range (including highest value)	Average for MWC Wells	Date of Last Measurement MWC (b)
Odor threshold	3	NS	units	0-6	1.5	2011/2012/2013
pH	6.5 - 8.5	NS	units	7.2-7.9	7.7	2011/2012/2013
Turbidity	5	NS	NTU	ND-0.5	0.1	2011/2012/2013

ADDITIONAL PARAMETERS --Unregulated	Federal MCL	MCLG	Units of Measurement	MWC Range (including highest value)	Average for MWC Wells	Date of Last Measurement MWC
Aggressiveness Index	NS	NS	units	11.4 - 12.4	11.9	2011/2012/2013
Alkalinity (as Ca CO3)	NS	NS	ppm	120 - 207	155	2011/2012/2013
Calcium	NS	NS	ppm	28 - 61	47	2011/2012/2013
Corrosivity (Langlier index)	NS	NS	positive/negative	(-0.4) - (+0.6)	+0.16	2011/2012/2013
Hardness (Ca CO3)	NS	NS	ppm	129 - 238	171	2011/2012/2013
Hardness	NS	NS	grains	7.5 – 13.9	10	2011/2012/2013
Magnesium	NS	NS	ppm	8-23	13	2011/2012/2013
Potassium	NS	NS	ppm	ND-2	1.96	2011/2012/2013
Sodium	NS	NS	ppm	4-18	7.3	2011/2012/2013
Specific Conductance	NS	NS	Micromho/cm	240 - 466	353	2011/2012/2013
Total Trihalomethanes (TTHM's)	NS	NS	ppb	ND-9.7	1.5	2011/2012/2013

KEY TO ABBREVIATIONS AND FOOTNOTES

MCL = Maximum Contaminant Level, a drinking water standard
MCLG = Maximum Contaminant Level Goal
ND = Not detected
NS = No Standard
NTU = Nephelometric Turbidity Units. This is a measure of the suspended material in water
* = Action levels are measured at the 90th percentile sample (third highest reading out of thirty samples for lead & copper

2.1.3 *Groundwater Quality Impacts to the Missoula Aquifer*

Water quality concerns have included impacts from industrial wastewater, discharges of sanitary wastewater and storm water, storage and accidental releases of petroleum chemicals, and groundwater impacts from mining wastes. Specific historic impacts to MWC groundwater supply wells and the Rattlesnake Reservoir surface water system are summarized below.

PCE in MWC Wells

In the mid-80s, Mountain Water Company discovered low levels of tetrachloroethylene (perchloroethylene or PCE) in 8 of their 38 supply wells with two exceeding USEPA's Maximum Contaminant Levels of 5 ug/l PCE. The sources of PCE in the Missoula Aquifer are suspected to be the widespread discharge of chlorinated solvents through industrial injection wells and leakage of chlorinated solvents from sewer mains (English, 1992; MCCHD, 1999). Since 2002 there have been no detectable levels of PCE in supply wells.

Mining Wastes

The Milltown Reservoir Sediments site is an Operable Unit of the larger Milltown Reservoir/Clark Fork River Superfund site located approximately 4 ½ river miles upstream of the Missoula Valley and approximately two miles up-gradient from MWC's easternmost groundwater supply wells (East Missoula #1 and Canyon River). The Superfund site had contained over six million cubic yards of metal laden sediments that originated from the Butte-Anaconda mining/smelting complex and accumulated behind the Milltown Dam. Removal of approximately 2.2 million cubic yards of the most impacted sediments began in 2007 and ended in 2009 and included removal of Milltown Dam Arsenic from the sediments impacted groundwater quality in the vicinity of the reservoir and forced the replacement of the water supply for Milltown.

Groundwater monitoring shows an arsenic plume (>10 ug/l arsenic) located approximately 9500 feet up-gradient of the Canyon River well. Water quality monitoring of the Missoula Aquifer has shown arsenic to not exceed 4 μg /l from 1999 to 2012 with average value ranging from 1-2 μg /l (Harvala, 2014).

Bacterial Contamination

A pump failure in a City of Missoula sewer lift station in the spring of 1990 contaminated the Maurice Street supply well (MWC-34) with fecal coliform bacteria. Sewer lift stations at that time contained no radio telemetry and monitoring consisted of weekly manual inspections. Since then, the City of Missoula has installed radio telemetry in all lift stations with various degrees of controls depending on the volume pumped (Sullivan, 2014). C ontamination of the Maurice well was temporary and the well was brought back on line after a few weeks of daily fecal coliform sampling.

That same year, coliform contamination was detected in the West Rattlesnake/Mountain View well (MWC-13) from an unknown source (Hydrometrics, 1992).

Besides coliform bacteria, nitrates are often used as an indicator of groundwater impacts from sanitary wastewater. The Linda Vista subdivision in southwest Missoula historically showed nitrates to exceed 10 mg/l MCL in individual wells. Homes within the subdivision originally discharged sanitary wastewater into individual on-site septic systems. The City of Missoula extended their wastewater collection system into Linda Vista in 1997 and nitrate levels have steadily decreased in the subdivision (Lynch, 2002).

MWC has not detected fecal coliform in any of the active supply wells since 1990. In 2012, total nitrite plus nitrate as nitrogen levels have ranged <0.4 to 3.29 mg/l, with an average of 0.74 mg/l (MWC, 2013).

2.2 **Rattlesnake Creek Surface Water System**

Rattlesnake Creek is a tributary to the Clark Fork River that enters the Missoula Valley from the north foothills. MWC maintains a surface water system on Rattlesnake Creek located in Section 2 of Township 13 North, Range 19 West in the Rattlesnake Valley. A dam, reservoir, intake and treatment system are located on Rattlesnake Creek approximately four miles upstream of the confluence of the Clark Fork River and Rattlesnake Creek. MWC maintains water rights on Rattlesnake Creek and on eight lakes in the Rattlesnake Wilderness north of Missoula.

The Rattlesnake surface water supply system formerly operated as the primary source of water for the drinking water system. *Giardia lamblia,* a parasite commonly found in surface water and associated with wildlife excrement, was detected in the water supply in 1983 following an extremely high seasonal runoff. The presence of the parasite resulted in the suspension of its use as an active part the drinking water system. The Rattlesnake surface water source is maintained to provide a back-up water source for MWC's groundwater system.

Currently, Rattlesnake Creek is use-classified as an A-Closed stream with the MDEQ. Rattlesnake Creek is classified as "partially impaired" as a cold water fishery on the MDEQ's 2012 303-D list. The partial impairment classification is due to flow alteration (Rattlesnake Dam). Rattlesnake Creek is included in the Middle Clark Fork TMDL Planning Area.

2.2.1 *Infrastructure and Treatment*

For emergency purposes, MWC maintains the infrastructure to divert Rattlesnake Creek into its distribution facility by means of a diversion dam located approximately four miles up the Rattlesnake Valley. Additional surface water is stored in eight lakes in the Rattlesnake Wilderness. The lakes were dammed in the 1920s to increase storage capacity; MWC currently maintains the dams on all eight lakes. **Table 2-3** provides a description of the lakes in the MWC Rattlesnake water supply system.

Table 2-3. MWC Rattlesnake Supply Lakes

Lake Name	Location (TRS)	Storage Capacity (acre feet)	Storage Capacity (millions of gallons)
Big Lake	T15N, R18W, S19	621	202
Carter Lake	T15N, R18W, S30	161	52
Glacier Lake	T15N, R19W, S19/24	210	68
Little Lake	T15N, R18W, S19	298	97
McKinley Lake	T15N, R18W, S31	168	54
Sanders Lake	T15N, R19W, S13	898	293
Sheridan Lake	T15N, R18W, S19/20	115	37
Worden Lake	T15N, R18W, S30	43	14
Total Lake Capacity		**2514**	**817**

Water from Rattlesnake Creek is diverted into a settling pond upstream of the dam on Rattlesnake Creek. Any sediment that does not settle out is removed in a secondary filter before entering a screen building. Water then enters a 30" diameter steel gravity-fed line following Rattlesnake Drive to the Waterworks Hill storage tank approximately 1 ½ miles south of the dam.

Giardia lamblia has not been detected in water samples collected from the intake since the mid 1980s. MWC sampled for *Giardia lamblia* and *Cryptosporidium* monthly from October 1996 until September 1997 with no detects of either organism. The system remains as an emergency back-up system to the groundwater supply. In general, the quality of surface water from Rattlesnake Creek is considered good and is suitable for drinking water (MDEQ, 2014).

3 SOURCE WATER PROTECTION AREA DELINEATION

The source water protection areas for groundwater wells and the surface water supply were defined in the 2003 SWDAR Report for Mountain Water Company. For groundwater wells, numerical groundwater flow models were used to identify contribution zones to 38 MWC wells and the watershed boundary and buffer zones were used to define protection zones around the Rattlesnake Reservoir. Since 2003, four new wells have been added to the groundwater system. Methods for identifying the capture zones are discussed below.

Montana DEQ guidance suggests that for each groundwater well, an Inventory Zone be established that is equivalent to an up-gradient portion of the aquifer that may flow to that well within a three year time of travel (TOT) (MDEQ, 1998). The guidance indicates that this distance can vary depending on the type of aquifer. Previous studies and groundwater modeling have demonstrated that the Missoula Aquifer is a high hydraulic conductivity aquifer and flow paths to wells are long and linear (Miller, 1991). Because of the length of the contribution zones, the 2003 SWDAR identified an Inventory Zone for each well based on both a one year and three year TOT with different levels of risk associated with each zone.

For surface water sources, DEQ recommends a spill response region that is equivalent to ten miles upstream and a 1,000 foot buffer above the streams (MDEQ, 1998). A similar Spill Response Region was created for the Rattlesnake Reservoir.

3.1 Groundwater Inventory Zones

The 2003 SWDAR presents and discusses in detail the numerical groundwater flow model used to define time of travel distances to wells and delineate Inventory Zones for MWC wells. The groundwater flow model represented a combination of two previously developed models for the Hellgate Valley and Missoula area. The resulting model was expanded to include the Rattlesnake Valley, the Bitterroot Valley to the south, and additional portions of the Missoula Valley to the northwest.

MWC's Missoula Aquifer groundwater flow model was completed within the software package Groundwater Vistas and uses the USGS code MODFLOW for the groundwater flow simulations and MODPATH for particle tracking (Land & Water, 2003). Model construction and calibration was facilitated through the use of GIS data, including elevation and point data. Model output was used to populate GIS attribute tables to enhance visualization and flexibility in evaluating the results.

The contribution zones were based on particle flow paths produced from the 2003 SWDAR model under high and low pumping and water table scenarios. The particle travel times were tracked for one and three years to define determine the up-gradient "capture zone" also referred to as the Inventory Zones. The "recharge" protection zone is defined by the upper boundary of the watershed which extends to the continental divide of the Clark Fork and Blackfoot River basins. For practical purposes, the recharge protection zone extends 2 miles upstream of the junction of the

Blackfoot and Clark Rivers. . **Figures 3a, 3b, 3c, and 3d** show the Inventory Zones, both one and three year TOT, for the MWC wells.

The Canyon River well was added to the system after the 2003 SWDAR. The Inventory Zone for the Canyon River well was determined using the same numerical model as the other MWC wells (see **Figure 3d**) (PBS&J, 2005).

3.2 Surface Water Delineated Zones

DEQ guidance recommends surface water sources identify a "spill response" zone extending ½ mile downstream and 10 miles upstream of the intake (MDEQ, 1998). The spill response zone includes a ½ mile buffer on Rattlesnake Creek and all perennial drainages flowing into Rattlesnake Creek. A second "watershed" buffer zone is defined by the Rattlesnake drainage boundary. **Figure 4** shows both the spill response and watershed buffer zone.

4 POTENTIAL CONTAMINANT SOURCES & INVENTORY

Potential contaminant sources (PCS) were collected from various federal, state and local agencies and organizations in tabular or spatial format. In general, sites were located and mapped using facility addresses, GPS data or approximate coordinate locations. All sites were organized in a geodatabase to facilitate analysis and display of the data. . The capture zones discussed in **Section 3.0** represent the "inventory" zone for each well. MDEQ recommended a list of potential contaminant sources to include in inventories (see **Table 4-1** below).

Table 4-1. MDEQ Recommended Potential Contaminant Source Categories

Source Category	Information
Septic Systems	Percent unsewered residential land use and population density
Animal Feeding Operations	*Type, location, size, and history of releases*
Underground Storage Tanks	Location, capacity, and compliance status
Underground Storage Tank Leaks	Location, length of plume, and remediation status
State and Federal Superfund Sites	Location, length of plume, and remediation status
RCRA Large Quantity Generators	Industry classification, location, and history of releases
Injection Wells	Class, standard industry classification, and location
Wastewater Treatment / Spray Irrigation / Lagoons	Location and permit requirements
Landfills	Location, operating status, and history of releases
Mines	*Location and presence of mine wastes or drainage*
MPDES Wastewater Discharges	Location and permit requirements
Municipal Sanitary Sewer	Location of sewer service areas and residential land use
Municipal Storm Sewers	Location of discharge and businesses in targeted standard industrial classifications
Storm Water Discharges	Location and permit requirements
Highways, Railroads, and Pipelines	Location and transportation analysis
Cultivated Cropland	*Location and percent land use*

The Animal Feeding Operations and Mines source categories listed above in Table 4-1 have not been included in the MWC SWDAR because there are no facilities of this type within the Inventory Zones. The Cultivated Cropland source category has also not been inventoried because of the relatively small percentage of cropland within the inventory regions. The MWC SWDAR has been re-organized based on the major categories of PCS and additional sources added to reflect the potential threats to the Missoula Aquifer. **Table 4-2** shows the PCS used in the MWC SWDAR and source of each PCS type.

Table 4-2. Potential Contaminant Source Categories

PC Source Category	PC Source Type	Description	Source
HAZARDOUS/REGULATED WASTE SITES	Federal Superfund Sites (NPL)	Known releases of hazardous and regulated materials that have impacted groundwater and clean-up actions are under the authority of the Environmental Protection Agency (USEPA)	Environmental Protection Agency http://www.epa.gov/superfund/sites/npl/
	Sites on Federal CERCLIS Lists	Inventory of known releases of hazardous and regulated materials that have impacted soil and/or groundwater	Environmental Protection Agency http://www.epa.gov/superfund/sites/cursites/
	State Superfund Sites (CECRA)	Known releases of hazardous and regulated materials that have impacted soil and/or groundwater and clean-up actions are under the authority of the Montana Department of Environmental Quality (MDEQ).	Montana Department of Environmental Quality (Remediation) http://deq.mt.gov/StateSuperfund/Cecra.mcpx
	Emergency Response Notification System	Spills of hazardous and regulated substances that have been reported to the National Response Center.	Environmental Protection Agency - http://www2.epa.gov/region8/emergency-response-notification-system-erns
	Permitted Solid Waste Sites (Landfills)	Solid waste management facilities that have been permitted by the MDEQ to include Class II (municipal solid waste) and Class III (construction waste) facilities.	Montana Department of Environmental Quality (Solid Waste) - http://www.deq.mt.gov/solidwaste/default.mcpx
	Leaking Underground Storage Tank Sites (LUSTs)	Known releases of petroleum substances from underground storage tank systems that have impacted soil and/or groundwater.	Montana Department of Environmental Quality (Remediation) http://deq.mt.gov/LUST/LUSTSites.mcpx
HAZARDOUS/REGULATED MATERIAL HANDLING	Hazardous Waste Generators (RCRA)	Facilities that generate hazardous waste and are required by federal and state rules to be registered as generators	Environmental Protection Agency - http://www.epa.gov/enviro/html/rcris/rcris_query_jav a.html
	Underground Storage Tanks	Facilities that have registered with the MDEQ the use of underground tanks and piping for the storage and conveyance of petroleum products. Only active facilities included.	Montana Department of Environmental Quality (Remediation) - http://deq.mt.gov/ust/default.mcpx
	Petroleum Pipelines	Pipelines that transmit petroleum products via above ground and underground transmission pipes (Yellowstone Pipeline)	Conoco Pipeline Co., Rocky Mountain Region, Bruce Owens
	Railroad Routes	Rail routes that are used to regularly transport hazardous and regulated materials (main east-west MRL route)	Montana Department of Transportation/Planning/Data & Statistics Bureau/RIM - http://www.mdt.mt.gov/other/traffcount/external/gis_datasets/railroads.zip
	Hazmat Highway Routes	Highway routes that are designated for the transport of hazardous materials (Interstate 90, Highway 93, Highway 12).	Montana State Library - http://nris.mt.gov/nsdi/nris/shape/rd16.zip

Table 4-2. Potential Contaminant Source Categories Continued

PC Source Category	PC Source Type	Description	Source
STORM WATER SOURCES	Street Sumps	Injection wells in the public right of way designed for the discharge of storm water from public streets.	City of Missoula ftp://ftp.ci.missoula.mt.us/Maps%20and%20Graphics/City%20Maps/GIS/
	Private Sumps (Non- Residential Property)	Injection wells on private property that are used to discharge storm water collected from paved parking lots.	Missoula County Cadastral and CAMA Database
SANITARY WASTEWATER SOURCES	Septic Systems	Individuals septic systems used to discharge sanitary wastewater on the property.	Missoula County Cadastral Database and Montana Department of Revenue Tax Parcel Info
	Sewer Lift Stations	Pressurized pump stations designed to lift sanitary wastewater.	City of Missoula ftp://ftp.ci.missoula.mt.us/Maps%20and%20Graphics/City%20Maps/GIS/
MISCELLANEOUS SOURCES	Surface Water Discharge Points (MPDES)	Facilities permitted by the MDEQ to discharge wastewater (sanitary, industrial process, and storm waters) to surface water bodies.	Montana State Library - http://nris.mt.gov/nsdi/nris
	Groundwater Discharge Points (GWPCS)	Facilities permitted by the MDEQ to discharge sanitary and industrial process wastewater into the ground.	Montana Department of Environmental Quality (Water Resources), Keri Smith

4.1 **Hazardous/Regulated Waste Sites**

Hazardous/Regulated Waste Sites represent existing and historic sites that have known releases of hazardous and regulated substances or are actively disposing of solid waste. These include the only National Priority List (NPL or Superfund) site in Missoula County, the Milltown Reservoir Site, several State Superfund (CECRA sites), and all active Leaking Underground Storage Tank (LUST) sites. These sites will have a variety of contaminants that may have impacted groundwater. They have defined areas of impacts and groundwater is monitored to ensure the impacts to potential receptors are minimized or negated. A brief description of the major sites is provided below. All of the hazardous/regulated waste sites are shown on **Figure 5a.**

4.1.1 *Milltown Reservoir Sediments NPL Site*

The Milltown Reservoir Sediments site is an Operable Unit of the larger Milltown Reservoir/Clark Fork River Superfund site and is located approximately 4 ½ river miles upstream of the Missoula Valley and approximately two miles up-gradient from MWC's easternmost groundwater supply wells (East Missoula #1 and Canyon River). The Superfund site had contained over six million cubic yards of metal laden sediments that had originated from the Butte-Anaconda mining/smelting complex and accumulated behind the Milltown Dam. Removal of approximately 2.2 million cubic yards of the most impacted sediments began in 2007 and ended in 2009 and included the removal of Milltown Dam. Arsenic from the sediments impacted groundwater quality in the vicinity of the reservoir and forced the replacement of the water supply of Milltown (not a part of the MWC system). Groundwater in the immediate vicinity of the Milltown Reservoir Sediments Superfund site is impacted with arsenic, cadmium, copper, lead and zinc.

4.1.2 *Burlington Northern (BN) Railroad Fueling Facility*

Burlington Northern Fueling Site was an old refueling location for passenger car railroad engines with diesel free product and solvents present on a perched groundwater zone beneath the site. This remains a high priority site under the DEQ's Superfund section and recovery of product is ongoing. The pentachlorophenol solvent plume is located below the Round House, approximately 500 feet east of the former BN depot station, and the passenger rail diesel fuel plume is located approximately 700 feet east of the former depot. The plumes are stable and there is no immediate threat to MWC drinking water supply wells down-gradient of the two contaminant sites.

4.1.3 *Conoco-Phillips Missoula Products Terminal*

The Conoco-Phillips Product Terminal is located on Raser Drive in northwest Missoula. Eleven fuel releases have been documented at the site since the 1950s as a result of the storage and dispensing of petroleum at the site. Currently, a dissolved phase petroleum plume on the regional aquifer seasonally varies from 600 feet to 1,000 feet south-southwest beyond the site boundaries. The plume appears to be stable due to natural attenuation mechanisms. Free product was measured on the regional aquifer initially, but has not been observed

at the site since 1996. There are no MWC wells down-gradient from the Conoco-Phillips Products terminal.

4.1.4 *Missoula White Pine and Sash*

The Missoula White Pine Sash (MWPS) facility was a precision wood, window and door component manufacturing facility which operated from the 1920s through 1996. From the mid-1930s until 1987, milled wood products were dipped into mixtures of pentachlorophenol (PCP) and petroleum products. These substances were released into the environment, contaminating soil and groundwater with PCP, petroleum hydrocarbons, and dioxins/furans.

The primary groundwater contaminants include PCP, diesel fuel fractions, dioxins, and cadmium, but also include additional petroleum constituents, several volatile contaminants, and five metals. Groundwater wells in the vicinity of the facility are not utilized as drinking water sources, as drinking water is provided by the MWC in Missoula. The DEQ has approved a risk assessment and established site-specific cleanup levels that will protect groundwater beneath the facility (MDEQ, 2013). MWC's Dickins-Defoe well is near the MWPS site and has been taken out of use.

4.1.5 Smurfit-Stone/M2 Green Redevelopment Facility

The Smurfit-Stone Mill is located approximately 11 miles northeast of Missoula, and was a large integrated pulp and paper mill that was in operation from 1957 through early 2010. It began operation as a pulp mill producing paper, linerboard, and bleached pulp. The mill developed numerous retention ponds for wastewater discharged. After the mill ceased operations, it was purchased by M2 Green in 2010. The USEPA completed a preliminary assessment of the site in 2013 and discovered a number of potential sources of contamination. Four sludge ponds, an emergency spill pond, one wastewater storage pond, and a land farming area were confirmed to contain hazardous substances. Along with impacts to surface water and surface soil, arsenic, barium, calcium, chromium, manganese, nickel, potassium, zinc, and a number of dioxin/furan congeners were present at elevated levels in shallow groundwater samples (USEPA START, 2012). The site is currently being considered for listing on the National Priorities Listing for Superfund sites. The site is on the western end of the Missoula Valley and there are no MWC wells in the vicinity or downgradient of the site.

4.2 **Hazardous/Regulated Material Handling**

Hazardous/Regulated Material Handling sites includes facilities that currently handle hazardous or regulated materials. They include petroleum underground storage tanks, generators of hazardous wastes, petroleum pipelines, and facilities required to report chemical use and storage under the Environmental Protection and Community Right to Know Act (EPCRA). Also included in this category are railroad routes and highway routes that are used for transporting hazardous and regulated materials. These facilities and routes are shown on **Figure 5b**.

The potential for these sites to impact MWC wells is a function of the protective measures in place to prevent releases to the environment (engineered barriers). Protective measures include secondary containment for above ground storage of tanks and drums, and double walled tanks and pipeline for underground storage and transmission. Protective measures may also include storm water collection systems along hazardous material highway routes. Facilities, equipment, and routes that lack protective measures present a high hazard for accidental releases to enter the environment and potentially impact groundwater flowing to wells.

Fixed facilities that handle, store, or generate wastes above threshold amounts are required under the City of Missoula Aquifer Protection Ordinance to maintain a Pollution Prevention Permit. The permit requires regulated substances to be stored within secondary containment structures, thus reducing the potential for discharges to the environment (Missoula Municipal Code 13.26.010). Threshold amounts vary for the type of regulated substance. Facilities that have current pollution prevention permits are considered to have protective measures in place to reduce susceptibility to wells.

The types of potential contaminants stored and handled in Missoula are primarily petroleum, either transported through pipelines, or stored in above and below ground storage tanks. Commonly delivered hazardous materials via railroad to the Missoula area include (MCOEM, 2000):

Aluminum Sulfate	Sodium Hydroxide	Sodium Chlorate
Methanol	Phenol	Sodium Chloride
Sodium Hydrosulfide	Chlorine	Anhydrous Sodium Sulfide
Sulfuric Acid	Sulfur Dioxide	Sodium Solution Wastes

Other substances transported via rail in large quantities through Missoula include:

Gasoline	Diesel	Ethyl Alcohol
Asphalt	Copper Concentrates	Molten Sulfur
Mixed Waste	Liquefied Petroleum Gas	

4.3 **Storm Water Sources**

The coarse nature of the subsurface geologic materials in the Missoula Valley allows for the discharge of storm water into shallow injection wells. The use of injection wells for discharging street runoff and runoff from parking lots is the approved practice for handling storm water within the City of Missoula. Most city street intersections have an injection well located at each corner. For private parking lots, building codes require a storm water injection well for every 10,000 square feet of impervious surface (parking, sidewalks, roof). These wells offer little retention of the storm water to filter sediment with high metals, remove dissolved or free petroleum hydrocarbons from the water, or attenuate deicing chemicals applied to the streets. There are a few areas within the Missoula Valley that have collection systems that do not directly discharge into injection wells but pass storm water to surface waters.

The City of Missoula has mapped all storm water injection wells on city streets. Private storm

water injection wells on parking lots were located using the State of Montana's Computer Assisted Mass Appraisal (CAMA) database (CAMA, 2014). The CAMA database was queried for assessed paved areas and one injection well was assigned to the property for every 10,000 square feet of pavement. Estimated private and mapped public storm water injection wells are shown on **Figure 5c**.

Wogsland (1988) evaluated the groundwater impacts from the discharge of storm water into injection wells in the City of Missoula. At that time, the report identified 2,669 street storm water injection wells within the city. Storm water runoff was found to contain elevated levels of iron, manganese, zinc, copper, and lead, along with major cations and anions (especially chloride and sodium). Wogsland estimated total annual loading of 309,600 pounds (lb) total dissolved solids, 142,250 lb of chloride and 89,410 lb of sodium to the vadose zone. Annual metals loading was estimated to be 296.6 lb iron, 231.6 lb manganese, and 112 lb zinc. In her study, Wogsland noted metals to be mostly attenuated in the vadose zone, but observed increases in major cations and anions in groundwater related to storm water injection.

Federal, state and local regulations permit the discharge of storm water to injection wells, but urban areas are required to prepare municipal separate storm sewer system (MS4) management plans that identify methods to reduce impairment to surface water (waters of the US). The City of Missoula, and participating state and local governments, have a small MS4 permit that identifies efforts to reduce contaminants in storm water through education and public involvement, regulation, and construction site storm water standards, mostly addressing source control (City of Missoula, 2011). The MS4 does not specifically address groundwater protection and does not address different design standards for injection wells or separation from drinking water wells. Therefore, the MS4 cannot be considered an engineered barrier.

Even with source control, storm water will likely cause general degradation of water quality over time, reduced attenuation in the vadose zone, and increased levels of metals and major cations and anions. There may also be acute risks from spills and releases into storm drains and injection wells in close proximity to drinking water wells. Injection wells within 500 feet of MWC wells will be considered a high risk.

4.4 Sanitary Wastewater Sources

Sanitary wastewater sources can include both collection systems and on-site discharge systems. Sanitary wastewater can contain a number of contaminants, but the principal concerns are bacterial and viral organisms and inorganic compounds such as ammonia and nitrate.

Collection systems, such as the City of Missoula's wastewater collection system, are intended to prevent direct discharge to the subsurface, but may inadvertently cause releases prior to reaching the treatment facility. The most vulnerable parts of the system are pumping stations where power or equipment failures can result in inadvertent discharges of raw sewage to the subsurface. The City of Missoula has installed telemetry and back-up power systems at all lift stations to ensure power failure does not result in the inadvertent release of untreated wastewater.

Areas outside of the City of Missoula and smaller wastewater collection and treatment systems

discharge sanitary wastewater into individual or community septic systems. These areas include densely developed residential areas such as East Missoula, the west side of Missoula and industrial areas in the northwest portion of Missoula. Even in sewered sections of the City, many commercial and residential buildings are unconnected and use septic systems for sanitary wastewater disposal.

On-site septic discharge systems are typically designed to attenuate the biological and inorganic compounds, but often perform poorly in the high conductivity soils found in the Missoula Valley. Other contaminants of concern include a general category of pharmaceuticals which are disposed of into wastewater systems and have little attenuation in septic and subsurface soils (Lynch, 2010).

Potential hazards to water quality are a function of the number of septic systems within an inventory zone and proximity to a well or intake. MDEQ defined septic densities of 300/square mile or one septic system/2.13 acres as a high hazard (see **Table 5-2**). Outside of sewered areas, the State of Montana and Missoula County permit residential septic systems at a density of one system/0.5 acres with community water and one system/1.0 acre for sites with individual wells. The rules appear to allow development that could create a high hazard in well inventory zones. For the purposes of this SWDAR, we have used a slightly more conservative value of one system/2.5 acres density within the 1 year TOT inventory region as a high hazard.

Sewer collection systems pose potential problems to water quality through leakage from collection lines and at pump stations that must lift wastewater occasionally to allow gravity drainage in the rest of the system. The City of Missoula has been actively inspecting sewer mains to identify major cracks and pipe failures and insuring back-up systems are in place at lift stations to prevent accidental releases from lift stations.

4.5 **Miscellaneous Sources**

Other miscellaneous sources include facilities that are permitted to discharge sanitary wastewater, storm water or industrial process water into surface waters and groundwater. Surface water discharges are permitted under the Montana Pollution Discharge Elimination System (MPDES) and are subject to permitting and monitoring requirements that are protective of the receiving water. These facilities are not considered to be high hazard sources because of their discharge to surface waters and dilution requirements of the permits. These sites are also shown on **Figure 7d**.

Facilities that discharge to the groundwater are permitted under the Ground Water Pollution Control System (GWPCS). The permits set stringent treatment and monitoring requirements for the discharged water so that there are no impacts to the receiving water. Because of the permit requirements, these facilities are not considered high hazard sources. There are only two permitted facilities in the Missoula area that have discharges other than storm water: Roseburg Forest Products (Louisiana Pacific) and Town Pump-Bonner. The Roseburg facility is not located within well inventory zones and Town Pump-Bonner is for a commercial sanitary septic system.

5 SUSCEPTIBILITY ASSESSMENT

MDEQ devised a two-stage qualitative assessment method for determining water system susceptibility: Intersystem Susceptibility and Intrasystem Susceptibility**. Intersystem susceptibility** is determined by source sensitivity and exposure as indicated by documented water contamination. **Intrasystem susceptibility** is determined by the hazard associated with potential contaminant sources and barriers restricting migration to the water supply.

5.1 Intersystem Susceptibility

Intersystem susceptibility is determined by how sensitive the source water is to contaminants released on or just below the ground surface and documented contamination to wells. For groundwater systems, source sensitivity ranges from high for unconfined alluvial aquifers or fractured bedrock aquifers, moderate for semi-confined aquifers, to low for consolidated bedrock aquifers. All surface water systems have high source water sensitivity. Exposure is related to recent contamination of wells and analytical results that have exceeded Safe Drinking Water Act Maximum Contaminant Levels in the last 5 years. Because the system has high source water sensitivity, the exposure has little relevance (see **Table 5-1** below).

Table 5-1. MDEQ Intersystem Susceptibility Evaluation

Source Water Sensitivity	Documented Exposure		
	Acute	**Non-acute**	**None**
High Source Water Sensitivity □ Surface water and GWUDISW □ Unconsolidated Alluvium (unconfined) □ Fluvial-Glacial Gravel □ Terrace and Pediment Gravel □ Shallow Fractured or Carbonate Bedrock	High Susceptibility	High Susceptibility	High Susceptibility
Moderate Source Water Sensitivity □ Semi-consolidated Valley Fill sediments □ Unconsolidated Alluvium (semi-confined)	High Susceptibility	Moderate Susceptibility	Moderate Susceptibility
Low Source Water Sensitivity □ Consolidated Sandstone Bedrock □ Deep Fractured or Carbonate Bedrock	High Susceptibility	Moderate Susceptibility	Low Susceptibility

The Missoula Aquifer and its tributary aquifers are unconfined alluvial aquifer systems that have no confining beds and are composed of coarse sand and gravel deposits. Aquitard layers have been mapped in select locations throughout the Missoula Valley, but most groundwater is believed to be hydraulically connected. All wells within the MWC system are considered to have **high source water sensitivity.** Additionally, the Rattlesnake surface water system is considered to have high source water sensitivity.

5.2 **Intrasystem Susceptibility**

MDEQ has recommended **intrasystem susceptibility** be determined by the hazard associated with potential contaminant sources and barriers restricting migration to the water supply. The proximity or density of significant potential contaminant sources and nature of contaminants determines the Hazard Rating (**Table 5-2**). Barriers that may decrease contaminant movement to a well or surface water intake and thus reduce the Hazard Rating include natural conditions, engineered structures, or management actions (**Table 5-4**). Susceptibility ratings are determined individually for point sources and collectively for non-point sources.

Table 5-2. MDEQ Recommendations for PCS Hazard Rating

Type of Contaminant Source		High Hazard	Moderate Hazard	Low Hazard
SURFACE WATER	**Point Sources of Nitrate or Microbes**	Potential for direct discharge to source water	Potential for discharge to groundwater hydraulically connected to source water	Potential contaminant sources in the watershed region
	Point Sources of VOCs, SOCs, or Metals	Potential for direct discharge of large quantities from roads, rails, or pipelines	Potential for direct discharge of small quantities to source water	Potential for discharge to groundwater hydraulically connected to source water
WELLS	**Point Sources of All Contaminants (Unconfined)**	Within 1-year TOT	1 to 3 years TOT	Over 3 years TOT
	Point Sources of All Contaminants (Confined)	PWS well is not sealed through the confining layer	Well(s) in the inventory region other than the PWS well are not sealed through the confining layer	All wells in the inventory region are sealed through the confining layer
ALL	**Septic Systems**	More than 300 per sq. mi.	50 – 300 per sq. mi.	Less than 50 per sq. mi.
	Municipal Sanitary Sewer (% land use)	More than 50 percent of region	20 to 50 percent of region	Less than 20 percent of region
	Cropped Agricultural Land (% land use)	More than 50 percent of region	20 to 50 percent of region	Less than 20 percent of region

MDEQ recommends grouping all of the hazardous/regulated waste sites and hazardous/regulated materials handling sites together in addressing VOC/SVOC and metal potential contaminant sources. Because the MWC well system was developed within the urban area, there are numerous hazardous/regulated substance contaminant sources within 1-year time of travel (TOT) to wells. Most wells will have a High Hazard Rating for these sources.

MDEQ also identifies urbanized areas having high risk whether they are on a municipal sewer system or on individual septic systems. All MWC wells are located in urbanized areas and most are down-gradient of sewered residential areas. Nearly all wells will have a High Hazard Rating because of their proximity to sewered and non-sewered residential areas.

The MDEQ Hazard Rating does not address storm water sources and criteria regarding the relative hazards of storm water injection has not been published. Storm water can be a significant source of chemical and biological contaminants if discharged directly underground. There are two concerns with storm water injection wells: the first is the potential for accidental releases to be directly injected into the subsurface; and the second is the more chronic concern of the runoff from impervious surfaces that contains low levels of organics, metals, and inorganic nutrients. Storm water injection wells within 500 feet of a well, whether on public streets or private parking lots, will be considered High Hazards because of the immediate impacts to drinking water wells from an accidental release into the storm drain. Any storm water injection well greater than 500 feet from the supply well but within 1 year TOT will be considered a Moderate Hazard.

The susceptibility of the Rattlesnake surface water system will depend on the number of septic systems within the spill response zone. The Missoula City-County Health Department prohibits the lifting of sanitary restrictions on new subdivisions up-stream from the dam (Missoula City-County Health Code). The health regulations do permit the installation of septic systems in existing lots. Other non-anthropogenic sources, such as *Giardia lamblia* and *Cryptosporidium*, can increase the hazard to the system. There are few other potential contaminant sources within the spill response zone.

The MWC SWDAR has modified the MDEQ hazard ranking system to reflect the conditions found in the Missoula Valley. **Table 5-3** identifies the relative risk of each type of PCS and describes which sites will be High or Moderate Hazards. All others are considered Low H azards. Non-point sources, such as storm water and sanitary wastewater discharges, are based on density within the inventory or spill response regions.

Table 5-3. MWC SWDAR Hazard Rating for Potential Contaminant Source

PC Source Category	PC Source Type	High Hazard	Moderate Hazard
HAZARDOUS/REGULATED WASTE SITES	**Federal Superfund Sites (NPL)**	within 1 Year TOT	Between 1-3 Year TOT
	Sites on Federal CERCLIS Lists	within 1 Year TOT	Between 1-3 Year TOT
	State Superfund Sites (CECRA)	within 1 Year TOT	Between 1-3 Year TOT
	Emergency Response Notification System (ERNS)	Unresolved Spills within 1 Year TOT	Unresolved Spills Between 1-3 Year TOT
	Permitted Solid Waste Sites (Landfills)	Sites Under Corrective Measures within 1 Year TOT	Sites under Corrective Measures Between 1-3 year TOT
	Leaking Underground Storage Tank Sites (LUSTs)	Active Sites within 1 Year TOT	Active Sites Between 1-3 Year TOT
HAZARDOUS/REGULATED MATERIAL HANDLING	**Hazardous Waste Generators (RCRA)**	Facilities Under Corrective Measures Within 1 Year TOT LQG & SQG Facilities Without a Pollution Prevent Permit & within 1 Year TOT	All Other Facilities within 3 Year TOT
	Underground Storage Tanks Aboveground Storage Tanks	Non-compliant UST and ASTs (>500 gallons) without Pollution Prevention Permits within 1 Year TOT	Permitted USTs and ASTs over 500 gallon within 3 Year TOT
	Petroleum Pipelines	Single-Wall Pipelines Crossing Inventory Regions within 1 Year TOT	Double-Wall Pipeline within 1 Year TOT & Single-Wall Pipeline 1-3 Year TOT
	Railroad Routes	Major Rail Routes within 1 Year TOT	All Other Rail Routes within 3 Year TOT
	Hazmat Highway Routes	Primary & Secondary Routes within 1 Year TOT Using Injection Wells for Storm water Disposal	Primary & Secondary Highway Routes within 3 Year TOT
STORM WATER SOURCES	**Street Sumps**	Any Injection Well within 500 feet	Injections wells within 1 Year TOT
	Private Sumps (Non-Residential Property)	See street sumps above	See street sumps above
SANITARY WASTEWATER SOURCES	**Septic Systems**	Any Septic System within 500 feet Density Greater than 1 Septic Unit/2.5 Acres within 1 Year TOT	Density Greater than 1 Septic Unit/10 Acres within 1 Year TOT
	Sewer Lift Stations	Sewer Lift Stations without Back-up Power within 1000 feet	All Other Sewer Lift Stations
MISCELLANEOUS SOURCES	**Surface Water Discharge Points (MPDES)**	None	All Facilities within 3 Year TOT
	Groundwater Discharge Points (GWPCS)	GW Discharge Points for Industrial Process Water within 1 Year TOT	All Other GW Discharge Points within 3 Year TOT

Table 5-4 describes relative susceptibility based on natural or engineered barriers that may reduce the potential for contaminants to reach drinking water wells. MDEQ has recommended factoring institutional barriers into assessing hazard susceptibility. Institutional barriers are management actions that may prohibit or potentially prevent activities that can release contaminants to the ground or the subsurface. The City of Missoula has adopted rules requiring pollution prevention permits and secondary containment for storage of regulated substances

above threshold quantities (MMC, 2014). For facilities that handle or store hazardous/regulated substances, these requirements are implemented through engineered structures (i.e. secondary containment for underground storage tanks, or back-up power for sewer lift stations) and therefore, would be considered engineered barriers. Engineered barriers considered in this susceptibility assessment include:

- Hazardous waste generators and above ground storage tanks with current pollution prevention permits through the Aquifer Protection Ordinance are reduced from High Hazard to Moderate Hazard within 1 year TOT from wells.
- Underground storage tanks that meet State of Montana UST construction standards for leak detection and corrosion protection are reduced from High to Moderate Hazard within 1 year TOT from wells.

Natural barriers can include aquitards restricting surface and subsurface discharges, or well screens that are finished deep in the aquifer. Aquitards in the Missoula and Hellgate Aquifers are limited and are not considered barriers. Wells in unconfined settings with more than 20 feet of water column from the pumping water level surface to well screen are considered to have a natural barrier. Wells lacking the natural barrier include:

- Well #3A
- Well #3B
- Well #4
- Well #12
- Well #13
- Well #21

Table 5-4 is a graphic representation on how hazard relates to engineered and natural barriers and determines a well's susceptibility to contamination.

Table 5-4. Relative Susceptibility as Determined by the Presence of Barriers

Presence of Barriers	Hazard		
	High	**Moderate**	**Low**
No Barriers	Very High Susceptibility	High Susceptibility	Moderate Susceptibility
Natural Barrier or Engineered Barrier	High Susceptibility	Moderate Susceptibility	Low Susceptibility
Combined Natural and Engineered Barrier	Moderate Susceptibility	Low Susceptibility	Very Low Susceptibility

Table 5-5 displays a summary of the inventory results and the relative susceptibility of each well and includes the Rattlesnake intake. The detailed results for each well are included in **Appendix B**.

TABLE 5-5. *SUMMARY OF POTENTIAL CONTAMINANT SOURCES WITHIN WELL INVENTORY ZONES (ONE YEAR TOT)*

HIGH HAZARD SITES

			HAZARDOUS/REGULATED WASTE SITES						HAZARDOUS/REGULATED MATERIAL HANDLING						STORM WATER SOURCES		SANITARY WASTEWATER SOURCES				MISC SOURCES			
MWC WELL NO	PWSID SOURCE NO	NATURAL BARRIER (>20' PUMPING TO SWL)	NPL	CERCLIS	CECRA	ERNS	LANDFILLS	LUST	RCRA GENERATOR	UST/AST	PIPELINE	RAILROAD	HIGHWAY	STREET SUMPS	PRIVATE SUMPS	LIFT STATIONS	SEPTICS	LAGOONS	MPDES	GWPCS	SUSCEPTIBLITY ASSESSMENT
1	294-004	X																	1			HIGH
2	294-002	X																				HIGH
3A	294-003																					VERY HIGH
3B	294-037																					VERY HIGH
4	294-41																		1	1		VERY HIGH
8	294-008	X																	1			HIGH
9	294-009	X																	1			HIGH
10	294-010	X																				HIGH
11	294-011	X																				HIGH
12	294-42																		1			VERY HIGH
13	294-013																					VERY HIGH
16	294-016	X																				HIGH
17	294-17	X																				HIGH
18	294-018	X																				HIGH
19	294-019	X																	1			HIGH
20	294-020	X																				HIGH
21	294-021																					VERY HIGH
22	294-022	X																				HIGH
23	294-023	X																				HIGH
24	294-024	X																				HIGH
25	294-025	X																				HIGH
26	294-026	X																				HIGH
27	294-027	X																				HIGH
29	294-029	X																				HIGH
30	294-030	X																	1			HIGH
31	294-031	X																				HIGH
32	294-032	X																	1			HIGH
33	294-033	X																	1			HIGH
34	294-034	X																				HIGH
35	294-035	X																	4			HIGH
36	294-036	X																				HIGH
38	294-39	X																				HIGH
39	294-40	X																				HIGH
40A	294-43	X	CAPTURE ZONE NOT MODELED																			NC
40B	294-44	X	CAPTURE ZONE NOT MODELED																			NC
40C	294-45	X	CAPTURE ZONE NOT MODELED																			NC
41	294-46	X																				HIGH
42	294-47	X																				HIGH
43	294-48	X																	1			MODERATE
																	203^					MODERATE

Indicates high hazard as defined in Table 5-3

NC **Susceptibility Assessment has not been completed**

^ There are 90 septics upgradient of the intake but 203 septic systems within the Spill Response Zone

6 ANALYSIS

The SWDAR Update for the Mountain Water Company municipal water system was completed to provide a current qualitative assessment of risk to MWC wells and the Rattlesnake Creek surface water intake. The results of the susceptibility assessment indicate that most wells have *High Susceptibility* and six wells have *Very High Susceptibility*. T hree Linda Vista wells have *Moderate Susceptibility*. The Rattlesnake intake is considered to have *Moderate Susceptibility*.

As shown in Table 5-4, susceptibility is a function of the hazard rating of potential contaminant sources near and up-gradient of supply wells and natural or engineered barriers to restrict or prevent contaminants to migrate to wells. Supply wells found to have a *Very High Susceptibility* have both a High Hazard Rating and no natural or engineered barrier to prevent contaminant transport to the well. The supply wells with *Very High Susceptibility* (except East Missoula #1) have storm drain dry wells in close proximity to the wellhead. They also include either hazardous material highway routes, railroads, and/or petroleum pipeline routes located within the one year TOT Inventory Zone. While most of the other MWC wells have a *High Susceptibility* due to potential contaminant sources within the Inventory Zones, they are protected by natural barriers created by deeper well screens relative to the pumping water level.

The primary state and federal highways through Missoula (US 93, Interstate 90, and State Highway 200) are designated hazardous material transportation routes and are considered High Hazard because of the potential for accidental releases. The analysis identified 24 of 42 wells with Inventory Zones that intercept these routes. Twenty two of the Inventory Zones intercepted railroad routes which are also designated hazardous material transportation routes. The Yellowstone Pipeline, a single-wall petroleum pipeline, is also considered a High Hazard and crosses the Inventory Zones for 19 MWC wells.

Fixed facilities that handle hazardous/regulated materials without engineered secondary containment also pose a High Hazard. The Missoula Water Quality District administers the Missoula Valley Aquifer Protection Ordinance (see **Appendix C**) that requires fixed facilities that store chemicals above threshold quantities to provide secondary containment through an approved pollution prevention plan. State regulations for underground storage tanks (UST) require either secondary containment or leak detection systems for tanks storing petroleum products. Facilities that are in compliance with either the Aquifer Ordinance and/or the UST regulations are considered to have engineered barriers thus reducing the susceptibility.

Storm water and sanitary wastewater discharges may be considered High Hazards dependent on a discharge's relative location to a well or the density of the discharges in an inventory zone. Storm water injection wells in close proximity to drinking water wells (within 500 feet) were identified as a High Hazard (**Section 4.4**). Thirty-three MWC wells have public street or private parking lot injection wells within 500 feet of the wellhead.

Sanitary wastewater sources were considered High Hazard if wastewater collection lift stations were within 500 feet of a well or septic density exceeds one system/2.5 acres. Two wells, Bank Street and Maurice, are located in close proximity to lift stations but both have emergency back-up generators and alarms in case of power or pump failure and therefore. These safeguards are considered engineered barriers reducing susceptibility. The Linda Vista wells have a lift station within 400 feet and are considered High Hazard because back-up power could not be confirmed at the lift station. The hazard is considered high where septic density inside the Inventory Zone exceeds 1 septic/2.5 acres. The following wells have high hazards for septic densities: S. Sixth St W. (MWC-1), S. Fourteenth St. W. (MWC-2), East Missoula, #2 (MWC-12), Mountain View #1 (MWC-13), Bank St. (MWC-30), Kiwanis St. (MWC-31), Gerald Ave. (MWC-33), and Maurice Ave. (MWC-34).

All active hazardous/regulated waste sites are also considered High Hazard contaminant sources. These include one USEPA Superfund Priority Site (the Milltown Reservoir Sediment Site) located in six Inventory Zones; three active State Superfund Sites (BN Refueling Site, Missoula Sawmill Site, and Hart Oil Site) located in seven Inventory Zones; and active leaking underground storage tank sites with known groundwater impacts inside seven Inventory Zones of MWC wells.

The Rattlesnake Intake is considered to have *Moderate Susceptibility* because of the density of septic systems up-gradient of the dam. There are approximately 90 permitted septic systems up- gradient of the dam and approximately 25 undeveloped parcels in which septics could be installed. Currently, institutional controls are in place that limit the lifting of sanitary restrictions on new subdivisions upstream of the dam, reducing the potential to change the susceptibility rating. In addition, most of the upstream property is public land in protected status and new development above the dam is unlikely to occur.

This susceptibility analysis indicates that there are multiple potential contaminant sources that contribute to the high susceptibility to most of the MWC wells. Control measures such as secondary containment of regulated materials, inventory controls of material use, and use of safer, alternative chemicals, have greatly reduced the potential for groundwater contamination. But the susceptibility remains high, and there remains a need to continue public awareness, to examine ways to prevent accidental releases into the subsurface, and to eliminate or reduce permitted discharges that could affect water quality.

The susceptibility matrix presented in **Table 5-5** shows the greatest exposure of potential contaminant sources to MWC wells are storm water sources and accidental releases from transportation sources that could flow into storm water injection wells. These injection wells can be both a source of long term impacts to the aquifer from continued discharge of storm water and acute impacts from accidental releases into storm drains near municipal supply wells.

7 SOURCE WATER PROTECTION STRATEGY

The purpose of updating the Source Water Delineation and Assessment Report is to provide current information relative to MWC's drinking water system and to develop a certified source water protection plan. The State of Montana recognizes a plan as certified when there is substantial implementation of a source water protection strategy. A protection strategy ensures each water source has at most moderate susceptibility, but substantial implementation may mean partial protection and practical reduction in susceptibility. Because of the urban location of the groundwater well field, full protection and reduction of susceptibility to moderate may not be achievable without substantial capital investment. The capital costs may be very high relative to possible benefit. This section outlines the actions taken to reduce system susceptibility.

- Sole Source Aquifer Designation: The Missoula City-County Health Department successfully petitioned the USEPA to designate the Missoula Valley Aquifer (Missoula Aquifer) as a sole source drinking water supply for Missoula. The designation required all federal funding and actions to take into consideration the vulnerability of the aquifer to contamination and ensure any federal action did not adversely affect water quality in the Missoula Aquifer (MCCHD, 1988).

- Wellhead Protection Program and Implementation Plan: MWC completed an assessment of all drinking water wells and mapping of the up-gradient contribution areas (surface expression) to the wells. The Implementation Plan recommended the adoption of a Wellhead Protection Ordinance that regulated hazardous substances and petroleum products stored in the Missoula urban area (Vandam and Horwich, 1992).

- Missoula Valley Water Quality District: The City of Missoula and Missoula County passed a resolution to create the Missoula Valley Water Quality District with the authority to enforce state and local water quality laws, monitor and conduct research on water quality, and public education on the prevention of water pollution.

- Missoula Valley Water Quality Ordinance: The City of Missoula enacted the Missoula Valley Water Quality Ordinance in 1997 requiring pollution prevention measures to reduce releases of regulated substances, constituent limits for deicer compounds, and siting requirements for new public supply wells (see Appendix C).

- Small MS4 Permit: The City of Missoula, jointly with Missoula County, University of Montana, and the Montana Department of Transportation, received a small municipal separate storm sewer system (MS4) permit that manages storm water discharges to surface waters. The measures help reduce the potential for impacts to groundwater by seeking to reduce pollutants in all storm water runoff (see Appendix D).

As indicated in **Table 5-5**, the major sources that contribute to *High Susceptibility* are

hazardous/regulated waste sites; transportation of hazardous/regulated material via roads, rail, and pipelines; and storm water systems. Many of the existing hazardous waste sites have been remediated or controlled with unlikely impacts to drinking water wells from these sources. Most of these sites are regulated by state and federal agencies that direct clean-up activities with input from local agencies. The Missoula Valley Water Quality Ordinance has addressed a major concern with the handling of regulated substances at fixed facilities, thereby substantially reducing the susceptibility from fixed facilities. State and federal regulations manage the transportation of hazardous and regulated materials limiting the implementation of actions at the local level.

The last major area of susceptibility is storm water. The City of Missoula's MS4 permit partially addresses the susceptibility relative to storm water dry wells. An evaluation of the implementation of MS4 and its ability to fully protect the drinking water supply must be completed to ensure MWC, the City of Missoula, and Missoula County have taken all measures to reduce hazards from storm water injection wells.

Substantial implementation has been accomplished, but the drinking water system remains *Highly Susceptible* to contamination. Certification of a source water protection plan will require a review of the MS4 permit to ensure all measures have been taken to reduce system susceptibility.

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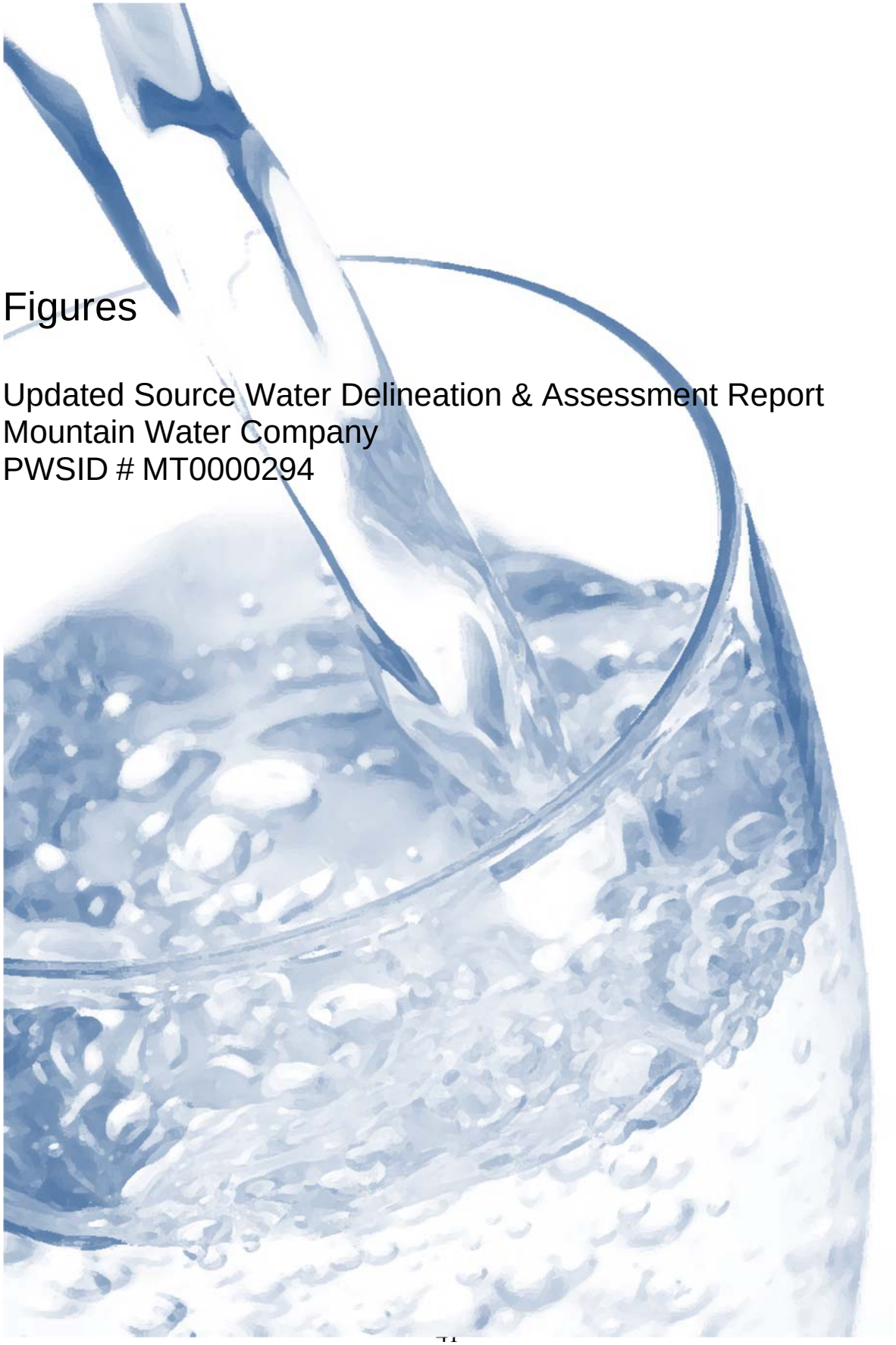
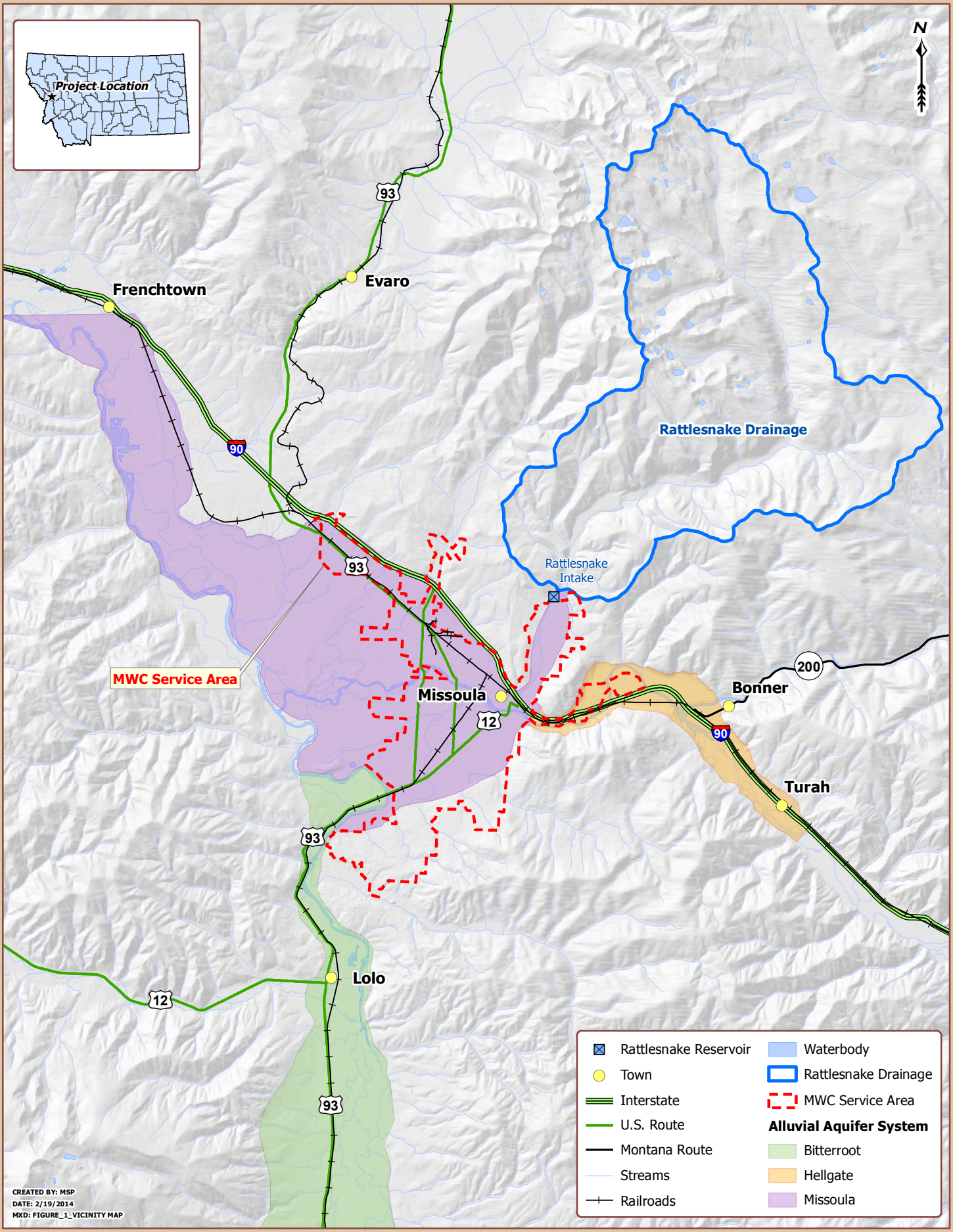


Figures

Updated Source Water Delineation & Assessment Report
Mountain Water Company
PWSID # MT0000294



RESPEC
WATER & NATURAL RESOURCES
1535 Liberty Lane
Suite 110D
Missoula, MT 59808

0 0.5 1 2 3 4 Miles

Figure 1. Vicinity Map

Mountain Water Company SWDAR - Missoula, MT

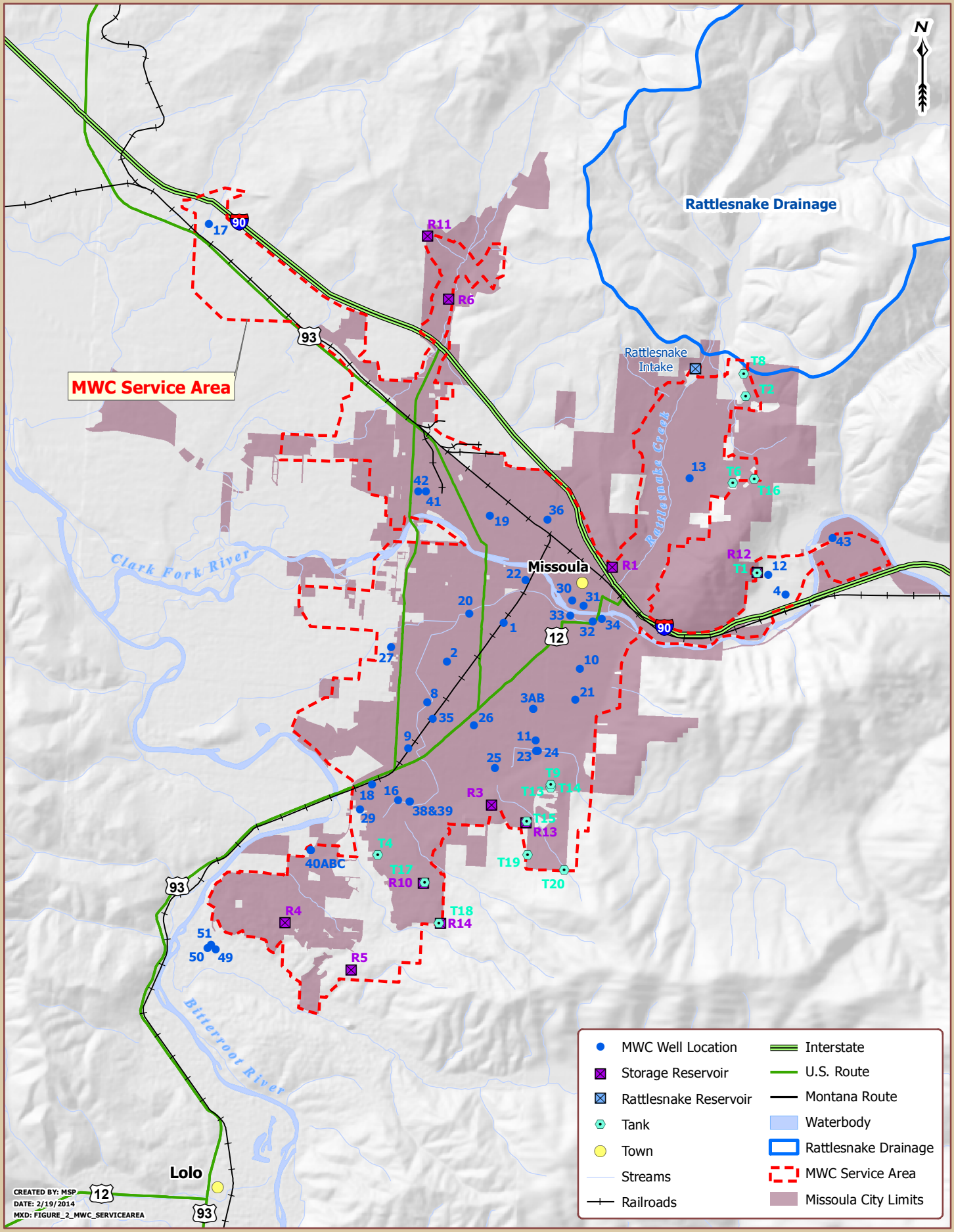


Figure 2. MWC Service Area

Mountain Water Company SWDAR - Missoula, MT

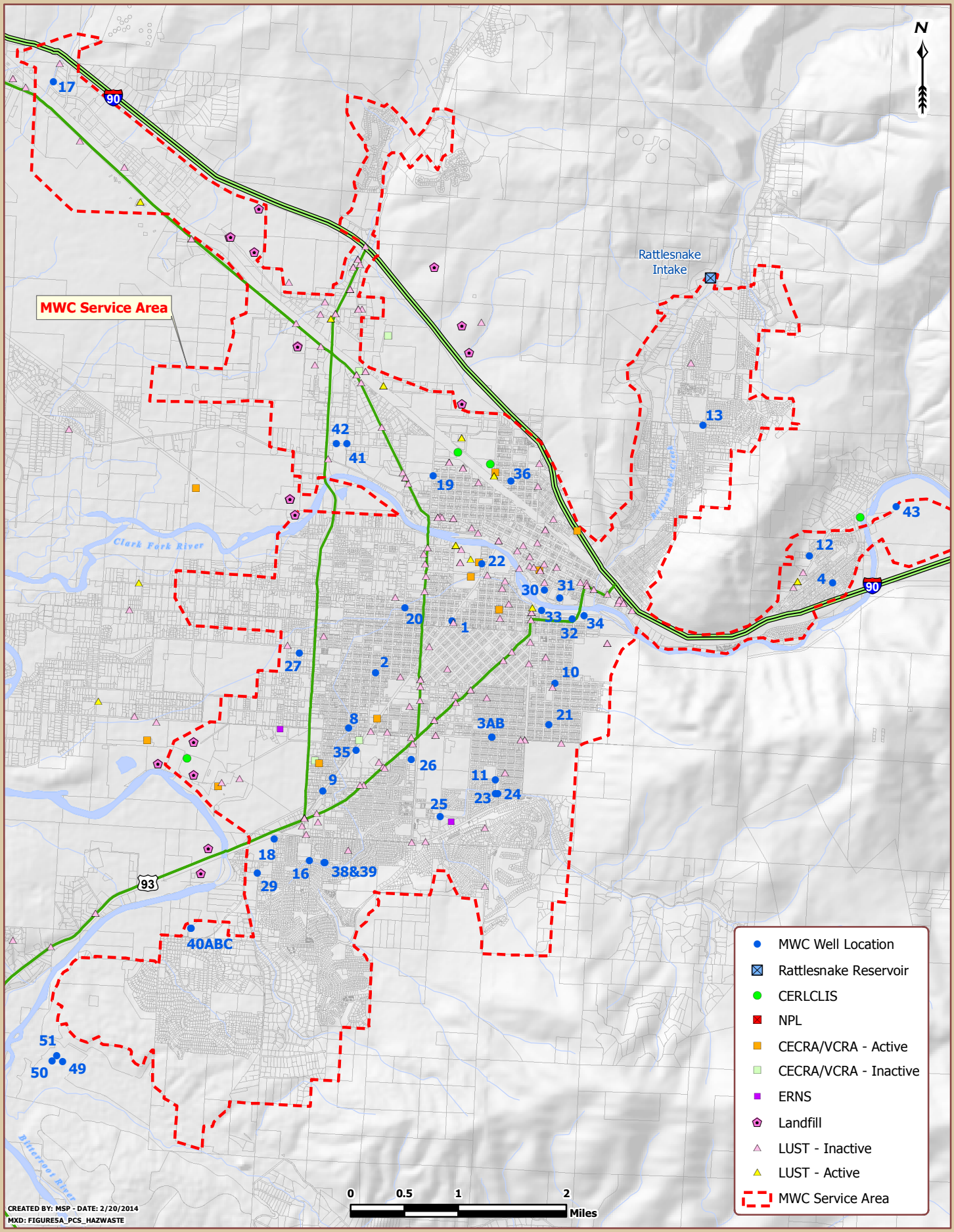


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Figure 3a. Potential Contaminant Sites - Hazardous / Regulated Waste Sites - ***Mountain Water Company SWDAR - Missoula, MT***

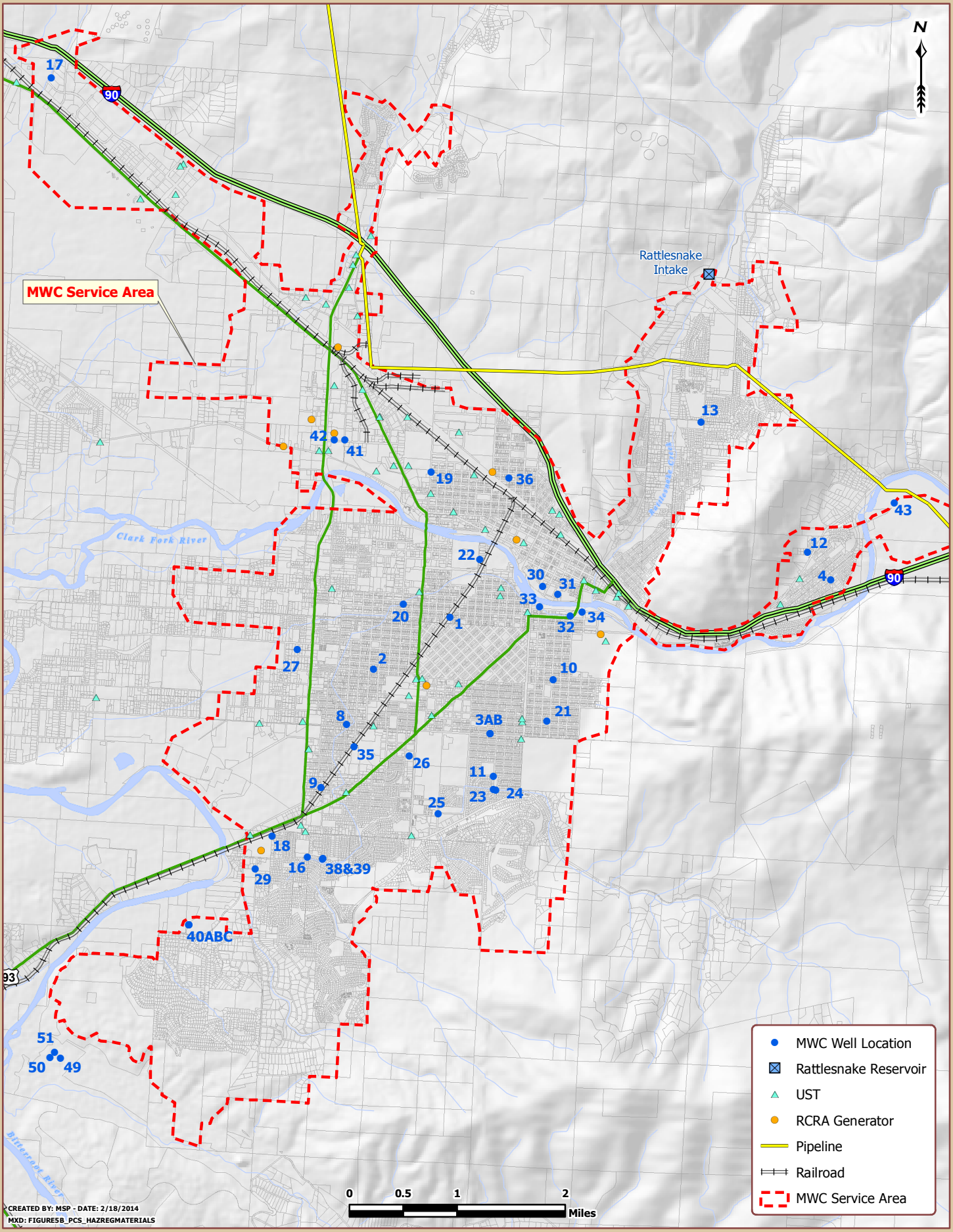

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Figure 3b. Potential Contaminant Sites - Hazardous / Regulated Materials Handling - ***Mountain Water Company SWDAR - Missoula, MT***

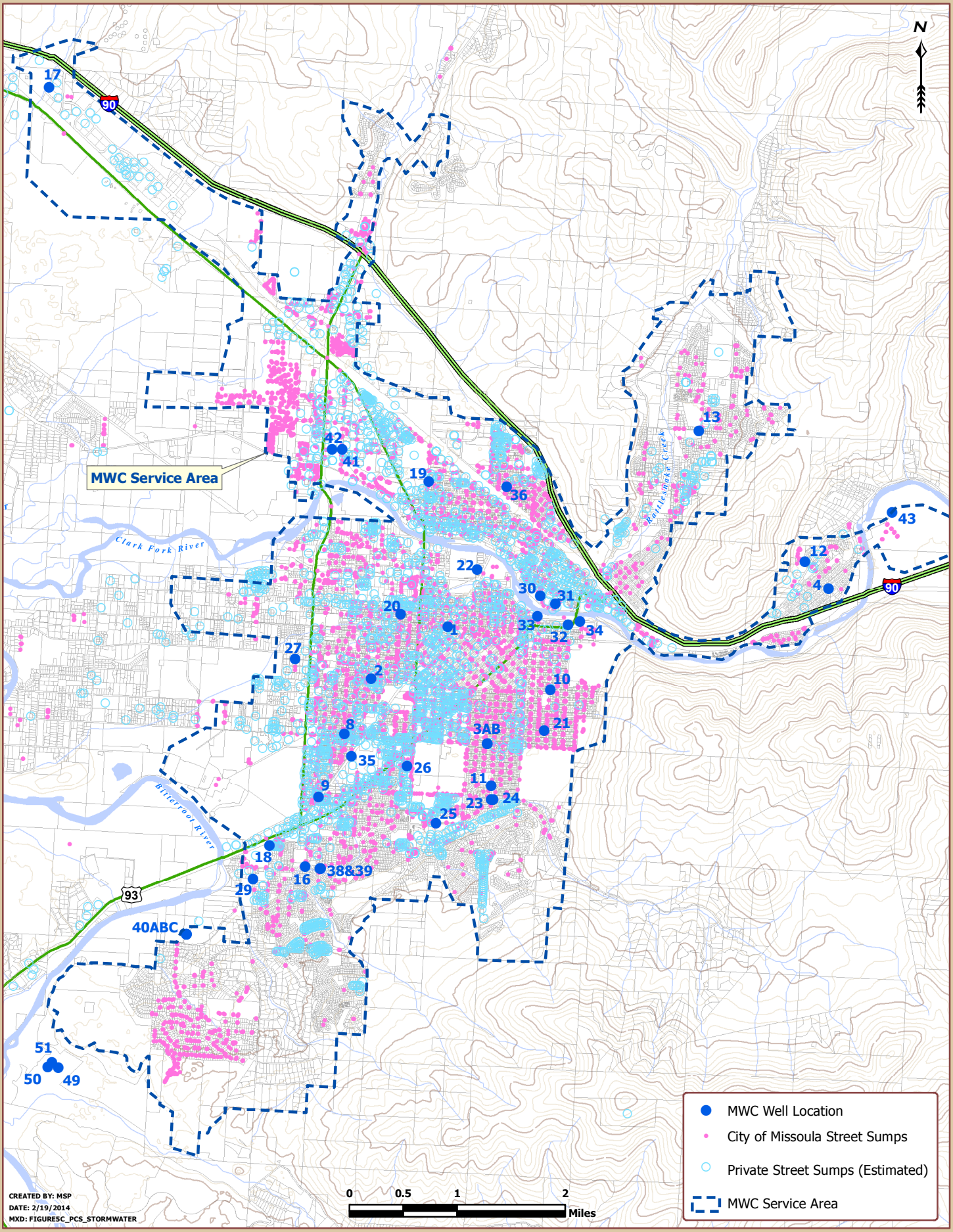

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Figure 3c. Potential Contaminant Sites - Storm Water Sources

Mountain Water Company SWDAR - Missoula, MT

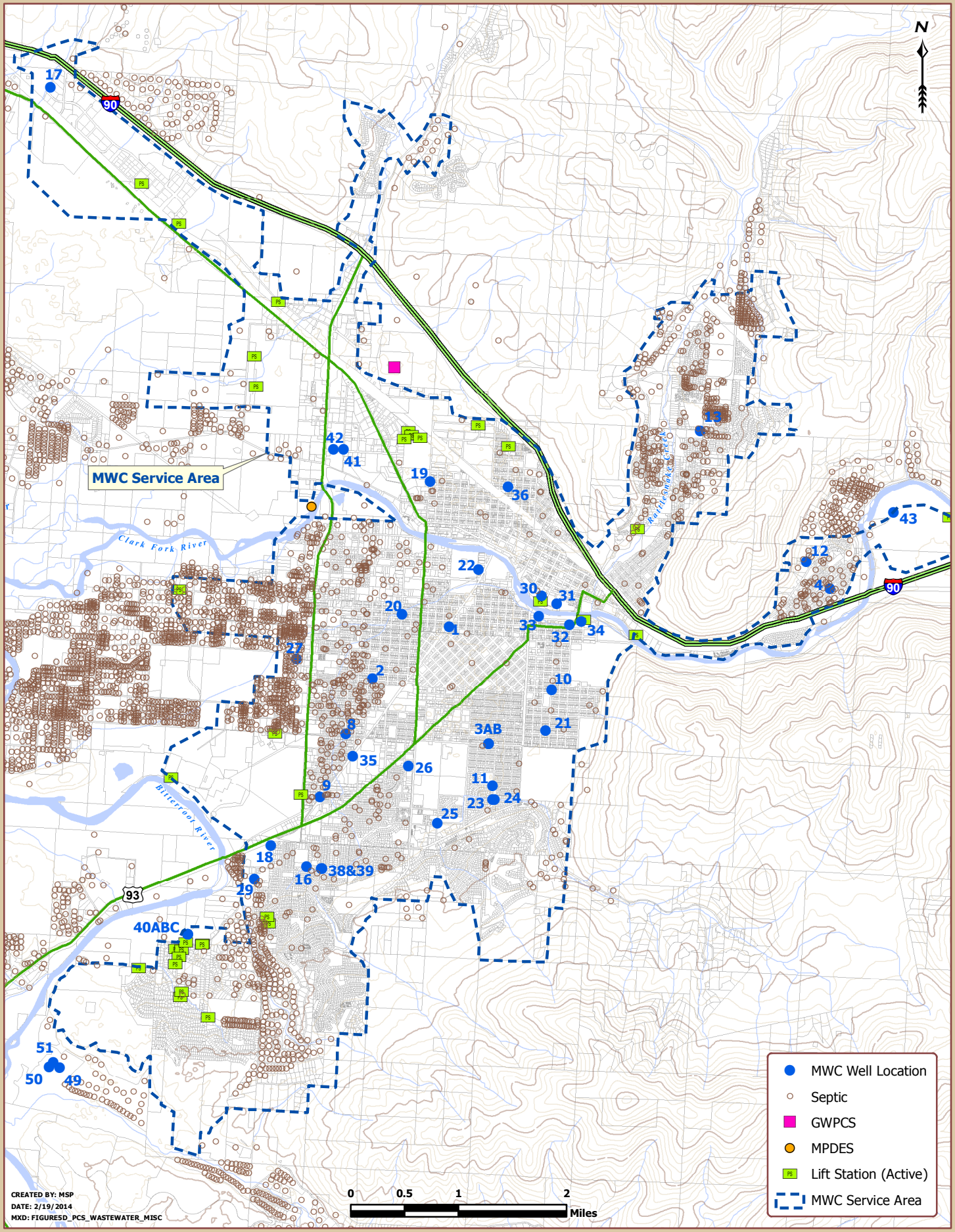

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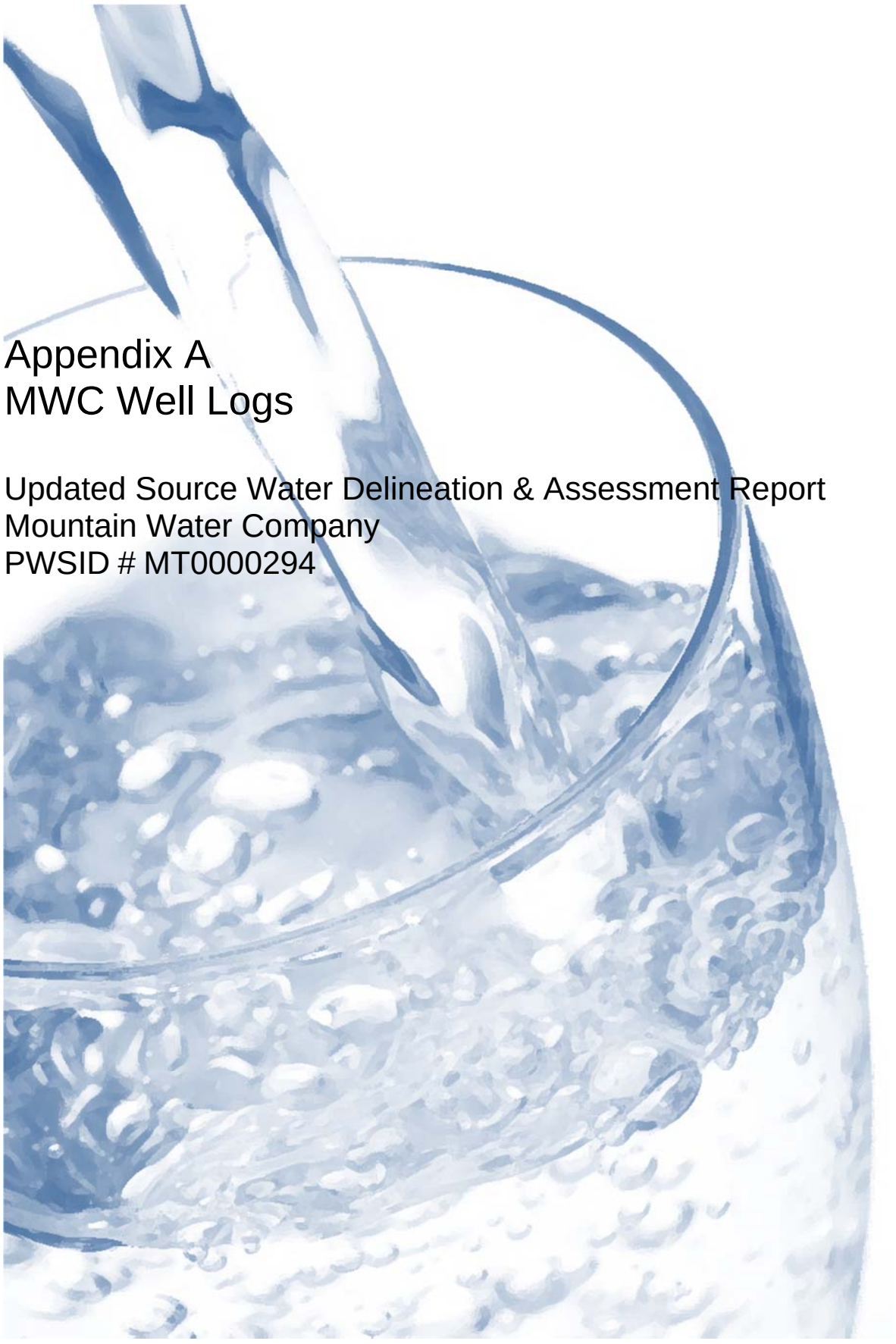
Figure 3d. Potential Contaminant Sites - Wastewater & Miscellaneous Sources - ***Mountain Water Company SWDAR - Missoula, MT***



Appendix A
MWC Well Logs

Updated Source Water Delineation & Assessment Report
Mountain Water Company
PWSID # MT0000294

#1

No. 1

T. 13 N. R. 19 W.

County Missoula

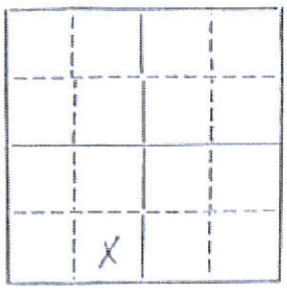
MWC#01

MONTANA BUREAU OF MINES AND GEOLOGY

Butte, Montana

Mountain Water Company Well #1

WATER WELL LOG



Owner Montana Power Co. Address Missoula

Driller Maud Address

Date Started [illegible] 1934 Date Completed [illegible] 1934

Location: Sec. 21 T. 13 N. R. 19 W. ¼ sec. S.E. ¼ of S.W. ¼

Type of well ..... Equipment used .....
(Dug, driven, bored, or drilled) (Churn drill, rotary, other)

Water use: Domestic ☐ Municipal ☐ Stock ☐ Irrigation ☐

Industrial ☐ Drainage ☐ Other: .....

Casing: ..... ft. to ..... ft. Type ..... Size .....

Casing: ..... ft. to ..... ft. Type ..... Size .....

Casing: ..... ft. to ..... ft. Type ..... Size .....

Perforated or Screened: Ft. ..... to ft. ..... Ft. ..... to ft. .....

Type of screen or perforations .....

Static Water level, for non-flowing well: 50' feet.

Shut-in pressure, for flowing well: ..... lb./sq. in. on: .....
(date)

Pumping water level 70' feet at 1200 gal. per min.

How tested: Pumped

Length of test .....

Remarks: (Gravel packing, cementing, packers, type of shut-off, depth of shut-off)

.....

.....

.....

.....

.....

(over)

MWC#01

Approved Stock Forms—State Publishing Co., Helena, Montana—38496

File No. .....

T. 13N R. 19W

QUADRUPLICATE

County Missoula

STATE OF MONTANA
ADMINISTRATOR OF GROUNDWATER CODE
OFFICE OF STATE ENGINEER

Nues #1

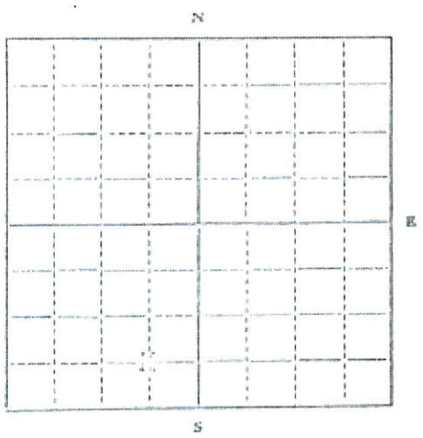
Declaration of Vested Groundwater Rights

MWC#01

(Under Chapter 237, Montana Session Laws, 1961)

1. The Montana Power Company, of 40 East Broadway (Address) Butte (Town)
(Name of Appropriator)

County of Missoula State of Montana have appropriated groundwater according to the Montana laws in effect prior to January 1, 1962, as follows:



SW ¼ NE ¼ Sec. 21 T. 13N R. 19W

Indicate point of appropriation and place of use, if possible. Each small square represents 10 acres.

2. The beneficial use on which the claim is based Municipal supply

3. Date or approximate date of earliest beneficial use; and how continuous the use has been May 1935 - 24 hours per day of each year since 1935.

4. The amount of groundwater claimed (in miner's inches or gallons per minute) 1,200 gallons per minute - 24 hours per day

5. If used for irrigation, give the acreage and description of the lands to which water has been applied and name of the owner thereof

6. The means of withdrawing such water from the ground and the location of each well or other means of withdrawal Pumped from well

7. The date of commencement and completion of the construction of the well, wells, or other works for withdrawal of groundwater Well was drilled and completed in 1934 - no other [illegible]

8. The depth of water table 50 feet

9. So far as it may be available, the type, size and depth of each well or the general specifications of any other works for the withdrawal of groundwater 1 - 12" steel casing - 120' deep

10. The estimated amount of groundwater withdrawn each year 95,000,000 gallons

11. The log of formations encountered in the drilling of each well if available Log of this well [illegible]

12. Such other information of a similar nature as may be useful in carrying out the policy of this act, including reference to book and page of any county record

[illegible]

THE MONTANA POWER COMPANY

Signature of Owner By [signature] Vice President

Date February 1, 1962

Three copies to be filed by the owner with the County Clerk and Recorder of the county in which the well is located.

Please answer all questions. If not applicable, so state, otherwise the form will be returned.

Original to the County Clerk and Recorder; duplicate to the State Engineer; Triplicate to the Montana Bureau of Mines and Geology, and Quadruplicate for the Appropriator.

Approved Stock Form—State Publishing Co., Helena, Montana—18496

File No. X

T. 13N R. 19W

County Missoula

TRIPLICATE

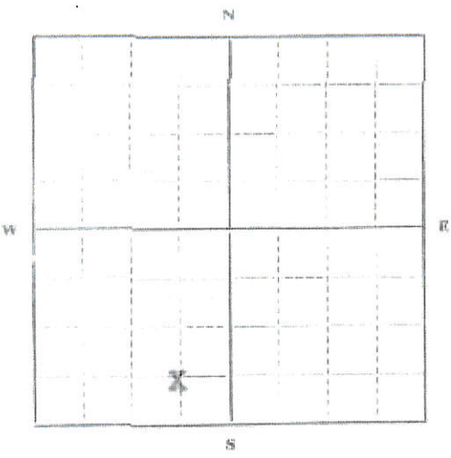
STATE OF MONTANA
ADMINISTRATOR OF GROUNDWATER CODE
OFFICE OF STATE ENGINEER

MWC#01

Declaration of Vested Groundwater Rights

(Under Chapter 237, Montana Session Laws, 1961)

1. The Montana Power Company (Name of Appropriator) of 40 East Broadway (Address) Butte (Town)
County of Missoula State of Montana
have appropriated groundwater according to the Montana laws in effect prior to January 1, 1962, as follows:



SE ¼ SW ¼ Sec. 21 T. 13N R. 19W

Indicate point of appropriation and place of use, if possible. Each small square represents 10 acres.

2. The beneficial use on which the claim is based Municipal supply

3. Date or approximate date of earliest beneficial use; and how continuous the use has been May 1935 - 24 hours per day of each year since 1935.

4. The amount of groundwater claimed (in miner's inches or gallons per minute) 1,200 gallons per minute - 24 hours per day

5. If used for irrigation, give the acreage and description of the lands to which water has been applied and name of the owner thereof

6. The means of withdrawing such water from the ground and the location of each well or other means of withdrawal Pumped from well

7. The date of commencement and completion of the construction of the well, wells, or other works for withdrawal of groundwater Well was drilled and completed in 1934 - no other information

8. The depth of water table 50 feet

9. So far as it may be available, the type, size and depth of each well or the general specifications of any other works for the withdrawal of groundwater Well - 12½" steel casing - 120' deep

10. The estimated amount of groundwater withdrawn each year 95,000,000 gallons

11. The log of formations encountered in the drilling of each well if available Log of this well not available

12. Such other information of a similar nature as may be useful in carrying out the policy of this act, including reference to book and page of any county record

(CORPORATE SEAL)
ATTEST: [signature]
Its Secretary

Signature of Owner THE MONTANA POWER COMPANY
By [signature]
Vice President
Date February 1, 1962

Three copies to be filed by the owner with the County Clerk and Recorder of the county in which the well is located.

Please answer all questions. If not applicable, so state, otherwise the form will be returned.

Original to the County Clerk and Recorder; duplicate to the State Engineer; Triplicate to the Montana Bureau of Mines and Geology, and Quadruplicate for the Appropriator.

Form W. & S. 17 Rev.—1M—9-31

13N 19W 21 CDCC Molo

Lic 0631

coded

MONTANA STATE BOARD OF HEALTH
Water and Sewage Division
WELL DRILLER'S REPORT

Registration No. 16

Top of Ground (Elev. above sea level 3190)

Surface to 22 ft. gravel and boulders
22 ft. to 24 ft. - gravel & fine sand.
24 ft. to 40 ft. - gravel, boulders & very little clay.
40 ft. to 45 ft. - gravel, boulders & clay.
45 ft. to 47 ft. - water, clean gravel & sand.
47 ft. to 50 ft. - sand
50 ft. to 62 ft. - sand, gravel & a little clay.
65 ft. to 69 ft. - gravel & a little clay.
69 ft. to 71.5 ft. - sand - fine gravel
71.5 ft. to 73.5 ft. - gravel - water
73.5 ft. to 75 ft. - sand - fine gravel
75 ft. to 88 ft. - gravel, sand, clay & boulders.
88 ft. to 100.5 - gravel, water - a little clay
100.5 ft. to 102.5 - gravel, boulders, clay
102.5 ft. to 114.3 - gravel, sand, clay.
114.3 ft. to 120 - gravel & sand

Show exact depth of bottom

Driller M. M. Ulrich Address 1203 Van Buren St.

Owner of Well The Montana Power Company

Exact Location of Well [redacted] - Missoula

Water to Be Used for City Supply MWC#01

Drilling Begun Well Finished

Indicate on the diagram the character and thickness of the different strata met with in drilling, such as soil, clay, shale, gravel, rock or sand, etc. Show depth at which water is encountered, thickness and character of water-bearing strata and height to which the water rises in the well.

Casing Record

Size of Pipe	Kind and Weight of Material Used	From (Feet)	To (Feet)	Perforations: Kind Size	Perforations: From (Feet)	Perforations: To (Feet)
12½"	50# o&l well casing	0	118	Punched ⅛ x1½"		
				300 to 350		

Describe the type of joints in casing Screwed

Describe any screens used None

Capacity of Well 600 gallons per minute
(In Gallons or Barrels)

How Determined Weir
(Pump, Bailer, Weir, Etc.)

Signed M. M. Ulrich

Date

(Law and Regulations on Reverse Side)

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Return to menu
Plot this site on a topographic map
View field visits for this site
View water quality for this site

Site Name: MOUNTAIN WATER COMPANY * WELL #2
GWIC Id: 69155

Section 1: Well Owner(s)

1) MOUNTAIN WATER COMPANY (MAIL)
N/A
MISSOULA MT N/A [10/22/1999]
2) MONTANA POWER COMPANY (MAIL)
40 E BROADWAY
MISSOULA MT N/A [11/19/1934]

Section 2: Location

Township	Range	Section	Quarter Sections
13N	19W	29	SE¼ SW¼ SW¼ NE¼

County: MISSOULA
Geocode:

Latitude	Longitude	Geomethod	Datum
		MAP	NAD27

Ground Surface Altitude	Method	Datum	Date
3143.7			

Addition: **Block:** **Lot:**

Section 3: Proposed Use of Water

PUBLIC WATER SUPPLY (1)

Section 4: Type of Work

Drilling Method: CHRUN
Status: NEW WELL

Section 5: Well Completion Date

Date well completed: Monday, November 19, 1934

Section 6: Well Construction Details

There are no borehole dimensions assigned to this well.

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
0	90	12				

Completion (Perf/Screen)

Section 7: Well Test Data

MWC#02

Total Depth: 116
Static Water Level: 50
Water Temperature:

Unknown Test Method *

Yield 1200 gpm.
Pumping water level _ feet.
Time of recovery _ hours.
Recovery water level _ feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source

112ALVM - ALLUVIUM (PLEISTOCENE)

From	To	Description
0	2	CLAY AND TOP SOIL
2	10	SAND AND SOME GRAVEL
10	21	SAND GRAVEL AND BOULDERS
21	35	CLAY SAND AND BOULDERS
35	55	CLAY AND GRAVEL - SOME WATER
55	62	GRAVEL AND WATER
62	68	GRAVEL CLAY AND BOULDERS
68	71	GRAVEL
71	72	CLAY AND GRAVEL
72	90	LOOSE SANDY GRAVEL WITH FINE SEDIMENT SOME CLAY

From	To	Diameter	# of Openings	Size of Openings	Description
40	90	12			1/2IN X1 1/2IN SLOT

Annular Space (Seal/Grout/Packer)

There are no annular space records assigned to this well.

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company: ULRICH
License No: -
Date Completed: 11/19/1934

MWC#02

13N 19W 28 DC DC No. 3

113506

T 13 N. R 19 W

County Missoula

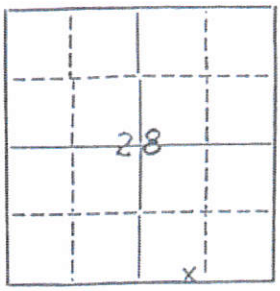
MWC#03A

MONTANA BUREAU OF MINES AND GEOLOGY

Butte, Montana

Mountain Water Company Well #3

WATER WELL LOG



Owner Montana Power Company Address E. Bdwy Missoula

Driller M. M. Ulrich Address 1203 Van Buren

Date Started Feb. 9, 1935 Date Completed Feb. 27, 1935

Location: Sec. 28 T. 13 N. R. 19 W. ¼ sec S. W. ¼ of S. E. ¼ SW, SE

Type of well Drilled (Dug, driven, bored, or drilled) Equipment used Churn Drill (Churn drill, rotary, other)

Water use: Domestic ☐ Municipal ☒ Stock ☐ Irrigation ☐

Industrial ☐ Drainage ☐ Other:

Casing: 0' ft. to 117' 9" ft. Type 50# Well Casing Size 12½" Screwed

Casing: ft. to ft. Type Size

Casing: ft. to ft. Type Size

Perforated or Screened: Ft. 85' to ft. 116' Ft. to ft.

Type of screen or perforations Punched ½" X 1½" holes 300 to 350 holes

Static Water level, for non-flowing well: 54' below surface of Ground feet.

Shut-in pressure, for flowing well: lb./sq. in. on: (date)

Pumping water level 90' feet at 1200 gal. per min.

How tested: Test pumped Measured by Weir

Length of test

Remarks: (Gravel packing, cementing, packers, type of shut-off, depth of shut-off)

Top of Ground elev. above Sea Level - 3180

(over)

M. 151950

NO. 3

MWC#03A

Log of Well

Depth, feet From	Depth, feet To	Description of Material Drilled
0'	30'	Top Soil Gravel, Boulders and Clay
30'	32'	Clay
32'	43'	Gravel, Boulders and Some Clay
43'	45'	Gravel and Water
45'	78'	Gravel, Boulders and Very little Clay
78'	81'	Gravel - Water
81'	116'	Gravel, Sand, Boulders and Some Clay.
		Water Stands at 54'

Approved Stock Form—State Publishing Co., Helena, Montana—38496

e No.....

T 13N R 19W

ADRUPLICATE

County Missoula

STATE OF MONTANA
ADMINISTRATOR OF GROUNDWATER CODE
OFFICE OF STATE ENGINEER

Mis #3

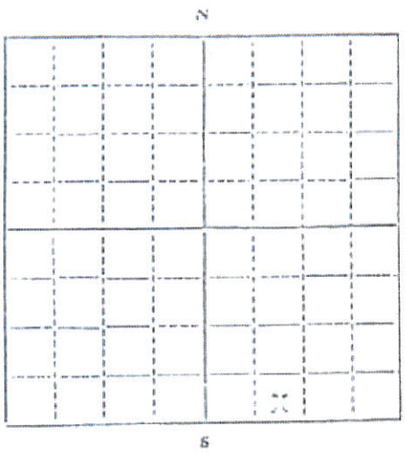
Declaration of Vested Groundwater Rights

MWC#03A

(Under Chapter 237, Montana Session Laws, 1961)

The Montana Power Company, of 40 East Broadway Butte
(Name of Appropriator) (Address) (Town)

County of Missoula State of Montana
have appropriated groundwater according to the Montana laws in effect prior to January 1, 1962, as follows:



¼ ¼ Sec. 32 T 13N R 19W

licate point of appropriation
l place of use, if possible.
ch small square represents 10
es.

2. The beneficial use on which the claim is based Municipal Supply

3. Date or approximate date of earliest beneficial use; and how continuous the use has been May 1935, 24 hrs. per day for each year since 1935

4. The amount of groundwater claimed (in miner's inches or gallons per minute) 1,200 gallons per minute - 24 hours per day

5. If used for irrigation, give the acreage and description of the lands to which water has been applied and name of the owner thereof

6. The means of withdrawing such water from the ground and the location of each well or other means of withdrawal Pumped from well

The date of commencement and completion of the construction of the well, wells, or other works for withdrawal of groundwater Started drilling February 9, 1935, Well complete February 27, 1935

The depth of water table 50'

So far as it may be available, the type, size and depth of each well or the general specifications of any other works for the withdrawal of groundwater Well 12½" - casing 116' deep

The estimated amount of groundwater withdrawn each year 100,000,000 gallons

The log of formations encountered in the drilling of each well if available 0' to 78' clay, sand gravel and some boulders, 78' to 120' gravel, some sand and some boulders

Such other information of a similar nature as may be useful in carrying out the policy of this act, including reference to book and page of any county record

THE MONTANA POWER COMPANY

Signature of Owner By [signature]
Vice President

Date February 1, 1962

ree copies to be filed by the owner with the County Clerk and Recorder of the county in which the well is ated.

ase answer all questions. If not applicable, so state, otherwise the form will be returned.

iginal to the County Clerk and Recorder; duplicate to the State Engineer; Triplicate to the Montana Bureau Mines and Geology, and Quadruplicate for the Appropriator.

Form No. 603 R8/83

063 13N 19W 28DCD

File No. Missoula

WELL LOG REPORT

MWC#03B

State law requires that this form be filed by the water well driller within 60 days after completion 010378

1. WELL OWNER
Name [illegible] Well 3B

2. CURRENT MAILING ADDRESS
[illegible]
Missoula, Montana 59806

3. WELL LOCATION
County MISSOULA
Township 13 N/S Range 19 W E/W
SW ¼ SW ¼ SE ¼ Section 28
Lot 15 Block 42
Subdivision Homevale Addition

4. PROPOSED USE Domestic ☐ Stock ☐ Irrigation ☐
Other ☐ specify Municipal

5. DRILLING METHOD x cable, ____ bored, ____ forward rotary, ____ reverse rotary, ____ jetted, ____ other (specify) ____

6. WELL CONSTRUCTION AND COMPLETION

Size of drilled hole	Size and weight of casing	From (feet)	To (feet)	Perforations and/or Screen: Kind Size	From (feet)	To (feet)
12"	12"OD 155 lb per ft.	+2	192	Mills knife 3/8 x 3	90 140 177	106 152 186

Was casing left open end? x Yes ____ No
Was a packer or seal used? ____ Yes x No
If so, what material ____
Was the well gravel packed? ____ Yes x No
Was the well grouted? x Yes ____ No
To what depth? 25 ft.
Material used in grouting Cement
Well head completion: Pitless adapter ____ Yes ____ No
Top of casing 12 in. or greater above grade ____ Yes ____ No

7. WHAT IS THE TEMPERATURE OF THE WATER?
____ Degrees Fahrenheit
☐ Measured ☐ Estimated

8. WATER LEVEL
Static water level [illegible] feet below land surface
If flowing; closed-in pressure ____ psi
____ gpm
Controlled by: ____ valve, ____ reducers, ____ other, (specify) ____

9. WELL TEST DATA x pump ____ bailer ____ other, (specify) ____
Pumping water level below land surface:
55 ft. after 4 hrs. pumping 2400 gpm
____ ft. after ____ hrs. pumping ____ gpm

10. WAS WELL PLUGGED OR ABANDONED? ____ Yes x No
If yes, how? ____

11. DATE COMPLETED July 3, 1984

12. WELL LOG

Depth (ft.) From	To	Formation
0	2	Topsoil
2	25	Gravel
25	53	Clay, Sand & Gravel
53	106	Clay, Sand, Gravel & Water
106	130	Clay, Gravel & Boulders
130	133	Clay, Sand, Gravel & Water
133	148	Clay, Gravel & Boulders
148	149	Clay, Gravel, Boulders & Water
149	151	Sand, Gravel, Boulders & Water
151	152	Sand, Gravel, Boulders & Water
152	176	Clay, sand, Gravel & Boulders
176	179	Sand, Gravel, Boulders & Water
179	192	Clay, Sand & Gravel

(use separate sheet if necessary)

13. DRILLER'S CERTIFICATION
This well was drilled under my jurisdiction and this report is true to the best of my knowledge.

November 13, 1984
Date

[illegible]
Firm Name

[illegible]
Address

[signature]
Signature License No.

MONTANA DEPARTMENT OF NATURAL RESOURCES & CONSERVATION DNRC
32 SOUTH EWING HELENA, MONTANA 59620 449-3962

STATE PUBLISHING CO HELENA MONT

DEPARTMENT - BUREAU COPY

M:132854

Butte

13N 19W 24 AC AD

T. 13 N. R. 19 W.

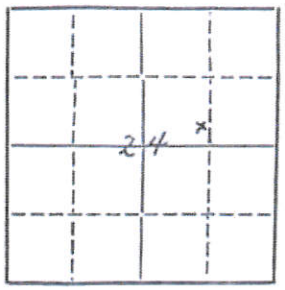
County Missoula

094870

MONTANA BUREAU OF MINES AND GEOLOGY
Butte, Montana

MWC#04

WATER WELL LOG



Owner Mountain ~~Missoula~~ Water Company (Montana Power Company) Address E. 13th Hwy. Missoula

Well # 4

Driller M.M. Ulrich Address 1203 Van Buren

Date Started May 7, 1937 Date Completed

Location: Sec. ~~24~~ 24 T. 13 N. R. 19 W. ¼ sec. ~~S.W. ¼ of N.E. ¼~~ AC AD

Type of well (Dug, driven, bored, or drilled) Equipment used (Churn drill, rotary, other)

Water use: Domestic ☐ Municipal ☒ Stock ☐ Irrigation ☐

Industrial ☐ Drainage ☐ Other:

Casing: 0' ft. to 86 ft. Type 45# Well Casing Size 10" E.D. Screwed

Casing: ft. to ft. Type Size

Casing: ft. to ft. Type Size

Perforated or Screened: Ft. 86' to ft. 100' Ft. to ft.

Type of screen or perforations Punched 1/2" x 1 1/2" Slots 8 Slots per ft.

Static Water level, for non-flowing well: 65' below surface of Ground feet.

Shut-in pressure, for flowing well: lb./sq. in. on: (date)

Pumping water level 80' feet at 400 gal. per min.

How tested: Permenent 25 H.P. Pamona Pump Water Flow Meter

Length of test

Remarks: (Gravel packing, cementing, packers, type of shut-off, depth of shut-off) PD

Note:

The original 25 H.P. pump in this well was replaced with a 50 H.P. 800 G.P.M. pump in 1955. Well will produce 800 G.P.M.

(over)

M.132849

MWC#04

Log of Well

Depth, feet From	Depth, feet To	Description of Material Drilled
0'	35'	Boulders and Gravel
35	37	Water tight Gravel and Clay
37	38	Sand
38	40	Water tight Gravel and Clay
40	69	Gravel and Boulders
69	75	Coarse Sand
75	86	Heavey Gravel and Sand

Butte No. 8 13N/19W 32 BA Missoula

T. 13 N R. 19 W

County Missoula

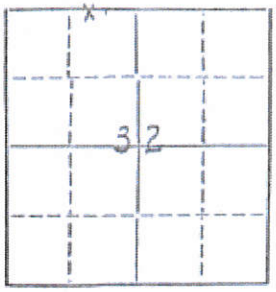
094877

MONTANA BUREAU OF MINES AND GEOLOGY
Butte, Montana

MWC#08

Mountain Water Company ~~Missoula Water~~

WATER WELL LOG



Owner Montana Power Company Address E. Bdwy Missoula

Driller Camp and Phelps Address Jct. Alder Missoula

Date Started July 27, 1954 Date Completed Aug. 10, 1954

Location: Sec. 32 T. 13 N R. 19 W ¼ sec. N.E. ¼ of N.W. ¼

Type of well Drilled (Dug, driven, bored, or drilled) Equipment used Churn Drill (Churn drill, rotary, other)

Water use: Domestic ☐ Municipal ☒ Stock ☐ Irrigation ☐

Industrial ☐ Drainage ☐ Other:

Casing: 0 ft. to 117 ft. Type 45 lbs. per ft. Size 12 Welded

Casing: ft. to ft. Type Size

Casing: ft. to ft. Type Size

Perforated or Screened: Ft. 71 to ft. 114 Ft. to ft.

Type of screen or perforations Slot with Mill knife 7 holes per ft.

Static Water level, for non-flowing well: 50' from surface of Ground feet.

Shut-in pressure, for flowing well: lb./sq. in. on: (date)

Pumping water level 90' feet at 1200 gal. per min.

How tested: Test Pump

Length of test 24 hrs.

Remarks: (Gravel packing, cementing, packers, type of shut-off, depth of shut-off)

PE

(over)

M: 132857

MWC#08

Log of Well

Depth, feet From	Depth, feet To	Description of Material Drilled
0'	2'	Fill dirt
2'	42'	Gravel and some clay
42'	51'	Gravel - some water
51'	94'	Gravel and clay - lots of water
94'	100'	Gravel and clay - little water
100'	109	Sand and Gravel lots of water
109'	112'	Gravel with clay
112'	117'	Gravel and sand - water

SW 4 Approved Stock Form: State Publishing Co., Helena, Montana 18496

File No. 063 T. 13N R. 19W 32B 9

TRIPLICATE County Missoula

MWC#08

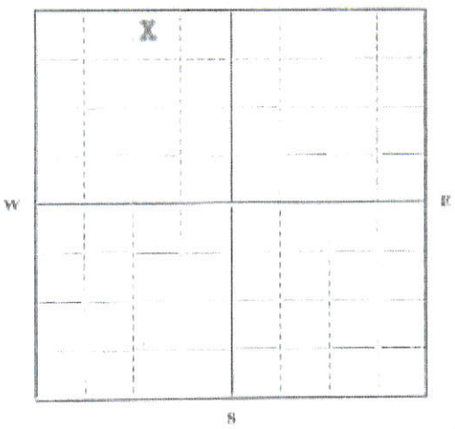
STATE OF MONTANA
ADMINISTRATOR OF GROUNDWATER
OFFICE OF STATE ENGINEER

Declaration of Vested Groundwater Rights

(Under Chapter 237, Montana Session Laws, 1961)

1. The Montana Power Company (Name of Appropriator) of 40 East Broadway (Address) Butte (Town)
County of Missoula State of Montana
have appropriated groundwater according to the Montana laws in effect prior to January 1, 1962, as follows:

BABB



NE ¼ NW ¼ Sec. 32 T13N R 19W

Indicate point of appropriation and place of use, if possible. Each small square represents 10 acres.

2. The beneficial use on which the claim is based Municipal supply

3. Date or approximate date of earliest beneficial use; and how continuous the use has been Aug. 1954, 24 hrs. per day for each year since 1954

4. The amount of groundwater claimed (in miner's inches or gallons per minute) 1,200 gallons per minute - 24 hours per day

5. If used for irrigation, give the acreage and description of the lands to which water has been applied and name of the owner thereof

6. The means of withdrawing such water from the ground and the location of each well or other means of withdrawal Pumped from well

7. The date of commencement and completion of the construction of the well, wells, or other works for withdrawal of groundwater Started drilling July 27, 1954, well completed Aug. 10, 1954

8. The depth of water table 50'

9. So far as it may be available, the type, size and depth of each well or the general specifications of any other works for the withdrawal of groundwater Well 12" steel casing - 117' deep

10. The estimated amount of groundwater withdrawn each year 100,000,000 gallons

11. The log of formations encountered in the drilling of each well if available
0' to 100' clay and gravel,
100' to 117' gravel and some sand

12. Such other information of a similar nature as may be useful in carrying out the policy of this act, including reference to book and page of any county record

(CORPORATE SEAL)
ATTEST: [signature]
Its Secretary

THE MONTANA POWER COMPANY
Signature of Owner By [signature]
Vice President
Date February 1, 1962

Three copies to be filed by the owner with the County Clerk and Recorder of the county in which the well is located.

Please answer all questions. If not applicable, so state, otherwise the form will be returned.

Original to the County Clerk and Recorder; duplicate to the State Engineer; Triplicate to the Montana Bureau of Mines and Geology, and Quadruplicate for the Appropriator.

Butte

NO. 4 13N 19W 32 CBAB MISSOULA

(#4)

T. 13 N. R. 19 W.

County Missoula

MONTANA BUREAU OF MINES AND GEOLOGY

Butte, Montana

013359

Verified 4/92 K. Metesh

WATER WELL LOG

MWC#09

alt 3165

Mountain ~~Missoula~~ Water

		32	
×			

Owner Montana Power Company Address E. Bdwy. Missoula

Driller Camp & Phelps Address

Date Started Aug. 17 1954 Date Completed Sept. 2, 1954

Location: Sec. 32 T. 13 N. R. 19 W. ¼ sec. ~~NW¼ of SW¼~~ NW of NE of NW of SW

Type of well Drilled (Dug, driven, bored, or drilled) Equipment used Churn drill (Churn drill, rotary, other)

Water use: Domestic ☐ Municipal ☒ Stock ☐ Irrigation ☐

Industrial ☐ Drainage ☐ Other:

Casing: 0 ft. to 17 ft. Type Size 12¼" I.D. Welded

Casing: 17 ft. to 132 ft. Type 45 lbs per ft. Size 12" I.D. Welded

Casing: ft. to ft. Type Size

Perforated or Screened: Ft. 80' to ft. 87 Ft. 112 to ft. 116'

Type of screen or perforations Slotted with Mills Knife 6 holes per ft.

Static Water level, for non-flowing well: 44' from Surface of Ground feet.

Shut-in pressure, for flowing well: lb./sq. in. on: (date)

Pumping water level 90' feet at 1200 gal. per min.

How tested: Test pumped

Length of test 24 hr.

Remarks: (Gravel packing, cementing, packers, type of shut-off, depth of shut-off)

PE

(over)

M: 69353

No, 7

MWC#09

Log of Well

Depth, feet From	Depth, feet To	Description of Material Drilled
0'	14'	Gravel and Clay
14'	16'	Sand
16'	44'	Gravel and Clay
44'	74'	Sand, Gravel With Clay - Small amount Water
74'	78'	Gravel With Clay - Some Water
78'	88'	Gravel With Sand - Some Water
88'	111'	Gravel and Clay - Some Water
111'	115'	Sand, Gravel and Water
115'	128'	Clay, Gravel, Boulders and Water
128	132'	Gravel and Boulders - Water

Form S. H. 17—2500 Trip. 9-48 23924

coded 063 13N 19W 32 CDBA Well #9

MONTANA STATE BOARD OF HEALTH
Division of Sanitary Engineering
Helena, Montana

013359

WELL DRILLER'S REPORT

MWC#09

Driller's Registration No. 215

Driller: Camp & Phelps Address: 705 Alder

Owner of Well: Montana Power Mt. WATER Co.

Exact Location of Well:

Nearest Post Office: Missoula County: Missoula

Water to be Used for: City of Missoula

Drilling Begun: 8/17/54 Well Finished: 9/2/54

Indicate on the diagram the character and thickness of the different strata met with in drilling, such as soil, clay, shale, gravel, rock or sand, etc. Show depth at which water is encountered, thickness and character of water-bearing strata and height to which the water rises in the well.

Top of Ground

(Elev. above sea level ________)

0 to 14' gravel & clay
14' to 16' sand
16' to 44' gravel & clay
44' to 74' sand, gravel with clay-little water
74' to 78' gravel with clay-little water
78' to 88' gravel with little sand & water
88' to 111' gravel & clay-little water
111' to 115' sand, gravel & water
115' to 128' clay, gravel & boulders
128' to 132' gravel & boulders with water

Show exact depth of bottom.

Casing Record

Size of Pipe	Kind and Weight of Material Used	From (Feet)	To (Feet)	Perforations: Kind Size	Perforations: From (Feet)	Perforations: To (Feet)
12¼" I.D.		0	17'	Slotted with Mills Knife	Perforated At 78' 80' 81' 82' 83' 84' 85' 86' 87' 112' 113'	114' 115' 116'
12" I.D.	45 lbs. per foot	17'	132'	6 holes to the foot		
	Pipe lengths in well: 11-6" drive shoe 7-4" 10-7" 8-9" 10-0" 9-4" 10-0" 10-0" 9-4" 7-0" 10-7" 9-4" 10-0" 8-3"					

Describe the type of joints in casing: Welded

Describe any screens used: ________

Capacity of Well: ________ (In Gallons or Barrels)

How Determined: ________ (Pump, Bailer, Weir, Etc.)

Signed: Camp and Phelps

Date: 9/5/54

(Law and Regulations on Reverse Side)

ORIGINAL — TO BE SENT TO THE STATE BOARD OF HEALTH

M. 69353

Approved Stock Form—State Publishing Co., Helena, Montana—38496

File No. 063 T. 13N R. 19W 32

MWC#09

TRIPLICATE

County Missoula

STATE OF MONTANA
ADMINISTRATOR OF GROUNDWATER CODE
OFFICE OF STATE ENGINEER

Declaration of Vested Groundwater Rights

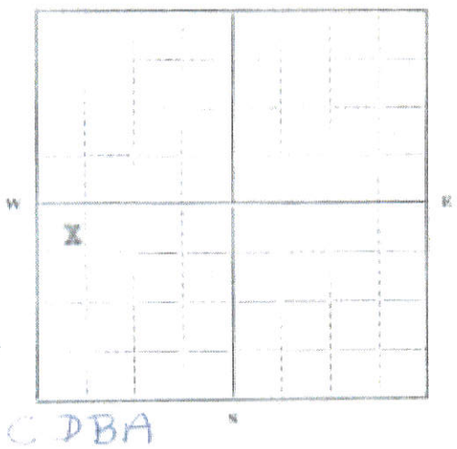
(Under Chapter 237, Montana Session Laws, 1961)

1980 Mountain Water Co Missoula

1. The Montana Power Company, of 40 East Broadway Butte
(Name of Appropriator) (Address) (Town)

County of Missoula State of Montana
have appropriated groundwater according to the Montana laws in effect prior to January 1, 1962, as follows:

Well #9



CDBA

NW¼SW¼ Sec. 32 T13N R 19W

Indicate point of appropriation and place of use, if possible. Each small square represents 10 acres.

2. The beneficial use on which the claim is based Municipal supply

a. Date or approximate date of earliest beneficial use; and how continuous the use has been May 1955, 24 hrs. per day for each year since 1955

4. The amount of groundwater claimed (in miner's inches or gallons per minute) 1,200 gallons per minute - 24 hours per day

5. If used for irrigation, give the acreage and description of the lands to which water has been applied and name of the owner thereof

6. The means of withdrawing such water from the ground and the location of each well or other means of withdrawal. Pumped from well

7. The date of commencement and completion of the construction of the well, wells, or other works for withdrawal of groundwater Started drilling Aug. 17, 1954, well completed Sept. 2, 1954

8. The depth of water table 50'

9. So far as it may be available, the type, size and depth of each well or the general specifications of any other works for the withdrawal of groundwater Well 12¼" I.D. steel casing - 132' deep

10. The estimated amount of groundwater withdrawn each year 125,000,000 gallons

11. The log of formations encountered in the drilling of each well if available 0' to 111' clay, sand, gravel and some boulders, 111' to 132' gravel

12. Such other information of a similar nature as may be useful in carrying out the policy of this act, including reference to book and page of any county record

(CORPORATE SEAL)
ATTEST: [signature]
Its Secretary

THE MONTANA POWER COMPANY
Signature of Owner By [signature]
Vice President
Date February 1, 1962

PE

Three copies to be filed by the owner with the County Clerk and Recorder of the county in which the well is located.

Please answer all questions. If not applicable, so state, otherwise the form will be returned.

Original to the County Clerk and Recorder; duplicate to the State Engineer; Triplicate to the Montana Bureau of Mines and Geology, and Quadruplicate for the Appropriator.

GW 4

Approved Stock Form—State Publishing Co., Helena, Montana—38496

1=013163

File No.

063 S. 13N R. 19W 27 BC

TRIPLICATE

County Missoula

MWC#10

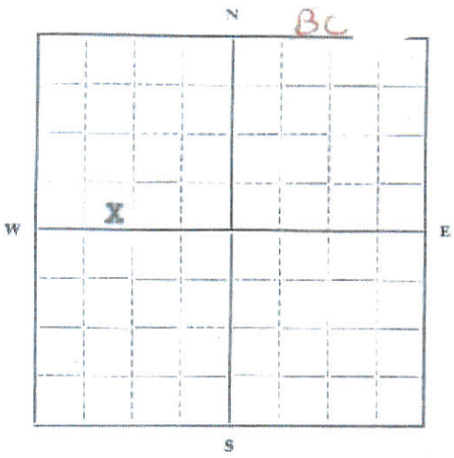
STATE OF MONTANA
ADMINISTRATOR OF GROUNDWATER CODE
OFFICE OF STATE ENGINEER

Declaration of Vested Groundwater Rights

(Under Chapter 237, Montana Session Laws, 1961)

1. The Montana Power Company of 40 East Broadway Butte
(Name of Appropriator) (Address) (Town)

County of Missoula State of Montana
have appropriated groundwater according to the Montana laws in effect prior to January 1, 1962, as follows:



SW ¼ NW ¼ Sec. 27 T 13N R. 19W

Indicate point of appropriation and place of use, if possible. Each small square represents 10 acres.

2. The beneficial use on which the claim is based Municipal supply

3. Date or approximate date of earliest beneficial use; and how continuous the use has been June 1957, 24 hrs. per day for each year since 1957

4. The amount of groundwater claimed (in miner's inches or gallons per minute) 1,200 gallons per minute - 24 hours per day

5. If used for irrigation, give the acreage and description of the lands to which water has been applied and name of the owner thereof

6. The means of withdrawing such water from the ground and the location of each well or other means of withdrawal Pumped from well

7. The date of commencement and completion of the construction of the well, wells, or other works for withdrawal of groundwater Started drilling May 17, 1957, well completed June 18, 1957

8. The depth of water table 77'

9. So far as it may be available, the type, size and depth of each well or the general specifications of any other works for the withdrawal of groundwater Well 12" I.D. steel casing - 150' deep

10. The estimated amount of groundwater withdrawn each year 100,000,000 gallons

11. The log of formations encountered in the drilling of each well if available 0' to 123' clay, sand fine gravel, coarse gravel and some boulders, 123' to 150' few boulders, coarse gravel and some sand.

12. Such other information of a similar nature as may be useful in carrying out the policy of this act, including reference to book and page of any county record

(CORPORATE SEAL)
ATTEST: [signature]
Its Secretary

THE MONTANA POWER COMPANY
Signature of Owner By [signature]
Vice President
Date February 1, 1962

Three copies to be filed by the owner with the County Clerk and Recorder of the county in which the well is located.

Please answer all questions. If not applicable, so state, otherwise the form will be returned.

Original to the County Clerk and Recorder; duplicate to the State Engineer; Triplicate to the Montana Bureau of Mines and Geology, and Quadruplicate for the Appropriator.

52850

063 T. 13N. R. 19W. 27 BCDA

County Missoula MWC#10

13 3

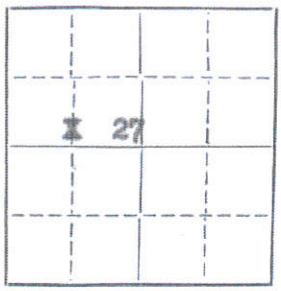
MONTANA BUREAU OF MINES AND GEOLOGY

Butte, Montana

013163

WATER WELL LOG

Mountain Water Company
Missoula Division
Well #10



Owner THE MONTANA POWER COMPANY Address Missoula, Montana

Driller Glenn Camp Address 705 Alder - Missoula

Date Started May 17, 1957 Date Completed June 18, 1957

Location: Sec. 27 T. 13N. R. 19W. ¼ sec. NW¼, SW, SE, NE

Type of well Drilled (Dug, driven, bored, or drilled) Equipment used Churn Drill (Churn drill, rotary, other)

Water use: Domestic ☐ Municipal ☒ Stock ☐ Irrigation ☐

Industrial ☐ Drainage ☐ Other:

Casing: 0 ft. to 147'8" ft. Type Seamless Size 12" I.D.

Casing: ft. to ft. Type Size

Casing: ft. to ft. Type Size

Perforated or ~~Screened~~: 95' to 100' Ft. 110' to ft. 120' Ft. 135' to ft. 146'

Type of screen or perforations Mills Knife 3/8" x 3" 8 Holes per Foot.

Static Water level, for non-flowing well: Seventy feet.

Shut-in pressure, for flowing well: lb./sq. in. on: (date)

Pumping water level 90 feet at 1200 gal. per min.

How tested:

Length of test

Remarks: (Gravel packing, cementing, packers, type of shut-off, depth of shut-off)

(over)

M:132850

MWC#10

Log of Well

Depth, feet From	Depth, feet To	Description of Material Drilled
0'	10'	Soil, Gravel, Sand loose formation
10'	60'	Clay, Coarse Gravel and Sand, Some Small Boulders with Clay,
		Tight Formation
60'	70'	Clay, Medium to Coarse Gravel and Sand
70'	77'	Fairly loose Gravel, Sand and Some Clay - First Water of 77 ft.
77'	95'	Fine to Medium Gravel and Sand
95'	112'	Thin layers of Clay, Sand and loose Rock with Water
112'	123'	Small Boulders Sand and Some Clay with Water
123'	130'	Clay and Boulders
130'	132'	Sand
132'	147'8"	Coarse Gravel and Sand with Water

I received and filed this instrument for record on the 7 day of Oct. A.D. 1953 at 3:05 o'clock P. M. in the [illegible] of Missoula County, State of Montana.
Witness my hand
EVELYN LUND [illegible] Recorder
By [illegible] Deputy
Fee $ 50¢ Paid

14

146876

Copy

063 T. 13N. R. 19W. 33 ACDA

County Missoula

MWC#11

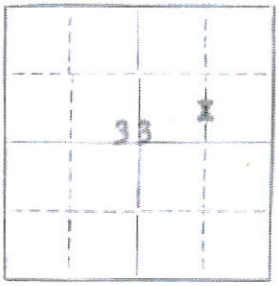
MONTANA BUREAU OF MINES AND GEOLOGY

Butte, Montana

013374

Montana Water Company well #11

WATER WELL LOG



Owner ~~THE MONTANA POWER COMPANY~~ Address Missoula, Montana

Driller Glenn Camp Address 705 Alder - Missoula

Date Started June 21, 1957 Date Completed July 4, 1957

Location: Sec. 33 T. 13N. R. 19W. ¼ sec. NE¼ ACDA

Type of well Drilled (Dug, driven, bored, or drilled) Equipment used Churn Drill (Churn drill, rotary, other)

Water use: Domestic ☐ Municipal ☒ Stock ☐ Irrigation ☐

Industrial ☐ Drainage ☐ Other:

Casing: 0 ft. to 118'6" ft. Type Seamless Size 12" I.D.

Casing: ft. to ft. Type Size

Casing: ft. to 90' ft. Type 115' Size

Perforated or Screened: Ft. to ft. Ft. to ft.

Type of screen or perforations Mill Knife 3/8" x 3" 8 Holes per Foot.

Static Water level, for non-flowing well: feet.

Shut-in pressure, for flowing well: 90' lb. sq. in. on: 1200 (date)

Pumping water level feet at gal. per min.

How tested:

Length of test

Remarks: (Gravel packing, cementing, packers, type of shut-off, depth of shut-off)

FE

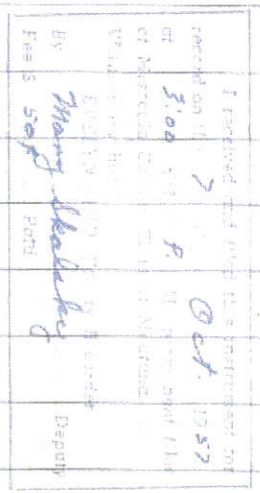
(over)

MWC#11

Log of Well

Depth, feet From	Depth, feet To	Description of Material Drilled
0'	8'	Black Muck and Gravel
8'	54'	Yellow Clay and Gravel
54'	56'	Sand and Small Gravel - Some Water
56'	77'	Clay and Gravel
77'	86'	Sand and Small Gravel - Some Water
86'	115'	Sand and Large Gravel with Water
115'	117'	Clay and Gravel

13



149875

File No.................................

063 T. 13N R. 19W 33 AC

TRIPLICATE

County Missoula

RECEIVED APR 2 1962 Montana Bureau of Mines and Geology

RECEIVED 13 Montana Bureau of Mines and Geology

MWC#11

Miss. #11

013374

STATE OF MONTANA
ADMINISTRATOR OF GROUNDWATER CODE
OFFICE OF STATE ENGINEER

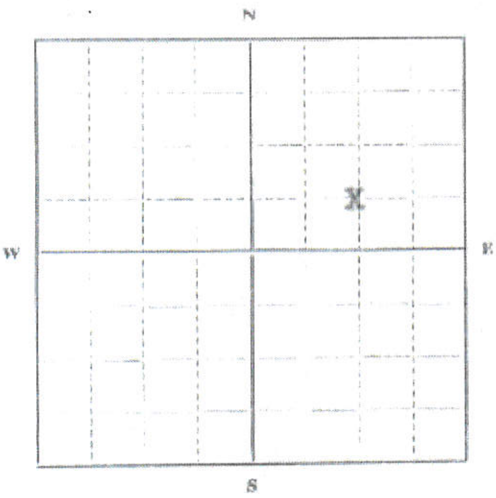
Declaration of Vested Groundwater Rights

(Under Chapter 237, Montana Session Laws, 1961)

1. The Montana Power Company (Name of Appropriator), of 40 East Broadway (Address) Butte (Town)

County of Missoula State of Montana

have appropriated groundwater according to the Montana laws in effect prior to January 1, 1962, as follows:



SE ¼ NE¼ Sec. 33 T13N R.19W

Indicate point of appropriation and place of use, if possible. Each small square represents 10 acres.

2. The beneficial use on which the claim is based Municipal supply

3. Date or approximate date of earliest beneficial use; and how continuous the use has been July 1957, 24 hrs. per day for each year since 1935

4. The amount of groundwater claimed (in miner's inches or gallons per minute) 1,200 gallons per minute - 24 hours per day

5. If used for irrigation, give the acreage and description of the lands to which water has been applied and name of the owner thereof

6. The means of withdrawing such water from the ground and the location of each well or other means of withdrawal Pumped from well

7. The date of commencement and completion of the construction of the well, wells, or other works for withdrawal of groundwater Started drilling June 21, 1957, well completed July 4, 1957

8. The depth of water table 56'

9. So far as it may be available, the type, size and depth of each well or the general specifications of any other works for the withdrawal of groundwater Well 12" I.D. steel casing - 118' deep

10. The estimated amount of groundwater withdrawn each year 95,000,000 gallons

11. The log of formations encountered in the drilling of each well if available 0' to 86' clay, sand and small gravel, 86' to 118' some sand and large gravel

12. Such other information of a similar nature as may be useful in carrying out the policy of this act, including reference to book and page of any county record

(CORPORATE SEAL)
ATTEST: [signature]
Its Secretary

THE MONTANA POWER COMPANY

Signature of Owner By [signature] Vice President

Date February 1, 1962

Three copies to be filed by the owner with the County Clerk and Recorder of the county in which the well is located.

Please answer all questions. If not applicable, so state, otherwise the form will be returned.

Original to the County Clerk and Recorder; duplicate to the State Engineer; Triplicate to the Montana Bureau of Mines and Geology, and Quadruplicate for the Appropriator.

GW 1

Approved Stock Form—State Publishing Co., Helena, Montana—39089

File No. .....

T. 13N R. 19W

TRIPLICATE

County MISSOULA

STATE OF MONTANA
ADMINISTRATOR OF GROUNDWATER CODE
OFFICE OF STATE ENGINEER

MWC#12

Notice of Appropriation of Groundwater

(Under Chapter 237, Montana Session Laws, 1961)

1. I, THE MONTANA POWER COMPANY, of Missoula
(Name of Appropriator) (Address) (Town)
County of Missoula, State of Montana, intend to appropriate groundwater in accordance with Chapter 237, Montana Session Laws of 1961.

2. The beneficial use to which water is to be applied is Municipal Use

(describe lands to be benefited, if for irrigation)

3. The rate of use in gallons per minute or miner's inches of groundwater claimed 800 GPM

4. The annual period (inclusive dates) of intended use 12 Months

5. The probable or intended date of first beneficial use July 1964

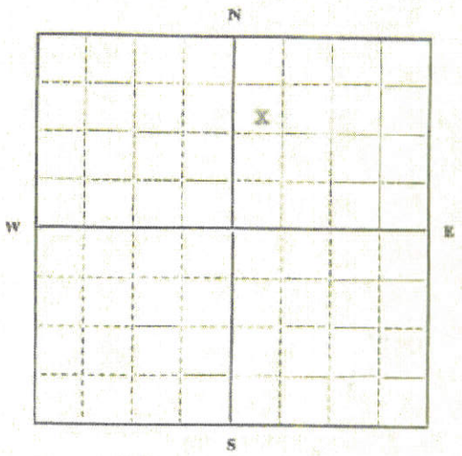
6. The probable or intended date of commencement and completion of the well* or wells* July 1964

7. The location, type, size and depth of well or wells contemplated East Missoula, Churn Drilled, Cased with 49#, 12" Casing

8. The probable or estimated depth of the water table or artesian aquifier 60 Feet

9. Name, address and license number of the driller engaged Glenn Camp, 705 Alder Street, Missoula, Montana, License No. 7

10. Give such other similar information as may be useful in carrying out the policy of this act.....



NE ¼ Sec. 24 T. 13N R. 19W
Locate well or other means of development as accurately as possible on the plat.

Signature of Appropriator H. McCrea
MISSOULA DIVISION MANAGER

Date July 13, 1964

* As defined in the Code Sec. 1 (c) "Well" means any artificial opening or excavation in the ground, however made, by which groundwater can be obtained or through which it flows under natural pressures or is artificially withdrawn."

Three copies of this notice are to be filed with County Clerk and Recorder of the county in which the well is located.

Please answer all questions. If not applicable, so state, otherwise the form will be returned.

Original to the County Clerk and Recorder; duplicate to the State Engineer; Triplicate to the Montana Bureau of Mines and Geology and Quadruplicate for the Appropriator.

132848

GW 2 — Approved Stock Form—State Publishing Co., Helena, Montana—40472 — NUMBER (13)

File No. 063 T 13N R 19W 14

TRIPLICATE

RECEIVED SEP 30 1964 Montana Bureau of Mines and Geology

County Missoula

STATE OF MONTANA
ADMINISTRATOR OF GROUNDWATER
OFFICE OF STATE ENGINEER

012683

Notice of Completion of Groundwater Appropriation by Means of Well

MWC#13

(Under Chapter 237, Montana Session Laws, 1961)

Top of Ground
(Elev. above sea level.....)

0 to 17' Boulders, gravel & clay
17' to 19' small gravel
19' to 31' Boulders & gravel
31' to 32' boulder, gravel & water
32' to 47' Clay & gravel
47' to 50' Gravel & water
50' to 55' Clay & gravel
55' to 78' Gravel & water
78' to 98' Gravel & clay
98' to 113' Clay, gravel & water
113' to 123' Gravel & water
123' to 127' Clay & gravel

Owner Montana Power Address Well up the [redacted]

Driller Glenn Camp 705 Alder Address Missoula, Montana

Date of Notice of Appropriation of Groundwater.....

Date well started June 13, 1964 Date Completed July 8, 1964

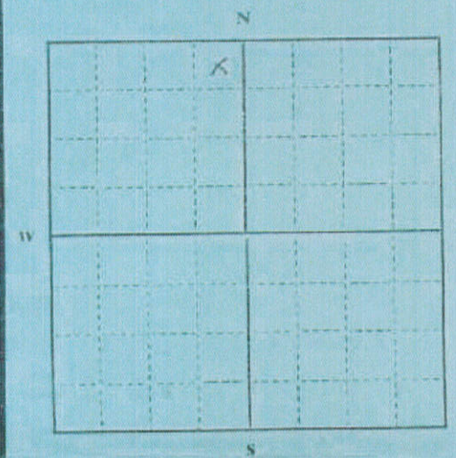
Type of well Drilled (dug, driven, bored or drilled) Equipment Used Churn drill (Churn, drill, rotary or other)

Water Use: Domestic ☐ Municipal ☑ Other ☐ Irrigation ☐
Industrial ☐ Drainage ☐ Stock ☐

☞ Indicate on the diagram the character and thickness of the different strata met with in drilling, such as soil, clay, shale, gravel, rock or sand, etc. Show depth at which water is encountered, thickness and character of water-bearing strata and height to which water rises in the well.

Montana Water Company
Missoula Division
Well #13
Mountain View Drive

Size of Drilled Hole	Size and Weight of Casing	From (Feet)	To (Feet)	PERFORATIONS Kind Size	From (Feet)	To (Feet)
12"	12" I.D. 53.56 # to ft	3' above G.L. to 130'-1"		Mills knife	70' 113'	78' 123'
				6 holes to circle		
				Circles 8" apart		



NW¼ Sec. 14 T. 13N R. 19W
Indicate location of well and place of use, if possible. Each small square represents 10 acres.

Show exact depth of bottom.

Static Water Level for non-flowing Well 25' from G.L. feet.

Shut-in Pressure for Flowing Well.....

Pumping Water Level 85 feet at 800 gal. per minute.

Discharge in gal. per min. of flowing well.....

How Tested Test Pump Length of Test 7 hours

Remarks: (Gravel packing, cementing, packers, type of shutoff, location of place of use of groundwater if not at well, and any other similar pertinent information, including number of acres irrigated, if used for irrigation).....

THE MONTANA POWER CO.
By Wil Talbott
Vice President
40 E. Broadway
Butte, Montana
APPROPRIATOR

License # 7
Driller's License Number

Glenn Camp
Driller's Signature

This form to be prepared by driller, and three copies to be filed by the owner with the County Clerk and Recorder in the county in which the well is located.

Please answer all questions. If not applicable, so state, otherwise the form will be returned.

Original to the County Clerk and Recorder; duplicate to the State Engineer; Triplicate to the Montana Bureau of Mines and Geology and Quadruplicate for the Appropriator.

M:68519

GW 1 15N 19W 17 D

Approved Stock Form—State Publishing Co., Helena, Montana—39089

File No.....

T 13N R 19W

TRIPLICATE

County MISSOULA

STATE OF MONTANA
ADMINISTRATOR OF GROUNDWATER CODE
OFFICE OF STATE ENGINEER

MWC#13

Notice of Appropriation of Groundwater

(Under Chapter 237, Montana Session Laws, 1961)

1. I, THE MONTANA POWER COMPANY, of Missoula
(Name of Appropriator) (Address) (Town)
County of Missoula, State of Montana, intend to appropriate groundwater in accordance with Chapter 237, Montana Session Laws of 1961.

2. The beneficial use to which water is to be applied is Municipal Use
(describe lands to be benefited, if for irrigation)

3. The rate of use in gallons per minute or miner's inches of groundwater claimed 800 GPM

4. The annual period (inclusive dates) of intended use May to October (1964)

5. The probable or intended date of first beneficial use July 1964

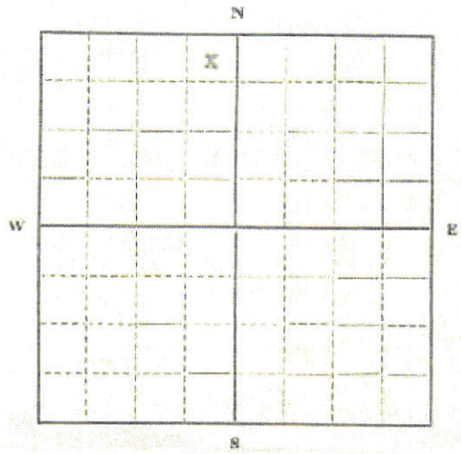
6. The probable or intended date of commencement and completion of the well* or wells* July 1964

7. The location, type, size and depth of well or wells contemplated Street, Churn Drilled with 49#, 12" Casing

8. The probable or estimated depth of the water table or artesian aquifer 60 Feet

9. Name, address and license number of the driller engaged Glenn Camp, 705 Alder Street, Missoula, Montana, License No. 7

10. Give such other similar information as may be useful in carrying out the policy of this act.....



NW ¼ Sec. 14 T 13N R 19W

Locate well or other means of development as accurately as possible on the plat.

Signature of Appropriator D. J. McGee
MISSOULA DIVISION MANAGER

Date July 13, 1964

* As defined in the Code Sec. 1 (c) "Well" means any artificial opening or excavation in the ground, however made, by which groundwater can be obtained or through which it flows under natural pressures or is artificially withdrawn."

Three copies of this notice are to be filed with County Clerk and Recorder of the county in which the well is located.

Please answer all questions. If not applicable, so state, otherwise the form will be returned.

Original to the County Clerk and Recorder; duplicate to the State Engineer; Triplicate to the Montana Bureau of Mines and Geology and Quadruplicate for the Appropriator.

68519

Butte

DUPLICATE

#16 12N 19W 06 BACD

County

MISSO44A

094849

MWC#16

STATE OF MONTANA
ADMINISTRATOR OF GROUNDWATER CODE
OFFICE OF STATE ENGINEER

Notice of Completion of Groundwater Appropriation by Means of Well

DEVELOPED AFTER JANUARY 1, 1962

(Under Chapter 237, Montana Session Laws, 1961)

LOG

Top of Ground

(Elev. above sea level..................)

0 to 3' top soil
3' to 41' gravel & yellow clay
41' to 57' water, gravel sand and clay
57' to 62' Sand & water
62' to 80' gravel, sand & water
80' to 87' Clay & gravel
87' to 89' water, fine sand, clay
89' to 97' heavy gravel water, fine sand, some clay
97' to 117' gravel sand and water
117' to 120' gravel, sand, water & trace of clay.

.PE

Show exact depth of bottom.

Owner: Montana Power Co. Address

Driller: Glenn Camp 705 Alder Address: Missoula, Montana

Mountain Water Co Missoula Division Well # 16

Date of Notice of appropriation of groundwater

Date well started: June 1, 1966 Date completed: June 22, 1966

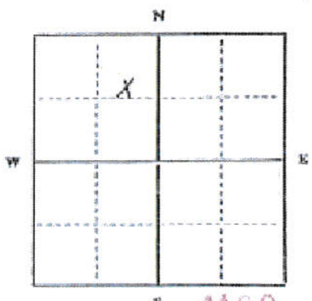
Type of well: Drilled (Dug, driven, bored or drilled) Equipment used: Churn Drill (Churn drill, rotary or other)

Water use: Domestic ☐ Municipal ☒ Stock ☐ Irrigation ☐ Industrial ☐ Drainage ☐ Other ☐

Indicate on the diagram the character and thickness of the different strata met with in drilling, such as soil, clay, shale, gravel, rock or sand, etc. Show depth at which water is encountered, thickness and character of water-bearing strata and height to which the water rises in the well.

Size of Drilled Hole	Size and Weight of Casing	From (Feet)	To (Feet)	PERFORATIONS Kind Size	From (Feet)	To (Feet)
12"	12" 49#				101'	119'
				6 perforations to a circle – 4" apart 168 perforations		

GPS Info
Lat =
Long =
Altitude = 3158.193



BACD

NE 1/4 NW 1/4 Sec. 6 T12N R19W

Indicate location of well and place of use, if possible. Each small square represents 40 acres.

Static Water Level for non-flowing well: [illegible] from top of pipe feet.

Shut-in Pressure for Flowing Well: Not tested with

Pumping Water Level: test pump feet at approx 1500 gal. per minute.

Discharge in gal. per min. of flowing well

How Tested: Not tested

Length of Test

Remarks: (Gravel packing, cementing, packers, type of shutoff)

(Continue on reverse side)

USE—If used for irrigation, industrial, drainage or other. Explain, state number of acres and location or other data (i.e., Lot, Block and Addition).

License 7

Driller's License Number

Driller's Signature

This form to be prepared by driller, and three copies to be filed by the owner with the County Clerk and Recorder in the county in which the well is located, tissue copy to be retained by driller.

Please answer all questions. If not applicable, so state, otherwise the form will be returned.

M:132828

Butte   #16   12N 19W 06 BACD   MISS044A

DUPLICATE   County..........

094849

LOG

STATE OF MONTANA
ADMINISTRATOR OF GROUNDWATER CODE
OFFICE OF STATE ENGINEER

Top of Ground

(Elev. above sea level..........)

Notice of Completion of Groundwater Appropriation by Means of Well

MWC#16

DEVELOPED AFTER JANUARY 1, 1962

(Under Chapter 237, Montana Session Laws, 1961)

0 to 3' top soil
3' to 41' gravel & yellow clay
41' to 57' water, gravel sand and clay
57' to 62' sand & water
62' to 80' gravel, sand & water
80' to 87' Clay & gravel
87' to 89' water, fine sand, clay
89' to 97' heavy gravel water, fine sand, some clay
97' to 117' gravel sand and water
117' to 120' gravel, sand, water & trace of clay.

.PE

Owner Montana Power Co. Address

Driller Glenn Camp 705 Alder Address Missoula, Montana

Date of Notice of appropriation of groundwater..........

Date well started June 1, 1966 Date completed June 22, 1966.

Type of well Drilled (Dug, driven, bored or drilled) Equipment used Churn Drill (Churn drill, rotary or other)

Water use: Domestic ☐ Municipal ☒ Stock ☐ Irrigation ☐ Industrial ☐ Drainage ☐ Other ☐

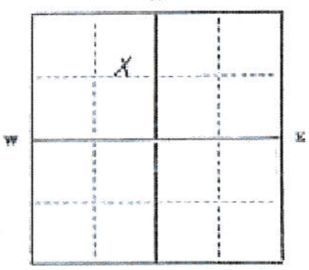
Mountain Water Co
Missoula Division
Well # 16

Indicate on the diagram the character and thickness of the different strata met with in drilling, such as soil, clay, shale, gravel, rock or sand, etc. Show depth at which water is encountered, thickness and character of water-bearing strata and height to which the water rises in the well.

Size of Drilled Hole	Size and Weight of Casing	From (Feet)	To (Feet)	PERFORATIONS Kind Size	From (Feet)	To (Feet)
12"	12" 49#				101'	119'
				6 perforations to a circle - 3" apart 168 perforations		

GPS Info
Lat =
Long =
Altitude= 3158.193

N



S   BACD

NE 1/4 NW 1/4 Sec. 6 T12N. R19W
Indicate location of well and place of use, if possible. Each small square represents 40 acres.

Static Water Level for non-flowing well 31½' from top of pipe feet.

Shut-in Pressure for Flowing Well..........

Pumping Water Level not tested with test pump feet at approx 1500 gal. per minute.

Discharge in gal. per min. of flowing well..........

How Tested Not tested

Length of Test..........

Remarks: (Gravel packing, cementing, packers, type of shutoff)..........

..........(Continue on reverse side)

USE—If used for irrigation, industrial, drainage or other. Explain, state number of acres and location or other data (i.e.: Lot, Block and Addition).

Show exact depth of bottom.

License 7

Driller's License Number

This form to be prepared by driller, and three copies to be filed by the owner with the County Clerk and Recorder in the county in which the well is located, tissue copy to be retained by driller.

Please answer all questions. If not applicable, so state, otherwise the form will be returned.

Driller's Signature

M:132828

GW 2 — Approved Stock Form—State Publishing Co., Helena, Montana 43642

File No. [redacted]

063 T 14 N R 20 W 35 BACB

TRIPLICATE

County Missoula MWC#17

LOG

STATE OF MONTANA
ADMINISTRATOR OF GROUNDWATER
OFFICE OF STATE ENGINEER

014340

Notice of Completion of Groundwater Appropriation by Means of Well

DEVELOPED AFTER JANUARY 1, 1962

(Under Chapter 237, Montana Session Laws, 1961)

Missoula Water #17

Owner THE MONTANA POWER CO. Address [redacted]

Driller Glenn Camp Address Missoula, Montana

Date of Notice of appropriation of groundwater

Date well started August 6, 1962 Date completed Oct. 30, 1962

Type of well Drilled Equipment used Churn Drill
(Dug, driven, bored or drilled) (Churn drill, rotary or other)

Water use: Domestic ☐ Municipal ☑ Stock ☐ Irrigation ☐
Industrial ☐ Drainage ☐ Other ☐

Indicate on the diagram the character and thickness of the different strata met with in drilling, such as soil, clay, shale, gravel, rock or sand, etc. Show depth at which water is encountered, thickness and character of water-bearing strata and height to which the water rises in the well.

Top of Ground

(Elev. above sea level)

Well for Industrial Site
N. W. of Fire Research Center

0-1	Topsoil
1-79	Gravel & Clay
79-85	Water, Sand, Gravel, Some Clay
85-90	Sand, Gravel & Clay
90-104	Clay
104-106	Water, Sand & Gravel
106-130	Clay & Gravel
130-132	Water, sand & Gravel
132-157	Gravel & Clay, Water seepage
157-171	Clay
171-179	Sand, Gravel, water, Traces of clay
179-189	Clay, sand & Gravel
189-201	Yellow Clay
201-212	Blue gray clay
212-213	Gravel & clay
213-220	Blue & yellow clay, carbolized
220-238	Blue gray clay
238-242	Gravel & clay
242-252	Gray clay
252-263	Sand, yellow clay, seep of water
263-270	clay
270-281	Brown clay
281-285	Brown sandy clay
285-297½	Water, sand
297½-299	Some gravel, sand, water
299-302	Clay & gravel
302-311	Gravel, sand, some clay, water
311-317	More clay, sand, gravel, water
317-327	Sand, gravel, water & clay
327-336	Sand, gravel, loose, a little clay, water
336-338	tan clay, gravel, sand no water
338-342	Gravel, sand, some clay, some water
342-346	Gravel, sand, some clay, some water
346-360	Gravel, sand, some clay

Size of Drilled Hole	Size and Weight of Casing	From (Feet)	To (Feet)	PERFORATIONS Kind Size	From (Feet)	To (Feet)
16"O.D.	16"O.D. 282.22 62.58 lb per ft.	2' above G.L.	360'	Mills Knife 3/8" x 3"	177' total-42 holes 319' total- 72 holes 335 total-120 holes	181' 326' 344

N

X

W E

S

Indicate location of well and place of use, if possible. Each small square represents 40 acres.

NW SW NE ¼ NW ¼ Sec. 35 T 14 N R 20 W

Static Water Level for non-flowing well 107 feet.
Drawdown- 6'

Shut-in Pressure for Flowing Well NA

Pumping Water Level 113 feet

at 500 gal. per minute.

Discharge in gal. per min. of flowing well NA

How Tested Air Compressor

Length of Test 55 hours

Remarks: (Gravel packing, cementing, packers, type of shutoff)

Lot [redacted]
Alt 3240

(Continue on reverse side)

USE If used for irrigation, industrial, drainage or other. Explain, state number of acres and location or other data (i.e.: Lot, Block and Addition).

NA

THE MONTANA POWER COMPANY
By K. A. Neel
Vice President

40 E. Broadway
Butte, Montana 59701
APPROPRIATOR

Show exact depth of bottom.

This form to be prepared by driller, and three copies to be filed by the owner with the County Clerk and Recorder in the county in which the well is located, tissue copy to be retained by driller.

Please answer all questions. If not applicable, so state, otherwise the form will be returned.

License # 7

Driller's License Number

Glenn Camp

Driller's Signature.

File No. 063 T 14 N R 20 W 35 BAA

TRIPLICATE

County Missoula

MWC#17

STATE OF MONTANA
ADMINISTRATOR OF GROUNDWATER CODE
OFFICE OF STATE ENGINEER

Notice of Appropriation of Groundwater

(Under Chapter 237, Montana Session Laws, 1961)

1. I, The Montana Power Company, of 40 E. Broadway, Butte, (Name of Appropriator) (Address) (Town) County of Silver Bow, State of Montana, intend to appropriate groundwater in accordance with Chapter 237, Montana Session Laws of 1961.

2. The beneficial use to which water is to be applied is for municipal water supply purposes
(describe lands to be benefited, if for irrigation)

3. The rate of use in gallons per minute or miner's inches of groundwater claimed five hundred (500) gallons per minute

4. The annual period (inclusive dates) of intended use January 1 through December 31 each year.

5. The probable or intended date of first beneficial use October 30, 1968

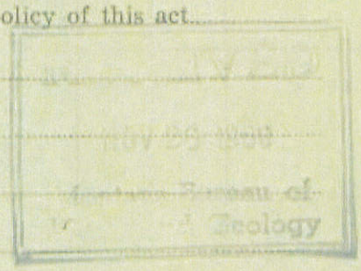
6. The probable or intended date of commencement and completion of the well* or wells* Commencement: August 8, 1968. Completion: October 30, 1968.

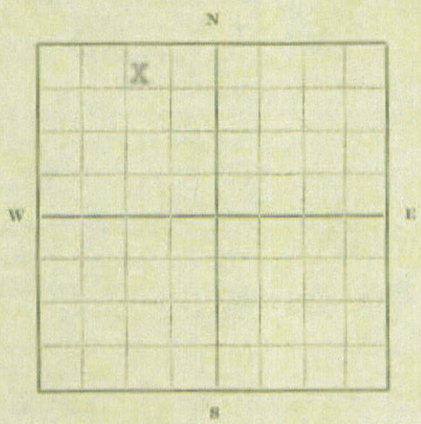
7. The location, type, size and depth of well or wells contemplated Churn drilled, 16" well 360' deep.

8. The probable or estimated depth of the water table or artesian aquifer at 171'-179', 289'-346'

9. Name, address and license number of the driller engaged Glenn Camp, 1522 S. 14th W., Missoula, Montana License #7

10. Give such other similar information as may be useful in carrying out the policy of this act.





THE MONTANA POWER COMPANY
By R. A. Neel
Vice President

40 E. Broadway, Butte, Montana 59701
APPROPRIATOR

NW ¼ Sec. 35 T14N R20W
Locate well or other means of development as accurately as possible on the plat.

Signature of Appropriator

Date November, 1968

* As defined in the Code Sec. 1 (c) "Well" means any artificial opening or excavation in the ground, however made, by which groundwater can be obtained or through which it flows under natural pressures or is artifically withdrawn."

Three copies of this notice are to be filed with County Clerk and Recorder of the county in which the well is located.

Please answer all questions. If not applicable, so state, otherwise the form will be returned.

Original to the County Clerk and Recorder; duplicate to the State Engineer; Triplicate to the School of Mines and Quadruplicate for the Appropriator.

Missoula W.O. 31391 12N. 19W 04 BG

GW 2

Approved Stock Form—State Publishing Co., Helena, Montana—4541

File No. .....

T ..... R .....

County .....

ORIGINAL

LOG

STATE OF MONTANA
ADMINISTRATOR OF GROUNDWATER CODE
OFFICE OF STATE ENGINEER

131478

Notice of Completion of Groundwater Appropriation by Means of Well

DEVELOPED AFTER JANUARY 1, 1962

MWC#18

(Under Chapter 237, Montana Session Laws, 1961)

Top of Ground

(Elev. above sea level.....)

0–4 Topsoil

4–29 Clay & Gravel

29–60 Water, Sand, Gravel

60–64 Clay & Gravel

64–80 Water, Sand & Gravel

80–83 Clay & Gravel

83–87 Sand & fine Gravel Water

87–105 Sand, large gravel Water

Show exact depth of bottom.

Owner MONTANA POWER COMPANY Address 32th & Ghaccatt 1522 S. 14th W.

Driller Glenn Camp Address Missoula, Montana

Date of Notice of appropriation of groundwater .....

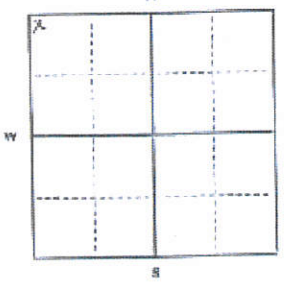
Date well started July 19, 1968 Date completed August 6, 1968

Type of well Drilled Equipment used Churn Drill
(Dug, driven, bored or drilled) (Churn drill, rotary or other)

Water use: Domestic ☐ Municipal ☒ Stock ☐ Irrigation ☐
Industrial ☐ Drainage ☐ Other ☐

Indicate on the diagram the character and thickness of the different strata met with in drilling, such as soil, clay, shale, gravel, rock or sand, etc. Show depth at which water is encountered, thickness and character of water-bearing strata and height to which the water rises in the well.

Size of Drilled Hole	Size and Weight of Casing	From (Feet)	To (Feet)	PERFORATIONS Kind Size	From (Feet)	To (Feet)
16" I.D.	16" I.D. 62.58 lb per ft.	1½' above G.L.	105'	Mills Knife 3/8" x 4"	95'	703'
				21 circles 8" apart 10 per circle		
				Total of 210 perf.		



NW ¼ NW ¼ Sec. 6 T 12 N R 19 W

Indicate location of well and place of use, if possible. Each small square represents 40 acres.

Static Water Level for non-flowing well 30'7" feet.
from top of pipe

Shut-in Pressure for Flowing Well .....

Pumping Water Level 38½ feet

at 1000 gal. per minute.

Discharge in gal. per min. of flowing well .....

How Tested Test Pump

Length of Test 7½ hours

Remarks: (Gravel packing, cementing, packers, type of shutoff) 2 Sacks of Cement set up in bottom of well.

(Continue on reverse side)

USE—If used for irrigation, industrial, drainage or other. Explain, state number of acres and location or other data (i.e.: Lot, Block and Addition).

This form to be prepared by driller, and three copies to be filed by the owner with the County Clerk and Recorder in the county in which the well is located, tissue copy to be retained by driller.

Please answer all questions. If not applicable, so state, otherwise the form will be returned.

License # 7
Driller's License Number

Glenn Camp
Driller's Signature Glenn Camp

W6872- M178752

1SN14W16\B   MISSOULA ... #19   Approved Stock Form—State Publishing Co., Helena, Montana—42329

No.________________   T.________ R.________

Mountain Water Company
#19 Well #19

GINAL   County________________

LOG   W.O. 31398

MWC#19

STATE OF MONTANA
ADMINISTRATOR OF GROUNDWATER CODE
OFFICE OF STATE ENGINEER

Notice of Completion of Groundwater Appropriation by Means of Well

DEVELOPED AFTER JANUARY 1, 1962

(Under Chapter 237, Montana Session Laws, 1961)

Top of Ground

(Elev. above sea level________)

Well located on Lincoln St. Between Defoe and Stoddard

0-1	Topsoil and Gravel
1-33	Gravel & Clay
33-41	Boulders & Gravel
41-55	Clay & Gravel
55-65	Clay, Gravel & Water
65-109'- 6"	Gravel, Water, Sand

Show exact depth of bottom.

Owner MONTANA POWER CO. Address Missoula, Montana

Driller Glenn Camp Address 1522 S. 14th W. Missoula, Montana

Date of Notice of appropriation of groundwater________________

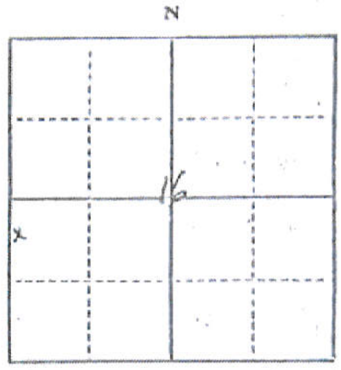
Date well started April 11, 1969 Date completed April 30, 1969

Type of well Drilled (Dug, Driven, bored or drilled) Equipment used Churn Drill (Churn drill, rotary or other)

Water use: Domestic ☐ Municipal ☒ Stock ☐ Irrigation ☐ Industrial ☐ Drainage ☐ Other ☐

Indicate on the diagram the character and thickness of the different strata met with in drilling, such as soil, clay, shale, gravel, rock or sand, etc. Show depth at which water is encountered, thickness and character of water-bearing strata and height to which the water rises in the well.

Size of Drilled Hole	Size and Weight of Casing	From (Feet)	To (Feet)	PERFORATIONS Kind Size	From (Feet)	To (Feet)
16" I.D.	16" I.D. 62.58 lb per ft.	2' above G.L.	109'6"	MILLS KNIFE 3/8" x 4"	85' 10 holes to the round - 30 round total - 300 holes	105'



NW 1/4 SW 1/4 Sec. 16 T. 13N R. 19W

Indicate location of well and place of use, if possible. Each small square represents 40 acres.

Static Water Level for non-flowing well Drawdown - 3'5" 48 from G.L.

Shut-in Pressure for Flowing Well________

Pumping Water Level 51'5" from G.L. feet at 1000 gal. per minute.

Discharge in gal. per min. of flowing well________

How Tested Test Pump

Length of Test 2 hours

Remarks: (Gravel packing, cementing, packers, type of shutoff) 4 sacks of cement put in bottom, 2' cement plug in bottom of pipe

________________(Continue on reverse side)

USE—If used for irrigation, industrial, drainage or other. Explain, state number of acres and location or other data (i.e.: Lot, Block and Addition).

____

...form to be prepared by driller, and three copies to be filed by the owner with the ...ty Clerk and Recorder in the county in which the well is located, tissue copy to be ...ned by driller.

...se answer all questions. If not applicable, so state, otherwise the form will be ...rned.

License # 7
Driller's License Number

Glenn Camp
Driller's Signature

M:151948

GW 2

Approved Stock Form—State Publishing Co., Helena, Montana—42329

File No. 1

T 13N R 19W - 20

TRIPLICATE

0094860

County Missoula

LOG

STATE OF MONTANA
ADMINISTRATOR OF GROUNDWATER C
OFFICE OF STATE ENGINEER

MWC#20

Notice of Completion of Groundwater Appropriation by Means of Well

DEVELOPED AFTER JANUARY 1, 1962

(Under Chapter 237, Montana Session Laws, 1961)

Top of Ground

(Elev. above sea level)

Well located between [redacted] Well #20

0-2 Brown Top Soil & Gravel

2-55 Tan Clay & Gravel

55-83 Gravel Sand & Water

83-90 Sand & Water

90-92 Gravel & Clay

92-98 Sand & Water

98-130 Gravel, Sand & Water

130-142'8" Clay & Gravel

Owner MONTANA POWER CO. Address Missoula, Montana 1522 W. 14th St.

Driller Glenn Camp Address Missoula, Montana

Date of Notice of appropriation of groundwater

Date well started April 30, 1969 Date completed May 10, 1969

Type of well Drilled (Dug, Driven, bored or drilled) Equipment used Churn Drill (Churn drill, rotary or other)

Water use: Domestic ☐ Municipal ☒ Stock ☐ Irrigation ☐ Industrial ☐ Drainage ☐ Other ☐

Indicate on the diagram the character and thickness of the different strata met with in drilling, such as soil, clay, shale, gravel, rock or sand, etc. Show depth at which water is encountered, thickness and character of water-bearing strata and height to which the water rises in the well.

Size of Drilled Hole	Size and Weight of Casing	From (Feet)	To (Feet)	PERFORATIONS Kind Size	From (Feet)	To (Feet)
20"I.D.	16"I.D. 62.58 lbs per ft.	21 above C.L.	142'8"	Mills Knife 3/8" x 3"	105 TO holes to the round.. 30 rounds Total - 300 hol	125

RECEIVED
JUN 6 1969
Montana Bureau of Mines & Geology

N

W E

S

Static Water Level for non-flowing well 22'6" feet. from C.L.

Shut-in Pressure for Flowing Well

Pumping Water Level 82'6" feet from C.L. at 1500 gal. per minute.

Discharge in gal. per min. of flowing well

How Tested Test Pump

Length of Test 6 hours

Remarks: (Gravel packing, cementing, packers, type of shutoff)

SE NE SE ¼ SE ¼ Sec. 20 T 13N R 19W

Indicate location of well and place of use, if possible. Each small square represents 40 acres.

THE MONTANA POWER COMPANY

By W. L. Talbott
Vice President

40 E. Broadway
Butte, Montana 59701

APPROPRIATOR

Show exact depth of bottom.

(Continue on reverse side)

USE—If used for irrigation, industrial, drainage or other. Explain, state number of acres and location or other data (i.e.: Lot, Block and Addition).

This form to be prepared by driller, and three copies to be filed by the owner with the County Clerk and Recorder in the county in which the well is located, tissue copy to be retained by driller.

Please answer all questions. If not applicable, so state, otherwise the form will be returned.

License # 7

Driller's License Number

Glenn Camp

Driller's Signature Glenn Camp

GW 2

Approved Stock Form—State Publishing Co., Helena, Montana—42329

File No.....

TRIPLICATE

Montana Water Co 063 T13N R19W - 27 cc
Missoula Division
Well #21

County Missoula

LOG

STATE OF MONTANA
ADMINISTRATOR OF GROUNDWAT 013164
OFFICE OF STATE ENGINE

Notice of Completion of Groundwater Appropriation by Means of Well

DEVELOPED AFTER JANUARY 1, 1962 MWC#21

(Under Chapter 237, Montana Session Laws, 1961)

Top of Ground

(Elev. above sea level.....)

Well located at [redacted]

0-40	Gravel & Clay
40-47	Clay
47-72	Gravel & Clay
72-83	Clay and Sand
83-101	Water, Gravel and Sand
101-108	Gravel & Clay
108-137	Gravel, Sand, Water

Owner MONTANA POWER CO. Address Missoula, Montana 1522 S. 14th W.

Driller Glenn Camp Address Missoula, Montana

Date of Notice of appropriation of groundwater.....

Date well started May 24, 1962 Date completed June 17, 1962

Type of well drilled (Dug, Driven, bored or drilled) Equipment used churn drill (Churn drill, rotary or other)

Water use: Domestic ☐ Municipal ☒ Stock ☐ Irrigation ☐ Industrial ☐ Drainage ☐ Other ☐

Indicate on the diagram the character and thickness of the different strata met with in drilling, such as soil, clay, shale, gravel, rock or sand, etc. Show depth at which water is encountered, thickness and character of water-bearing strata and height to which the water rises in the well.

Size of Drilled Hole	Size and Weight of Casing	From (Feet)	To (Feet)	PERFORATIONS Kind Size	From (Feet)	To (Feet)
16" I.D.	16" I.D. 62.58 lb per ft.	2' above G.L.	137'	Mills Knife 3/8" x 3"	90' 112' 30 rounds 10 holes to rd. Total = 300 holes	96' 132'

RECEIVED
JUL 1 01959
Montana Bureau of Mines and Geology

N

W E

S

Static Water Level for non-flowing well 50 feet.

Drawdown=51' from G.L.

Shut-in Pressure for Flowing Well.....

Pumping Water Level 631' feet from G.L.

at 1000 gal. per minute.

Discharge in gal. per min. of flowing well .....

How Tested Test Pump

Length of Test ½ hour

Remarks: (Gravel packing, cementing, packers, type of shutoff).....

SE, NE SW ¼ SW ¼ Sec. 27 T. 13N R. 19W

Indicate location of well and place of use, if possible. Each small square represents 40 acres.

(Continue on reverse side)

THE MONTANA POWER COMPANY
40 E. Broadway
Butte, Montana 59701

By W W Talbott
Appropriator

USE—If used for irrigation, industrial, drainage or other. Explain, state number of acres and location or other data (i.e.: Lot, Block and Addition).

Show exact depth of bottom.

This form to be prepared by driller, and three copies to be filed by the owner with the County Clerk and Recorder in the county in which the well is located, tissue copy to be retained by driller.

Please answer all questions. If not applicable, so state, otherwise the form will be returned.

License # 7
Driller's License Number

Glenn Camp
Driller's Signature Glenn Camp

M-132851

GW 1

File No.....

ORIGINAL

#21

Approved Stock Form—State Publishing Co., Helena, Montana—42329

T 13N R 19W 27 CCAD

County.....

MWC#21

LOG

STATE OF MONTANA
ADMINISTRATOR OF GROUNDWATER CODE
OFFICE OF STATE ENGINEER

Notice of Completion of Groundwater Appropriation by Means of Well

DEVELOPED AFTER JANUARY 1, 1962

(Under Chapter 237, Montana Session Laws, 1961)

Top of Ground

(Elev. above sea level.....)

Well located at 300 Block E. Central

0-40	Gravel & Clay
40-47	Clay
47-72	Gravel & Clay
72-83	Clay and Sand
83-101	Water, Gravel and Sand
101-108	Gravel & Clay
108-137	Gravel, Sand, Water

Show exact depth of bottom.

Owner MONTANA POWER CO. Address Missoula, Montana 1522 S. 14th W.

Driller Glenn Camp Address Missoula, Montana

Date of Notice of appropriation of groundwater.....

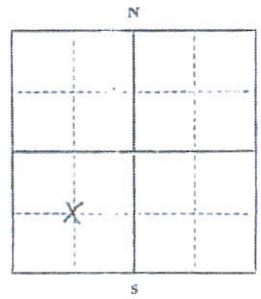
Date well started May 24, 1969 Date completed June 17, 1969

Type of well..... (Dug, Driven, bored or drilled) Equipment used..... (Churn drill, rotary or other)

Water use: Domestic ☐ Municipal ☒ Stock ☐ Irrigation ☐ Industrial ☐ Drainage ☐ Other ☐

Indicate on the diagram the character and thickness of the different strata met with in drilling, such as soil, clay, shale, gravel, rock or sand, etc. Show depth at which water is encountered, thickness and character of water-bearing strata and height to which the water rises in the well.

Size of Drilled Hole	Size and Weight of Casing	From (Feet)	To (Feet)	PERFORATIONS Kind Size	From (Feet)	To (Feet)
16" I.D.	16" I.D. 62.58 lb per ft.	2' above G.L.	137'	Mills Knife 3/8" x 3"	90'	96'
					112'	132'
					30 rounds 10 holes to r	
					Total = 380 holes	



SW 1/4 SW 1/4 Sec. 27 T 13N R 19W

Indicate location of well and place of use, if possible. Each small square represents 40 acres.

Static Water Level for non-flowing well 58 feet.

Drawdown-5'8" from G.L.

Shut in Pressure for Flowing Well.....

Pumping Water Level 63'8" feet from G.L.

at 1000 gal. per minute.

Discharge in gal. per min. of flowing well.....

How Tested Test Pump

Length of Test ½ hour

Remarks: (Gravel packing, cementing, packers, type of shutoff).....

.....(Continue on reverse side)

USE—If used for irrigation, industrial, drainage or other. Explain, state number of acres and location or other data (i.e.: Lot, Block and Addition).

This form to be prepared by driller, and three copies to be filed by the owner with the County Clerk and Recorder in the county in which the well is located, tissue copy to be retained by driller.

Please answer all questions. If not applicable, so state, otherwise the form will be returned.

License # 7

Driller's License Number

Glenn Camp

Driller's Signature Glenn Camp

132851

Butte

15N14W21 ...

/11)55...

094862

MWC#22

STATE OF MONTANA
ADMINISTRATOR OF GROUNDWATER CODE
MONTANA WATER RESOURCES BOARD

NOTICE OF COMPLETION OF GROUNDWATER APPROPRIATION BY MEANS OF WELL

Developed after January 1, 1962

(Under Chapter 237 Montana Session Laws, 1961, as amended)

This form to be prepared by driller, and three copies to be filed by the owner with the County Clerk and Recorder in the county in which the well is located, last copy to be retained by driller.

Please answer all questions. If not applicable, so state, otherwise the form may be returned.

Missoula Water

Owner Montana Power

Address Missoula, Montana

Well located at

For Administrator's Use
File
GW 1

Date well started Dec. 1949

completed Dec. 1949

Type of well Drilled (Dug, driven, bored or drilled)

Equipment used Churn Drill (Churn drill, rotary or other)

Water Use: Domestic ☐ Municipal ☒ Stock ☐ Irrigation ☐ Industrial ☐ Drainage ☐ Other ☐* Garden/Lawn ☐

*Describe

USE: If used for irrigation, industrial, drainage or other. Explain, state number of acres and location or other data (i.e. Lot, Block and Addition).

ESTIMATED ANNUAL WITHDRAWAL

Size of Drilled Hole	Size and Weight of Casing	From (Feet)	To (Feet)	Perforations: Kind Size	From (Feet)	To (Feet)
12" ID	12" ID 50 lb per ft	2' above G.L.	92'	Mills Knife 3/8" x 3"	62	72
					82	92

N / W / E / S

NE SW

S.W. ¼ N.E. ¼ Sec. 21

T. 13 N R. 19 W

Static water level 23 ft.*

Pumping water level 23½ ft.*

at 1200 gallons per minute, measured immed minutes after pumping began.

*Measured from ground level.

Well developed by Test Pump for 5 hours.

Power Pump 8" Turb (HP

Remarks: (Gravel packing, cementing, packers, type of shutoff)

INDICATE LOCATION OF WELL AND PLACE OF USE, IF POSSIBLE. EACH SMALL SQUARE REPRESENTS 40 ACRES.

Driller's Signature CAMP WELL DRILLING & PUMP SUPPLY

Driller's Address 1522 S. 14th W., Missoula, Montana

Glenn Camp LICENSE NO. 7

DRILLER'S LOG

Indicate the character, color, thickness of strata such as soil, clay, sand, gravel, shale, sandstone, etc. Show depth at which water is found and height to which water rises in well.

Top of Ground (Elev. above sea level)

From (Feet)	To (Feet)	
0	6	Topsoil & Gravel
6	15	Clay
15	29	Clay and Gravel
29	38	Sand and Gravel
38	41	Gravel, sand and water (15 GPM)
41	48	Gravel & Water XXXXXXXX (30-40 GPM)
48	52	Tight Gravel & Sand some clay
52	60	Clay and gravel
60	72	Boulders, Gravel & Water
72	80	Clay and Gravel
80	92	Gravel sand & Water
		Well cemented in bottom

92 Show exact depth of bottom

Montana Water Co
Missoula Division
Well # 22

PD

M: 132841

Butte

Form W. & S. 17—1M—4-43

Well No. 1

23/24 Pattee Creek

13N 14W 33DDAA Missoula

#23

MONTANA STATE BOARD OF HEALTH

Visited 9/92 FAN MWC#23

Water and Sewage Division

WELL DRILLER'S REPORT

Well #23

Registration No. 092816

Driller M. M. Ulrich Address Missoula, Montana

Owner of Well ~~Mosbye Inc.~~ Missoula Water

Exact Location of Well 13 N, 19 W, 33 DBAA

Water to Be Used for Residential area

Drilling Begun Sept. 11, 1945 Well Finished Sept. 24, 1945

Indicate on the diagram the character and thickness of the strata met with in drilling, such as soil, clay, shale, gravel, rock or Show depth at which water is encountered, thickness and char water-bearing strata and height to which the water rises in the we

Top of Ground

(Elev. above sea level ....)

Depth	Strata
+14"	
0	Top soil
4	Gravel & soil
20	Gravel clay
53	Clay
55	Clay & gravel
76	Sand gravel & clay
87	More clay & Sand
98	Gravel, clay, water
98	Tight gravel
100	& little water
	Sand grav Wat

PE

Lat Long. alt 3200

20 hp pump

Casing Record

Size of Pipe	Kind and Weight of Material Used	From (Feet)	to (Feet)	Perforations Kind Size	From (Feet)	(
8"	25.55 lb.	0	116'2"	3/8x1"	105	113

Describe the type of joints in casing Welded

Describe any screens used None

Capacity of Well 300 g.p.m. (In Gallons or Barrels)

How Determined Estimate (Pump, Bailer, Weir, Etc.)

Signed Copy of Ulrich's report by Mosby

Date

(Law and Regulations on Reverse Side)

13N 19W 33

Health permit #16

M:132025

File No. .....

DUPLICATE

063 T

County Missoula

MWC#23

STATE OF MONTANA
ADMINISTRATOR OF GROUNDWATER CODE
OFFICE OF STATE ENGINEER

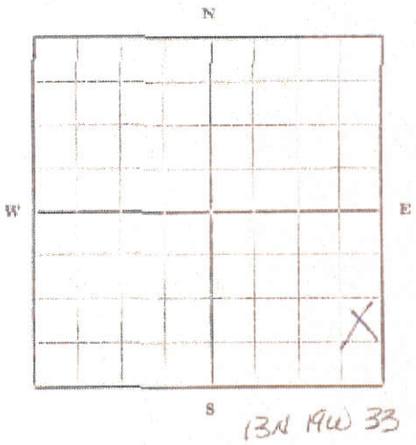
Declaration of Vested Groundwater Rights

(Under Chapter 237, Montana Session Laws, 1961)

Well #23
Visited 9/92 KAM

1. Farviews Development Company, of 340 West Main, Missoula
(Name of Appropriator) (Address) (Town)

County of Missoula State of Montana have appropriated groundwater according to the Montana laws in effect prior to January 1, 1962, as follows:



13N RW 33

NE ¼ SW¼ Sec. 19 T 13 R 33

Indicate point of appropriation and place of use, if possible. Each small square represents 10 acres.

20 hp pump

2. The beneficial use on which the claim is based provide household water for over 200 homes, & Golf Course Recreational area with room for 250 more homes.

3. Date or approximate date of earliest beneficial use; and how continuous the use has been July, 1948 and continuous thereafter

4. The amount of groundwater claimed (in miner's inches or gallons per minute) Well #1 - 300 gpm; Well #2 - 450 gpm; Total 750 gpm

5. If used for irrigation, give the acreage and description of the lands to which water has been applied and name of the owner thereof residential irrigation

6. The means of withdrawing such water from the ground and the location of each well or other means of withdrawal 2 wells; Both located Lot 22, Bl.1 Willows Add'n of Missoula County, Montana

7. The date of commencement and completion of the construction of the well, wells, or other works for withdrawal of groundwater Well #1 - Sept. 24, 1945; Well #2 - June 1955 (approx)

8. The depth of water table Well #1 - 113 ft.; Well #2 - 72 feet

9. So far as it may be available, the type, size and depth of each well or the general specifications of any other works for the withdrawal of groundwater Well #1: 8 in. D.S. Casing 25.55 lbs. per sq.ft., 116 ft. deep, perforated casing from 105 ft. to 113 ft., Worthington deep well turbine pump powered by 25 HP G.E. pump motor; Well #2: 120 ft. deep perforated casing from 95 ft. to 120 ft. deep well pump powered 50 HP electric motor

10. The estimated amount of groundwater withdrawn each year Wells #1 and #2 Total 25,000,000 gals.

11. The log of formations encountered in the drilling of each well if available Well #1: 0' - 4' - Topsoil; 4'-20' Gravel & soil; 20'-96' Clay, sand, gravel; 96'-98' light gravel; 100'-116' Sand, gravel, water. Well #2: 0'-72' Clay, gravel; 72'-97' Gravel, sand, water, 97'-101' clay and water; 101' - 120' Gravel, water.

12. Such other information of a similar nature as may be useful in carrying out the policy of this act, including reference to book and page of any county record re: Montana State Board of Health

Signature of Owner Farviews Mgt Co Inc

Date 6 July 1962

Three copies to be filed by the owner with the County Clerk and Recorder of the county in which the well is located.

Please answer all questions. If not applicable, so state, otherwise the form will be returned.

Original to the County Clerk and Recorder; duplicate to the State Engineer; Triplicate to the Montana Bureau of Mines and Geology and Quadruplicate for the Appropriator.

File No.............

DUPLICATE

063 13 NR. 19W 33 DABB

County Missoula

013997

MWC#24

Well #24

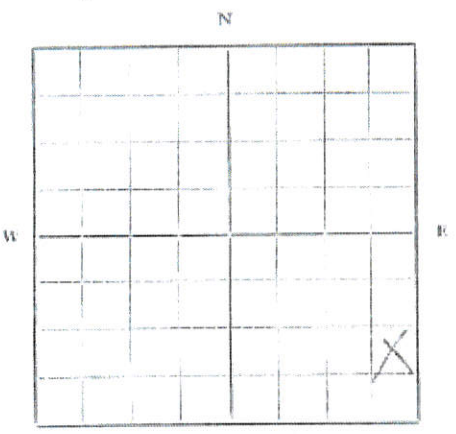
STATE OF MONTANA
ADMINISTRATOR OF GROUNDWATER CODE
OFFICE OF STATE ENGINEER

Declaration of Vested Groundwater Rights

(Under Chapter 237, Montana Session Laws, 1961)

1. Farviews Development Company (Missoula Water), of 340 West Main, Missoula
(Name of Appropriator) (Address) (Town)

County of Missoula State of Montana
have appropriated groundwater according to the Montana laws in effect prior to January 1, 1962, as follows:



13N 19W 33

NE 1/4 SE1/4 Sec. 19 T 13 R 33

Indicate point of appropriation and place of use, if possible. Each small square represents 10 acres.

50 hp pump

2. The beneficial use on which the claim is based provide household water for over 200 homes, & Golf Course Recreational area with room for 250 more homes.

3. Date or approximate date of earliest beneficial use; and how continuous the use has been July, 1948 and continuous thereafter

4. The amount of groundwater claimed (in miner's inches or gallons per minute) Well #1 - 300 gpm; Well #2 - 450 gpm; Total 750 gpm

5. If used for irrigation, give the acreage and description of the lands to which water has been applied and name of the owner thereof residential irrigation

6. The means of withdrawing such water from the ground and the location of each well or other means of withdrawal 2 wells; Both located Lot 22, Bl.1 Willows Add'n of Missoula County, Montana

7. The date of commencement and completion of the construction of the well, wells, or other works for withdrawal of groundwater Well #1 - Sept. 24, 1945; Well #2 - June 1955 (approx)

8. The depth of water table Well #1 - 113 ft.; Well #2 - 72 feet

9. So far as it may be available, the type, size and depth of each well or the general specifications of any other works for the withdrawal of groundwater Well #1: 8 in. D.S. Casing 25.55 lbs. per sq.ft., 116 ft. deep, perforated casing from 105 ft. to 113 ft., Worthington deep well turbine pump powered by 25 HP G.E. pump motor; [Well #2: 120 ft. deep perforated casing from 95 ft. to 120 ft. deep well pump powered 50 HP electric motor]

10. The estimated amount of groundwater withdrawn each year Wells #1 and #2 Total 25,000,000 gals.

11. The log of formations encountered in the drilling of each well if available Well #1: 0' - 4' - Topsoil; 4'-20' Gravel & soil; 20'-96' Clay, sand, gravel; 96'-98' light gravel; 100'-116' Sand, gravel, water. Well #2: 0'-72' Clay, gravel; 72'-97' Gravel, sand, water, 97'-101' clay and water; 101' - 120' Gravel, water.

12. Such other information of a similar nature as may be useful in carrying out the policy of this act, including reference to book and page of any county record re: Montana State Board of Health

Lat
Long
alt 3200

PE

Signature of Owner Farviews Dev. Co. Inc.

Date .... Mooby Pres.

Three copies to be filed by the owner with the County Clerk and Recorder of the county in which the well is located.

Please answer all questions. If not applicable, so state, otherwise the form will be returned.

Original to the County Clerk and Recorder; duplicate to the State Engineer; Triplicate to the Montana Bureau of Mines and Geology and Quadruplicate for the Appropriator.

File No. - 24 - 50 HP

T 13 N R 19 W Sec. 33

ORIGINAL

County Missoula

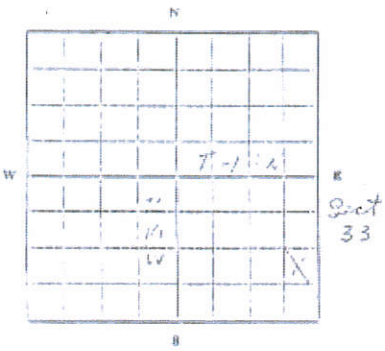
STATE OF MONTANA
ADMINISTRATOR OF GROUNDWATER CODE
OFFICE OF STATE ENGINEER

MWC#24

Declaration of Vested Groundwater Rights

(Under Chapter 237, Montana Session Laws, 1961)

1. Farviews Development Company, of 340 West Main, Missoula
(Name of Appropriator) (Address) (Town)
County of Missoula State of Montana
have appropriated groundwater according to the Montana laws in effect prior to January 1, 1962, as follows:



NE ¼ SE¼ Sec. 19 T 13 R 33

Indicate point of appropriation and place of use, if possible. Each small square represents 10 acres.

2. The beneficial use on which the claim is based provide household water for over 200 homes, & Golf Course Recreational area with room for 250 more homes.

3. Date or approximate date of earliest beneficial use; and how continuous the use has been July, 1948 and continuous thereafter

4. The amount of groundwater claimed (in miner's inches or gallons per minute) Well #1 - 300 gpm; Well #2 - 450 gpm; Total 750 gpm

5. If used for irrigation, give the acreage and description of the lands to which water has been applied and name of the owner thereof residential irrigation

6. The means of withdrawing such water from the ground and the location of each well or other means of withdrawal 2 wells; Both located Lot 22, Bl.1 Willows Addn of Missoula County, Montana

7. The date of commencement and completion of the construction of the well, wells, or other works for withdrawal of groundwater Well #1 - Sept. 24, 1945; Well #2 - June 1955 (approx)

8. The depth of water table Well #1 - 113 ft.; Well #2 - 72 feet

9. So far as it may be available, the type, size and depth of each well or the general specifications of any other works for the withdrawal of groundwater Well #1: 8 in. D.S. Casing 25.55 lbs. per sq.ft., 116 ft. deep, perforated casing from 105 ft. to 113 ft., Worthington deep well turbine pump powered by 25 HP G.E. pump motor; Well #2: 120 ft. deep perforated casing from 95 ft. to 120 ft. deep well pump powered 50 HP electric motor

10. The estimated amount of groundwater withdrawn each year Wells #1 and #2 Total 25,000,000 gals.

11. The log of formations encountered in the drilling of each well if available Well #1: 0'-4' - Topsoil; 4'-20' Gravel & soil; 20'-96' Clay, sand, gravel; 96'-98' Light gravel; 100'-116' Sand, gravel, water. Well #2: 0'-72' Clay, gravel; 72'-97' Gravel, sand, water, 97'-101' clay and water; 101' - 120' Gravel, water.

12. Such other information of a similar nature as may be useful in carrying out the policy of this act, including reference to book and page of any county record re: Montana State Board of Health

Signature of Owner

Date 11 - 15 1962

Three copies to be filed by the owner with the County Clerk and Recorder of the county in which the well is located

Please answer all questions. If not applicable, so state, otherwise the form will be returned.

Original to the County Clerk and Recorder; duplicate to the State Engineer; Triplicate to the Montana Bureau of Mines and Geology and Quadruplicate for the Appropriator.

W-9412

GW [illegible] ... PV ~~water~~ 9/92 [illegible]

File No. .... STEVENS

Approved Stock Form—State Publishing Co., Helena, Montana—42329

T. 13N R. 19W

ORIGINAL

County Missoula

094881

MWC#25

STATE OF MONTANA
ADMINISTRATOR OF GROUNDWATER CODE
OFFICE OF STATE ENGINEER

Notice of Completion of Groundwater Appropriation by Means of Well

DEVELOPED AFTER JANUARY 1, 1962

(Under Chapter 237, Montana Session Laws, 1961)

LOG

Top of Ground

(Elev. above sea level Approx. 3210')

Formations Log:

0 - 6 Sandy soil.
6 - 13 Sand & gravel mixed in brown clay.
13 - 15 Clean gravel.
15 - 55 Gravel imbedded in tan clay.
55 - 78 Fine gray sand & gravel. Some water. Static level 48' from surface.
78 - 86 Red to tan clay.
86 - 90 Gravel imbedded in tan clay.
90 - 99 Coarse sand & gravel. Water.
99 - 101 Boulder.
101 - 127 Fine to coarse sand & gravel. Water.
127 - 137 Fine to coarse sand & gravel. Some tan clay. Water.
137 - 146 Sand & gravel mixed in gray clay.

The water rises in the well 45'3" from surface

Show exact depth of bottom.

Bottom of hole 146'

Owner ~~Arthur J. Mosby~~ Missoula Water Farviews Development Co. Address Missoula, Montana

Driller Liberty Drilling Co. Address Missoula, Montana

Date of Notice of appropriation of groundwater None filed

Date well started 7/26/66 Date completed 8/27/66

Type of well Drilled Equipment used Cable Tools
(Dug, Driven, bored or drilled) (Churn drill, rotary or other)

Water use: Domestic ☐ Municipal ☒ Stock ☐ Irrigation ☐ Industrial ☐ Drainage ☐ Other ☐

Indicate on the diagram the character and thickness of the different strata met with in drilling, such as soil, clay, shale, gravel, rock or sand, etc. Show depth at which water is encountered, thickness and character of water-bearing strata and height to which the water rises in the well.

Size of Drilled Hole	Size and Weight of Casing	From (Feet)	To (Feet)	PERFORATIONS Kind Size	From (Feet)	To (Feet)
14"	14"OD x .312	+2	146'	617 one-quarter inch & one-half inch perforated with a Mills Knife	90	127

N

W E

X

S

NE, NE, SW 1/4 SW Sec. ~~25~~ 33 T. 13N R. 19W

Indicate location of well and place of use, if possible. Each small square represents 40 acres.

PE

Lat
Long
Alt 3195

Static Water Level for non-flowing well 45'3" feet.

Shut-in Pressure for Flowing Well Non-f.

Pumping Water Level 73 feet at 1000 gal. per minute.

Discharge in gal. per min. of flowing well Non-flowing

How Tested Air Lift Pump

Length of Test 48½ hours

Remarks: (Gravel packing, cementing, packers, type of shutoff) All water entering the well is coming through perforations in the casing. Wells with perforated completions in this area can be depended upon to produce clear and sand free water year after year as long as they are not overpumped, i.e., they (Continue on reverse side)

USE—If used for irrigation, industrial, drainage or other. Explain, state number of acres and location or other data (i.e.: Lot, Block and Addition).

15 Acres

T 13N R 19 W sec. 33

...s form to be prepared by driller, and three copies to be filed by the owner with the ...nty Clerk and Recorder in the county in which the well is located, tissue copy to be ...ined by driller.

...se answer all questions. If not applicable, so state, otherwise the form will be ...rned.

52
Driller's License Number

William F. Osborne
Driller's Signature

WM. F. OSBORNE, Owner

LIBERTY DRILLING COMPANY

MUNICIPAL
INDUSTRIAL
DOMESTIC
IRRIGATION
WELLS

LICENSED, BONDED AND INSURED

2500 RESERVE STREET
PHONE 543-8304
MISSOULA, MONTANA 59801

MWC#25

August 27, 1966

Arthur J. Mosby
Farviews Development Company
137 East Main
Missoula, Montana

WELL LOG

Location: NE¼, SW¼, Section 33, Township 13N, Range 19W, Missoula County.

Formations Log:

0	- 6	Sandy soil.
6	- 13	Sand and gravel mixed in brown clay.
13	- 15	Clean gravel.
15	- 55	Gravel imbedded in tan clay.
55	- 78	Fine gray sand and gravel. Some water. Static level 48' from surface.
78	- 86	Red to tan clay.
86	- 90	Gravel imbedded in tan clay.
90	- 99	Coarse sand and gravel. Water.
99	- 101	Boulder.
101	- 127	Fine to coarse sand and gravel. Water.
127	- 137	Fine to coarse sand and gravel. Some tan clay. Water.
137	- 146	Sand and gravel mixed in gray clay.

Water Log:

Well produced in excess of 2300 gallons per minute of clear sand free water during development with an Air Lift Pump. Pumping level at 1000 gallons per minute was 73 feet from surface. Static water level at completion of well was 45'3" from surface.

Casing Log:

Well cased from two feet above surface to 146 feet with 14 inch OD by .312 Wall Black Steel Water Well Casing. A forged steel drive shoe is welded to the bottom of the 14 inch casing. The casing is perforated with a Mills Knife from 90 feet to 127 feet. These are 617 one-quarter inch by two and one-half inch slots cut in this zone. All water entering the well is coming through the perforations in the casing.

Butte

15N 14W 32 ... DRILLER'S LOG

MISSOULA

894855

STATE OF MONTANA
ADMINISTRATOR OF GROUNDWATER CODE
MONTANA WATER RESOURCES BOARD

NOTICE OF COMPLETION OF GROUNDWATER APPROPRIATION BY MEANS OF WELL

#26

Developed after January 1, 1962

(Under Chapter 237 Montana Session Laws, 1961, as amended)

This form to be prepared by driller, and three copies to be filed by the owner with the County Clerk and Recorder in the county in which the well is located, last copy to be retained by driller.

Please answer all questions. If not applicable, so state, otherwise the form may be returned.

Owner ~~Montana Power Co.~~ MISSOULA WATER

Address Benton Ave.

Missoula, Montana

Date well started June 18, 1971

completed July 2, 1971

For Administrator's Use
File
GW 1

Type of well Drilled (Dug, driven, bored or drilled)

Equipment used Churn Drill (Churn drill, rotary or other)

Water Use: Domestic ☐ Municipal ☒ Stock ☐ Irrigation ☐

Industrial ☐ Drainage ☐ Other ☐* Garden/Lawn ☐

*Describe

USE: If used for irrigation, industrial, drainage or other. Explain, state number of acres and location or other data (i.e. Lot, Block and Addition).

ESTIMATED ANNUAL WITHDRAWAL

Size of Drilled Hole	Size and Weight of Casing	From (Feet)	To (Feet)	PERFORATIONS Kind Size	From (Feet)	To (Feet)
16"ID	16"ID 62.58 lb per ft.	2' above g.l.	125'	Mills Knife 5/8" x 4"	100 10 holes to the rd. 8" apart. Total 300 Holes	120

N / W / E / S

Static water level 38 ft.*
Pumping water level 40' 5" ft.*
at 1275 gallons per minute, measured imme minutes after pumping began.
*Measured from ground level.
Well developed by Turbine Pump for 8 hours
Power ____ Pump 100 HP
Remarks: (Gravel packing, cementing, packers, type of shutoff)

SE¼ NE¼ NE¼ Sec. 12
T. 13 N R. 19 W

INDICATE LOCATION OF WELL AND PLACE OF USE, IF POSSIBLE. EACH SMALL SQUARE REPRESENTS 40 ACRES.

Driller's Signature [signature]
CAMP WELL DRILLING & PUMP SUPPLY
Driller's Address 1522 S. 14th W., Missoula, Montana 59801

LICENSE NO. 7

DRILLER'S LOG

Indicate the character, color, thickness of strata such as soil, clay, sand, gravel, shale, sandstone, etc. Show depth at which water is found and height to which water rises in well.

Top of Ground (Elev. above sea level)

From (Feet)	To (Feet)	Benton Ave.
0	24	Cobblestones & Gravel & Clay
24	46	Brown Clay & Gravel
46	57	Gravel, Sand & Water
57	70	Big Gravel, Sand, Water
70	84	Sand, Small Gravel & Water
84	104	Gravel, Some Sand Water
104	108	Sand, Gravel, Water
108	125	Big Gravel, Sand, Water

PC

125' Show exact depth of bottom

MWC#26

Mountain Water Co
Missoula Division
Well #26

M:132234

Frenchtown   MISSOULA

13 N 19W 30 ADBA 110 21   P35166

(Elev above sea level   )
Top of Ground

MONTANA STATE DEPARTMENT OF HEALTH

Division of Environmental Sanitation

Helena, Montana

NO. 27

094865

WELL DRILLER'S REPORT

MWC#27

0-2	Brown topsoil & gravel
2-53	Brown clay & Gravel
53-62	Gravel Sand & Water
62-75	Tan clay & Gravel
75-98	Gravel sand & Water
98-109	Big Gravel Clay & Water
109-119	Sand Gravel & Water
119-125	Clay, Gravel, Sand and Water

Driller's Registration No. ......

Driller: CAMP WELL DRILLING & PUMP SUPPLY   Address: 1022 S. 14th W., Missoula, Mont.

Owner of Well: MONTANA POWER COMPANY   MISSOULA WATER

Exact Location of Well ......

Nearest Post Office: Missoula,   County: Missoula

Water to be Used for: Municipal

Drilling Begun: March 15, 1972   Well Finished: April 10, 1972

NOTE: Indicate on the diagram the character and thickness of the different strata met with in drilling, such as soil, clay, shale, gravel, rock or sand, etc. Show depth at which water is encountered, thickness and character of water-bearing strata and height to which the water rises in the well.

Casing Record

Size of Pipe	Kind and Weight of Material Used	From (Feet)	To (Feet)	PERFORATIONS Kind Size	PERFORATIONS From (Feet)	PERFORATIONS To (Feet)
16"ID	16"ID 62 lb per ft.	3' above g.l.	125'	Mills Knife 3/8" x 3"	92'	118'

Describe the type of joints in casing: Welded

Describe any screens used: none

Capacity of Well: 1475 GPM (In Gallons or Barrels)

How Determined: Engine Driven 80 HP Test pump (Pump, Bailer, Weir, Etc)

PD

Signed: [signature]
CAMP WELL DRILLING & PUMP SUPPLY

Date: April 26, 1972

ORIGINAL—TO BE SENT TO THE STATE DEPARTMENT OF HEALTH

Show exact depth of bottom.   -62-

Mi132844

13N 19W 30 ADBA

Form GW 2 Revised 1969
TATE PUBLISHING COMPANY

County MISSOULA

MWC#27

STATE OF MONTANA
ADMINISTRATOR OF GROUNDWATER CODE
MONTANA WATER RESOURCES BOARD

NOTICE OF COMPLETION OF GROUNDWATER APPROPRIATION BY MEANS OF WELL

Developed after January 1, 1962

(Under Chapter 237 Montana Session Laws, 1961, as amended)

This form to be prepared by driller, and three copies to be filed by the owner with the County Clerk and Recorder in the county in which the well is located, last copy to be retained by driller.

Please answer all questions. If not applicable, so state, otherwise the form may be returned.

Owner MONTANA POWER CO.

Address Missoula, Montana

For Administrator's Use
File
GW 1

Date well started March 15, 1972

completed April 10, 1972

Type of well Drilled (Dug, driven, bored or drilled)

Equipment used Churn Drill (Churn drill, rotary or other)

Water Use: Domestic ☐ Municipal ☒ Stock ☐ Irrigation ☐

Industrial ☐ Drainage ☐ Other ☐* Garden/Lawn ☐

Describe

USE: If used for irrigation, industrial, drainage or other. Explain, state number of acres and location or other data (i.e. Lot, Block and Addition).

ESTIMATED ANNUAL WITHDRAWAL

Size of Drilled Hole	Size and Weight of Casing	From (Feet)	To (Feet)	Perforations: Kind Size	From (Feet)	To (Feet)
16" ID	16" ID 62 lb per ft.	3' above g.l.	125'	Mills Knife 3/8" x 3"	92 12 holes to Round	118

N / W / E / S

X

S.E.¼ N.E.¼ Sec. 30
T. 13 N R. 19 W

INDICATE LOCATION OF WELL AND PLACE OF USE, IF POSSIBLE. EACH SMALL SQUARE REPRESENTS 40 ACRES.

Static water level 36 ft.*
Pumping water level 37 ft.*
at 1475 gallons per minute, measured immed minutes after pumping began.
*Measured from ground level.
Well developed by test pump for 6 hours.
Power Engine Pump 80 HP
Remarks: (Gravel packing, cementing, packers, type of shutoff)

DRILLER'S LOG

Indicate the character, color, thickness of strata such as soil, clay, sand, gravel, shale, sandstone, etc. Show depth at which water is found and height to which water rises in well.

Top of Ground (Elev. above sea level)

From (Feet)	To (Feet)	Well: 25th Ave
0	2	Brown Topsoil & Gravel
2	53	Brown clay & Gravel
53	62	Gravel Sand & Water
62	75	Tan clay & Gravel
75	98	Gravel sand & water
98	109	Big Gravel Clay & Water
109	112	Sand Gravel & Water
112	125	Clay, Gravel Sand & Water

125' Show exact depth of bottom

Driller's Signature CAMP WELL DRILLING & PUMP SUPPLY

Driller's Address 1522 S. 14th W., Missoula, Montana 59801

Phil Bakke

LICENSE NO. 7

132844

Form GW 2 Revised 1969
MONTANA PUBLISHING COMPANY

WO-3:583

County Missoula

MWC#29

STATE OF MONTANA
ADMINISTRATOR OF GROUNDWATER CODE
MONTANA WATER RESOURCES BOARD

NOTICE OF COMPLETION OF GROUNDWATER APPROPRIATION BY MEANS OF WELL

Developed after January 1, 1962

(Under Chapter 237 Montana Session Laws, 1961, as amended)

is form to be prepared by driller, and three copies to be filed the owner with the County Clerk and Recorder in the county in hich the well is located, last copy to be retained by driller.

ease answer all questions. If not applicable, so state, otherwise the rm may be returned.

wner THE MONTANA POWER CO.

ddress Missoula, Montana

ate well started May 25, 1973

completed June 20, 1973

For Administrator's Use
File
GW 1

ype of well Drilled (Dug, driven, bored or drilled)

quipment used Churn Drill (Churn drill, rotary or other)

Water Use: Domestic ☐ Municipal ☒ Stock ☐ Irrigation ☐

Industrial ☐ Drainage ☐ Other ☐* Garden/Lawn ☐

Describe

SE: If used for irrigation, industrial, drainage or other, Explain, state number of acres and location or other data (i.e. Lot, Block and Addition).

STIMATED ANNUAL WITHDRAWAL

Size of Drilled Hole	Size and Weight of Casing	From (Feet)	To (Feet)	PERFORATIONS Kind Size	From (Feet)	To (Feet)
16" ID	16" ID 62.58 lb per foot	1'8" above g.l.	136'	Mills Knife 3/8" x 3"	100'	125'
					29 rows 8 slots per row	

N

W E

S

AOAC

SE ¼ NE ¼ Sec. 1

T. 12 N R. 20 E W

Static water level 24 ft.*
Pumping water level 35 ft.*
at 1000 gallons per minute,
measured 1 minutes after pumping began.
*Measured from ground level.
Well developed by Test pump
for 4 hours.
Power Engine driven 100 HP
Remarks: (Gravel packing, cementing, packers, type of shutoff)
Well cemented in bottom
using 10 sacks of cement

INDICATE LOCATION OF WELL AND PLACE OF USE, IF POSSIBLE. EACH SMALL SQUARE REPRESENTS 40 ACRES.

Driller's Signature Phil Bakke

CAMP WELL DRILLING & PUMP SUPPLY

Driller's Address 1522 S. 14th W., Missoula, Montana 59801

LICENSE NO. 7

DRILLER'S LOG

Indicate the character, color, thickness of strata such as soil, clay, sand, gravel, shale, sandstone, etc. Show depth at which water is found and height to which water rises in well.

Top of Ground 011695 (Elev. above sea level)

From (Feet)	To (Feet)	ORCHARD ST.
0	1	Black Dirt
1	5	Sandy Clay
5	15	Sand and Gravel
15	24	Sand, Gravel & Seeps of water
24	33	Clay and Gravel
33	35	Sand and Water
35	49	Sand, Gravel & Water
49	64	Sand and Clay
64	68	Sand, small gravel & Water
68	75	Clay and Gravel
75	78	Sand, Water
78	84	Sand Gravel & Water
84	90	Sand, Gravel, Water with seems of clay
90	125	Sand, Gravel & Water
125	136	Gray Clay & Gravel

Montana Water Company
Missoula Division
Well #29

136' Show exact depth of bottom

MWC#29

Butte ..... 13N/19W22 CBBD ..... Missoula

STATE OF MONTANA
Department of Natural Resources and Conservation

S452-976M

WHITE — DEPARTMENT
PINK — BUREAU
CANARY — WELL OWNER
GOLDENROD — DRILLER

Well #30 Mountain Water Company Missoula Division

WELL LOG REPORT

094866

MWC#30

State law requires that this form be filed by the water well driller on any water well completed by him on and after July 1, 1973 within sixty (60) days after completion of

1. WELL OWNER: Name THE MONTANA POWER CO. Missoula Water Address MISSOULA, MONTANA 59801

2. WELL LOCATION: County MISSOULA SE¼ NW¼ SW¼ ¼, Sec. 22, Twp. 13 N~~S~~ Rg. 19 ~~E~~-W

3. PROPOSED USE: ___Domestic ___Stock x Municipal ___Industrial ___Lawn and Garden ___Irrigation ___Other (*if other, specify*)

4. METHOD DRILLED: x Cable ___Bored ___Forward Rotary ___Reverse Rotary ___Jetted ___Other (*if other, specify*)

5. WELL CONSTRUCTION:
Diameter of hole 16 inches. Depth 176 ft.
Casing: x Steel ___Plastic ___Concrete ___Threaded x Welded ___Other (*if other, specify*)
Pipe Weight: Dia.: From: To:
70.5 lb/ft. 18 OD inches +2 feet 160½ feet
___lb/ft. ___inches ___feet ___feet
___lb/ft. ___inches ___feet ___feet
Was perforated pipe used? x Yes ___No
Length of pipe perforated 16 feet
Was casing left open end? ___Yes ___No
Was a well screen installed? ___Yes x No
Material ___ Dia. ___inches (*stainless steel, bronze, etc.*)
Perforation type: x slots ___holes
Size 3/8x3 set from 80 feet to 96 feet
Size ___set from ___feet to ___feet
Size ___set from ___feet to ___feet
Was a packer or seal used? ___Yes x No
If so, what material ___
Well type: ___Straight screen ___Graveled
Was the well grouted? ___Yes ___No
To what depth? ___feet
Material used in grouting ___
Well head completion: Pitless adapter ___
12" above grade ___ Other 2' above grade
(*If other, specify*) ___
Was the well disinfected? ___Yes x No

6. WATER LEVEL:
Static water level 31½ ft. below land surface
If flowing: closed-in pressure ___psi
GPM flow ___through ___inch pipe
Controlled by: ___Valve ___Reducers ___Other, *specify* ___

7. WELL TEST DATA: x Pump ___Bailer ___Other (*If other, specify*) ___
Pumping level below land surface:
41½ ft. after 3 hrs. pumping 2000 gpm
___ft. after 4 hrs. pumping 1200 gpm

8. WELL LOG:

Depth (ft.) From	To	Formation
0	6	Fill
6	16	Rock & Gravel
16	40	Clay and Gravel
40	50	Sand, Gravel some clay with water
50	55	Clay, Gravel
55	73	Gravel, sand & with clay ball water
73	78	Sand & Clay
78	98	Clay, Gravel, Boulders & Water
98	108	Clay
108	115	Clay & Gravel
115	150	Tight Clay, Sand & Gravel
150	152	Clay & Gravel
152	158	Gray Clay & Sand
158	176	Clay & Sharp Rock
		Backfilled to 158' and Cemented
		PD

(*Use separate sheet if necessary*)

9. DATE STARTED: December 3, 1973

10. DATE COMPLETED: January 25, 1974

11. WAS WELL PLUGGED OR ABANDONED? ___Yes x No
If so, how ___

12. DRILLER'S CERTIFICATION:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge.

CAMP WELL DRILLING & PUMP SUPPLY 7
Driller's or Firm Name *License No.*

1522 S. 14th W., Missoula, Montana 59801
Address

Glenn Camp Feb. 19, 1974
Signed by *Date*

M:132845

T13N R19W 22 4 BDA

File No. _____

STATE OF MONTANA
Department of Natural Resources and Conservation

White-Department
Pink-Bureau
Yellow-Well owne
Gold-Driller

Mountain water Company
Well #31 Missoula Water

MWC#31

WELL LOG REPORT

D13109

5452-976M

State law requires that this form be filed by the water well driller within 60 days after completion of the well, and Form 602, Notice of Completion of Groundwater Development, be filed by the well owner within 60 days after the water has been put to beneficial use.

1. WELL OWNER
Name THE MONTANA POWER CO. Current address Russell St., Missoula, Mt. 59801

2. WELL LOCATION Lot 2, Block 8, Subdivision Original Townsite, Misso
County Missoula, or ¼ ¼ ¼ Sec. 22, T. 13 (N)-S, R. 19W E-

3. PROPOSED USE _____ domestic (includes lawn and garden); _____ stock; X municipal
_____ industrial; _____ irrigation; _____ other (specify) _____

4. METHOD DRILLED X cable, _____ bored, _____ forward rotary, _____ reverse rotary, _____ jetted, _____ other (specify) _____

5. WELL CONSTRUCTION
Diameter of hole 18 in.; depth 135 ft.
Casing: X steel, ___ plastic, ___ concrete, ___ threaded, X welded, ___ other (specify) _____

Pipe weight:

	Dia.	From	To
70 lb/ft	18 in.	+1½ ft.	135 ft.
___ lb/ft	___ in.	___ ft.	___ ft.

Was casing left open end? ___ Yes X No
Was a well screen installed? ___ Yes X No
Material _____, dia. _____ in.
(stainless steel, bronze, etc.)
Was perforated pipe used? X Yes ___ No
Perforation type: x slots ___ holes
Size 3/8x3 set from 101 ft. to 117 ft.
Size ___ set from ___ ft. to ___ ft.
Was a packer or seal used? ___ Yes X No
If so, what material _____
Well type: ___ Straight screen X Graveled
Was the well grouted: ___ Yes X No
To what depth: _____ ft.
Material used in grouting _____
Well head completion: Pitless adapter ___
12 in. above grade ___, other 1½' above
(if other, specify) ground level
Was well disinfected? X Yes ___ No

6. WATER LEVEL
Static water level 32 ft. below land surface
If flowing: closed-in pressure _____ psi
gpm flow _____ through _____ inch pipe
Controlled by: ___ valve ___ reducers
___ other (specify) _____

7. WELL TEST DATA X Pump ___ Bailer ___ Other
(if other, specify) _____
Pumping level below land surface:
47 ft. after 2 hrs. pumping 4,100 gpm
___ ft. after ___ hrs. pumping ___ gpm

8. WELL LOG

Depth (ft) From	To	Formation
0	15	Fill
15	51	Gravel & Clay
51	80	Gravel, Sand & Water
80	92	Clay & Silt
92	118	Gravel & Water
118	135	Clay & Gravel (Silt)
		CEMENT PLUG IN BOTTOM OF HOLE

(use separate sheet if necessary)

9. DATE STARTED June 20, 1975
DATE COMPLETED December 10, 1976

10. WAS WELL PLUGGED OR ABANDONED? ___ Yes x No
If so, how? _____

11. DRILLER'S CERTIFICATION
This well was drilled under my jurisdiction and this report is true to the best of my knowledge.

CAMP WELL DRILLING & PUMP SUPPLY 239
Driller's or firm name License No.

1522 S. 14th W., Missoula, Mt. 59801
Address

Signed by _____ Dec. 17, 1976 date

W-69073

Form No. 603 (Rev. 3/75)

063 13N 19W 22 CDAC

File No. 3884-76M

STATE OF MONTANA
Department of Natural Resources and Conservation

White-Department
Pink-Bureau
Yellow-Well
Gol

Montana Water Co
Missoula Division

Well #32

WELL LOG REPORT (1)

MWC#32

013111

State law requires that this form be filed by the water well driller within 60 days after completion of the well, and Form 602, Notice of Completion of Groundwater Development, be filed by the well owner within 60 days after the water has been put to beneficial use.

1. WELL OWNER
Name THE MONTANA POWER CO. Current address RUSSELL ST, MISSOULA, MT. 59801

2. WELL LOCATION Lot ____, Block ____, Subdivision ____
County MISSOULA, or NE ¼ SE ¼ SW ¼ Sec. 22, T. 13 N-S, R. 19 E-W

3. PROPOSED USE ____ domestic (includes lawn and garden); ____ stock; X municipal; ____ industrial; ____ irrigation; ____ other (specify) ____

MISSOULA SE

4. METHOD DRILLED X cable, ____ bored, ____ forward rotary, ____ reverse rotary, ____ jetted, ____ other (specify) ____

5. WELL CONSTRUCTION
Diameter of hole 16 in.; depth 139½ ft.
Casing: X steel, ____ plastic, ____ concrete, ____ threaded, X welded, ____ other (specify) ____

Pipe weight:

	Dia.	From	To
70 lb/ft	16 in.	+2 ft.	139½ ft.
____ lb/ft	____ in.	____ ft.	____ ft.

Was casing left open end? ____ Yes X No
Was a well screen installed? ____ Yes X No
Material ____, dia. ____ in.
(stainless steel, bronze, etc.)
Was perforated pipe used? X Yes ____ No
Perforation type: X slots ____ holes
Size 3/8" set from 100 ft. to 125 ft.
Size ____ set from ____ ft. to ____ ft.
Was a packer or seal used? ____ Yes X No
If so, what material ____
Well type: ____ Straight screen X Graveled
Was the well grouted: ____ Yes X No
To what depth: ____ ft.
Material used in grouting ____
Well head completion: Pitless adapter ____
12 in. above grade ____, other 2 ft. above
(if other, specify) ground level
Was well disinfected? X Yes ____ No

6. WATER LEVEL 43'10"
Static water level ____ ft. below land surface
If flowing: closed-in pressure ____ psi
gpm flow ____ through ____ inch pipe
Controlled by: ____ valve ____ reducers ____ other (specify) ____

7. WELL TEST DATA X Pump ____ Bailer ____ Other
(if other, specify) ____
Pumping level below land surface:
44'4" ft. after 3 hrs. pumping +1500 gpm
____ ft. after ____ hrs. pumping ____ gpm

8. WELL LOG ELEV 3200

Depth (ft) From	To	Formation
0	21	Clay, Gravel, Boulders & Fill
21	40	Clay, Gravel & Boulders
40	129	Gravel, Boulders & Water
129	139½	Clay
		110 ALVM

(use separate sheet if necessary)

9. DATE STARTED July 8, 1976
DATE COMPLETED August 17, 1976

10. WAS WELL PLUGGED OR ABANDONED? ____ Yes X No
If so, how? ____

11. DRILLER'S CERTIFICATION
This well was drilled under my jurisdiction and this report is true to the best of my knowledge.

Camp Well Drilling & Pump Supply 239
Driller's or firm name License No.

1522 S. 14th W., Missoula, Mt. 59801
Address

Phil Bakke August 19, 1976
Signed by date

W-69078

Form No. 603 (Rev. 7/76)

STATE OF MONTANA

File No. 10378-976M

Department of Natural Resources and Conservation

White-Department

Coded

MWC#33

013110

WELL LOG REPORT

Well #33

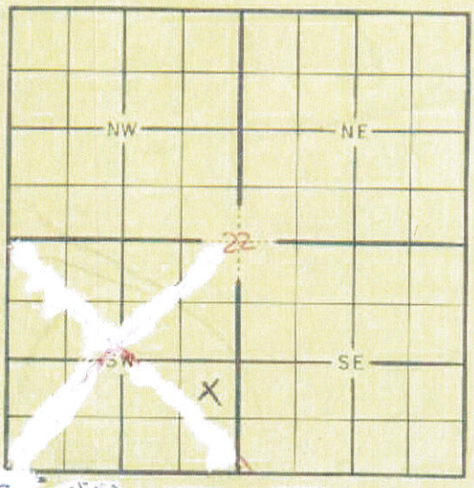
State law requires that this form be filed by the water well driller within 60 days after completion of the well, and Form 602, Notice of Completion of Groundwater Development, be filed by the well owner within 60 days after the water has been put to beneficial use.

1. WELL OWNER
Name ~~MONTANA POWER COMPANY~~ Mountain Water Company

2. CURRENT MAILING ADDRESS
1903 Russell St.
Missoula, Mt. 59801

3. PROPOSED USE
____ domestic (includes lawn and garden); ____ stock; x municipal; ____ industrial;
____ irrigation; ____ other (specify) ____

4. WELL LOCATION



NE ¼ NW ¼ SW ¼ SW ¼ Section 22
T. 13N N or S R. 19W E or W
OR, Lot ____ Block ____
Subdivision ____
City Missoula County Missoula
Elevation ____ Accuracy: __ ±10'; __ ±50'; _x_ ±100';

5. DRILLING METHOD
_x_ cable, ____ bored, ____ forward rotary, ____ reverse rotary, ____ jetted, ____ other (specify) ____

6. WELL CONSTRUCTION AND COMPLETION

Size of drilled hole	Size and weight of casing	From (feet)	To (feet)	Perforations ____ and/or Screen ____ Kind Size	From (feet)	To (feet)
18"	18" O.D. 48 lb per ft.	+4	147	Mills Knife 3/8 x3	118	138

Was casing left open end? ____ Yes, _x_ No
Was a packer or seal used? ____ Yes, _x_ No
If so, what material ____
Was the well gravel packed? ____ Yes, _x_ No
Was the well grouted? ____ Yes, _x_ No
To what depth? ____
Material used in grouting ____
Well head completion: Pitless adapter ____
12 in. above grade ____, other 4 ft.
(if other, specify) above grade
Pump horsepower ____, pump type ____
Pump intake level ____ feet below land surface
Power (electric, diesel, etc.) ____

7. WATER LEVEL
Static water level 51'6" feet below land surface
If flowing, closed-in pressure ____ psi
____ gpm flow through ____ inch pipe
Controlled by: ____ valve, ____ reducers, ____ other
(if other, specify) ____

8. WELL TEST DATA _x_ pump ____ bailer ____ other
(if other, specify) ____
Pumping level below land surface:
52'5" ft. after 1 hrs. pumping 2000 gpm
____ ft. after ____ hrs. pumping ____ gpm

9. WAS WELL PLUGGED OR ABANDONED? ____ Yes _x_ No
If yes, how? ____

10. DATE STARTED April 4, 1977
DATE COMPLETED August 17, 1977

11. WELL LOG

Depth (ft.) From	To	Formation
0	6	Black Dirt & Gravel
6	15	Clay, Gravel & Cobblestones
15	58	Clay & Gravel
58	65	Sand, Gravel & Water
65	80	Gravel, Boulders & Water
80	88	Sand, Small Gravel & Water
88	92	Sand, Gravel & Water
92	96	Small Gravel & Water
96	100	Clay & Gravel
100	104	Silty Clay
104	113	Tight Clay & Boulders
113	116	Sand, Gravel & Water
116	147	Gravel & Water

18 inches cemented in bottom of hole

ELEV inadequate for

(use separate sheet if necessary)

12. DRILLER'S CERTIFICATION
This well was drilled under my jurisdiction and this report is true to the best of my knowledge.

8/19/77
Date

Phil Bakke
Signature Phil Bakke License No. 239

CAMP WELL DRILLING & PUMP SUPPLY
Firm name

1522 S. 14th W., Missoula, Mt. 59801
Address

M: 69077

Form No. 603 (Rev. 7/76) RECEIVED

MAR 0 9 1978

MONT. DEPT. OF NATURAL RESOURCES & CONSERVATION

STATE OF MONTANA

File No. ____

Missoula

Department of Natural Resources and Conservation

White-Department

Mountain Water Co
Missoula Division Well #34

WELL LOG REPORT

Coded

013102

MWC#34 Gold-Owner

State law requires that this form be filed by the water well driller within 60 days after completion of the well, and Form 602, Notice of Completion of Groundwater Development, be filed by the well owner within 60 days after the water has been put to beneficial use.

1. WELL OWNER
Name ~~THE MONTANA POWER COMPANY~~

2. CURRENT MAILING ADDRESS
1903 Russell
Missoula, Mt. 59801

3. PROPOSED USE ____ domestic (includes lawn and garden); ____ stock; X municipal; ____ industrial; ____ irrigation; ____ other (specify) ____

4. WELL LOCATION

(Section grid: NW, NE, SW, SE)

NE ¼ NE ¼ SE ¼ SW ¼ Section 22
T. 13N (N or S) R. 19W (E or W)
OR, N. 30 ft. of Lot 16 & N. 30 ft. of E. 20 ft. of Lot 15 Block 16
Subdivision Montana Addition to City of
City Missoula County Missoula
Elevation ____ Accuracy: ____ ±10'; ____ ±50'; ____ ±100';

5. DRILLING METHOD X cable, ____ bored, ____ forward rotary, ____ reverse rotary, ____ jetted, ____ other (specify) ____

6. WELL CONSTRUCTION AND COMPLETION

Size of drilled hole	Size and weight of casing	From (feet)	To (feet)	Perforations and/or Screen: Kind Size	From (feet)	To (feet)
18"	18" OD 79 lb per ft.	+3	196	Mills Knife 3 x 3/8	80	104

Was casing left open end? X Yes, ____ No
Was a packer or seal used? ____ Yes, X No
If so, what material ____
Was the well gravel packed? ____ Yes, X No
Was the well grouted? ____ Yes, X No
To what depth? ____
Material used in grouting ____
Well head completion: Pitless adapter ____
12 in. above grade ____, other 3 ft.
(if other, specify) above grade
Pump horsepower ____, pump type ____
Pump intake level ____ feet below land surface
Power (electric, diesel, etc.) ____

7. WATER LEVEL
Static water level 40' 10" feet below land surface
If flowing, closed-in pressure ____ psi
____ gpm flow through ____ inch pipe
Controlled by: ____ valve, ____ reducers, ____ other
(if other, specify) ____

8. WELL TEST DATA X pump ____ bailer ____ other
(if other, specify) ____
Pumping level below land surface:
41'11" ft. after 2 hrs. pumping 1400 gpm
____ ft. after ____ hrs. pumping ____ gpm

9. WAS WELL PLUGGED OR ABANDONED? ____ Yes X No
If yes, how? ____

10. DATE STARTED August 25, 1977
DATE COMPLETED February 10, 1978

11. WELL LOG
Depth (ft.)

From	To	Formation
0	2	Top Soil
2	43	Sand, Gravel & Clay
43	78	Gravel & Water
78	104	Sand, Gravel & Water
104	110	Fine brown Sand, Gravel and Water
110	118	Fine brown sand & Clay
118	151	Fine brown sand, clay & gravel
151	186	Sand, Gravel, Water
186	196	Tan Clay
		BACKFILLED & CEMENTED TO 124 ft.

(use separate sheet if necessary)

12. DRILLER'S CERTIFICATION
This well was drilled under my jurisdiction and this report is true to the best of my knowledge.

3/7/78
Date

CAMP WELL DRILLING & PUMP SUPPLY
Firm Name

1522 S. 14th W., Missoula, Mt. 59801
Address

Phil Bakke (signature) M:69063
Signature Phil Bakke

239
License No.

Butte Well # 35

13N 19W 32 DAB

WELL LOG REPORT

Pink Well Owner
Gold-Driller

0948878

MWC#35

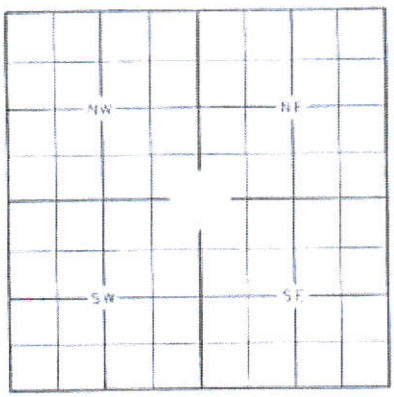
State law requires that this form be filed by the water well driller within 60 days after completion of the well, and Form 602, Notice of Completion of Groundwater Development, be filed by the well owner within 60 days after the water has been put to beneficial use

1. WELL OWNER
Name ~~THE MONTANA POWER COMPANY~~ Missoula Water
Mountain Water Company

2. CURRENT MAILING ADDRESS
1903 Russell
Missoula, Mt. 59801

3. PROPOSED USE ____ domestic (includes lawn and garden); ____ stock; X municipal; ____ industrial; ____ irrigation; ____ other (specify)

4. WELL LOCATION



SE ¼ NE ¼ NW ¼ ¼ Section 32
T. 13 N N or S R. 19 W E or W
OR, Lot ____ Block ____
Subdivision ____
City Missoula County Missoula
Elevation ____ Accuracy: ____ ±10'; ____ ±50'; ____ ±100'.

5. DRILLING METHOD ____ cable, ____ bored, ____ forward rotary, ____ reverse rotary, ____ jetted, ____ other (specify)

6. WELL CONSTRUCTION AND COMPLETION

Size of drilled hole	Size and weight of casing	From (feet)	To (feet)	Perforations ____ and/or Screen ____ Kind Size	From (feet)	To (feet)
18"	18" O.D. 47.5 lb per ft.	+4	145	Mills Knife 3/8 x 3"	104	129

Was casing left open end? ____ Yes, X No
Was a packer or seal used? ____ Yes, X No
If so, what material ____
Was the well gravel packed? ____ Yes, X No
Was the well grouted? ____ Yes, X No
To what depth? ____
Material used in grouting ____
Well head completion: Pitless adapter ____
12 in. above grade ____, other 4 ft.
(if other, specify) above ground
Pump horsepower ____, pump type ____
Pump intake level ____ feet below land surface
Power (electric, diesel, etc.) ____

7. WATER LEVEL
Static water level 350' feet below land surface
If flowing, closed-in pressure ____ psi
____ gpm flow through ____ inch pipe
Controlled by: ____ valve, ____ reducers, ____ other
(if other, specify) ____

8. WELL TEST DATA X pump ____ bailer ____ other
(if other, specify) ____
Pumping level below land surface:
365 ft. after 1 hrs. pumping 2,000 gpm
____ ft. after ____ hrs. pumping ____ gpm

9. WAS WELL PLUGGED OR ABANDONED? ____ Yes X No
If yes, how? ____

10. DATE STARTED May 4, 1978
DATE COMPLETED July 12, 1978

11. WELL LOG
Depth (ft.)

From	To	Formation
0	6	Gravel, Sand & Clay
6	25	Gravel & Boulders
25	38	Gravel, Boulders & Clay
38	42	Gravel, Clay, Some Water
42	57	Gravel, Sand & Water
57	70	Gravel, Sand, Lots of Water
70	85	Gravel & Water
85	94	Gravel, Seams of Clay & Water
94	99	Clay & Gravel
99	102	Sand, Small Gravel & Water
102	127	Sand, Large Gravel & Water
127	134½	Clay, Gravel & Boulders
134½	145	Gravel, Sand & Water
		4 ft. cement in bottom

PE

(use separate sheet if necessary)

12. DRILLER'S CERTIFICATION
This well was drilled under my jurisdiction and this report is true to the best of my knowledge.
7/19/78
Date
CMC WELL DRILLING & PUMP SUPPLY
Firm Name
1522 S. 14th St., Missoula, Mt. 59801
Address
Phil Beebe
Signature
License No.

M:132858

Form No. 603 R10/79 063 13N 19W 16 DBAC MISSOULA File No. Cobell 1

MWC#36

WELL LOG REPORT

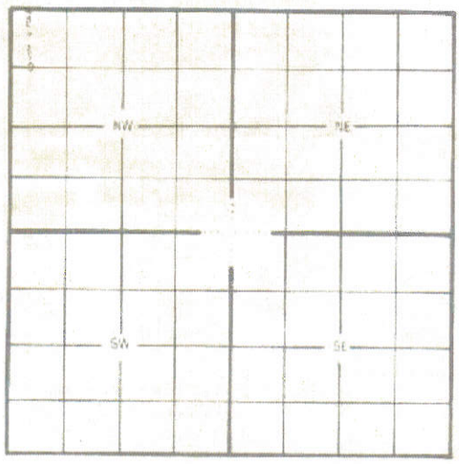
State law requires that this form be filed by the water well driller within 60 days after compl

012725

1. WELL OWNER
Name MOUNTAIN WATER CO Well #36

2. CURRENT MAILING ADDRESS
P.O. Box 4826
Missoula, Montana 59806

3. WELL LOCATION



SW NE ¼ NW ¼ SE ¼ Section 16
Township 13 N N/S Range 19 W E/W
County MISSOULA
Lot Block
Subdivision
Well Elevation
Accuracy: ± 10'; ± 50'; ± 100';

4. DRILLING METHOD X cable, bored, forward rotary, reverse rotary, jetted, other (specify)

5. WELL CONSTRUCTION AND COMPLETION

Size of drilled hole	Size and weight of casing	From (feet)	To (feet)	Perforations / Screen	From (feet)	To (feet)
16"	16" 62 lb per ft.	+2	131	Mills Knife 3/8 x 3	100	120 (240 slots)

Was casing left open end? Yes x No
Was a packer or seal used? x Yes No
If so, what material Cement
Was the well gravel packed? Yes x No
Was the well grouted? x Yes No
To what depth? 20
Material used in grouting Cement
Well head completion: Pitless adapter
12 in. above grade , other 2 ft.
(if other, specify) above ground level
Pump horsepower , pump type
Pump intake level feet below land surface
Power (electric, diesel, etc.)

6. WATER LEVEL
Static water level 51 feet below land surface
If flowing, closed-in pressure psi
gpm flow through inch pipe
Controlled by: valve, reducers, other
(if other, specify)

7. WELL TEST DATA x pump bailer other
(if other, specify)
Pumping level below land surface:
51 ft. after 1½ hrs. pumping 200 gpm
ft. after hrs. pumping gpm

8. WAS WELL PLUGGED OR ABANDONED? Yes x No
If yes, how?

9. DATE STARTED May 23, 1980
DATE COMPLETED July 24, 1980

10. WELL LOG

Depth (ft.) From	To	Formation
0	8	Clay, Gravel & Cobblestones
8	12	Sandy Clay
12	31	Clay, Gravel & Cobblestones
31	36	Silty Clay
36	56	Silty Clay & Sand
56	62	Clay, Sand, Gravel & Water
62	89	Sand, Gravel & Water
89	115	Clay, Sand, Gravel & Water
115	124	Clay, Sand, Gravel, Boulders & Water
124	131	Clay, Broken Rock & Boulders

(use separate sheet if necessary)

11. DRILLER'S CERTIFICATION
This well was drilled under my jurisdiction and this report is true to the best of my knowledge.

August 8, 1980
Date

CAMP WELL DRILLING & PUMP SUPPLY
Firm Name

1522 S. 14th W., Missoula, MT 59801
Address

Phil Babbe 7
Signature License No.

MONTANA DEPARTMENT OF NATURAL RESOURCES & CONSERVATION DNRC
32 SOUTH EWING HELENA, MONTANA 59601 449-3634

M:68567
WL - 30

DEPARTMENT COPY

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Return to menu
Plot this site on a topographic map

Site Name: MOUNTAIN WATER COMPANY
GWIC Id: 154873

Section 1: Well Owner(s)

Section 2: Location

Township	Range	Section	Quarter Sections
12N	19W	6	SW¼ SW¼ NW¼ NE¼

County	Geocode
MISSOULA	

Latitude	Longitude	Geomethod	Datum
		NAV-GPS	NAD27

Ground Surface Altitude	Method	Datum	Date
3190			

Addition	Block	Lot

Section 3: Proposed Use of Water
PUBLIC WATER SUPPLY (1)

Section 4: Type of Work
Drilling Method: CABLE AND ROTARY
Status: NEW WELL

Section 5: Well Completion Date
Date well completed: Wednesday, June 16, 1971

Section 6: Well Construction Details
There are no borehole dimensions assigned to this well.

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-1.3	90	18				STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
90	120	18			0.1 JOHNSON WIR

Annular Space (Seal/Grout/Packer)

There are no annular space records assigned to this well.

Section 7: Well Test Data

MWC#38

Total Depth: 125.5
Static Water Level: 25.75
Water Temperature:

Air Test *

2000 gpm with drill stem set at _ feet for 40 hours.
Time of recovery _ hours.
Recovery water level _ feet.
Pumping water level 66 feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source
112ALVM - ALLUVIUM (PLEISTOCENE)

From	To	Description
0	6	BROWN TOPSOIL
6	11	COBBLESTONES AND GRAVEL
11	31	COBBLESTONES GRAVEL AND BOULDERS
31	53	SAND AND GRAVEL MIXED IN TAN SILTY CLAY
53	61	SAND GRAVEL AND COBBLESTONES EMBEDDED IN TAN CLAY
61	89	SAND AND GRAVEL
89	109	COARSE SAND AND GRAVEL
109	119	SAND GRAVEL AND LARGE COBBLESTONES
119	125	SAND AND GRAVEL EMBEDDED IN CLAY
125	125.5	CLAY

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company: LIBERTY DRILLING & PUMP CO
License No: -0
Date Completed: 6/16/1971

MWC#38

GW 2 Revised 1969
STATE PUBLISHING COMPANY

County Missoula

STATE OF MONTANA
ADMINISTRATOR OF GROUNDWATER CODE
MONTANA WATER RESOURCES BOARD

NOTICE OF COMPLETION OF GROUNDWATER APPROPRIATION BY MEANS OF WELL

Developed after January 1, 1962

(Under Chapter 237 Montana Session Laws, 1961, as amended)

This form to be prepared by driller, and three copies to be filed by the **owner** with the County Clerk and Recorder in the county in which the well is located, last copy to be retained by driller.

Please answer all questions. If not applicable, so state, otherwise the form may be returned.

Owner Currin Construction Company, Inc. dba/Western Water Co

Address Box 1206

Missoula, Montana 59801

Date well started 6/16/71

completed 6/18/71

For Administrator's Use
File
GW 1

Type of well Drilled
(Dug, driven, bored or drilled)

Equipment used Air Rotary & Cable Tools
(Churn drill, rotary or other)

Water Use: Domestic ☒ Municipal ☐ Stock ☐ Irrigation ☒

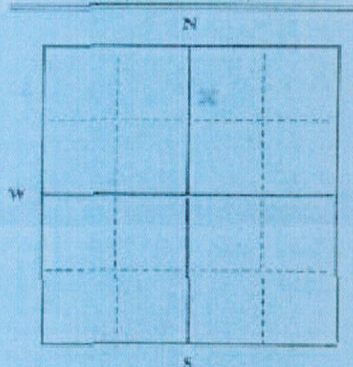
Industrial ☐ Drainage ☐ Other ☒* Garden/Lawn ☐

*Describe A platted subdivision of Missoula County

USE: If used for irrigation, industrial, drainage or other. Explain, state number of acres and location or other data (i.e. Lot, Block and Addition) Lot 1, Block 3, Tender Year Tract+ approx. 287 Acres known as Hillview Heights

ESTIMATED ANNUAL WITHDRAWAL 1,051,200,000 gallons

Size of Drilled Hole	Size and Weight of Casing	From (Feet)	To (Feet)	PERFORATIONS Kind Size	From (Feet)	To (Feet)
18"	18" OD x .375 #3		90	Johnson Wire Wound 100/1000	90	120
The top of screen is fitted with a lead packer tightly swaged to the inside of 18" casing. Bottom of screen is fitted with 16" OD tailpipe extending from					120	125'6"



NW ¼ NE ¼ Sec. 6
T. 12 N/S R. 19 E/W

Static water level 25'9" ft.*
Pumping water level 66 ft.*
at 2000 gallons per minute,
measured 30 minutes after pumping began.
*Measured from ground level.
Well developed by Airlift Pump
for 40 hours.
Power Diesel Pump 300 HP
Remarks: (Gravel packing, cementing, packers, type of shutoff) Forged steel drive shoe is welded to bottom of 18 inch casing. A two inch steel plate is solidly welded cont'd

INDICATE LOCATION OF WELL AND PLACE OF USE, IF POSSIBLE. EACH SMALL SQUARE REPRESENTS 40 ACRES.

Driller's Signature William F. Osborne

Driller's Address 2500 Reserve Street

Missoula, Montana 59801

LICENSE NO. 82

DRILLER'S LOG MWC#39

011543

Indicate the character and hardness of strata such as clay, gravel, shale, sandstone, etc. Show depth at which water is found and height to which water rises in well.

Top of Ground Approx. 3100 (Elev. above sea level)

From (Feet)	To (Feet)	
0	2	Brown topsoil
2	15	Cobblestones & gravel
15	29	Cobblestones, gravel & boulders
29	40	Sand & gravel mixed in tan silty clay
40	62	Sand, gravel & cobblestones embedded in tan clay
62	88	Sand and gravel
88	99	Coarse sand & gravel
99	120	Coarse sand, gravel & large cobblestones
120	125	Sand and gravel embedded in clay
125	125½	Clay

125½' Show exact depth of bottom

Water rises in well 25'9" from surface

04 Well # 3 | 107,... | 17448 | Hanyen Tw | SEC 6 ABCC 02 | 116477 | MWC#39

STATE OF MONTANA
ADMINISTRATOR OF GROUNDWATER CODE
MONTANA WATER RESOURCES BOARD

RECEIVED DEC 21 1973 MONT. DEPT. of NATURAL RESOURCES & CONSERVATION

County: Missoula

g764 DRILLER'S LOG

NOTICE OF COMPLETION OF GROUNDWATER APPROPRIATION BY MEANS OF WELL

Developed after January 1, 1962

(Under Chapter 237 Montana Session Laws, 1961, as amended)

This form to be prepared by driller, and three copies to be filed by the owner with the County Clerk and Recorder in the county in which the well is located, last copy to be retained by driller. Please answer all questions. If not applicable, so state, otherwise the form may be returned.

NEW

Owner: Curran Construction Company, Inc. dba/Western Water Co.

Address: Box 1206, Missoula, Montana 59801

For Administrator's Use
File
GW 1

Date well started: 6/11/71

completed: 6/16/71

Type of well: Drilled (Dug, driven, bored or drilled)

Equipment used: Air Rotary & Cable Tools (Churn drill, rotary or other)

Water Use: Domestic ☐ Municipal ☐ Stock ☐ Irrigation ☒ Industrial ☐ Drainage ☐ Other ☒ Garden/Lawn ☒

*Describe: A Platted subdivision of Missoula County

USE: If used for irrigation, industrial, drainage or other. Explain, state number of acres and location or other data (i.e. Lot, Block and Addition). Lot 1, Block 3, Hehder Home Sites + Approx. 387 acres known as Hillview Heights

ESTIMATED ANNUAL WITHDRAWAL: 1,051,200,000 gallons

Indicate the character, color, thickness of strata such as soil, clay, sand, gravel, shale, sandstone, etc. Show depth at which water is found and height to which water rises in well.

Top of Ground approx. (Elev. above sea level) 3190'

From (Feet)	To (Feet)	
0		
0	6	Brown topsoil
6	11	Cobblestones & gravel
11	31	Cobblestones, gravel & boulders
31	53	Sand & gravel mixed in tan silty clay
53	61	Sand, gravel & cobblestones embedded in tan clay
61	89	Sand & gravel
89	109	Coarse sand & gravel
109	119	Sand, gravel & large cobblestones
112	125	Sand & gravel embedded in clay
125	125½	Clay

Size of Drilled Hole	Size and Weight of Casing	From (Feet)	To (Feet)	Perforations: Kind Slot	From (Feet)	To (Feet)
18"	18" OD x .375	+1'3"	90	Johnson Wire Wound 100/1000	90	120

The top of screen is fitted with a lead packer tightly swaged to the inside of 18" casing, bottom of screen is fitted with 16" OD tailpipe extending from 120 [illegible] 125'6"

Static water level 25'9" ft.*

Pumping water level 66 ft.* at 2000 gallons per minute, measured 40 hrs. minutes after pumping began.

*Measured from ground level

Well developed by Airlift Pump for 40 hours.

Power Diesel Pump 300 HP

Remarks: (Gravel packing, cementing, packers, type of shutoff) A forged steel drive shoe is welded to bottom of 18" casing. The bottom of screen is fitted with 16" OD cont'd

N / S / E / W

NW ¼ NE ¼ Sec 6

T 12 N R 19 W

INDICATE LOCATION OF WELL AND PLACE OF USE, IF POSSIBLE. EACH SMALL SQUARE REPRESENTS 40 ACRES.

PE

Driller's Signature: William F. Osborne

Driller's Address: 2500 Reserve Street, Missoula, Montana 59801

LICENSE NO. 52

125½' Show exact depth of bottom

Water rises in well 25'9" from surface

H:154873 ok

13S 19W [redacted]17 BCAD

GW 1

File No. _____

T 13 R 19

TRIPLICATE

County Missoula

MWC#41

STATE OF MONTANA
ADMINISTRATOR OF GROUNDWATER CODE
OFFICE OF STATE ENGINEER

Notice of Appropriation of Groundwater

(Under Chapter 237, Montana Session Laws, 1961)

1. I, American Crystal Sugar Co., of P.O. Box 1387 Missoula
(Name of Appropriator) (Address) (Town)
County of Missoula, State of Montana, intend to appropriate groundwater in accordance with Chapter 237, Montana Session Laws of 1961.

2. The beneficial use to which water is to be applied is Industrial. Manufacture of beet sugar.
(describe lands to be benefited, if for irrigation)

3. The rate of use in gallons per minute or miner's inches of groundwater claimed
3,000 Gallons per minute

4. The annual period (inclusive dates) of intended use Nov. 1 to Dec. 31, except in case of fire

5. The probable or intended date of first beneficial use Approx. Nov. 1, 1962

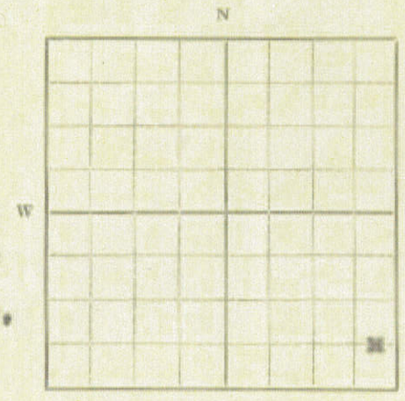
6. The probable or intended date of commencement and completion of the well* or wells*
Start between May 1 and May 15th, 1962. Complete about Aug. 15, 1962

7. The location, type, size and depth of well or wells contemplated Location: South side of factory building. Type: Casing. Size: 16". Depth: Approx 130'.

8. The probable or estimated depth of the water table or artesian aquifer 60'

9. Name, address and license number of the driller engaged William F. Osborne, Liberty Dilling and Pump Co., Box 830, Missoula, Montana. License No. 52.

10. Give such other similar information as may be useful in carrying out the policy of this act
In case of emergency, for fire protection. In case of freeze-up, for manufacture of beet sugar. In case of low water in river, could be used for irrigation. For short periods of time, in any case.



¼ Sec. 8 & 17 T 13 R 19

Locate well or other means of development as accurately as possible on the plat.

Signature of Appropriator E. F. Linder Supt.

Date April 5, 1962

* As defined in the Code Sec. 1 (c) "Well" means any artificial opening or excavation in the ground, however made, by which groundwater can be obtained or through which it flows under natural pressures or is artifically withdrawn."

Three copies of this notice are to be filed with County Clerk and Recorder of the county in which the well is located.

Please answer all questions. If not applicable, so state, otherwise the form will be returned.

Original to the County Clerk and Recorder; duplicate to the State Engineer; Triplicate to the School of Mines and Quadruplicate for the Appropriator.

68413

GW 2

Approved Stock Form—State Publishing Co., Helena, Montana 38496

File No.

TRIPLICATE

RECEIVED
JAN 21
Montana Bureau of Mines & Geology

063 T. 13 N R. 19 W S17
BCAD

County Missoula

STATE OF MONTANA
ADMINISTRATOR OF GROUNDWATER
OFFICE OF STATE ENGINEER

012610

Notice of Completion of Groundwater Appropriation by Means of Well

(Under Chapter 237, Montana Session Laws, 1961)

MWC#41

Top of Ground (Elevation above sea level 3200')

Owner ~~American Capital Syndicate~~ Missoula Waterworks Well 1 Address Missoula, Montana

Driller Liberty Drilling Co. Address Missoula, Montana

Date of Notice of Appropriation of Groundwater April 5, 1962

Date well started July 20, 1962 Date Completed Sept. 26, 1962

Type of well Drilled (dug, driven, bored or drilled) Equipment Used Cable Tools (Churn, drill, rotary or other)

Water Use: Domestic ☐ Municipal ☐ Other ☐ Irrigation ☐
Industrial ☑ Drainage ☐ Stock ☐

☜ Indicate on the *diagram the* character and thickness of the different strata met with in drilling, such as soil, clay, shale, gravel, rock or *sand, etc.* Show depth at which water is encountered, thickness and character of water-bearing strata and height to which water rises in the well.

0-8	P.T
8-36	Sand, gravel and cobblestones - sand coat mixed in
36-39	Gravel mixed in Tan clay
39-64	Sand + Gravel
64-76	Fine to coarse sand - few scattered gravels in Tan silt
76-79	Gravel imbedded in Tan silt
79-83	Coarse gravel and cobblestones mixed in fine sand
83-88	Fine to coarse sand
88-107	Sand + gravel imbedded in Tan silt
107-115	Clean coarse sand + gravel
115-121	Sand + gravel mixed in Tan silt
121-147	Clean coarse sand and gravel
147-156	Sand & gravel imbedded in Tan silt
156-167	Tan sticky clay
167-191	Gray sticky clay - few stony strata imbedded
191-208	Clean coarse sand and gravel
208-218	Gray clay

Size of Drilled Hole	Size and Weight of Casing	From (Feet)	To (Feet)	PERFORATIONS Kind Size	From (Feet)	To (Feet)
16"	16" OD x .375 Wall 67.58 # per Ft	8'	213'	Mills Knife 3⅛ x 3"	107	115
					121	147
					192	208

Static Water Level for non-flowing Well 29½' From Surface feet.

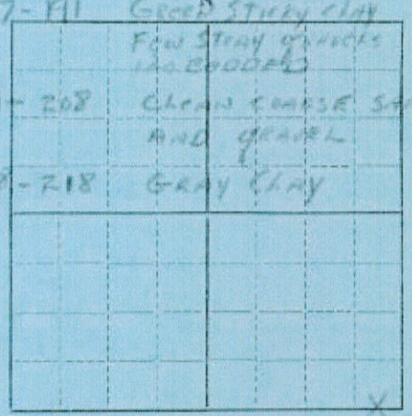
Shut-in Pressure for Flowing Well NOT - Applicable

Pumping Water Level 36 feet at 412 gal. per minute.

Discharge in gal. per min. of flowing well NOT - Applicable

How Tested Turbine Pump Length of Test 6 days

Remarks: (Gravel packing, cementing, packers, type of shutoff, location of place of use of groundwater if not at well, and any other similar pertinent information, including number of acres irrigated, if used for irrigation) In case of emergency, fire protection, in case of freeze up. For the manufacturing of beet sugar. For irrigation



BCAD 17s

SE¼ SE¼ Sec. 17 T. 13 R. 19

Indicate location of well and place of use, if possible. Each small square represents 10 acres.

Show exact depth of bottom.

Hole drilled to 218'

Hole cased to 213'

52
Driller's License Number

William F. Coburn
Driller's Signature

This form to be prepared by driller, and three copies to be filed by the owner with the County Clerk and Recorder in the county in which the well is located.

Please answer all questions. If not applicable, so state, otherwise the form will be returned.

Original to the County Clerk and Recorder; duplicate to the State Engineer; Triplicate to the Montana Bureau of Mines and Geology and Quadruplicate for the Appropriator.

CODE JUN 11 1981 BCAC File No.

WELL LOG REPORT

MWC#42

MONT. DEPT. OF NATURAL RESOURCES & CONSERVATION

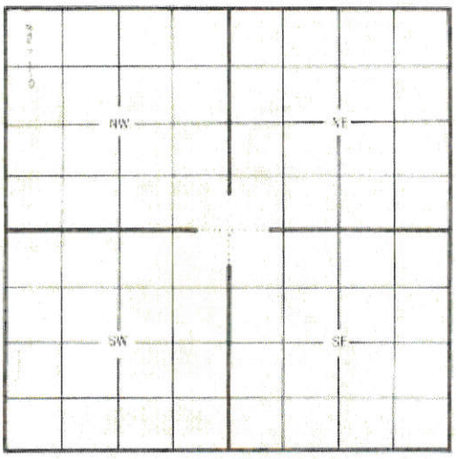
State law requires that this form be filed by the water well driller within 60 days after completi

012746

1. WELL OWNER
Name ~~MISSOULA WATER COMPANY~~ Missoula Waterworks West well Well 2

2. CURRENT MAILING ADDRESS
Treasure State Plaza - Suite D
2806 Garfield, Missoula, MT 59801

3. WELL LOCATION



BCAC
SE ¼ ¼ ¼ Section 17
Township 13 N N/S Range 19 W E/W
County Missoula
Lot ____ Block ____
Subdivision ____
Well Elevation ____
Accuracy: ____ ±10'; ____ ±50'; ____ ±100';

4. DRILLING METHOD ___ cable, ___ bored, ___ forward rotary, ___ reverse rotary, ___ jetted, ___ other (specify)

5. WELL CONSTRUCTION AND COMPLETION

Size of drilled hole	Size and weight of casing	From (feet)	To (feet)	Perforations and/or Screen: Kind Size	From (feet)	To (feet)
16"	16"OD 62.58 lb per ft.	+1½	+170	Mills Knife 3/8 x 3"	127	147
					Total	240 holes

Was casing left open end? X Yes ___ No
Was a packer or seal used? ___ Yes X No
If so, what material ____
Was the well gravel packed? ___ Yes X No
Was the well grouted? X Yes ___ No
To what depth? 15 ft.
Material used in grouting cement
Well head completion: Pitless adapter ____
12 in. above grade X, other ____
(if other, specify) ____
Pump horsepower [ ], pump type ____
Pump intake level ____ feet below land surface
Power (electric, diesel, etc.) ____

6. WATER LEVEL
Static water level 35 feet below land surface
If flowing, closed-in pressure ____ psi
____ gpm flow through ____ inch pipe
Controlled by: ____ valve, ____ reducers, ____ other
(if other, specify) ____

7. WELL TEST DATA X pump ___ bailer ___ other
(if other, specify) ____
Pumping level below land surface:
37 ft. after 2 hrs. pumping 1500 gpm
____ ft. after ____ hrs. pumping ____ gpm

8. WAS WELL PLUGGED OR ABANDONED? ___ Yes X No
If yes, how? ____

9. DATE STARTED December 29, 1980
DATE COMPLETED June 1, 1981

10. WELL LOG

Depth (ft.) From	To	Formation
0	26	Clay, Gravel & Cobblestones
26	44	Sandy Clay & Gravel
44	70	Silty Clay, Sand, Gravel & Water
70	87	Tan Clay, Sand, Gravel & Water
87	93	Sand & Water
93	159	Sand, Gravel & Water
159	171	Yellow Clay & Gravel

(use separate sheet if necessary)

11. DRILLER'S CERTIFICATION
This well was drilled under my jurisdiction and this report is true to the best of my knowledge.

June 5, 1981
Date

CAMP WELL DRILLING & PUMP SUPPLY
Firm Name

1522 S. 14th W., Missoula, MT 59801
Address

Phil Bahle 7
Signature License No.

MONTANA DEPARTMENT OF NATURAL RESOURCES & CONSERVATION DNRC
32 SOUTH EWING HELENA, MONTANA 59601 449-3634

M-108599

DEPARTMENT COPY

WI - 8027

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Return to menu
Plot this site on a topographic map
View hydrograph for this site
View scanned update/correction (4/2/2012 10:22:33 AM)

Site Name: MOUNTAIN WATER COMPANY *WELL #43
GWIC Id: 240491

Section 1: Well Owner(s)

1) MOUNTAIN WATER COMPANY
1345 WEST BROADWAY ST
MISSOULA MT 59802 [06/26/2007]

Section 2: Location

Township	Range	Section	Quarter Sections
13N	18W	18	

County: MISSOULA
Geocode:

Latitude	Longitude	Geomethod	Datum
		TRS-SEC	NAD83

Ground Surface Altitude	Method	Datum	Date

Addition: **Block:** **Lot:**

Section 3: Proposed Use of Water

PUBLIC WATER SUPPLY (1)

Section 4: Type of Work

Drilling Method: ROTARY
Status: NEW WELL

Section 5: Well Completion Date

Date well completed: Tuesday, June 26, 2007

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	25	14
25	132	10

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-2	100	10	0.25		WELDED	A53B STEEL
111	122	10	0.25		WELDED	A53B STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
101	111	10		.125	SCREEN-CONTINUOUS-STAINLESS
122	132	10		.125	SCREEN-CONTINUOUS-STAINLESS

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	100	K PACKER	

Section 7: Well Test Data

MWC#43

Total Depth: 132
Static Water Level: 49.06
Water Temperature:

Pump Test *

Depth pump set for test 100 feet.
450 gpm pump rate with 16 feet of drawdown after 24 hours of pumping.
Time of recovery _ hours.
Recovery water level 49.06 feet.
Pumping water level _ feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source

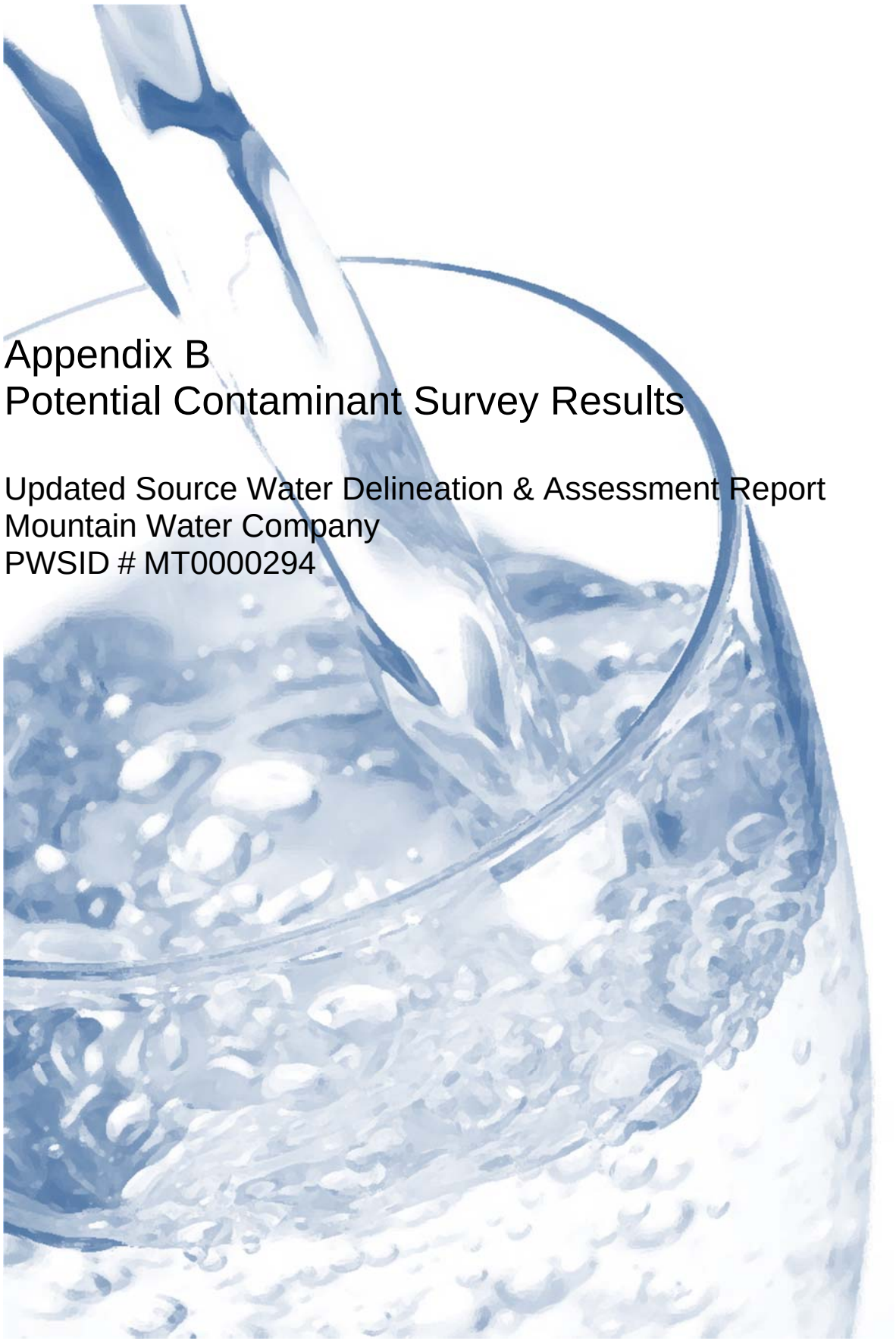
Unassigned

From	To	Description
0	2	SOIL
2	115	GRAVELS
115	124	GRAVELS WITH LITTLE CLAY
124	134	GRAVELS

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name: LARRY GAGNON
Company: OKEEFE DRILLING CO
License No: WWD-126
Date Completed: 6/26/2007



Appendix B
Potential Contaminant Survey Results

Updated Source Water Delineation & Assessment Report
Mountain Water Company
PWSID # MT0000294

MOUNTAIN WATER COMPANY

SOURCE WATER DELINEATION & ASSESSMENT REPORT

POTENTIAL CONTAMINANT SURVEY RESULTS ***WELL # 1***

WELL **1**

PWS ID# **294-004**

	PCS TYPE	FACILITY NAME	FACILITY ADDRESS	HIGH	MODERATE
HAZARDOUS/REGULATED WASTE SITES					
	NPL			0	0
	CERCLIS	CLARK FORK RIVER BASIN	CLARK FORK RIVERBANK	1	1
	CECRA	A J'S LAUNDRY AND LINEN	401 S ORANGE STREET	1	1
	ERNS			0	0
	LANDFILLS			0	0
	LUST	TOWN AND COUNTRY SUPPLY	225 W RAILROAD ST	1	1
		FARMERS UNION ASSOCIATION #1474	225 W RAILROAD ST	1	1
		OLES COUNTRY STORE 12 & DIXIES DINER	3705 MT HIGHWAY 200 E	1	1
HAZARDOUS/REGULATED MATERIALS HANDLING					
	RCRA HAZ. WASTE GEN			0	0
	UST	GREAT WESTERN PETROLEUM	1002 E BROADWAY ST	0	1
		OLE'S #12	3705 HWY 200 W	0	1
		KWIK STOP SINCLAIR	505 HIGHTON	0	1
	AST	GREAT WESTERN PETROLEUM	1002 E BROADWAY ST	0	1
	PIPELINE			1	1
	RAILROAD			1	1
	HIGHWAY			1	1
STORMWATER SOURCES					
	STREET SUMPS			15	126
	PRIVATE SUMPS			7	85
SANITARY SEWER SOURCES					
	SEPTICS			1.25	
	LIFT STATIONS			0	0
	LAGOONS			0	0
MISCELLANEOUS SOURCES					
	GWPCS			0	0
	MPDES	Stimson Lumber Co. (Bonner Mill)		1	1

MOUNTAIN WATER COMPANY

SOURCE WATER DELINEATION & ASSESSMENT REPORT

POTENTIAL CONTAMINANT SURVEY RESULTS ***MWC WELL # 2***

WELL **2**

PWS ID# **294-002**

	PCS TYPE	FACILITY NAME	FACILITY ADDRESS	HIGH	MODERATE
HAZARDOUS/REGULATED WASTE SITES					
	NPL			0	0
	CERCLIS	CLARK FORK RIVER BASIN	CLARK FORK RIVERBANK	1	1
	CECRA	A J'S LAUNDRY AND LINEN	401 S ORANGE STREET	1	1
	ERNS			0	0
	LANDFILLS			0	0
	LUST	FARMERS UNION ASSOCIATION #1474	225 W RAILROAD ST	1	1
		OLES COUNTRY STORE 12 & DIXIES DINER	3705 MT HIGHWAY 200 E	1	1
		TOWN AND COUNTRY SUPPLY #48	225 W RAILROAD ST	1	1
HAZARDOUS/REGULATED MATERIALS HANDLING					
	RCRA HAZ. WASTE GEN			0	0
	UST	GREAT WEST PETROLEUM	1002 E BROADWAY	0	1
		HOLIDAY STATION #282	605 S HIGGINS	0	1
		OLE'S #12	3705 HWY 200 E	0	1
		KWIK STOP	505 HIGHTON ST	0	1
	AST	GREAT WEST PETROLEUM	1002 E BROADWAY	0	1
	PIPELINE			1	1
	RAILROAD			1	1
	HIGHWAY			1	1
STORMWATER SOURCES					
	STREET SUMPS			18	310
	PRIVATE SUMPS			11	156
SANITARY SEWER SOURCES	SEPTICS			6.97	
	LIFT STATIONS			0	0
	LAGOONS			0	0
MISCELLANEOUS SOURCES					
	GWPCS			0	0
	MPDES	Stimson Lumber Co. (Bonner Mill)		0	1

MOUNTAIN WATER COMPANY

SOURCE WATER DELINEATION & ASSESSMENT REPORT

POTENTIAL CONTAMINANT SURVEY RESULTS ***WELL # 3A***

WELL **3A**

PWS ID# **294-037**

	PCS TYPE	FACILITY NAME	FACILITY ADDRESS	HIGH	MODERATE
HAZARDOUS/REGULATED WASTE SITES					
	NPL	MILLTOWN RESERVOIR SEDIMENTS	ADJACENT TO SOUTH EAST SIDE OF TOWN	1	1
	CERCLIS	MILLTOWN RESERVOIR SEDIMENTS	ADJACENT TO SOUTH EAST SIDE OF TOWN	1	1
	CECRA			0	0
	ERNS			0	0
	LANDFILLS			0	0
	LUST			0	0
HAZARDOUS/REGULATED MATERIALS HANDLING					
	RCRA HAZ. WASTE GEN			0	0
	UST	UNIVERSITY OF MONTANA	PHYSICAL PLANT BLDG-32 CAMPUS DR	0	1
	AST	UNIVERSITY OF MONTANA	PHYSICAL PLANT BLDG-32 CAMPUS DR	0	1
	PIPELINE			1	1
	RAILROAD			1	1
	HIGHWAY			1	1
STORMWATER SOURCES					
	STREET SUMPS			20	138
	PRIVATE SUMPS			2	15
SANITARY SEWER SOURCES					
	SEPTICS				21.20
	LIFT STATIONS			0	0
	LAGOONS			0	0
MISCELLANEOUS SOURCES					
	GWPCS			0	0
	MPDES			0	0

MOUNTAIN WATER COMPANY

SOURCE WATER DELINEATION & ASSESSMENT REPORT

POTENTIAL CONTAMINANT SURVEY RESULTS ***WELL # 3B***

WELL **3B**

PWS ID# **294-037**

	PCS TYPE	FACILITY NAME	FACILITY ADDRESS	HIGH	MODERATE
HAZARDOUS/REGULATED WASTE SITES					
	NPL	MILLTOWN RESERVOIR SEDIMENTS	ADJACENT TO SOUTH EAST SIDE OF TOWN	1	1
	CERCLIS	MILLTOWN RESERVOIR SEDIMENTS	ADJACENT TO SOUTH EAST SIDE OF TOWN	1	1
	CECRA			0	0
	ERNS			0	0
	LANDFILLS			0	0
	LUST			0	0
HAZARDOUS/REGULATED MATERIALS HANDLING					
	RCRA HAZ. WASTE GEN			0	0
	UST	UNIVERSITY OF MONTANA	PHYSICAL PLANT BLDG-32 CAMPUS DR	0	1
	AST	UNIVERSITY OF MONTANA	PHYSICAL PLANT BLDG-32 CAMPUS DR	0	1
	PIPELINE			1	1
	RAILROAD			1	1
	HIGHWAY			1	1
STORMWATER SOURCES	STREET SUMPS			20	138
	PRIVATE SUMPS			2	15
SANITARY SEWER SOURCES	SEPTICS				21.20
	LIFT STATIONS			0	0
	LAGOONS			0	0
MISCELLANEOUS SOURCES	GWPCS			0	0
	MPDES			0	0

MOUNTAIN WATER COMPANY

SOURCE WATER DELINEATION & ASSESSMENT REPORT

POTENTIAL CONTAMINANT SURVEY RESULTS ***WELL # 4***

WELL 4

PWS ID# 294-41

	PCS TYPE	FACILITY NAME	FACILITY ADDRESS	HIGH	MODERATE
HAZARDOUS/REGULATED WASTE SITES					
	NPL	MILLTOWN RESERVOIR SEDIMENTS	ADJACENT TO SOUTH EAST SIDE OF TOWN	1	1
	CERCLIS			0	0
	CECRA			0	0
	ERNS			0	0
	LANDFILLS			0	0
	LUST			0	0
HAZARDOUS/REGULATED MATERIALS HANDLING					
	RCRA HAZ. WASTE GEN			0	0
	UST	TOWN PUMP (MILLTOWN)	7915 Hwy 200	0	1
	AST			0	0
	PIPELINE			1	1
	RAILROAD			1	1
	HIGHWAY			1	1
STORMWATER SOURCES					
	STREET SUMPS			0	1
	PRIVATE SUMPS			0	53
SANITARY SEWER SOURCES					
	SEPTICS			NA	4.87
	LIFT STATIONS			0	0
	LAGOONS			0	0
MISCELLANEOUS SOURCES					
	GWPCS	Town Pump Travel Plaza	7985 Highway 200 E.	1	1
	MPDES	Stimson Lumber Co. (Bonner Mill)		1	1

MOUNTAIN WATER COMPANY

SOURCE WATER DELINEATION & ASSESSMENT REPORT

POTENTIAL CONTAMINANT SURVEY RESULTS ***WELL # 8***

WELL **8**

PWS ID# **294-008**

	PCS TYPE	FACILITY NAME	FACILITY ADDRESS	HIGH	MODERATE
HAZARDOUS/REGULATED WASTE SITES					
	NPL			0	0
	CERCLIS			0	0
	CECRA	MONTANA RAIL LINK	1930 SOUTH AVE W	1	1
	ERNS			0	0
	LANDFILLS			0	0
	LUST			0	0
HAZARDOUS/REGULATED MATERIALS HANDLING					
	RCRA HAZ. WASTE GEN	MISSOULA TEXTILE SERVICE SOUTH	1201 BURLINGTON AVE	0	1
	UST	OLE'S #11	1209 MOUNT AVE	0	1
		NOONS #470	1605 RUSSELL	0	1
		NORTHWESTERN ENERGY	1801 S RUSSELL STREET	0	1
	AST			0	0
	PIPELINE			0	1
	RAILROAD			1	1
	HIGHWAY			1	1
STORMWATER SOURCES					
	STREET SUMPS			22	349
	PRIVATE SUMPS			16	163
SANITARY SEWER SOURCES					
	SEPTICS			NA	NA
	LIFT STATIONS			0	0
	LAGOONS			0	0
MISCELLANEOUS SOURCES					
	GWPCS				
	MPDES	Daily, John R., Inc. 001, 002		1	1
		Stimson Lumber Co. (Bonner Mill)		0	1

MOUNTAIN WATER COMPANY

SOURCE WATER DELINEATION & ASSESSMENT REPORT

POTENTIAL CONTAMINANT SURVEY RESULTS ***WELL # 9***

WELL **9**

PWS ID# **294-009**

	PCS TYPE	FACILITY NAME	FACILITY ADDRESS	HIGH	MODERATE
HAZARDOUS/REGULATED WASTE SITES					
	NPL	MILLTOWN RESERVOIR SEDIMENTS	ADJACENT TO SOUTH EAST SIDE OF TOWN	0	1
	CERCLIS			0	0
	CECRA			0	0
	ERNS			0	0
	LANDFILLS			0	0
	LUST			0	0
HAZARDOUS/REGULATED MATERIALS HANDLING					
	RCRA HAZ. WASTE GEN	UNIVERSITY OF MONTANA	PHYSICAL PLANT BLDG-32CAMPUS DRIVE	0	1
	UST	UNIVERSITY OF MONTANA	PHYSICAL PLANT BLDG-32CAMPUS DRIVE	0	1
		TOWN PUMP	7985 HWY 200	0	1
	AST	UNIVERSITY OF MONTANA	PHYSICAL PLANT BLDG-32CAMPUS DRIVE	0	1
	PIPELINE			0	1
	RAILROAD			1	1
	HIGHWAY			1	1
STORMWATER SOURCES					
	STREET SUMPS			24	472
	PRIVATE SUMPS			14	206
SANITARY SEWER SOURCES					
	SEPTICS			NA	NA
	LIFT STATIONS			0	1
	LAGOONS			0	0
MISCELLANEOUS SOURCES					
	GWPCS	Town Pump Travel Plaza	7985 Highway 200 E.	0	1
	MPDES	Stimson Lumber Co. (Bonner Mill)		1	1

MOUNTAIN WATER COMPANY

SOURCE WATER DELINEATION & ASSESSMENT REPORT

POTENTIAL CONTAMINANT SURVEY RESULTS ***WELL # 10***

WELL **10**

PWS ID# **294-010**

	PCS TYPE	FACILITY NAME	FACILITY ADDRESS	HIGH	MODERATE
HAZARDOUS/REGULATED WASTE SITES					
	NPL	MILLTOWN RESERVOIR SEDIMENTS	ADJACENT TO SOUTH EAST SIDE OF TOWN	1	1
	CERCLIS	MILLTOWN RESERVOIR SEDIMENTS	ADJACENT TO SOUTH EAST SIDE OF TOWN	1	1
	CECRA			0	0
	ERNS			0	0
	LANDFILLS			0	0
	LUST			0	0
HAZARDOUS/REGULATED MATERIALS HANDLING					
	RCRA HAZ. WASTE GEN			0	0
	UST			0	0
	AST			0	0
	PIPELINE			1	1
	RAILROAD			1	1
	HIGHWAY			1	1
STORMWATER SOURCES					
	STREET SUMPS			12	20
	PRIVATE SUMPS			1	1
SANITARY SEWER SOURCES					
	SEPTICS			NA	NA
	LIFT STATIONS			0	0
	LAGOONS			0	0
MISCELLANEOUS SOURCES					
	GWPCS			0	0
	MPDES			0	0

MOUNTAIN WATER COMPANY

SOURCE WATER DELINEATION & ASSESSMENT REPORT

POTENTIAL CONTAMINANT SURVEY RESULTS ***WELL # 11***

WELL **11**

PWS ID# **294-011**

	PCS TYPE	FACILITY NAME	FACILITY ADDRESS	HIGH	MODERATE
HAZARDOUS/REGULATED WASTE SITES					
	NPL	MILLTOWN RESERVOIR SEDIMENTS	ADJACENT TO SOUTH EAST SIDE OF TOWN	1	1
	CERCLIS			0	0
	CECRA			0	0
	ERNS			0	0
	LANDFILLS			0	0
	LUST			0	0
HAZARDOUS/REGULATED MATERIALS HANDLING					
	RCRA HAZ. WASTE GEN			0	0
	UST			0	0
	AST			0	0
	PIPELINE			1	1
	RAILROAD			0	0
	HIGHWAY			0	0
STORMWATER SOURCES					
	STREET SUMPS			9	196
	PRIVATE SUMPS			0	3
SANITARY SEWER SOURCES					
	SEPTICS			NA	NA
	LIFT STATIONS			0	0
	LAGOONS			0	0
MISCELLANEOUS SOURCES					
	GWPCS			0	0
	MPDES			0	0

MOUNTAIN WATER COMPANY

POTENTIAL CONTAMINANT SURVEY RESULTS ***WELL # 12***

WELL 12

PWS ID# 294-42

	PCS TYPE	FACILITY NAME	FACILITY ADDRESS	HIGH	MODERATE
HAZARDOUS/REGULATED WASTE SITES					
	NPL			0	0
	CERCLIS	CLARK FORK RIVER BASIN	CLARK FORK RIVERBANK	1	1
	CECRA			0	0
	ERNS			0	0
	LANDFILLS			0	0
	LUST			0	0
HAZARDOUS/REGULATED MATERIALS HANDLING					
	RCRA HAZ. WASTE GEN			0	0
	UST			0	0
	AST			0	0
	PIPELINE			1	1
	RAILROAD			0	0
	HIGHWAY			0	0
STORMWATER SOURCES					
	STREET SUMPS			10	3
	PRIVATE SUMPS			3	10
SANITARY SEWER SOURCES					
	SEPTICS			1.15	NA
	LIFT STATIONS			0	0
	LAGOONS			0	0
MISCELLANEOUS SOURCES					
	GWPCS			0	0
	MPDES	Stimson Lumber Co. (Bonner Mill)		1	1

MOUNTAIN WATER COMPANY

SOURCE WATER DELINEATION & ASSESSMENT REPORT

POTENTIAL CONTAMINANT SURVEY RESULTS ***WELL #*** ***13***

INTAKE **13**

PWS ID# **294-013**

	PCS TYPE	FACILITY NAME	FACILITY ADDRESS	HIGH	MODERATE
HAZARDOUS/REGULATED WASTE SITES					
	NPL			0	0
	CERCLIS			0	0
	CECRA			0	0
	ERNS			0	0
	LANDFILLS			0	0
	LUST			0	0
HAZARDOUS/REGULATED MATERIALS HANDLING					
	RCRA HAZ. WASTE GEN			0	0
	UST			0	0
	AST			0	0
	PIPELINE			1	1
	RAILROAD			0	0
	HIGHWAY			0	0
STORMWATER SOURCES					
	STREET SUMPS			2	8
	PRIVATE SUMPS			3	3
SANITARY SEWER SOURCES					
	SEPTICS			1.16	NA
	LIFT STATIONS			0	0
	LAGOONS			0	0
MISCELLANEOUS SOURCES					
	GWPCS			0	0
	MPDES			0	0

MOUNTAIN WATER COMPANY

SOURCE WATER DELINEATION & ASSESSMENT REPORT

POTENTIAL CONTAMINANT SURVEY RESULTS ***WELL # 16***

WELL **16**

PWS ID# **294-016**

	PCS TYPE	FACILITY NAME	FACILITY ADDRESS	HIGH	MODERATE
HAZARDOUS/REGULATED WASTE SITES					
	NPL	MILLTOWN RESERVOIR SEDIMENTS	ADJACENT TO SOUTH EAST SIDE OF TOWN	0	1
	CERCLIS			0	1
	CECRA			0	0
	ERNS			0	0
	LANDFILLS			0	0
	LUST	MILLTOWN MARKET #4964	8340 HWY 200 EAST	0	1
HAZARDOUS/REGULATED MATERIALS HANDLING					
	RCRA HAZ. WASTE GEN			0	0
	UST	Gary's Conoco	2125 S Higgins Ave	0	1
		Ole's Country Store #7	2105 S Higgins Ave	0	1
		Noon's #427	2401 S Higgins	0	1
	AST			0	0
	PIPELINE			0	1
	RAILROAD			0	1
	HIGHWAY			0	1
STORMWATER SOURCES					
	STREET SUMPS			3	191
	PRIVATE SUMPS			0	96
SANITARY SEWER SOURCES					
	SEPTICS			NA	NA
	LIFT STATIONS			0	0
	LAGOONS			0	0
MISCELLANEOUS SOURCES					
	GWPCS			0	0
	MPDES			0	0

MOUNTAIN WATER COMPANY

SOURCE WATER DELINEATION & ASSESSMENT REPORT

POTENTIAL CONTAMINANT SURVEY RESULTS ***WELL # 17***

WELL **17**

PWS ID# **294-17**

	PCS TYPE	FACILITY NAME	FACILITY ADDRESS	HIGH	MODERATE
HAZARDOUS/REGULATED WASTE SITES					
	NPL			0	0
	CERCLIS			0	0
	CECRA			0	0
	ERNS			0	0
	LANDFILLS			0	0
	LUST			0	0
HAZARDOUS/REGULATED MATERIALS HANDLING					
	RCRA HAZ. WASTE GEN			0	0
	UST			0	0
	AST			0	0
	PIPELINE			0	0
	RAILROAD			1	1
	HIGHWAY			1	1
STORMWATER SOURCES					
	STREET SUMPS			0	2
	PRIVATE SUMPS			5	10
SANITARY SEWER SOURCES					
	SEPTICS			NA	NA
	LIFT STATIONS			0	0
	LAGOONS			0	0
MISCELLANEOUS SOURCES					
	GWPCS			0	0
	MPDES			0	0

MOUNTAIN WATER COMPANY

SOURCE WATER DELINEATION & ASSESSMENT REPORT

POTENTIAL CONTAMINANT SURVEY RESULTS ***WELL # 18***

WELL 18

PWS ID# 294-018

	PCS TYPE	FACILITY NAME	FACILITY ADDRESS	HIGH	MODERATE
HAZARDOUS/REGULATED WASTE SITES					
	NPL	MILLTOWN RESERVOIR SEDIMENTS	ADJACENT TO SOUTH EAST SIDE OF TOWN	0	1
	CERCLIS	MILLTOWN RESERVOIR SEDIMENTS	ADJACENT TO SOUTH EAST SIDE OF TOWN	0	1
	CECRA			0	0
	ERNS			0	0
		CHAMPION INTERNATIONAL CP	DRAWER 7 HWY 200	0	1
	LANDFILLS			0	0
	LUST	MILLTOWN MARKET	8340 HWY 200 EAST	0	1
HAZARDOUS/REGULATED MATERIALS HANDLING					
	RCRA HAZ. WASTE GEN	U OF M MISSOULA	32 CAMPUS DR	0	1
	UST	Noon's #430	3325 Brooks Street	0	1
		PHYSICAL PLANT BLDG #32	32 CAMPUS DR	0	1
		Ole's Country Store #7	2105 S Higgins Ave	0	1
		Safeway Stores, Inc.	3801 South Reserve Street	0	1
		Town Pump Inc	7985 Hwy 200	0	1
	AST			0	0
	PIPELINE			0	1
	RAILROAD			1	1
	HIGHWAY			1	1
STORMWATER SOURCES					
	STREET SUMPS			10	123
	PRIVATE SUMPS			8	218
SANITARY SEWER SOURCES					
	SEPTICS			NA	NA
	LIFT STATIONS			0	0
	LAGOONS			0	0
MISCELLANEOUS SOURCES					
	GWPCS	Town Pump Travel Plaza	7985 Highway 200 E.	0	1
	MPDES	Stimson Lumber Co. (Bonner Mill)		0	1

MOUNTAIN WATER COMPANY

SOURCE WATER DELINEATION & ASSESSMENT REPORT

POTENTIAL CONTAMINANT SURVEY RESULTS ***WELL # 19***

WELL **19**

PWS ID# **294-019**

	PCS TYPE	FACILITY NAME	FACILITY ADDRESS	HIGH	MODERATE
HAZARDOUS/REGULATED WASTE SITES					
	NPL			0	0
	CERCLIS			0	0
	CECRA	WEST FRONT BATTERY SITE	225 W FRONT ST	1	1
	ERNS			0	0
	LANDFILLS			0	0
	LUST			0	0
HAZARDOUS/REGULATED MATERIALS HANDLING					
	RCRA HAZ. WASTE GEN	ST PATRICK HOSPITAL	W BROADWAY	0	1
	UST	Finest Oil Company	940 E Broadway	0	1
		Tabish Brothers Distributors Inc	501 Taylor	0	1
		St Patrick Hospital	500 W Broadway	0	1
	AST			0	0
	PIPELINE			0	0
	RAILROAD			1	1
	HIGHWAY			1	1
STORMWATER SOURCES					
	STREET SUMPS			10	101
	PRIVATE SUMPS			11	88
SANITARY SEWER SOURCES					
	SEPTICS			NA	NA
	LIFT STATIONS			0	0
	LAGOONS			0	0
MISCELLANEOUS SOURCES					
	GWPCS			0	0
	MPDES	BFI Waste Systems Of North America Inc		1	1

MOUNTAIN WATER COMPANY

SOURCE WATER DELINEATION & ASSESSMENT REPORT

POTENTIAL CONTAMINANT SURVEY RESULTS ***WELL # 20***

WELL 20

PWS ID# 294-020

	PCS TYPE	FACILITY NAME	FACILITY ADDRESS	HIGH	MODERATE
HAZARDOUS/REGULATED WASTE SITES					
	NPL			0	0
	CERCLIS	CLARK FORK RIVER BASIN	CLARK FORK RIVERBANK	1	1
	CECRA	HART OIL REFINERY	3RD STREET	1	1
	ERNS			0	0
	LANDFILLS			0	0
	LUST	OLES COUNTRY STORE 12 & DIXIES DINER	3705 MT HIGHWAY 200 E	1	1
HAZARDOUS/REGULATED MATERIALS HANDLING					
	RCRA HAZ. WASTE GEN			0	0
	UST	Holiday Stationstore #278	403 Russell	0	1
		Ole's #12	3705 Hwy 200 E	0	1
		GREAT WEST PETROLEUM	1002 E BROADWAY ST	0	1
		Town Pump Inc (Missoula #2)	318 S Orange	0	1
	AST	GREAT WEST PETROLEUM	1002 E BROADWAY ST	0	1
	PIPELINE			1	1
	RAILROAD			1	1
	HIGHWAY			1	1
STORMWATER SOURCES					
	STREET SUMPS			15	128
	PRIVATE SUMPS			5	138
SANITARY SEWER SOURCES					
	SEPTICS			NA	6.99
	LIFT STATIONS			0	0
	LAGOONS			0	0
MISCELLANEOUS SOURCES					
	GWPCS			0	0
	MPDES	Stimson Lumber Co. (Bonner Mill)		0	1

MOUNTAIN WATER COMPANY

SOURCE WATER DELINEATION & ASSESSMENT REPORT

POTENTIAL CONTAMINANT SURVEY RESULTS ***WELL # 21***

WELL 21

PWS ID# 294-021

	PCS TYPE	FACILITY NAME	FACILITY ADDRESS	HIGH	MODERATE
HAZARDOUS/REGULATED WASTE SITES					
	NPL	MILLTOWN RESERVOIR SEDIMENTS	ADJACENT TO SOUTH EAST SIDE OF TOWN	1	1
	CERCLIS			0	0
	CECRA			0	0
	ERNS			0	0
	LANDFILLS			0	0
	LUST			0	0
HAZARDOUS/REGULATED MATERIALS HANDLING					
	RCRA HAZ. WASTE GEN			0	0
	UST			0	0
	AST			0	0
	PIPELINE			1	1
	RAILROAD			1	1
	HIGHWAY			1	1
STORMWATER SOURCES					
	STREET SUMPS			21	49
	PRIVATE SUMPS			0	0
SANITARY SEWER SOURCES					
	SEPTICS			NA	NA
	LIFT STATIONS			0	0
	LAGOONS			0	0
MISCELLANEOUS SOURCES					
	GWPCS			0	0
	MPDES			0	0

MOUNTAIN WATER COMPANY

SOURCE WATER DELINEATION & ASSESSMENT REPORT

POTENTIAL CONTAMINANT SURVEY RESULTS ***WELL # 22***

WELL 22

PWS ID# 294-022

	PCS TYPE	FACILITY NAME	FACILITY ADDRESS	HIGH	MODERATE
HAZARDOUS/REGULATED WASTE SITES					
	NPL			0	0
	CERCLIS	CLARK FORK RIVER BASIN	CLARK FORK RIVERBANK	1	1
	CECRA	MISSOULA SAWMILL	3RD ST	1	1
	ERNS			0	0
	LANDFILLS			0	0
	LUST	OLES COUNTRY STORE 12 & DIXIES DINER	3705 MT HIGHWAY 200 E	1	1
HAZARDOUS/REGULATED MATERIALS HANDLING					
	RCRA HAZ. WASTE GEN				
	UST	Finest Oil Company	940 E Broadway	0	1
	AST	CENTURY LINK	201 PATTEE ST	0	1
	PIPELINE			1	1
	RAILROAD			1	1
	HIGHWAY			1	1
STORMWATER SOURCES					
	STREET SUMPS			1	60
	PRIVATE SUMPS			0	63
SANITARY SEWER SOURCES					
	SEPTICS			NA	5.95
	LIFT STATIONS			0	0
	LAGOONS			0	0
MISCELLANEOUS SOURCES					
	GWPCS			0	0
	MPDES			0	0

MOUNTAIN WATER COMPANY

SOURCE WATER DELINEATION & ASSESSMENT REPORT

POTENTIAL CONTAMINANT SURVEY RESULTS ***WELL #*** ***23***

WELL **23**

PWS ID# **294-023**

	PCS TYPE	FACILITY NAME	FACILITY ADDRESS	HIGH	MODERATE
HAZARDOUS/REGULATED WASTE SITES					
	NPL			0	0
	CERCLIS			0	0
	CECRA			0	0
	ERNS			0	0
	LANDFILLS			0	0
	LUST			0	0
HAZARDOUS/REGULATED MATERIALS HANDLING					
	RCRA HAZ. WASTE GEN			0	0
	UST			0	0
	AST			0	0
	PIPELINE			0	0
	RAILROAD			0	0
	HIGHWAY			0	0
STORMWATER SOURCES					
	STREET SUMPS			7	11
	PRIVATE SUMPS			0	15
SANITARY SEWER SOURCES					
	SEPTICS			NA	NA
	LIFT STATIONS			0	0
	LAGOONS			0	0
MISCELLANEOUS SOURCES					
	GWPCS			0	0
	MPDES			0	0

MOUNTAIN WATER COMPANY

SOURCE WATER DELINEATION & ASSESSMENT REPORT

POTENTIAL CONTAMINANT SURVEY RESULTS WELL # 24

WELL 24

PWS ID# 294-024

	PCS TYPE	FACILITY NAME	FACILITY ADDRESS	HIGH	MODERATE
HAZARDOUS/REGULATED WASTE SITES					
	NPL			0	0
	CERCLIS			0	0
	CECRA			0	0
	ERNS			0	0
	LANDFILLS			0	0
	LUST			0	0
HAZARDOUS/REGULATED MATERIALS HANDLING					
	RCRA HAZ. WASTE GEN			0	0
	UST			0	0
	AST			0	0
	PIPELINE			0	0
	RAILROAD			0	0
	HIGHWAY			0	0
STORMWATER SOURCES					
	STREET SUMPS			7	11
	PRIVATE SUMPS			0	15
SANITARY SEWER SOURCES					
	SEPTICS			NA	NA
	LIFT STATIONS			0	0
	LAGOONS			0	0
MISCELLANEOUS SOURCES					
	GWPCS			0	0
	MPDES			0	0

MOUNTAIN WATER COMPANY

SOURCE WATER DELINEATION & ASSESSMENT REPORT

POTENTIAL CONTAMINANT SURVEY RESULTS ***WELL # 25***

WELL 25

PWS ID# 294-025

	PCS TYPE	FACILITY NAME	FACILITY ADDRESS	HIGH	MODERATE
HAZARDOUS/REGULATED WASTE SITES					
	NPL	MILLTOWN RESERVOIR SEDIMENTS	ADJACENT TO SOUTH EAST SIDE OF TOWN	0	1
	CERCLIS			0	0
	CECRA			0	0
	ERNS			0	0
	LANDFILLS			0	0
	LUST			0	0
HAZARDOUS/REGULATED MATERIALS HANDLING					
	RCRA HAZ. WASTE GEN			0	0
	UST	Noon's #427	2401 S Higgins	0	1
	AST			0	0
	PIPELINE			0	1
	RAILROAD			0	1
	HIGHWAY			0	1
STORMWATER SOURCES					
	STREET SUMPS			11	237
	PRIVATE SUMPS			7	55
SANITARY SEWER SOURCES					
	SEPTICS			NA	NA
	LIFT STATIONS			0	0
	LAGOONS			0	0
MISCELLANEOUS SOURCES					
	GWPCS			0	0
	MPDES			0	0

MOUNTAIN WATER COMPANY

SOURCE WATER DELINEATION & ASSESSMENT REPORT

POTENTIAL CONTAMINANT SURVEY RESULTS ***WELL # 26***

WELL 26

PWS ID# 294-026

	PCS TYPE	FACILITY NAME	FACILITY ADDRESS	HIGH	MODERATE
HAZARDOUS/REGULATED WASTE SITES					
	NPL	MILLTOWN RESERVOIR SEDIMENTS	ADJACENT TO SOUTH EAST SIDE OF TOWN	0	1
	CERCLIS			0	0
	CECRA			0	0
	ERNS			0	0
	LANDFILLS			0	0
	LUST	MILLTOWN MARKET	8340 HWY 200 EAST	0	1
HAZARDOUS/REGULATED MATERIALS HANDLING					
	RCRA HAZ. WASTE GEN	U OF M MISSOULA	32 CAMPUS DR	0	1
	UST	Town Pump Inc (Milltown) 8500664	7985 Hwy 200	0	1
	AST			0	0
	PIPELINE			1	1
	RAILROAD			1	1
	HIGHWAY			1	1
STORMWATER SOURCES					
	STREET SUMPS			16	285
	PRIVATE SUMPS			19	80
SANITARY SEWER SOURCES					
	SEPTICS			NA	NA
	LIFT STATIONS			0	0
	LAGOONS			0	0
MISCELLANEOUS SOURCES					
	GWPCS	Town Pump Travel Plaza	7985 Highway 200 E.	0	1
	MPDES			0	0

MOUNTAIN WATER COMPANY

SOURCE WATER DELINEATION & ASSESSMENT REPORT

POTENTIAL CONTAMINANT SURVEY RESULTS ***WELL # 27***

WELL 27

PWS ID# 294-027

	PCS TYPE	FACILITY NAME	FACILITY ADDRESS	HIGH	MODERATE
HAZARDOUS/REGULATED WASTE SITES					
	NPL			0	0
	CERCLIS	CLARK FORK RIVER BASIN	CLARK FORK RIVERBANK	0	1
	CECRA	HART OIL REFINERY	3RD STREET	1	1
		MISSOULA SAWMILL	3RD STREET	1	1
	ERNS			0	0
	LANDFILLS			0	0
	LUST	OLES COUNTRY STORE 12 & DIXIES DINER	3705 MT HIGHWAY 200 E	0	1
		CHAMPION INTERNATIONAL(SAWMILL)	CHAMPION MISSOULA SAWMILL	1	1
HAZARDOUS/REGULATED MATERIALS HANDLING					
	RCRA HAZ. WASTE GEN			0	0
	UST	Finest Oil Company	940 E Broadway	0	1
		Holiday Stationstore #278	403 Russell	0	1
		Ole's #12	3705 Hwy 200 E	0	1
		GREAT WEST PETROLEUM	1002 E BROADWAY ST	0	1
		Town Pump Inc (Missoula #2)	318 S Orange	0	1
	AST	GREAT WEST PETROLEUM	1002 E BROADWAY ST	0	1
		CENTURY LINK	201 PATTEE ST	0	1
	PIPELINE			0	1
	RAILROAD			0	1
	HIGHWAY			1	1
STORMWATER SOURCES					
	STREET SUMPS			1	292
	PRIVATE SUMPS			0	240
SANITARY SEWER SOURCES					
	SEPTICS			NA	NA
	LIFT STATIONS			0	0
	LAGOONS			0	0
MISCELLANEOUS SOURCES					
	GWPCS			0	0
	MPDES			0	0

MOUNTAIN WATER COMPANY

SOURCE WATER DELINEATION & ASSESSMENT REPORT

POTENTIAL CONTAMINANT SURVEY RESULTS ***WELL # 29***

WELL 29

PWS ID# 294-029

	PCS TYPE	FACILITY NAME	FACILITY ADDRESS	HIGH	MODERATE
HAZARDOUS/REGULATED WASTE SITES					
	NPL	MILLTOWN RESERVOIR SEDIMENTS	ADJACENT TO SOUTH EAST SIDE OF TOWN	0	1
	CERCLIS			0	0
	CECRA			0	0
	ERNS			0	0
	LANDFILLS			0	0
	LUST	MILLTOWN MARKET	8340 HWY 200 EAST	0	1
HAZARDOUS/REGULATED MATERIALS HANDLING					
	RCRA HAZ. WASTE GEN			0	0
	UST	Gary's Conoco	2125 S Higgins Ave	0	1
		Noon's #427	2401 S Higgins	0	1
		Noon's #430	3325 Brooks Street	0	1
		University of Montana	Physical Plant Bldg -32 Campus Drive	0	1
		Ole's Country Store #7	2105 S Higgins Ave	0	1
	AST	University of Montana	Physical Plant Bldg -32 Campus Drive	0	1
	PIPELINE			0	1
	RAILROAD			0	1
	HIGHWAY			1	1
STORMWATER SOURCES					
	STREET SUMPS			1	84
	PRIVATE SUMPS			1	50
SANITARY SEWER SOURCES					
	SEPTICS			NA	8.78
	LIFT STATIONS			0	0
	LAGOONS			0	0
MISCELLANEOUS SOURCES					
	GWPCS	Town Pump Travel Plaza	7985 Highway 200 E.	0	1
	MPDES			0	0

MOUNTAIN WATER COMPANY

SOURCE WATER DELINEATION & ASSESSMENT REPORT

POTENTIAL CONTAMINANT SURVEY RESULTS ***WELL # 30***

WELL 30

PWS ID# 294-030

	PCS TYPE	FACILITY NAME	FACILITY ADDRESS	HIGH	MODERATE
HAZARDOUS/REGULATED WASTE SITES					
	NPL			0	0
	CERCLIS	CLARK FORK RIVER BASIN	CLARK FORK RIVERBANK	1	1
	CECRA			0	0
	ERNS			0	0
	LANDFILLS			0	0
	LUST	OLES COUNTRY STORE 12 & DIXIES DINER	3705 MT HIGHWAY 200 E	1	1
HAZARDOUS/REGULATED MATERIALS HANDLING					
	RCRA HAZ. WASTE GEN			0	0
	UST			0	0
	AST			0	0
	PIPELINE			1	1
	RAILROAD			1	1
	HIGHWAY			1	1
STORMWATER SOURCES					
	STREET SUMPS			6	26
	PRIVATE SUMPS			18	50
SANITARY SEWER SOURCES					
	SEPTICS			1.34	NA
	LIFT STATIONS			0	0
	LAGOONS			0	1
MISCELLANEOUS SOURCES					
	GWPCS			0	0
	MPDES	Stimson Lumber Co. (Bonner Mill)		1	1

MOUNTAIN WATER COMPANY

SOURCE WATER DELINEATION & ASSESSMENT REPORT

POTENTIAL CONTAMINANT SURVEY RESULTS ***WELL # 31***

WELL 31

PWS ID# 294-031

	PCS TYPE	FACILITY NAME	FACILITY ADDRESS	HIGH	MODERATE
HAZARDOUS/REGULATED WASTE SITES					
	NPL			0	0
	CERCLIS	CLARK FORK RIVER BASIN	CLARK FORK RIVERBANK	1	1
	CECRA			0	0
	ERNS			0	0
	LANDFILLS			0	0
	LUST	OLES COUNTRY STORE 12 & DIXIES DINER	3705 MT HIGHWAY 200 E	1	1
HAZARDOUS/REGULATED MATERIALS HANDLING					
	RCRA HAZ. WASTE GEN			0	0
	UST	Finest Oil Company	940 East Broadway	0	1
	AST			0	0
	PIPELINE			1	1
	RAILROAD			1	1
	HIGHWAY			1	1
STORMWATER SOURCES					
	STREET SUMPS			10	29
	PRIVATE SUMPS			22	37
SANITARY SEWER SOURCES					
	SEPTICS			1.21	NA
	LIFT STATIONS			0	1
	LAGOONS			0	0
MISCELLANEOUS SOURCES					
	GWPCS			0	0
	MPDES			0	0

MOUNTAIN WATER COMPANY

SOURCE WATER DELINEATION & ASSESSMENT REPORT

POTENTIAL CONTAMINANT SURVEY RESULTS ***WELL #*** ***32***

WELL **32**

PWS ID# **294-032**

	PCS TYPE	FACILITY NAME	FACILITY ADDRESS	HIGH	MODERATE
HAZARDOUS/REGULATED WASTE SITES					
	NPL			0	0
	CERCLIS			0	0
	CECRA			0	0
	ERNS			0	0
	LANDFILLS			0	0
	LUST			0	0
HAZARDOUS/REGULATED MATERIALS HANDLING					
	RCRA HAZ. WASTE GEN			0	0
	UST			0	0
	AST			0	0
	PIPELINE			1	1
	RAILROAD			1	1
	HIGHWAY			1	1
STORMWATER SOURCES					
	STREET SUMPS			1	38
	PRIVATE SUMPS			2	25
SANITARY SEWER SOURCES					
	SEPTICS			NA	4.87
	LIFT STATIONS			0	1
	LAGOONS			0	0
MISCELLANEOUS SOURCES					
	GWPCS			0	0
	MPDES	Stimson Lumber Co. (Bonner Mill)		1	1

MOUNTAIN WATER COMPANY

SOURCE WATER DELINEATION & ASSESSMENT REPORT

POTENTIAL CONTAMINANT SURVEY RESULTS ***WELL # 33***

WELL 33

PWS ID# 294-033

	PCS TYPE	FACILITY NAME	FACILITY ADDRESS	HIGH	MODERATE
HAZARDOUS/REGULATED WASTE SITES					
	NPL			0	0
	CERCLIS			0	0
	CECRA			0	0
	ERNS			0	0
	LANDFILLS			0	0
	LUST			0	0
HAZARDOUS/REGULATED MATERIALS HANDLING					
	RCRA HAZ. WASTE GEN			0	0
	UST	KWIK STOP SINCLAIR	505 Highton	0	1
		GREAT WEST PERTOLEUM	1002 E BROADWAY ST	0	1
		OLE'S #12	3705 Hwy 200 E	0	1
	AST	GREAT WEST PERTOLEUM	1002 E BROADWAY ST	0	1
	PIPELINE			1	1
	RAILROAD			1	1
	HIGHWAY			1	1
STORMWATER SOURCES					
	STREET SUMPS			5	31
	PRIVATE SUMPS			4	45
SANITARY SEWER SOURCES					
	SEPTICS			1.02	NA
	LIFT STATIONS			0	1
	LAGOONS			0	0
MISCELLANEOUS SOURCES					
	GWPCS			0	0
	MPDES	Stimson Lumber Co. (Bonner Mill)		1	1

MOUNTAIN WATER COMPANY

SOURCE WATER DELINEATION & ASSESSMENT REPORT

POTENTIAL CONTAMINANT SURVEY RESULTS ***WELL #*** ***34***

WELL **34**

PWS ID# **294-034**

	PCS TYPE	FACILITY NAME	FACILITY ADDRESS	HIGH	MODERATE
HAZARDOUS/REGULATED WASTE SITES					
	NPL			0	0
	CERCLIS			0	0
	CECRA			0	0
	ERNS			0	0
	LANDFILLS			0	0
	LUST			0	0
HAZARDOUS/REGULATED MATERIALS HANDLING					
	RCRA HAZ. WASTE GEN			0	0
	UST	KWIK STOP SINCLAIR	505 Highton	0	1
		Ole's #12	3705 Hwy 200 E	0	1
	AST			0	0
	PIPELINE			1	1
	RAILROAD			1	1
	HIGHWAY			1	1
STORMWATER SOURCES					
	STREET SUMPS			3	41
	PRIVATE SUMPS			0	44
SANITARY SEWER SOURCES					
	SEPTICS			1.25	NA
	LIFT STATIONS			0	1
	LAGOONS			0	0
MISCELLANEOUS SOURCES					
	GWPCS			0	0
	MPDES			0	0

MOUNTAIN WATER COMPANY

SOURCE WATER DELINEATION & ASSESSMENT REPORT

POTENTIAL CONTAMINANT SURVEY RESULTS ***WELL # 35***

WELL 35

PWS ID# 294-035

	PCS TYPE	FACILITY NAME	FACILITY ADDRESS	HIGH	MODERATE
HAZARDOUS/REGULATED WASTE SITES					
	NPL			0	0
	CERCLIS			0	0
	CECRA			0	0
	ERNS			0	0
	LANDFILLS			0	0
	LUST			0	0
HAZARDOUS/REGULATED MATERIALS HANDLING					
	RCRA HAZ. WASTE GEN	MISSOULA TEXTILE SERVICE SOUTH	1201 BURLINGTON AVE	0	1
	UST	Beach Transportation	825 Mount Ave	0	1
	AST			0	0
	PIPELINE			0	1
	RAILROAD			1	1
	HIGHWAY			1	1
STORMWATER SOURCES					
	STREET SUMPS			4	411
	PRIVATE SUMPS			21	219
SANITARY SEWER SOURCES					
	SEPTICS			NA	NA
	LIFT STATIONS			0	0
	LAGOONS			0	0
MISCELLANEOUS SOURCES					
	GWPCS			0	0
	MPDES	Stimson Lumber Co. (Bonner Mill)		1	1
		Beach Transportation		1	1
		Daily, John R., Inc. 001, 002		1	1
		US Postal Service		1	1

MOUNTAIN WATER COMPANY

SOURCE WATER DELINEATION & ASSESSMENT REPORT

POTENTIAL CONTAMINANT SURVEY RESULTS ***WELL #*** ***36***

WELL **36**

PWS ID# **294-036**

	PCS TYPE	FACILITY NAME	FACILITY ADDRESS	HIGH	MODERATE
HAZARDOUS/REGULATED WASTE SITES					
	NPL			0	0
	CERCLIS			0	0
	CECRA			0	0
	ERNS			0	0
	LANDFILLS			0	0
	LUST			0	0
HAZARDOUS/REGULATED MATERIALS HANDLING					
	RCRA HAZ. WASTE GEN			0	0
	UST	Noon's #457	540 E Broadway	0	1
	AST			0	0
	PIPELINE			0	0
	RAILROAD			1	1
	HIGHWAY			1	1
STORMWATER SOURCES					
	STREET SUMPS			22	56
	PRIVATE SUMPS			1	47
SANITARY SEWER SOURCES					
	SEPTICS			NA	NA
	LIFT STATIONS			0	0
	LAGOONS			0	0
MISCELLANEOUS SOURCES					
	GWPCS			0	0
	MPDES			0	0

MOUNTAIN WATER COMPANY

SOURCE WATER DELINEATION & ASSESSMENT REPORT

POTENTIAL CONTAMINANT SURVEY RESULTS ***WELL # 38***

WELL 38

PWS ID# 294-39

	PCS TYPE	FACILITY NAME	FACILITY ADDRESS	HIGH	MODERATE
HAZARDOUS/REGULATED WASTE SITES					
	NPL	MILLTOWN RESERVOIR SEDIMENTS	ADJACENT TO SOUTH EAST SIDE OF TOWN	0	1
	CERCLIS	MILLTOWN RESERVOIR SEDIMENTS	ADJACENT TO SOUTH EAST SIDE OF TOWN	0	1
	CECRA			0	0
	ERNS	NORTHWEST ENERGY	704 SW HIGGINS	0	1
	LANDFILLS			0	0
	LUST	MILLTOWN MARKET #4964	8340 HWY 200 EAST	0	1
HAZARDOUS/REGULATED MATERIALS HANDLING					
	RCRA HAZ. WASTE GEN			0	0
	UST	University of Montana	Physical Plant Bldg-32 CAMPUS DR	0	1
		Gary's Conoco	2125 S Higgins Ave	0	1
		Noon's #426	1250 39Th Street	0	1
		Noon's #427	2401 S Higgins	0	1
		Ole's Country Store #7	2105 S Higgins Ave	0	1
	AST	University of Montana	Physical Plant Bldg-32 CAMPUS DR	0	1
	PIPELINE			0	1
	RAILROAD			0	1
	HIGHWAY			0	1
STORMWATER SOURCES					
	STREET SUMPS			2	224
	PRIVATE SUMPS			0	133
SANITARY SEWER SOURCES					
	SEPTICS			NA	NA
	LIFT STATIONS			0	0
	LAGOONS			0	0
MISCELLANEOUS SOURCES					
	GWPCS			0	0
	MPDES			0	0

MOUNTAIN WATER COMPANY

SOURCE WATER DELINEATION & ASSESSMENT REPORT

POTENTIAL CONTAMINANT SURVEY RESULTS ***WELL # 39***

WELL 39

PWS ID# 294-40

	PCS TYPE	FACILITY NAME	FACILITY ADDRESS	HIGH	MODERATE
HAZARDOUS/REGULATED WASTE SITES					
	NPL	MILLTOWN RESERVOIR SEDIMENTS	ADJACENT TO SOUTH EAST SIDE OF TOWN	0	1
	CERCLIS			0	0
	CECRA			0	0
	ERNS			0	0
	LANDFILLS			0	0
	LUST			0	0
HAZARDOUS/REGULATED MATERIALS HANDLING					
	RCRA HAZ. WASTE GEN			0	0
	UST			0	0
	AST			0	0
	PIPELINE			0	1
	RAILROAD			0	1
	HIGHWAY			0	1
STORMWATER SOURCES					
	STREET SUMPS			2	224
	PRIVATE SUMPS			0	133
SANITARY SEWER SOURCES					
	SEPTICS			NA	NA
	LIFT STATIONS			0	0
	LAGOONS			0	0
MISCELLANEOUS SOURCES					
	GWPCS			0	0
	MPDES			0	0

MOUNTAIN WATER COMPANY

SOURCE WATER DELINEATION & ASSESSMENT REPORT

POTENTIAL CONTAMINANT SURVEY RESULTS ***WELL # 40A***

WELL **40A**

PWS ID# **294-43**

	PCS TYPE	FACILITY NAME	FACILITY ADDRESS	1YR TOT	3 YR TOT
HAZARDOUS/REGULATED WASTE SITES					
	NPL			0	0
	CERCLIS			0	0
	CECRA			0	0
	ERNS			0	0
	LANDFILLS			0	0
	LUST			0	0
HAZARDOUS/REGULATED MATERIALS HANDLING					
	RCRA HAZ. WASTE GEN			0	0
	UST			0	0
	AST			0	0
	PIPELINE			0	0
	RAILROAD			0	0
	HIGHWAY			0	0
STORMWATER SOURCES					
	STREET SUMPS			0	18
	PRIVATE SUMPS			0	1
SANITARY SEWER SOURCES					
	SEPTICS			NA	NA
	LIFT STATIONS			3	2
	LAGOONS			0	0
MISCELLANEOUS SOURCES					
	GWPCS			0	0
	MPDES			0	0

MOUNTAIN WATER COMPANY

SOURCE WATER DELINEATION & ASSESSMENT REPORT

POTENTIAL CONTAMINANT SURVEY RESULTS ***WELL # 40B***

WELL **40B**

PWS ID# **294-44**

	PCS TYPE	FACILITY NAME	FACILITY ADDRESS	HIGH	MODERATE
HAZARDOUS/REGULATED WASTE SITES					
	NPL			0	0
	CERCLIS			0	0
	CECRA			0	0
	ERNS			0	0
	LANDFILLS			0	0
	LUST			0	0
HAZARDOUS/REGULATED MATERIALS HANDLING					
	RCRA HAZ. WASTE GEN			0	0
	RTK			0	0
	UST			0	0
	AST			0	0
	PIPELINE			0	0
	RAILROAD			0	0
	HIGHWAY			0	0
STORMWATER SOURCES					
	STREET SUMPS			0	18
	PRIVATE SUMPS			0	1
SANITARY SEWER SOURCES					
	SEPTICS			NA	NA
	LIFT STATIONS			3	2
	LAGOONS			0	0
MISCELLANEOUS SOURCES					
	GWPCS			0	0
	MPDES			0	0

MOUNTAIN WATER COMPANY

SOURCE WATER DELINEATION & ASSESSMENT REPORT

POTENTIAL CONTAMINANT SURVEY RESULTS ***WELL # 40C***

WELL **40C**

PWS ID# **294-45**

	PCS TYPE	FACILITY NAME	FACILITY ADDRESS	HIGH	MODERATE
HAZARDOUS/REGULATED WASTE SITES					
	NPL			0	0
	CERCLIS			0	0
	CECRA			0	0
	ERNS			0	0
	LANDFILLS			0	0
	LUST			0	0
HAZARDOUS/REGULATED MATERIALS HANDLING					
	RCRA HAZ. WASTE GEN			0	0
	RTK			0	0
	UST			0	0
	ASAT			0	0
	PIPELINE			0	0
	RAILROAD			0	0
	HIGHWAY			0	0
STORMWATER SOURCES					
	STREET SUMPS			0	18
	PRIVATE SUMPS			0	1
SANITARY SEWER SOURCES					
	SEPTICS			NA	NA
	LIFT STATIONS			3	2
	LAGOONS			0	0
MISCELLANEOUS SOURCES					
	GWPCS			0	0
	MPDES			0	0

MOUNTAIN WATER COMPANY

SOURCE WATER DELINEATION & ASSESSMENT REPORT

POTENTIAL CONTAMINANT SURVEY RESULTS ***WELL # 41***

WELL 41

PWS ID# 294-46

	PCS TYPE	FACILITY NAME	FACILITY ADDRESS	HIGH	MODERATE
HAZARDOUS/REGULATED WASTE SITES					
	NPL			0	0
	CERCLIS			0	0
	CECRA	WEST FRONT BATTERY	255 WEST FRONT ST	0	1
	ERNS			0	0
	LANDFILLS			0	0
	LUST	OLES COUNTRY STORE 12 & DIXIES DINER #4571	3705 MT HIGHWAY 200 E	0	1
HAZARDOUS/REGULATED MATERIALS HANDLING					
	RCRA HAZ. WASTE GEN	TARGET STORE #T0885	N RESERVE ST	1	1
	UST	PS Mini Mart	930 N Russell	0	1
		Finest Oil Company	940 E Broadway	0	1
		Tabish Brothers Distributors Inc.	501 Taylor	0	1
		Missoula County (5613921)	2330 Mullan Rd	0	1
		Noon's #435	1540 Toole Ave	0	1
		MDT 11	2100 W Broadway	0	1
		Safeway	900 W BROADWAY	0	1
		Rangitsch Brothers	2001 West Broadway	0	1
	AST	Century Link	201 Pattee St	0	1
	PIPELINE			0	1
	RAILROAD			1	1
	HIGHWAY			0	1
STORMWATER SOURCES					
	STREET SUMPS			8	175
	PRIVATE SUMPS			12	306
SANITARY SEWER SOURCES					
	SEPTICS			NA	NA
	LIFT STATIONS			0	0
	LAGOONS			0	0
MISCELLANEOUS SOURCES					
	GWPCS			0	0
	MPDES			0	0

MOUNTAIN WATER COMPANY

SOURCE WATER DELINEATION & ASSESSMENT REPORT

POTENTIAL CONTAMINANT SURVEY RESULTS ***WELL # 42***

WELL 42

PWS ID# 294-47

	PCS TYPE	FACILITY NAME	FACILITY ADDRESS	HIGH	MODERATE
HAZARDOUS/REGULATED WASTE SITES					
	NPL			0	0
	CERCLIS			0	0
	CECRA	WEST FRONT BATTERY	255 WEST FRONT ST	0	1
	ERNS			0	0
	LANDFILLS			0	0
	LUST			0	1
HAZARDOUS/REGULATED MATERIALS HANDLING					
	RCRA HAZ. WASTE GEN			0	0
	UST	PS Mini Mart	930 N Russell	0	1
		Tabish Brothers Distributors Inc.	501 Taylor	0	1
		Finest Oil Company	940 E Broadway	0	1
		Safeway	900 W BROADWAY	0	1
		MDT 11	2100 W Broadway	0	1
		Noon's #435	1540 Toole Ave	0	1
		Rangitsch Brothers	2001 West Broadway	0	1
	AST	Century Link	201 Pattee St	0	1
	PIPELINE			0	1
	RAILROAD			1	1
	HIGHWAY			0	1
STORMWATER SOURCES					
	STREET SUMPS			4	149
	PRIVATE SUMPS			25	246
SANITARY SEWER SOURCES					
	SEPTICS			NA	NA
	LIFT STATIONS			0	0
	LAGOONS			0	0
MISCELLANEOUS SOURCES					
	GWPCS			0	0
	MPDES			0	0

MOUNTAIN WATER COMPANY

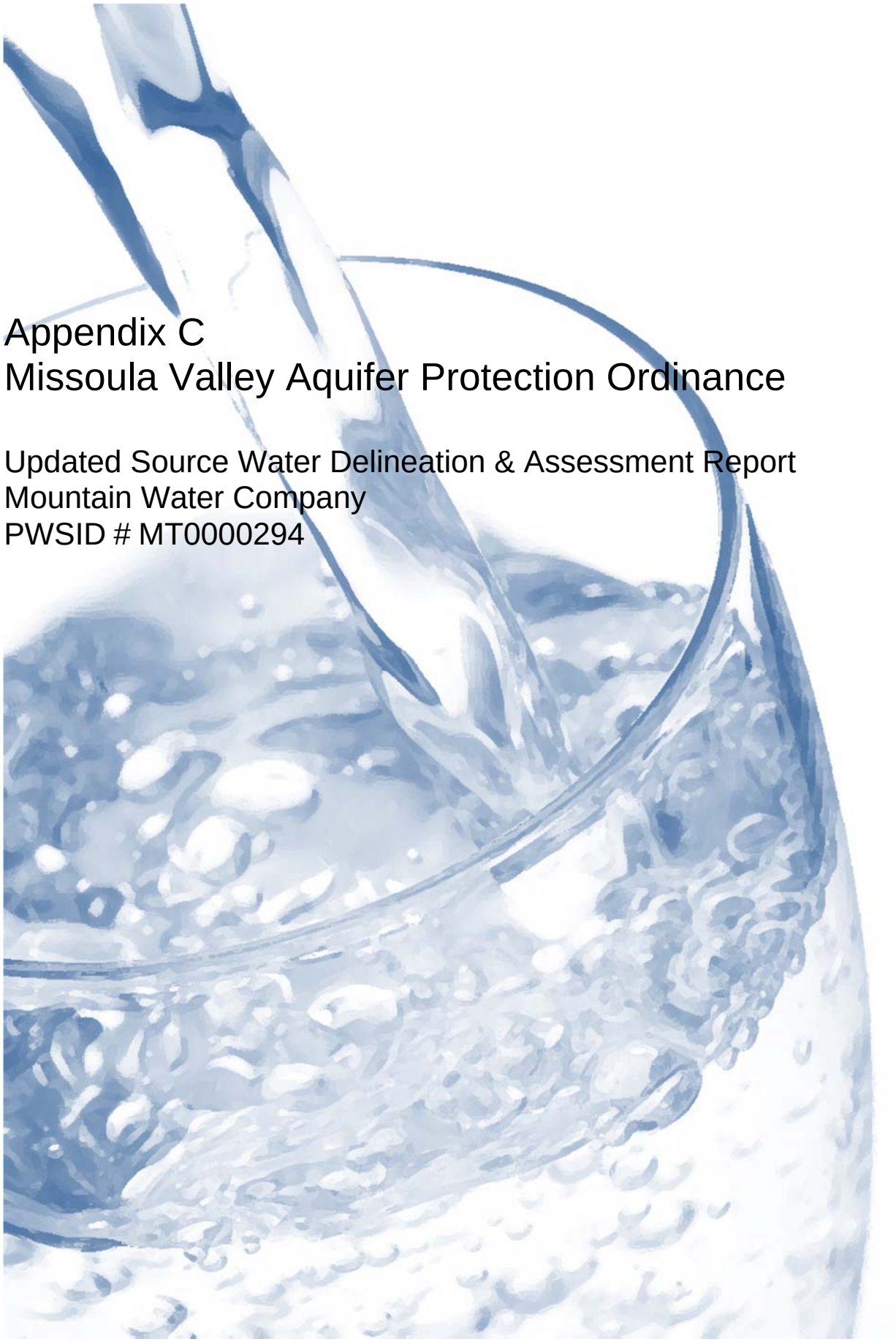
SOURCE WATER DELINEATION & ASSESSMENT REPORT

POTENTIAL CONTAMINANT SURVEY RESULTS ***WELL # 43***

WELL **43**

PWS ID#

	PCS TYPE	FACILITY NAME	FACILITY ADDRESS	HIGH	MODERATE
HAZARDOUS/REGULATED WASTE SITES					
	NPL			0	0
	CERCLIS			0	0
	CECRA			0	0
	ERNS			0	0
	LANDFILLS			0	0
	LUST			0	0
HAZARDOUS/REGULATED MATERIALS HANDLING					
	RCRA HAZ. WASTE GEN			0	0
	UST			0	0
	AST			0	0
	PIPELINE			1	1
	RAILROAD			0	0
	HIGHWAY			0	0
STORMWATER SOURCES					
	STREET SUMPS			0	1
	PRIVATE SUMPS			0	1
SANITARY SEWER SOURCES					
	SEPTICS			NA	5.22
	LIFT STATIONS			0	0
	LAGOONS			0	0
MISCELLANEOUS SOURCES					
	GWPCS			0	0
	MPDES	Stimson Lumber Co. (Bonner Mill)		1	1



Appendix C
Missoula Valley Aquifer Protection Ordinance

Updated Source Water Delineation & Assessment Report
Mountain Water Company
PWSID # MT0000294

MISSOULA VALLEY WATER QUALITY ORDINANCE
Amended December, 2008

Section 13.26.010 SHORT TITLE; APPLICABILITY; CONSTRUCTION.

This Ordinance shall be known as the "Missoula Valley Water Quality Ordinance." It is intended to protect the public health, safety and general welfare of those utilizing the Missoula Valley Aquifer and surface waters in the Missoula Valley for drinking water, recreation and other beneficial uses. The provisions of the Ordinance are deemed to be a health ordinance and shall be effective within the City of Missoula and all places within five miles outside the city limits that are within the boundary of the Missoula Valley Water Quality District pursuant to §7-4-4306 MCA (1993). This Ordinance establishes prohibitions and restrictions to prevent surface water and groundwater contamination, and to protect public health, safety and welfare. This Ordinance shall be broadly construed to effect its purposes. Nothing in this Ordinance shall relieve a person from the requirements of any other federal, state, or local law. If any provision of this Ordinance duplicates any local, state or federal statute or regulation, the local, state or federal statute or regulation shall govern. However, if the requirements of this Ordinance are more stringent than the requirements of the local, state or federal statute or regulation, the requirements of this Ordinance shall govern.

Section 13.26.020 LEGISLATIVE INTENT AND PURPOSE

In order to protect the Missoula Valley's sole source of drinking water and surface waters in the Missoula Valley and to secure and promote the general public health, safety and welfare, the Missoula City Council declares that:

(a) the improper storage, handling, use, transport, production or disposal of certain substances in the Missoula Valley is potentially harmful to the quality of water in the Missoula Valley and to drinking water obtained by the use of private and public supply wells, and that certain activities involving the use of certain substances should be managed to prevent water contamination.
(b) affirmative measures to prevent water pollution are the most effective means available to protect water quality.
(c) in order to effectively protect surface and groundwater, local authority is needed to require pollution prevention measures at facilities which handle significant quantities of certain substances, and to prohibit and deter activities which pose threats to the quality of the Missoula Valley Aquifer.
(d) the construction, development and use of new public water supply wells in proximity to existing sources of contamination is potentially harmful to the quality of drinking water obtained from such wells. The location of identified contaminant sources which pose serious threats of contamination should also be prohibited in proximity to public drinking water wells, in order to minimize the risk of contamination.

Section 13.26.030 DEFINITIONS

For purposes of this Ordinance, the following terms have the following meanings unless the context clearly indicates otherwise:

1. Aboveground Storage Tank (AST) - Any one or combination of tanks that is used to contain an accumulation of Regulated Substance, and the volume of which is more than 90% above the surface of the ground.

2. Anti-Icing: Anti-icing means the application of a deicer before or during a storm event for the purpose of preventing ice and snow accumulation on the roadway.

3. Aquifer - A water-bearing, subsurface formation capable of yielding sufficient quantities of water for beneficial use.

4. Aquifer Protection Area - The areas within the City of Missoula and within five miles outside the

Missoula city limits which are within the boundaries of the Missoula Valley Water Quality District.

5. Board - The Board of Directors of the Missoula Valley Water Quality District.

6. Bulk Petroleum Storage Facility - A facility used for storage of petroleum products for marketing or wholesale distribution that has a total bulk storage capacity of 50,000 gallons or more.

7. Carbon Absorption/Evaporation Technology: A treatment technology for perchloroethylene contaminated wastewater which removes perchloroethylene or other chlorinated solvents from a water-solvent mixture using carbon absorption and evaporates the remaining water.

8. Chemical Manufacturing Facility - A facility having a Standard Industry Class Code (SIC Code) between 2800 and 2899 which handles Regulated Substances in an amount equal to or greater than threshold quantities.

9. Class II Landfill - An area of land or an excavation, as defined in Montana Administrative Rules A.R.M. 17.50.504, where group II or group III wastes are placed for permanent disposal, and that is not a land application unit, surface impoundment, injection well, or waste pile. Group II and III wastes are defined in Montana Administrative Rules, A.R.M. 17.50.503.

10. Class III Landfill - An area of land or an excavation, as defined in Montana Administrative Rules A.R.M. 17.50.504, where group III wastes are placed for permanent disposal, and that is not a land application unit, surface impoundment, injection well, or waste pile. Group III wastes are defined in Montana Administrative Rules, A.R.M. 17.50.503.

11. Closure Permit - A permit issued by the Department in accordance with section 13.26.060 of this Ordinance when a facility is permanently closed, or has been abandoned for one year.

12. Community Water System - Any public water supply system, as defined in A.R.M. 17.38.101, which serves at least ten service connections used by year-round residents or regularly serves at least 25 year-round residents.

13. Component - Any constituent part of a unit or any group of constituent parts of a unit which are assembled to perform a specific function.

14. Contamination - The presence of any substance (chemical, radiological, or biological) or any condition (temperature, pH, taste, color, odor, turbidity) in soil or water which may create or threaten to create a hazard to human health or the environment, or impair the usefulness of the soil or water.

15. Department - The Missoula Valley Water Quality District.

16. Dry Cleaning Establishment - Any facility that uses a transfer machine, dry-to-dry vented unit, or dry-to-dry closed loop unit with one or more of the following solvents to clean clothing or other materials: perchloroethylene; trichlorotriflouroethane (CFC-113); CFC-11; stoddard solvent; 1,1,1-Trichloroethane; HCFC 14 lb.; HCFC-123 lb.; and HCFC-225 lb.

17. Dry-to-Dry machine: A machine that can wash and dry garments without transferring them and potentially emit chlorinated solvent to the atmosphere.

18. EPA - United States Environmental Protection Agency.

19. Facility - An area, building or buildings, appurtenant structures or surrounding land area used by a person.

20. Fleet - More than 5 vehicles or locomotives.

21. Fueling Facility - A facility that dispenses petroleum products for commercial sale, public use, or for fleet vehicle operation, excluding bulk petroleum storage facilities and farm and residential tanks of 1100 gallons or less capacity used for storing motor fuel for non commercial purposes.

22. Future Wellhead Reservation Area - The surface area overlying a portion of the Missoula Valley Aquifer which, because of aquifer recharge, groundwater flow and potential sources of contamination, should be protected against contamination to assure high quality groundwater for future generations.

23. Grass Infiltration Swale - A vegetative-lined infiltration cell designed and constructed in accordance with Department standards to collect and treat contaminants in storm water runoff.

24. Groundwater - Water that fills the interconnected spaces of material below the water table (upper limit of saturation), or water which is held in the unsaturated zone by capillary action.

25. Handle - To use, generate, process, produce, package, treat, store, emit, discharge or dispose of a Regulated Substance, excluding (a) handling during continuous non-stop transit, (b) transit via pipeline, and (c) handling of parcels and packages by the United States Postal Service, motor freight companies, and private delivery services.

26. Hazardous Waste - A hazardous waste as defined pursuant to section 1004(5) of the Resource Conservation and Recovery Act of 1976, 42 U.S.C. 6903(5), as amended, including a substance listed or identified in 40 CFR 261.

27. Hazardous Waste Management Facility - All contiguous land, and structures, other appurtenances, and improvements on the land used for treating, storing, or disposing of a hazardous waste, and that are required under Montana Hazardous Waste Administrative Rules, A.R.M 17.54.105, to have a hazardous waste management permit. A Hazardous Waste Management Facility may consist of several treatment, storage, or disposal operational units.

28. Independent Certified Laboratory: A laboratory outside the control of the person requesting approval from the Department that is certified by the EPA or other appropriate certifying agency to complete testing.

29. Industrial or Commercial Injection Well - A well or septic system that receives industrial or commercial wastes from a public or private facility, excluding wells or septic systems used solely for storm water discharge, sanitary waste discharge and/or discharge or extraction of non-contact heating and cooling system water.

30. Missoula Valley Aquifer - The aquifer underlying the Missoula Valley which supplies the area with water.

31. New - Constructed, installed or brought into operation after the effective date of this Ordinance.

32. Noncomplying Activity - An activity involving the handling of a Regulated Substance in an amount equal to or greater than its threshold quantity within a Future Wellhead Reservation Area.

33. Non-transient Non-community water system - Any public water supply system as defined in A.R.M. 17.38.202 that is not a community water system and that regularly serves at least 25 of the same persons over six months per year.

34. Perchloroethylene (C_2CL_4) - A colorless liquid used as a dry cleaning fluid; general degreaser of metals; solvent for waxes, fats, oils, and gums; constituent of printing inks and paint removers. Synonyms include, Tetrachloroethylene, Tetrachloroethene, PCE, PERC.

35. Person - Any natural person, individual, public or private corporation, firm, association, joint venture, partnership, municipality, governmental agency, political subdivision, public officer or any other entity whatsoever or any combination of such, jointly or severally.

36. Piping Manifold - The area(s) of a piping system fitted with apertures for making multiple connections.

37. Pollution Prevention Permit - A permit required of a person who owns, operates or controls a facility that handles any Regulated Substance in an amount equal to or greater than four times its threshold quantity. Pollution Prevention Permits are issued by the Department in accordance with section 13.26.050 of this Ordinance.

38. Primary Container - A container which comes into immediate contact with a Regulated Substance.

39. Public Sewage Disposal System - A system, as defined in §75-6-102(11) MCA, for collection, transportation, treatment or disposal of sewage that is designed to serve or serves ten or more families or 25 or more persons daily for a period of at least 60 days out of the calendar year.

40. Public Water Supply System - A system, as defined in §75-6-102(12) MCA, for the provision of water for human consumption from any community well, water hauler for cisterns, water bottling plant, water dispenser, or other water supply that is designed to serve or serves 10 or more families or 25 or more persons daily or has at least 10 service connections at least 60 days out of the calendar year.

41. Reasonably Achievable Limit: A pollutant limit that is determined on a case by case basis to be reasonably achievable taking into account environmental, economic, and other factors and costs.

42. Refrigerator Condenser: A vapor recovery system into which an air-chlorinated solvent vapor stream is routed and the chlorinated solvent is condensed by cooling the gas-vapor stream.

43. Regulated Substance - Any liquid substance, semi-liquid substance, or soluble solid on the most current Superfund Amendments and Reauthorization Act (SARA), Title III List of Lists published by the Office of Pollution Prevention and Toxic Substances, U.S. Environmental Protection Agency, Washington D.C., any petroleum product, any hazardous waste, or any other substances that the Board determines, following public review, may threaten contamination of the Missoula Valley Aquifer, excluding substances used for personal household use. The Board may, following public review and comment, remove a substance from the list of Regulated Substances.

44. Release - Any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing of a regulated substance into the environment (including the past release of a regulated substance), but excluding (a) releases contained in a secondary containment area or the indoor work place provided the release does not exit the indoor work place, (b) the use of pesticides and fertilizers as defined in §80-8-102(30) MCA and §80-8-102(2) MCA when they are applied in accordance with approved federal and state labels, and (c) any

discharge permitted by a local, state, or federal agency.

45. Replacement - Replacement or replace shall mean:
    (a) Replacing, repairing, upgrading or improving a facility at a cost which equals or exceeds 50% of the value of the facility at the time of such act.
    (b) Replacing a component or more than 50% of a component of a facility.
    (c) Reoccupation of a facility, reuse of a component at a facility, or restarting an activity which has been out of service or not practiced for a period of one year.

46. Secondary Containment - Containment external to and separate from the primary container adequate to prevent the release of Regulated Substances to native soil, surface water, or groundwater. The secondary containment structure or cell must:
    (a) be non-reactive and resistant to the materials contained;
    (b) prevent infiltration of any Regulated Substance into the ground in the event of a release from the primary storage container;
    (c) isolate the Regulated Substance from soils, injection wells, floor drains, or any other potential surface and groundwater entry point; and
    (d) contain at least 110% of the volume of the largest container, or 10% of the aggregate volume of all containers, whichever is greater.

    A covered building or structure may fulfill the secondary containment requirements of this Ordinance, provided the building or structure has an impermeable floor and walls and the release of a Regulated Substance would remain in the building or structure.

47. Soluble Solid - A solid that exists in a powder form and has a particle size less than 100 microns, is handled in solution or molten form, or meets the criteria for a National Fire Protection Association (NFPA) rating of 2, 3, or 4 for reactivity.

48. Storm Water Injection Well - A structure, pit or hole that primarily receives storm water runoff from paved areas, including, but not limited to, parking lots, streets, residential subdivisions, and highways.

49. Tank - Stationary device designed to contain an accumulation of substances and constructed of non-earthen materials (e.g. concrete, steel, plastic) that provide structural support.

50. Tank Fueling Area - The area surrounding the above or underground storage tanks subject to releases of petroleum products during tank fueling, including the area surrounding the tanker truck during fueling.

51. Threshold Quantity - The following quantities of Regulated Substances (excluding products in vehicle fuel tanks, aerosol spray cans, products used for research at educational institution laboratories, and substances sold for retail in a container equal to or less than 5 gallons capacity) handled at a facility at any one time, regardless of location, number of containers, or method of storage, shall constitute the Threshold Quantity:
    (a) For those Regulated Substances specifically listed in the Superfund Amendments and Reauthorization Act (SARA) Title III List of Lists and for those Regulated Substances which are listed hazardous waste defined pursuant to 40 CFR Part 261, as amended, the threshold quantity shall be the reportable quantity published in the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 40 CFR 302, Table 302.4 or the Superfund Amendments and Reauthorization Act (SARA) Section 355, Appendix A.
    (b) For those Regulated Substances that are characteristic hazardous wastes defined pursuant to 40 CFR Part 261, as amended, the threshold quantity shall be based on the substance contained in the waste with the lowest threshold quantity.

(c) For those Regulated Substances not listed in the Superfund Amendments and Reauthorization Act Title III List of Lists, and for those Regulated Substances that are not a hazardous waste, the following quantities of qualifying substances at a facility at any one time shall constitute a Threshold Quantity:

(i) Waste oil - 1000 pounds or 100 gallons.
(ii) Gasoline - 250 pounds or 25 gallons
(iii) Diesel/Jet Fuel/Kerosene - 500 pounds or 50 gallons
(iv) New Motor Oil - 2,000 pounds or 200 gallons

(d) For those substances that are mixtures of one or more Regulated Substance, the threshold quantity shall be based on the substance contained in the mixture with the lowest threshold quantity.

Threshold Quantities of substances may be established or revised by the Board, following public review and comment.

52. Transfer Dry Cleaning Machine: A machine unable to both wash and dry garments, which emits chlorinated solvent to the atmosphere during transfer.-

53. Underground Storage Tank (UST) - Any one or combination of tanks as defined in MCA 75-10-403.

54. Vehicle Fueling Area - The area surrounding a fuel island or dispenser(s) subject to releases of petroleum products during vehicle fueling, including a 3 foot release collection buffer zone extending beyond the lanes of traffic next to the fuel islands or dispenser(s).

55. Waste Oil - Oil that has been refined from crude oil, or any synthetic oil, that has been used and as a result of such use is contaminated by physical or chemical impurities.

56. Well - A structure, pit or hole sunk into the earth to reach a resource supply such as water.

57. Wellhead - The physical structure or device at the land surface surrounding a well, from or through which groundwater flows or is pumped from an aquifer.

Section 13.26.040 POLLUTION PREVENTION REQUIREMENTS

(A) No product shall be distributed, sold, offered, or exposed for sale within the aquifer protection area if it contains Perchloroethylene in any quantity. Those products containing Perchloroethylene used at dry cleaning establishments and educational institution research laboratories are exempt from this provision of the Ordinance, provided the person who owns, operates, or controls such facility obtains a pollution prevention permit from the Department, regardless of the quantity of Perchloroethylene handled at the facility.

(B) A person who owns, operates or controls a facility which handles Regulated Substances in an amount equal to or greater than the threshold quantities must submit an inventory and quantity of those Regulated Substances to the Local Emergency Planning Committee (LEPC) every year.

(C) A person who owns, operates or controls a new or replacement fueling facility must:

(1) install and maintain an awning or canopy that prevents precipitation from falling on the vehicle fueling area(s) if surface releases of fuel from the vehicle fueling area could discharge to a storm water injection well; and
(2) design and install a storm water collection system for the facility which shall:
(a) prevent the flow of fuel releases in the tank fueling area and vehicle fueling area from discharging directly to a storm water injection well; and

(b) collect and discharge storm water from areas outside of the tank fueling area and vehicle fueling area to a grass infiltration swale or otherwise provide for such storm water to be handled in a manner to reduce the potential for water contamination.

(3) The storm water collection design must be approved by the Department and permitted by the City of Missoula Engineering Department prior to facility construction. The person owning, operating, or controlling the facility must maintain any grass infiltration swale and any other approved device used to prevent releases in the vehicle and tank fueling areas from discharging to a storm water injection well. The facility shall keep records of maintenance of the device at the facility to be viewed during Department inspections.

(D) A person who owns, operates or controls a fueling facility where surface releases of fuel from the vehicle or tank fueling area may discharge to a storm water injection well shall provide the following physical and procedural measures to prevent fuel releases:

(1) Breakaway hoses and nozzles shall be installed on all dispensers;

(2) Emergency response equipment shall be kept on site to be used in the event of a release, including absorbent materials and spill containment covers for each storm water injection well which may receive discharge from a surface release; and

(3) An employee trained on how to respond to a release must be on site at all times during facility operation, except as provided in (a).

(a) A fueling Facility that provides 24-hour public access to fuel through a remote card-lock system is exempt from the requirement to have a trained employee on site at all times during facility operation if it provides the following:

(1) automatic pump shutoff when 50 gallons of gasoline or 250 gallons of diesel fuel have been dispensed,

(2) emergency phone access,

(3) signs posted to instruct public to call 9-1-1 in the event of a fuel release.

(4) In addition to the above procedural and physical requirements, a person who owns, operates, or controls an existing fueling facility shall incorporate a release prevention section within the pollution prevention plan required under section 13.26.050 (B) of this Ordinance. The release prevention section of the plan shall describe the steps or methods that will be taken to prevent fuel released at the tank and/or vehicle fueling areas from reaching a storm water injection well. The release prevention plan must be approved by the Department. Physical alterations or procedural changes required as a condition of the Department's approval must be completed or instituted within one year of the Department's approval.

(E) A facility that handles a total quantity of any Regulated Substance in an amount equal to or greater than four times its threshold quantity must obtain a Pollution Prevention Permit, pursuant to section 13.26.050 of this Ordinance.

(F) A person who owns, operates or controls a facility at which a Regulated Substance (excluding petroleum products in underground storage tanks, in vehicle fuel tanks, at bulk petroleum storage facilities, and Regulated Substances sold for retail in a container equal to or less than 5 gallons capacity) equal to or greater than the threshold quantity is handled on the effective date of this Ordinance shall provide secondary containment for that substance. A person who owns, operates, or controls a new facility at which a Regulated Substance (excluding petroleum products in underground storage tanks, in vehicle fuel tanks, at bulk petroleum storage facilities, and Regulated Substances sold for retail in a container equal to or less than 5 gallons capacity) equal to or greater than the threshold quantity is handled after the effective date of this Ordinance must obtain Department approval of their plan for secondary containment prior to obtaining a building permit or first handling a Regulated Substance in an amount equal to or greater than its threshold quantity, whichever occurs first.

(G) A person who owns, operates, or controls a facility at which a Regulated Substance equal to or greater

than its threshold quantity is stored in any new or replacement underground storage tank system shall equip that system with double walled product piping, secondary containment of all ancillary equipment from the tank to the dispenser(s), tank release detection systems, and leak detectors on pressurized piping. Tank system design must be approved by the Department prior to obtaining a building permit. Such systems shall, at a minimum, meet the requirements described in A.R.M. 17.56.403 of the Montana Underground Storage Tank Regulations, as amended.

(H) No person shall construct or operate an industrial commercial injection well at a new or existing facility unless said person obtains an Underground Injection Control Permit from the Environmental Protection Agency (EPA) or the Department. A person may be granted a permit from the Department or EPA if the owner, operator or controller demonstrates to the Department or EPA that the process wastewater does not contain a Regulated Substance at a concentration equal to or above its EPA primary maximum contaminant level for drinking water, EPA health advisory level, or the standard proposed in the Montana Numeric Water Quality Standards, (Circular WQB-7), whichever is lower, and the potential for water contamination is reduced by such other measures as the Department or EPA may require.

(I) A person who owns, operates, or controls a bulk petroleum storage facility shall:

(1) During new or replacement construction, install all new or replacement piping aboveground;

(2) Perform annual release response training exercises simulating the actions that will be taken during a release of fuel at the facility;

(3) Have a person trained in the proper filling of aboveground tanks at the facility during tank filling operations, or establish a monitoring system capable of detecting and alerting local emergency personnel of a release during tank filling operations in such a manner to prevent the contamination of the Missoula Valley Aquifer. The monitoring system shall at a minimum include vapor monitors located at any valve and piping manifold that controls the flow of fuel to the tanks and from the tanks to the dispensers, and overfill alarms on any aboveground product fuel storage tank. The monitoring system must be staffed during tank filling operations. Any proposed monitoring system must be approved by the Department;

(4) Conduct annual integrity and leak testing of below grade metal fuel product piping to a pressure of one and a half times the operational pressure;

(5) Cathodically protect buried metal piping and the bottom of aboveground tanks in accordance with guidelines contained in American Petroleum Institute (API) 651;

(6) On or before January 1, 1996, and every five years thereafter, prepare a Contingency Plan outlining how personnel are to respond to a release of fuel at the facility. The plan shall also address alternative technologies which may prevent fuel from contaminating the Missoula Valley Aquifer, such as:

(a) installation of impermeable barriers or liners to prevent the vertical migration of released fuel to the aquifer;

(b) grading of the secondary containment area to common drainage channels or sumps equipped with dedicated pumps that can be activated to pump fuel from the containment area in the event of a large release;

(c) installation of vapor monitoring devices at piping manifolds and valves to alert personnel of a release;

(d) installation of vapor monitoring wells within a secondary containment area of the aboveground tanks to be used to recover released fuel before it reaches the underlying aquifer;

(e) installation of a dedicated recovery tank outside a secondary containment area of the aboveground tanks that can be used to recover released fuel; or

(f) excavation of contaminated soils immediately after a release occurs.

The Contingency Plan must be approved by the Department, and all physical or procedural changes required as a condition of the Department's approval of the Contingency Plan, shall be completed or instituted within two years of the Department's approval;

(7) On or before January 1, 1998, and every 10 years thereafter, test the integrity of the shell of

each aboveground tank in accordance with American Petroleum Institute (API) 653;
(8) Install containment devices to prevent a surface release of fuel at the vehicle fueling area from discharging directly to a storm water injection well, or surface waters;
(9) Secondarily contain all aboveground piping manifolds; and
(10) On or before January 1, 2000, and every 10 years thereafter, test the integrity of the bottom of each aboveground tank in accordance with American Petroleum Institute (API) 653. The frequency of integrity testing of the bottom of each tank may be extended by the Department provided that the owner, operator, or controller of the bulk petroleum storage facility proposes an extended frequency in accordance with American Petroleum Institute (API) 653, the proposal is received by the Department within two years of the adoption of this Ordinance, and the Department approves of the change in frequency of testing.

(J) A person who owns, operates or controls a facility on which a public or private water well or monitoring well is abandoned after the effective date of this Ordinance shall ensure that the well is abandoned in compliance with the Montana Department of Natural Resources and Conservation Board of Water Well Contractor Regulations, ARM §36.21.669 through §36.21.679 and §36.21.810.

(K) No person shall construct or operate a new or replacement facility which handles a Regulated Substance in a quantity equal to or greater than its threshold quantity within the Future Wellhead Reservation Area comprised of all land within township 13N, range 19W, sections 27 and 34, all land south of the Clark Fork River within township 13N, range 19W, section 22, and all land within the northwest and northeast quarter sections of township 13N, range 19W, section 4 of Montana Meridian, Missoula County, Missoula, Montana.

(L) Existing facilities within the Future Wellhead Reservation Area defined in section 13.26.050 (K) of this Ordinance may continue to operate, subject to all the conditions of section 13.26.050 and the following:
(1) Any activity involving the handling of a Regulated Substance in an amount equal to or greater than its threshold quantity shall be a noncomplying activity.
(2) Any noncomplying activity that is discontinued, abandoned or ceases for a period of twelve consecutive months may not be resumed.
(3) A noncomplying activity may not be enlarged, expanded, or altered so as to substantially increase the risk of soil or groundwater contamination. Any enlargement, expansion or increase in a noncomplying activity must be approved by the Department, in writing, prior to activity commencement.
(4) In the event a facility which houses a noncomplying activity is destroyed or damaged by any means to an extent that the cost to repair or replace the facility equals 50% of the value of the facility at the time of such act, the activity shall not be resumed or continued.

(M) In addition to any other applicable federal or state law and regulation, the following pollution prevention measures shall apply to dry cleaning facilities:
(1) After October 19, 2000, wastewater generated from dry cleaning machines and vacuum presses that use perchloroethylene and other chlorinated solvents shall not be discharged to any sewer system. Dry cleaning facilities which use perchloroethylene or other chlorinated dry-cleaning solvents shall either, a) treat their wastewater from dry-cleaning machines and vacuum presses on site using carbon absorption/evaporation or an equivalent technology, or b) properly dispose of the wastewater as a hazardous waste;
(2) After June 19, 2000, all new or replacement dry cleaning machines using perchloroethylene or other chlorinated solvents shall be dry-to-dry machines and be equipped with integral refrigerated condensers or an equivalent.
(3) After June 19, 2001, no dry cleaning facility shall include operation of a transfer dry cleaning machine using perchloroethylene.

(N) DEICER SPECIFICATIONS

(A) GENERAL REQUIREMENTS

(1) A person applying a deicer on streets and highways within the City of Missoula and all places within five miles outside the city limits must comply with the requirements of this section, which are intended to ensure compliance with the drinking water or aquatic life standards for parameters listed in Table 1 below, at the point of discharge after 100:1 dilution with stormwater.

(2) Any deicer applied within the City of Missoula and all places within five miles outside the city limits must be analytically tested to demonstrate that its quality meets the limits shown in Table 1. Analytical testing must be performed by the manufacturer or distributor at an independent certified laboratory using test methods approved by the Department. It is the City's preference to use a deicer that contains the least amount of any constituents which are not essential to the product's performance and which may cause contamination of soil or water, including inert or proprietary ingredients.

Table 1: Constituent Limit for Deicers

Parameter	Limit (mg/kg) [1]
Arsenic	1.0
Barium	100
Cadmium	0.20
Chromium	0.50
Copper	0.20
Lead	1.0
Mercury	0.005
Selenium	5.0
Zinc	10.0
Total Cyanide	0.20
Total Phosphorus	2,000
Total Nitrogen	1,000 / 500 [2]
PH	6.0- 9.0
Pesticides/herbicides	Based on WQB-7 Standard [3]

1 In most cases, the limit is based on the Montana drinking water quality or acute aquatic life standard (WQB-7 standards), whichever is lower. The limit for nitrogen and phosphorus are set even lower because they are believed to be reasonably achievable. A 100 to 1 dilution factor is applied for most parameters. This factor accounts for the dilution and attenuation of deicer from the truck to the side of the road. It was determined by comparing the chloride concentration of deicers to the chloride concentration of storm water samples collected during runoff.

2 The allowable amount of total nitrogen for a deicer is dependent on the form of nitrogen present in the deicer. Supplier must test for TKN, Nitrate + Nitrite as N, and Ammonia Nitrogen using methods approved by the Department. Organic nitrogen shall equal the amount of Total Kjeldahl Nitrogen (TKN) minus Ammonia Nitrogen. If 50% or more of the nitrogen present in the deicer is of the organic form, a limit of 1,000 mg/kg shall apply. If less than 50% of the nitrogen is of the organic form, a limit of 500 mg/kg shall apply.

3 For a product that contains an agricultural by-product, the supplier shall test for any pesticide/herbicide possibly in the deicer using test methods approved by the Department. The limit will be based on MT WQB-7 standard using a 100 to 1 dilution.

4 Liquid products shall be analyzed in the concentration they are applied to the street and directly compared to Table 1. Solid products shall be liquefied at specifications approved by the Department prior to analysis. In general products will be analyzed in accordance with product category test protocols developed by the Pacific Northwest Snowfighter's Association (PNS) before being compared to Table 1.

(3) The supplier of a product delivered and/or applied that is contaminated with something not specified on the Product Checklist or contains a specified constituent at a concentration high enough to be a public health or environmental concern, may be subject to cleanup costs for anything that came in contact with the product, including but not limited to storage tanks, equipment, soils, and/or groundwater.

(B) DEPARTMENT APPROVAL PROCESS

(1) Persons wanting Department approval for a deicer must submit a complete application to the Department. The complete application must include:

(a) A Department supplied Product Checklist;
(b) Documentation showing that the product is on the approved PNS product list;
(c) Analytical results of testing required in section (A) (2);
(d) The most recent Material Safety Data Sheet for the product;
(e) Proprietary chemical and physical information on the product, which shall be held confidential;
(f) Two one liter samples of the product for quality control testing purposes; and
(g) Other relevant information that the Department may require which is obtainable by the applicant.

(2) The Department shall have 30 days to review the submitted documentation and determine whether the product is approved. Persons requesting approval shall be notified whether their product is approved within 7 days of the Department's determination. Once a product has been approved it need not be approved again as long as the product formulation does not change.

(3) Changes to an approved product by the manufacturer or distributor which in any way makes the product different from the original qualified product will result in removal of the product from the approved list, and may result in cleanup costs, as per section (A) (3).

(C) FIELD DELIVERY OF PRODUCTS

(1) A bill of lading and invoice must accompany each shipment. The bill of lading and invoice must contain the following information:

(a) Name of product;
(b) Supplier and manufacturer of product;
(c) Destination of delivery;
(d) Total number of units being delivered;
(e) Total weight of delivery (certified scale, or certified micro flow meter);
(f) Lot number. The lot number must enable purchaser to track a delivered product back to its manufacturing point, date of manufacture, and specific batch;
(g) Name of Transport Company, tank trailer or rail car number, point and date of origin;
(h) Percent concentration and specific gravity for liquid products; and
(i) Contract unit of measure, unit price delivered (invoice only), and total price for units delivered (invoice only).

(2) All deicers can be subject to inspection and analysis as delivered. Purchaser shall have the option at the point of delivery to collect a sample of the product for quality control/quality assurance purposes. No precipitate or flocculation in liquid products shall be allowed in excess of the specification limits. Materials portraying these or other uncharacteristic traits or found to contain constituents at concentrations above the limits shown in Table 1, may be immediately rejected at the option of the buyer or their representative at the delivery location. Cost to remove

an unwanted product and re-supply the purchaser shall be paid by the supplier or manufacturer of the product. The supplier or manufacturer may also be subject to cleanup costs in accordance with section (A) (3).

(3) Each shipment shall be accompanied by a current and clearly legible MSDS.

(4) Advance notice must be made for all deliveries. Deliveries shall be made during normal working hours (Monday through Friday between the hours of 8:00 A.M. and 4:00 P.M.), unless otherwise requested or agreed to by the purchaser.

(D) STORAGE AND FIELD APPLICATION OF DEICERS

(1) Deicers stored at volumes greater than 1000 gallons or 10,000 pounds (for solids) shall be secondarily contained (liquids) or covered (solids).

(2) Where appropriate based on deicer manufacturer recommendations and/or PNS specifications, deicers stored in tanks must be circulated to prevent settling and product stratification.

(3) Deicers shall be applied in such a manner and at such a rate that pure product (liquid or solid) remains on the roadway.

(4) Deicers shall be applied using trucks equipped with ground-speed controllers. Deicers applied for anti-icing purposes prior to or during a storm event shall be applied at a rate not to exceed 30 gallons per lane mile. Whenever snow accumulations on the road are equal or greater than 2 inches, deicers shall only be applied after snow plowing to improve the effectiveness of a deicer and to reduce the amount applied.

(5) Deicer may be applied over the entire roadway for main transportation routes identified in the Missoula Street Snow and Ice Control Plan. Only the area in advance of intersections shall be deiced for residential neighborhood streets and non-essential transportation routes.

(6) The location and amount of deicer applied shall be tallied daily. Yearly volumes of deicer applied shall be provided to the Department annually by June 1 of each year.

(7) Any application of a non-approved deicer or a spill of deicer in an amount greater than 100 gallons or 1,000 pounds (solid) shall be reported to the Department within 24 hours of application or release.

(8) By January 1, 2001, the City of Missoula shall revise their Street Snow and Ice Control Plan to address the following:

(a) liquid deicer application methods (use of ground-speed controllers);
(b) rates of application;
(c) use of deicers with respect to the effective temperature and freezing point of the product;
(d) use of snow plows prior to deicer application; and
(e) keeping records on the amounts applied.

Section 13.26.050 POLLUTION PREVENTION PERMIT

(A) A person who owns, operates or controls a facility at which any Regulated Substance is handled in an amount equal to or greater than four times its threshold quantity shall apply for a Pollution Prevention Permit from the Department by the later of (a) July 1, 1995, or (b) 60 days after the date on which the facility first handled a Regulated Substance in an amount equal to or greater than four times its threshold

quantity. New or replacement facilities which will handle a Regulated Substance in an amount equal to or greater than four times its threshold quantity shall obtain a pollution prevention permit prior to obtaining a building permit, facility construction or operation. The Department may order revisions in the permit application submitted by the regulated facility to be completed within 30 days of receipt of an administrative order issued pursuant to 13.26.120 of this Ordinance.

(B) In order to obtain a Pollution Prevention Permit, an application for the permit accompanied by a Pollution Prevention Plan shall be submitted to the Department for approval. The Department shall supply a form that can be used for the plan. If a facility is required by State or Federal law to prepare a Pollution Prevention or Release Prevention Plan, a copy of such plan, supplemented with such other information as required by this Section, shall suffice to meet the Pollution Prevention Plan requirement of this section. The Pollution Prevention Plan shall contain the following:

(1) A discussion of the risks posed by major water quality hazards at the facility and the steps taken to address each of those risks, including but not limited to:

(a) the quantity and toxicity of any Regulated Substance handled in an amount equal to or greater than four times its threshold quantity

(b) potential consequences of any release

(c) location of facility with respect to a water body, groundwater, and conduits to groundwater

(d) personnel training

(e) engineering controls

(f) emergency response plans

(g) preventative maintenance

(h) process safety

(i) management structure implemented to control the risks and hazards

(2) A description of (a) emergency equipment available at the facility to respond to a release of a Regulated Substance, (b) written procedures describing how such equipment will be inspected and maintained, and (c) procedures to control, mitigate and/or remediate any release of Regulated Substance.

(3) For each Regulated Substance that is handled in an amount equal to or greater than four times its threshold quantity at the facility, the Pollution Prevention Plan shall describe:

(a) The state (solid, liquid or gas), quantity and type of container in which each Regulated Substance is acquired by the facility;

(b) Available alternatives, if any, by which the facility could:

(i) Reduce the quantity of Regulated Substances handled by process changes, product substitution, reuse or recycling , or treatment that does not constitute disposal; and

(ii) Adopt handling practices or make site improvements to reduce the potential for contamination.

(c) The manner and conditions under which each Regulated Substance is stored and transferred prior to use or disposition;

(d) The manner and conditions under which each Regulated Substance is used at the facility;

(e) The manner and process by which any waste Regulated Substances are treated, recycled or disposed;

(f) The physical structures and/or operational procedures employed at the facility to meet the secondary containment requirements of this Ordinance.

(g) The procedures to be employed to ensure that Regulated Substances over the threshold quantity do not release or otherwise cause contamination during transportation, transfer, use, storage, and disposal.

(4) Building plans and site development drawings showing compliance with the secondary containment requirements of this Ordinance. Such plans shall show the pathway of a potential release of a Regulated Substance, including but not limited to, information on the location of sewer

manholes, injection wells, drainage ditches, nearby streams, rivers or irrigation ditches and the direction of surface drainage. Such plans shall provide confirmation that the secondary containment methods are compatible with the materials to be contained and that Regulated Substances are isolated from injection wells, floor drains, surface waters, and any other surface water or groundwater injection point. The Department may require the plans to be reviewed by a professional engineer if the secondary containment structures require substantial engineering design. The building or site plans must show the location of Regulated Substances in buildings or other designated site areas.

(5) Identification of the individual(s) or staff position responsible for monitoring releases and threatened releases and a description of the steps to be taken in the event of a release, including but not limited to, reporting the release to the Department, Missoula 9-1-1 dispatch, the City Fire Department, Rural Fire Department, National Response Center and any other entity required by law. The Plan should identify the skill and knowledge of the person or position responsible for actions in the event of a spill.

(C) The Pollution Prevention Permit shall be valid for a period of two years. The applicant must apply for permit renewal at least 60 days prior to permit expiration.

(D) To obtain a Pollution Prevention Permit from the Department the applicant shall pay an application fee in an amount determined by the Board.

(E) The Department shall issue a Pollution Prevention Permit within 30 days of determining that the applicant has submitted a complete and accurate permit application and the pollution prevention plan complies with the requirements of this Ordinance. The Department may require a facility inspection to ensure compliance with the requirements of this Ordinance before a permit is issued.

Section 13.26.060 FACILITY CLOSURE PERMIT

(A) After the effective date of this Ordinance, any person that is required to have a Pollution Prevention Permit by this Ordinance must obtain a facility Closure Permit as required by this section. Applications for a Closure Permit shall be filed with the Department no later than 30 days after (1) the facility owned, operated, or controlled by said person is permanently closed, or (2) the date on which the facility has been abandoned for one year. If a person is required by State or Federal law to obtain a closure permit, a copy of such permit, supplemented with such other information as may be required by this section, shall suffice to meet the facility closure permit requirement of this section. All applications shall include:

(1) A Closure Permit Application Form, supplied by the Department.

(2) A written record identifying the Regulated Substances and quantities at the facility on the date on which the facility permanently closed or was abandoned, and a description of the Regulated Substances removed from the facility before or at the time the facility permanently closed or was abandoned.

(3) If the facility has underground sumps, injection wells, underground tanks, or any other structure that may have contained or become contaminated with Regulated Substances, the application shall include a plan to collect samples to assess whether contaminants are present near the structure. The Department shall assist the applicant in complying with this requirement.

(4) Results of any soil or groundwater samples collected on site.

(5) Such other information as the Department may require which is relevant to the environmental condition of the facility.

(B) If the Closure Permit application and required submittals are not complete, the Department shall notify the applicant in writing of the deficiencies and the applicant shall have 45 days to cure the deficiencies.

(C) The Department shall issue a Closure Permit within 30 days of finding that the Closure Permit Application Form is accurate and complete and all appropriate copies of sample analyses have been

submitted to the Department showing that the facility has complied with this section.

Section 13.26.070 REPORTING OF RELEASES

(A) A person who owns, operates or controls a facility or a person responsible for a release must immediately report a release of a Regulated Substance to the Missoula 9-1-1 Center by telephone in the following cases:

(1) A release of petroleum in an amount greater than 25 gallons.

(2) A release of a Regulated Substance other than petroleum in a quantity which exceeds the lesser of the threshold quantity of this Ordinance or the reportable quantity under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, as amended.

(B) Exemption from the requirement to report a release is not intended to relieve, in whole or in part, a person's responsibility to remediate or eliminate contamination caused by a release, as may be required by this Ordinance or any other state, federal or local law or regulation.

Section 13.26.080 PROHIBITED ACTIVITY

It is unlawful for any person to:

(a) cause contamination or to place, cause to be placed, or allow to remain in place any substance in a location where it is likely to cause contamination;

(b) violate any provision set forth in a permit for the facility issued pursuant to this Ordinance;

(c) violate any order issued pursuant to this Ordinance; or

(d) violate any provision of this Ordinance.

Section 13.26.090 PROTECTION OF WATER SUPPLY WELLS

(A) New water supply wells installed after the effective date of this Ordinance shall comply with the following:

(1) New and replacement public and private water supply wells must be installed within design standards established by the Montana Administrative Rules, A.R.M. 17.38.101 through 17.38.513.

(2) Wells of new community and non-community non-transient water systems may not be constructed:

(a) Within 1000 feet of any hazardous waste management facility, Class II landfill, bulk petroleum storage facility, fuel pipeline, fueling facility not meeting the design standards of section 13.26.040 (C) or (D) of this Ordinance, chemical manufacturing facility, regulated substance tank not meeting the requirements of section 13.26.040 (G) of this Ordinance, and any site where a release to groundwater has been reported to a state or federal agency.

(b) Within 250 feet of a Class III landfill, railroad track, the edge of pavement of the principal north-south or east-west hazardous substance transportation routes, or the subsurface discharge point of a public sewage disposal system.

(c) Within 100 feet of a sewer lift station serving a publicly-owned or public sewage system, storm water injection well, or wastewater absorption system, as defined in the Missoula City-County Health Board, Regulation No. 1.

(d) Within 50 feet of any sewer main or unlined irrigation ditch.

(3) The siting requirements of subsection 13.26.090 (A)(2), may be waived by the Department if it is demonstrated to the Department through scientific and technical evidence that the proposed location of a new well is the only practical site available and the potential for contamination to the well or groundwater is reduced by such other measures as the Department may require.

(4) The siting requirements of subsection 13.26.090 (A) (2) shall not be considered by any state or federal agency to provide an institutional control which would protect public health from contaminants at a site described in subsections 13.26.090 (A) (2) (a)-(d) in order to justify a decision not to clean up contamination at such sites or to not take action to limit releases of contaminants from such sites which may affect the quality of groundwater or surface water that may affect the quality of water obtained through community or non-community non-transient public water systems located within the distances described in subsections 13.26.090 (A) (2) (a)-(d).

(B) After the effective date of this Ordinance, no person shall construct or operate a new:

(1) Hazardous waste management facility, Class II landfill, bulk petroleum storage facility, chemical manufacturing facility, fuel pipeline, fueling facility not meeting the design standards of section 13.26.040 (C) or (D) of this Ordinance, or a regulated substance tank not meeting the requirements of section 13.26.040 (G) of this Ordinance within 1000 feet of a community or non-transient non-community public water supply well.

(2) Class III landfill, railroad track, or the discharge point of a public sewage disposal system within 250 feet of a community or non-transient non-community public water supply well.

(3) Publicly-owned or public sewage system sewer lift station or wastewater absorption system, as defined in the Missoula City-County Health Board Regulation No. 1 within 100 feet of a community or non-transient non-community public water supply well.

(4) Sewer main or storm water injection well within 50 feet of a community or non-transient non-community public water supply well.

(C) No person shall install a new private drinking water supply well if the primary structure located on the property is situated within 200 feet of a water main which is part of an existing public water supply system regulated by the Montana Public Service Commission, or which is owned or operated by a county or consolidated city and county water or sewer district as defined in Title 7, chapter 13, parts 22 and 23, the property abuts the right-of-way in which the main is located, and the owner of the existing public water supply system approves of the connection.

(D) U.S. Highway 93 and Interstate Highway 90 shall serve as the principal North-South and East-West hazardous substance transportation routes in the Missoula Valley. The City of Missoula shall provide adequate signing to indicate location of the routes to persons who transport hazardous substances through the valley.

Section 13.26.100 VARIANCES

(A) Purpose: Variances provide limited flexibility from strict compliance with specific Ordinance requirements.

(B) Applicability: When a person believes he or she meets the criteria for a variance set forth in subsection (D) below, such person may apply for Board approval of a variance following the procedure in subsection (F).

(C) Fees: The Board shall establish a fair and reasonable variance application fee based on the cost to give notice of hearing and investigate the proposed variance. The application fee must be paid in full before a variance will be considered. Application fees are not refundable. The Board may approve changes in fees at regularly scheduled board meetings.

(D) Criteria for Variances: The Board may approve of a variance to strict compliance with specific Ordinance requirements only if it finds all of the following:

(1) The applicant is subject to special circumstances which are:

(a) peculiar to the applicant's facility or situation; and

(b) not caused by the applicant's actions or inaction; and

(2) Substantial undue hardship would result from requiring strict compliance with the requirements(s) from which the variance is sought by:

(a) creating an unreasonable financial burden on the applicant; and

(b) depriving the applicant of rights commonly enjoyed by other persons similarly situated under the terms of the Ordinance.

(3) The variance must prevent aquifer and public water supply contamination and protect public health, safety and welfare to an extent similar to the requirements(s) from which the variance is sought.

(E) Variance Restrictions:

(1) The Board may not approve a variance which may adversely affect the health, safety, or welfare of any individual.

(2) No variance granted shall be construed to relieve an applicant of its obligations under other provisions of this Ordinance, or under other local, state, and federal laws.

(3) Variances are non-transferable and apply only to the applicant to whom they are granted for the period stipulated by the Board.

(F) Variance Approval Procedure:

(1) A complete variance application shall be submitted to the Department, including:

(a) Applicant's name and address

(b) Specific provision(s) of the Ordinance from which the variance is requested.

(c) Legal description or address where alternative is requested.

(d) Detailed and accurate description of the proposed alternative under consideration.

(e) Written explanation addressing each criteria under section 13.26.100 (D) (1)-(3).

(f) Other relevant information which the Department may require which is obtainable by the applicant.

(2) The Department shall have 7 days to determine if an application is complete.

(3) If the Department determines that the application is not complete, it shall notify the applicant of the deficiencies.

(4) If the Department determines that the application is complete, the Board shall schedule a public hearing within 45 days of the Department's determination.

(5) The Department shall serve notice of the hearing to the applicant's last known address by personal service or certified mail at least 14 days before the hearing is scheduled. The Department shall publish notice of hearing in a newspaper of general circulation in Missoula County at least 4 days before the hearing. Notice shall include:

(a) Name and address of applicant;

(b) Time, location and nature of hearing; and

(c) Address and phone number where interested persons may obtain information.

(G) Order of Hearings:

(1) Hearings shall proceed in the following order:

(a) First, the Board shall hear the staff report, if any, on the proposed variance.

(b) Second, the applicant shall present relevant evidence to the Board.

(c) Third, the Board shall hear any person in support of or in opposition to the proposed variance and shall accept any related letters, documents, or materials.

(H) Disposition of Hearing and Continuances:

(1) The Board shall deny, approve, or approve with conditions an application for variance to specific requirements of this Ordinance.

(2) The Board shall inform the applicant of its decision in writing, along with reasons for approving, conditionally approving, or denying the variance, within 15 days of its decision.

(3) The Board may continue a hearing for a period not to exceed 45 days.

(4) A hearing may be continued for longer than 45 days only if circumstances require a longer period and both the Board and the applicant agree to a longer period.

(I) Appeals: Any person adversely affected by a variance decision of the Board may initiate judicial review.

Section 13.26.110 INSPECTIONS

(A) The Department is authorized to enter and inspect at reasonable hours (or at any time on evidence of a release), upon presentation of credentials with or without prior notice, all facilities within the Aquifer Protection Area which it reasonably believes may handle Regulated Substances, in order to determine that the provisions of this Ordinance are being followed.

(B) If a person with authority over a facility will not permit an inspection, the City Attorneys office may apply to the City Municipal Court for a search warrant, based on probable cause to issue a warrant to inspect, survey or examine the facility and the premises on which it is located for potential violations of this Ordinance or in the interest of public health, safety, and general welfare.

(C) If a facility appears vacant or abandoned, and the property owner cannot be readily contacted to obtain consent for an inspection, in the interest of public health, safety and general welfare an agent of the City may enter any open or unsecured portion of the facility to conduct an inspection.

(D) Agents of the City or Department shall be provided with official identification and will show their identification when making an inspection.

(E) Law enforcement officers shall assist in making inspections when the Department requests their assistance, when necessary to provide for safe access and entry to the facility and at such time that law enforcement assistance can be reasonably scheduled or when a clear hazard to public health, safety or welfare exists.

Section 13.26.120 ENFORCEMENT

(A) The Department shall have the power and authority to administer and enforce the provisions of this Ordinance.

(B) Whenever the Department has knowledge or evidence that a violation of this Ordinance has occurred, the Department may issue a Notice of Violation and Order to Take Corrective Action to be served personally or by certified mail on the alleged violator or its agent. This Notice of Violation and Order to Take Corrective Action shall specify:

(1) the provision of this Ordinance or permit alleged to be violated;
(2) the facts alleged to constitute the violation; and
(3) any penalties sought to be assessed pursuant to section 13.26.130.

This notice may also include an order for corrective action, which shall specify as applicable:

(1) the specific nature of corrective action that the Department requires, which may include without limitation:
    (a) investigation, sampling and analysis to confirm a release or contamination;
    (b) containment, removal and remedial action to abate and reduce contamination or the threat of contamination;
    (c) the submission of a corrective action plan and corrective action progress reports or any other information deemed appropriate to protect human health and the environment; and
(2) the time within which the corrective action is to be implemented.

This order is final unless, five working days after the order is received, the offender submits a

written request for an administrative review as provided for in Section (C), or within 10 working days of receipt of the Department's Decision concluding the administrative review, the offender submits a written request for a hearing before the Board, as provided for in Section (D). Upon good cause shown, the time frame for requesting a departmental administrative review or a Board review may be extended if made within the time specified for compliance in the Notice of Violation and Order To Take Corrective Action. In no case, however, shall a request for administrative review or Board Hearing be granted if requested after the compliance date required in the Department's Order to Take Corrective Action.

(C) Administrative review. Any person subject to a Department Notice of Violation and Order to Take Corrective Action may request an administrative review by the Health Officer, or in the case of Health Officer absence, his or her designee (Hearing Officer). The Hearing Officer shall schedule an administrative review hearing within ten days of receipt of the request, but in no case later than the date of compliance required in the Department's Order to Take Corrective Action. The Hearing officer shall provide written or verbal notice of the date, time and location of the scheduled hearing to the person requesting the hearing. At the administrative hearing the Hearing Officer shall first hear the staff report, if any, on the Notice of Violation and Order To Take Corrective Action. Second, the person who requested the hearing may present relevant information to the hearing officer. Third, the Hearing Officer may hear any person who has relevant information regarding the Notice of Violation and Order to Take Corrective Action. The Hearing Officer may continue its administrative review for a reasonable time period following the administrative review hearing in order to obtain information necessary to make a decision, but in no case shall the administrative review be continued beyond the date of compliance required in the Department's Order to Take Corrective Action. The Hearing Officer shall affirm, modify or revoke the Notice of Violation and Order to Take Corrective Action, in writing, following completion of the administrative review. A copy of this decision shall be sent by certified mail or delivered personally to the person who requested the administrative review.

(D) Board Hearings. Persons subject to a Department Notice of Violation and Order to Take Corrective Action may submit a written request for a hearing before the Board following conclusion of an Administrative Review, within ten days of receipt of the Hearing Officers Decision concluding the administrative review, but in case later than the date of compliance required in the Departments Order to Take Corrective Action. Upon good cause shown, the time frame for requesting a hearing may be extended if made within the time specified for compliance in the Notice of Violation ad Order to Take Corrective Action. The Board shall schedule a hearing within 45 days of receipt of this request, but in no case later than the date of compliance required in the Departments Notice of Violation and Order to Take Corrective Action. Notice of hearing shall be given by the Department to persons requesting a hearing at the address stated on the request for hearing or at the last known address, by personal service or by mail, not less than seven days before the hearing is scheduled. Notice is complete on the date of delivery or mailing. The Department shall publish a notice of hearing in a newspaper of general circulation in Missoula County at least four days prior to the hearing. At the hearing, The Board shall first hear the staff report, if any, on the Notice of Violation and Order To Take Corrective Action. Second, the person who requested the hearing may present relevant information to the Board. Third, the Board may hear any person who has relevant information regarding the Notice of Violation ad Order to Take Corrective Action. The hearing may be conducted informally and need not follow rules of evidence or procedure applicable to judicial hearings. The Board may impose rules for the orderly conduct of the hearing. The Board shall affirm, modify, or revoke the Department's Notice of Violation and Order To Take Corrective Action, in writing, following completion of its review. A copy of this decision shall be sent by certified mail or delivered personally to the person who requested the hearing. The Board shall maintain a written record of the hearing and document its final decision in the record.

(E) If the person who owns, operates or controls the facility fails to comply with investigation or sampling required in an order issued pursuant to this section, the Department may conduct said investigation or

sampling and the person so ordered shall be responsible for paying for Department staff time, analytical costs, and any incidental costs associated with the investigation and/or sampling. Failure of said person to pay the Department staff time or analytical costs shall be a violation of this Ordinance.

(F) Instead of issuing the order provided for in subsection (B), the Department may either:

(1) require the alleged violator to appear before the Board for a hearing at a time and place specified in the notice and answer the charges complained of; or

(2) initiate any other action authorized by this Ordinance.

(G) In connection with a Board hearing held under this Chapter, the Board may and on application by a person shall, compel the attendance of witnesses and the production of evidence on behalf of the persons.

(H) A person aggrieved by an order of the Board may within fourteen (14) days apply for rehearing upon only one or more of the following grounds:

(1) the Board acted without or in excess of its powers;

(2) the order was procured by fraud;

(3) the order is contrary to the evidence;

(4) the applicant has discovered new evidence, material to him/her, which he/she could not with reasonable diligence have discovered and produced at the hearing;

(5) competent evidence was excluded to the prejudice of the applicant.

(I) Within thirty (30) calendar days after the decision, or in the case of rehearing within (30) calendar days of the rehearing, a party aggrieved thereby may appeal to the municipal court.

(J) The municipal court shall hear and decide the cause upon the record of the Board. The court shall determine whether or not the Board properly exercised its authority, whether or not the findings of the Board were supported by substantial competent evidence, and whether or not the Board made errors of law prejudicial to the appellant.

(K) Either the Board or the person aggrieved may appeal from the decision of the municipal court to the Supreme Court.

Section 13.26.130 CRIMINAL PENALTIES

(A) Any person who violates any of the provisions of this Ordinance, or any order made pursuant to this Ordinance, shall be guilty of a misdemeanor and subject, upon conviction thereof, to a fine not to exceed five hundred dollars ($500) or by imprisonment in the County jail not to exceed sixty days, or by both such fine and imprisonment. Each day a violation exists shall constitute a separate offense.

(B) Action under this section shall not be a bar to enforcement of this Ordinance or orders made pursuant thereto, by injunction or other appropriate remedy. The Board or the Department may institute and maintain any and all enforcement proceedings.

(C) All fines collected shall be deposited in the City General Fund.

(D) Pollution prevention efforts made by the violator, the economic benefit of not complying with any section of the Ordinance, and the gravity of the offense shall be considered in determining penalties for violations of this Ordinance.

(E) The City of Missoula may not enter into a vendor or construction contract, grant, or loan with any person who has been convicted of an offense under this Ordinance. This prohibition shall:

(1) continue for a period of 1 year following the date of conviction, and more than one year if said person does not correct the conditions giving rise to the conviction; and;

(2) affect each facility owned or operated by the person.

(F) Notwithstanding any other provision of law, the municipal court may also order that the offender take action to enhance public health or the environment by restoring or otherwise improving the quality of the Missoula Valley Aquifer in a manner consistent with public health, safety, and general welfare and this provisions of this Ordinance.

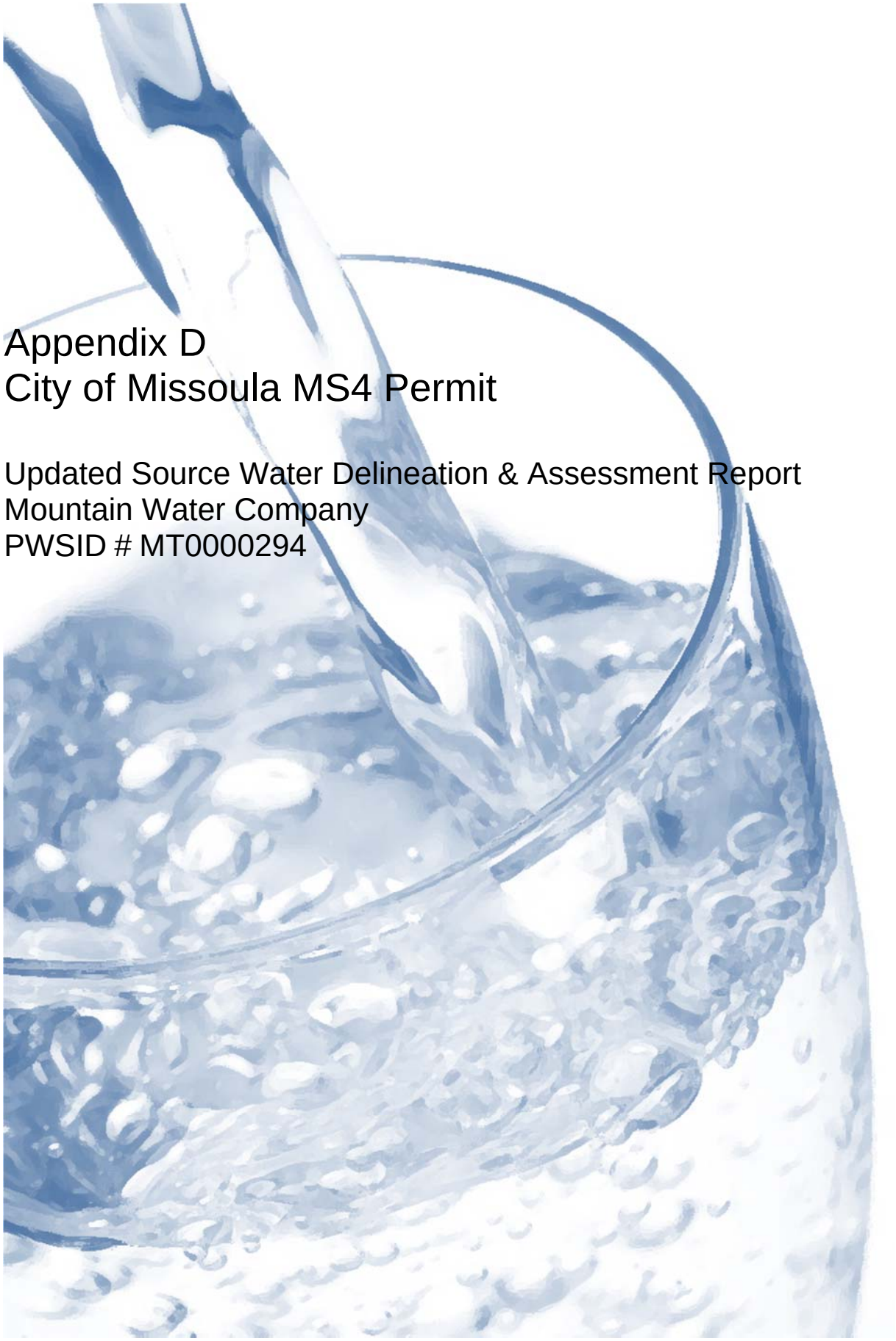
Section 13.26.140 INJUNCTIVE RELIEF

If a person continues to operate a facility or engage in an activity in violation of the provisions of this Ordinance, then the Board or the Department may file an action for injunctive relief in the District Court or in the City Municipal Court if the City Municipal Court has jurisdiction and authority to do so.

Section 13.26.150 SEVERABILITY

If any section, subsection, sentence, clause, phrase or word of this Ordinance is for any reason held to be invalid or unconstitutional, such decision shall not affect the validity of the remaining portions of this Ordinance. The Council hereby declares that it would have passed the Ordinance and each section, subsection, sentence, clause, phrase, and words thereof, irrespective of the fact that any one or more sections, subsections, sentences, clauses, phrases or words have been declared invalid or unconstitutional, and if for any reason this Ordinance should be declared invalid or unconstitutional, then the remaining Ordinance provisions will be in full force and effect.

Codification Instructions - This Ordinance shall be codified as Chapter 13.26 Missoula Municipal Code, Sections 13.26.010 through 13.26.150.



Appendix D
City of Missoula MS4 Permit

Updated Source Water Delineation & Assessment Report
Mountain Water Company
PWSID # MT0000294

City of Missoula

Small MS4 Storm Water Management Program

Prepared for MPDES Permit No. MTR040007

Prepared By:

City of Missoula
435 Ryman
Missoula, Montana 59802-4297

February 2011

INTRODUCTION

Executive Summary

Storm water management is a critical municipal interest. The effectiveness and efficiency of storm water management have a direct impact on public health and safety, surface water quality, wildlife habitat and future development. Consequently, the Federal government amended the Clean Water Act (CWA) in 1987 to regulate the management of storm water runoff from municipalities and specific industrial classifications. Recent state and federal regulations ("Phase II") promulgated in response to those amendments require that designated municipalities obtain coverage under a Statewide General Permit by March of 2003. The City of Missoula has prepared this Storm Water Management Program (SWMP) in fulfillment of the requirements of that permit.

The purpose of this SWMP is to describe efforts proposed by the City to control discharge of pollutants to State Waters in storm water. The SWMP includes descriptions of storm water management activities that will be undertaken during the second cycle of the statewide general permit, which extends through 2014. The program has been built around a suite of programmatic elements that the City has already implemented, is in the process of developing for implementation, or plans to develop in order to meet new or revised requirements set forth in the latest General Permit. Together, these programmatic elements address the six minimum control measures required under the Statewide General Permit:

- Public Education - The City must continue to educate the public in its permitted jurisdiction about the importance of the storm water program and the public's role in that program.
- Public Involvement/Participation – The City must continue to comply with all state and local notice requirements when implementing a public involvement/participation program.
- Illicit Discharge Detection and Elimination – The City must continue to adopt and enforce ordinances or take equivalent measures to prohibit illicit discharges. The City must also implement a program to detect illicit discharges.
- Construction Site Storm Water Runoff Control – The City must continue to develop a program to control the discharge of pollutants from construction sites greater than one acre in size within its permittee jurisdiction.
- Post-Construction Storm Water Management in New Development and Redevelopment – The City must continue to require long-term post-construction best management practices (BMPs) that protect water quality and control runoff flow to be incorporated into development and significant redevelopment projects.
- Pollution Prevention/Good Housekeeping for Municipal Operations – The City must continue to examine its activities and develop programs to prevent the discharge of pollutants from these activities. The City must also educate staff on pollution prevention practices.

The program is designed to reduce the discharge of pollutants from the City's municipal separate storm sewer system (MS4) to the maximum extent practicable (MEP) and to protect water quality. Based on EPA's 2008 303(d) list, water bodies that the City discharges to, which are impaired, include the Clark Fork River, Bitterroot River, Grant Creek, and Rattlesnake Creek. In addition, the areas within the City storm water jurisdiction can be characterized as primarily residential, with some commercial, and very little industrial. Based on these factors, the pollutants of concern / causes of impairment targeted by the City's Storm Water Management Program will include:

- Chlorophyll-a
- Nitrogen, Nitrate
- Organic Enrichment (Sewage)
- Phosphorus
- Sedimentation/Siltation

The City has also identified additional potential contaminants and causes of impairment of concern, which are not required to be addressed by the Department of Environmental Quality. These identified contaminants and causes of impairment include:
- Arsenic
- Biological indicators such as fecal coliform
- Cadmium
- Chloride
-Copper
- Excess Algal Growth
- Lead
- Litter and Trash
- Magnesium Chloride
- Oil, Hydro carbons, including PAHs
- Pesticides
- Sodium Chloride
- Stream bank Alteration
- Temperature

The Missoula area has a long history of addressing water quality issues. In 1988, the Missoula City-County Health Department applied for and obtained Sole Source Aquifer designation from the US EPA. This designation requires that all projects which obtain federal funding be reviewed by the EPA. In January 1993, the Missoula Board of County Commissioners and the Missoula City Council passed a resolution creating the Missoula Valley Water Quality District (MVWQD), providing for more direct control for the protection of water resources with the Missoula Valley. The MVWQD has since undertaken numerous projects to protect and improve water quality. These projects include removal of auto shop floor drains that discharge through subsurface injection, public education on issues pertaining to water quality, household hazardous waste collection, establishment of a permitting system for facilities that store regulated substances, and regulation of deicer products. In August 1998, the Clark Fork River Voluntary Nutrient Reduction Program was finalized and put into place as an agreement among major parties in the Montana portion of the watershed to significantly reduce nutrient pollution along a 200-mile stretch of the Clark Fork River. The City of Missoula has chosen to build its storm water program on this framework of successful, established programs that are already making significant strides to protect our water resources.

Montana Pollutant Discharge Elimination System

The State of Montana has established a permit system which is similar to the federal permit system, called the Montana Pollutant Discharge Elimination System (MPDES). This system is administered by the Montana Department of Environmental Quality (MDEQ). The Administrative Rules of Montana (ARM), section 17.30.1105 require that any entity discharging storm water from a point source must obtain coverage under an MPDES general permit. MPDES general permits cover discharges 1) associated with construction activity; 2) associated with industrial activity; 3) associated with mining, oil, and gas activity; 4) from small municipal separate storm sewer systems (small MS4s); 5) for which the department determines that storm water controls are needed based on wasteload allocations that are part

of Total Maximum Daily Loads (TMDLs) that address the pollutants of concern; and 6) that the department determines are contributing to a violation of a water quality standard or are significant contributors of pollutants to surface waters.

Montana Designated Small MS4s

The EPA established guidelines for designating small MS4s, which MDEQ used to create the list of Montana small MS4s named in ARM 17.30.1102(23) – the Urban Areas (as determined by the 2010 decennial census by the United States census bureau) of the City of Billings and Yellowstone County; the City of Missoula and Missoula County; and the City of Great Falls and Cascade County. In addition, MS4s located within the cities of Bozeman, Butte, Helena, and Kalispell were also named because their discharge "results in, or has the potential to result in, exceedances of water quality standards, including impairment of designated uses, or has other significant water quality impacts, including habitat and biological impacts".

Municipalities within the Missoula Urban area which own and operate separate storm sewer systems are the City of Missoula, Missoula County, Montana Department of Transportation – Missoula Office, and the University of Montana.

General Permit

The General Permit for Storm Water Discharge Associated with Small Municipal Separate Storm Sewer Systems provides authorization to discharge storm water to waters of the United States under the Montana Pollutant Discharge Elimination System. The General Permit, under the authority of the Administrative Rules of Montana, defines effluent limitations; establishes monitoring, recording, and reporting requirements; establishes requirements for a Storm Water Management Program; and sets standard permit conditions.

Montana Administrative Rules and the General Permit allow for the sharing of responsibilities; as such, the Missoula small MS4 operators have applied for and received coverage under a single authorization. With the common goal of achieving the cleanest storm water possible, the co-permittees have, and will continue to, collaborate their knowledge, ideas, and resources. As the co-permittees work together, each will retain jurisdiction over its own permit area, maintain its own records, complete its own annual report, and individually meet Permit requirements until or unless other written agreements are made.

The permit area of Missoula has been defined by the MDEQ as the Urban Area delineated following the most recent decennial census, and responsibility has been divided among the co-permittees as follows:

1) The Montana Department of Transportation – parcels owned by the department and the numerous state traffic routes within the Urban Area.
2) The University of Montana - parcels owned by the University within the Urban Areas.
3) The City of Missoula – areas within the City Limits and Urban Area which are not owned by either the Department of Transportation of the University of Montana, excluding state traffic routes.
4) Missoula County – areas outside the City Limits, but within the Urban Area which are not owned by either the Department of Transportation of the University of Montana, excluding state traffic routes.

Storm Water Management Program Requirements

As required by the General Permit for Storm Water Discharge Associated with Small Municipal Separate Storm Sewer System (MS4), permittees must develop a Storm Water Management Program designed to reduce the discharge of pollutants from the permitted Small MS4 to the maximum extent practicable to protect water quality, and to satisfy the appropriate water quality requirements of the Montana Water Quality Act. The SWMP must include management practices, control techniques, systems, designs, good standard engineering practices, and such other provisions necessary for the control of such pollutants. Each Minimum Control Measure (MCM) has requirements to identify how the success of the Best Management Practice (BMP) will be evaluated, including how the measureable goals for each of the BMPs were selected. In addition to these requirements, permittees are required to maintain documentation describing how and why each of the BMPs and measurable goals for the SWMP was selected. These items have been addressed in the Minimum Control Measure sections of this document.

The SWMP must include a section describing how the SWMP will control discharges of pollutants of concern (POC) and ensure storm water discharges will not cause or contribute to instream exceedances of water quality standards. The Montana Department of Environmental Quality's 2010 303(d) list is being used as the basis for the list of (POC) and the specifics of addressing these can be found on pages 5 – 7.

Finally, each Minimum Control Measure has requirements to identify the responsible party for overall management and implementation of the programs and Best Management Practices. A Storm Water Program Staff Organizational Chart with responsibilities assigned for each BMP has been included in this section on page 8. Since some agencies involved in the storm water program are funded by both City and County taxes, these agencies have been shown on the chart to illustrate the relationship. Responsibilities are also noted in the Minimum Control Measure sections.

This program documents the efforts of the City of Missoula to meet the requirements of the MDEQ Storm Water General Permit.

Pollutants of Concern

Water Body	Pollutant	Probable Source(s)	Associated Uses	TMDL	BMPs
Clark Fork River, Fish Creek to Rattlesnake Creek	Arsenic	Mill Tailings	Aquatic Life Cold Water Fishery Drinking Water	No	N/A
	Cadmium	Mill Tailings	Aquatic Life Cold Water Fishery Drinking Water	No	N/A
	Chlorophyll-a	Industrial Point Source Discharge Municipal Point Source Discharges On-Site Treatment Systems	Aquatic Life Cold Water Fishery Primary Contact Recreation	Yes	1.1, 1.2, 1.3, 1.4, 1.5, 3.2, 3.3, 3.4, 5.2, 6.1, 6.2
	Copper	Mill Tailings	Aquatic Life Cold Water Fishery	No	N/A
	Nitrogen (Total)	Industrial Point Source Discharge Municipal Point Source Discharges On-Site Treatment Systems	Aquatic Life Cold Water Fishery	Yes	1.1, 1.2, 1.3, 1.4, 1.5, 3.2, 3.3, 3.4, 5.2, 6.1, 6.2
	Organic Enrichment (Sewage) Biological Indicators	Industrial Point Source Discharge Municipal Point Source Discharges On-Site Treatment Systems	Aquatic Life Cold Water Fishery	Yes	1.1, 1.2, 1.3, 1.4, 1.5, 3.2, 3.3, 3.4, 5.2, 6.1, 6.2
	Phosphorus (Total)	Industrial Point Source Discharge Municipal Point Source Discharges On-Site Treatment Systems	Aquatic Life Cold Water Fishery	Yes	1.1, 1.2, 1.3, 1.4, 1.5, 3.2, 3.3, 3.4, 5.2, 6.1, 6.2

Continued on following page

Water Body	Pollutant	Probable Source(s)	Associated Uses	TMDL	BMPs
Bitterroot River, Eightmile to the mouth	Alteration in stream-side or littoral vegetative covers	Rangeland Grazing Wet Weather Discharges	Aquatic Life Cold Water Fishery	No	1.1, 1.2, 1.3, 1.4, 1.5, 4.1, 4.2, 4.3, 4.4, 4.5, 5.1, 5.2, 6.1, 6.2
	Copper	Sediment Resuspension (Contaminated Sediment)	Aquatic Life Cold Water Fishery	No	N/A
	Lead	Sediment Resuspension (Contaminated Sediment)	Aquatic Life Cold Water Fishery	No	N/A
	Nitrogen, Nitrate	On-Site Treatment Systems Rangeland Grazing Wet Weather Discharges	Aquatic Life Cold Water Fishery	No	1.1, 1.2, 1.3, 1.4, 1.5, 3.2, 3.3, 3.4, 5.2, 6.1, 6.2
	Sedimentation/Siltation	Sediment Resuspension Streambank Modifications Wet Weather Discharges	Aquatic Life Cold Water Fishery	No	1.1, 1.2, 1.3, 1.4, 1.5, 3.2, 3.3, 3.4, 4.1, 4.2, 4.3, 4.4, 4.5, 5.2, 6.1, 6.2
Grant Creek, headwaters to the mouth	Alteration in stream-side or littoral vegetative covers	Irrigated Crop Production Site Clearance	Aquatic Life Cold Water Fishery	No	1.1, 1.2, 1.3, 1.4, 1.5, 4.1, 4.2, 4.3, 4.4, 4.5, 5.1, 6.1, 6.2
	Excess Algal Growth	Irrigated Crop Production Site Clearance	Aquatic Life Cold Water Fishery Primary Contact Recreation	No	1.1, 1.2, 1.3, 1.4, 1.5, 6.1, 6.2
	Low flow alterations	Flow Alterations Irrigated Crop Production Site Clearance	Aquatic Life Cold Water Fishery Industrial Primary Contact Recreation	No	1.1, 1.2, 1.3, 1.4, 1.5, 4.1, 4.2, 4.3, 4.4, 4.5, 5.1, 6.1, 6.2
	Nitrate/Nitrite (Nitrite + Nitrate as N)	Irrigated Crop Production Site Clearance	Aquatic Life Cold Water Fishery	No	1.1, 1.2, 1.3, 1.4, 1.5, 6.1, 6.2
	Sedimentation/Siltation	Site Clearance Streambank Modifications	Aquatic Life Cold Water Fishery	No	1.1, 1.2, 1.3, 1.4, 1.5, 4.1, 4.2, 4.3, 4.4, 4.5, 6.1, 6.2
	Temperature, water	Flow Alterations Loss of Riparian Habitat	Aquatic Life Cold Water Fishery	No	1.1, 1.2, 1.3, 1.4, 1.5, 4.1, 4.2, 4.3, 4.4, 4.5, 5.1, 6.1, 6.2

Continued on following page

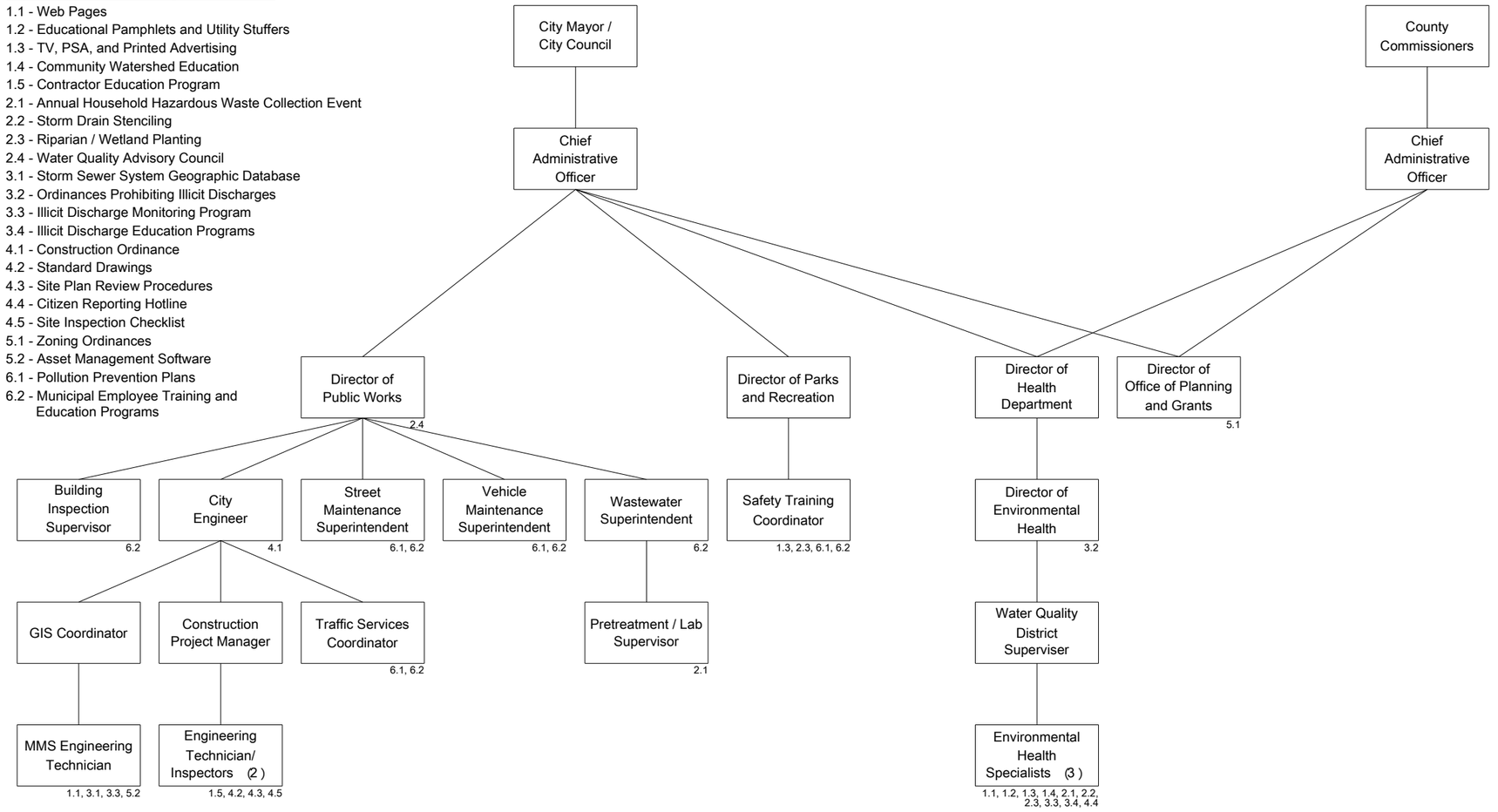
Water Body	Pollutant	Probable Source(s)	Associated Uses	TMDL	BMPs
Rattlesnake Creek	Other flow regime alterations	Dam Construction Water Diversions	Cold Water Fishery	No	5.1

Information based on 2010 303(d) List from Montana Department of Environmental Quality Clean Water Act Information Center.

City Storm Water Program Staff Organizational Chart and Responsibilities

City of Missoula Best Management Practices

1.1 - Web Pages
1.2 - Educational Pamphlets and Utility Stuffers
1.3 - TV, PSA, and Printed Advertising
1.4 - Community Watershed Education
1.5 - Contractor Education Program
2.1 - Annual Household Hazardous Waste Collection Event
2.2 - Storm Drain Stenciling
2.3 - Riparian / Wetland Planting
2.4 - Water Quality Advisory Council
3.1 - Storm Sewer System Geographic Database
3.2 - Ordinances Prohibiting Illicit Discharges
3.3 - Illicit Discharge Monitoring Program
3.4 - Illicit Discharge Education Programs
4.1 - Construction Ordinance
4.2 - Standard Drawings
4.3 - Site Plan Review Procedures
4.4 - Citizen Reporting Hotline
4.5 - Site Inspection Checklist
5.1 - Zoning Ordinances
5.2 - Asset Management Software
6.1 - Pollution Prevention Plans
6.2 - Municipal Employee Training and Education Programs



MCM I – Public Education and Outreach on Storm Water Impacts

Regulatory Requirement(s):

Part II.A.2. – The permittee shall maintain documentation describing how and why each of the BMPs and measureable goals for the SWMP was selected.

Part II.B.1.b. - The permittee shall maintain documentation with respect to the development of a storm water public education and outreach program. This documentation must address both the overall public education program and the individual BMPs, measurable goals, and responsible persons/positions for the program. This documentation must include the following information, at a minimum:

Part II.B.1.b.i. – Identify how the permittee plans to inform individuals and households about the steps they can take to reduce storm water pollution.

Part II.B.1.b.ii. – Identify how the permittee plans to inform individuals and groups on how to become involved with the SWMP (with activities such as local stream and beach restoration activities).

Part II.B.1.b.iii. – Identify the target audiences for the education program which are likely to have significant storm water impacts (including commercial, industrial, and institutional entities) and why those target audiences were selected.

Part II.B.1.b.iv. – Identify the target pollutant sources the public education program is designed to address.

Part II.B.1.b.v. – Identify the outreach strategy, including the mechanisms (e.g., printed brochures, newspapers, media, workshops, etc) to be used to reach the target audiences, and how many people are expected to be reached by the outreach strategy over the General Permit term.

Part II.B.1.b.vi. – Identify who is responsible for overall management and implementation of the storm water public education and outreach program and, if different, who is responsible for each of the BMPs identified in this program.

Part II.B.1.b.vii. – Identify how the success of this minimum control measure will be evaluated, including how the measurable goals for each of the BMPs were selected.

Part II.B.3.b.v. – Identify the plan to inform public employees, businesses, and the general public of hazards associated with illegal discharges and improper disposal of waste. Include in this description how this plan will coordinate with the public education minimum control measure and the pollution prevention/good housekeeping minimum control measure programs. This plan must identify measures to train pertinent municipal employees on the illicit discharge program.

Part III.A.1. – The permittee's SWMP must include a section describing how the SWMP will control discharges of pollutants of concern and ensure storm water discharges will not cause or contribute to instream exceedances of water quality standards. This discussion must specifically identify measures and BMPs that will collectively control the discharges of pollutants of concern.

Common household activities such as car washing, lawn care and automobile maintenance affect water quality through non-point source water pollution. Non-point source pollution is the largest contributor to water quality degradation in the United States. By educating citizens about how these activities affect water quality, aquatic life, and recreational opportunities, and identifying ways citizens can reduce their impact, the City of Missoula hopes to decrease impacts to water quality associated with storm water in the Missoula valley. The public education and outreach program targets three main audiences: the general public, contractors, and municipal employees. Each group has specific activities that have different contributions to storm water quality degradation. Primary pollutants of concern which the general public may reduce are nitrogen, phosphorus, and organic enrichment. These pollutants can largely be attributed to septic systems, lawn care, and pet waste. Contractor education, in conjunction with both construction programs, will target sediment and other pollutants associated with construction activity. Finally, in conjunction with the Pollution Prevention/Good Housekeeping for Municipal Operations Program,

municipal employees are educated about pollutants common to their everyday operations. The following items target non-point source education for the general public. Web pages, educational pamphlets, utility stuffers, TV, Public Service Announcements (PSA), and printed advertising are used to educate the general public about non-point source pollution. Contractors receive information about storm water pollution prevention through the contractor education program, and municipal employees receive training in coordination with Section Six of this Program.

Web Pages (BMP 1.1)

The City's website provides information about common impacts people have to storm water quality and offers ways residents can decrease their contributions. The City's webpage also has a link to the Missoula Valley Water Quality District's webpage which has more information about alternatives to common household hazardous substances. In addition, the Water Quality District's website includes information about the impacts of excess nutrients on surface water and offers ways the public can reduce its impact. The web pages also list the Water Quality hotline number and describe how to report suspected cases of water pollution.

This BMP was chosen because the web is becoming an increasingly more popular form of communication. It has the potential to reach thousands of people using a minimum amount of personnel time and money. Between the two web pages and various links, the City plans to reach approximately 3,000 households annually.

STATUS: Fully Implemented

Educational Pamphlets and Utility Stuffers (BMP 1.2)

Missoula Valley Water Quality District prints and distributes brochures to participants in the Annual Household Hazardous Waste Collection Event. Members of the public received the following brochures: Alternatives to Household Toxics, Managing Leftover Paint, and A Residential Guide to the Missoula Valley Aquifer. This material includes information on recycling and proper disposal of household toxics. It also informs readers of the hazards associated with improper waste disposal.

Buying less toxic alternatives and disposing of potential pollutants in the least harmful ways is a proactive way to prevent storm water pollution. Approximately five hundred sets of brochures will be distributed annually.

STATUS: Fully Implemented

TV, PSA, and Printed Advertising (BMP 1.3)

TV, PSA, and printed advertising are also being used to inform individuals and households about the steps they can take to reduce storm water pollution. Television advertising is primarily centered on the Annual Household Hazardous Waste Collection. These ads focus on non-point source pollution and effects on surface water quality with regard to leaking vehicles and over-application of lawn chemicals. During the weeks preceding Household Hazardous Waste Days, the ads focus on the importance of proper waste disposal while advertising the collection event. One ad portrays various residents using a storm drain for disposal of paints, antifreeze and lawn clippings and explains that these contaminants find their way into surface water and drinking water supplies. Another ad shows a man fertilizing a lake and reminds watchers that too much fertilizer or fertilizer applied at the wrong time can end up in our water

bodies. Other public education advertising periodically conducted by the Water Quality District targets riparian habitat protection.

Periodically, PSAs are placed with local radio stations. The Water Quality District also runs ads during Hazardous Waste Days over local radio stations and in local newspapers to publicize the collection event.

The Parks & Recreation Department frequently publishes PSAs to all City employees, the *Missoulian*, the *Independent* and other media sources. These PSAs announce projects being done within City limits such as tree work, plantings, park restrictions/closures, construction projects, detours, dog regulations, trail work, wildlife habitat notices, riparian habitat closures/re-vegetation projects, public education events and programs sponsored by the department. Through these PSAs, the public receives the knowledge they need to respect and help the department to maintain our parks and open spaces, and keep them in good condition.

Average citizens get the bulk of their environmental messages from television, radio, and other traditional venues. The Water Quality District targets the general public and their actions that most commonly contribute to water pollution. The success of this BMP will be measured by the number of ads placed.

STATUS: Fully Implemented

Community Watershed Education (BMP 1.4)

The MVWQD supports the Annual Watershed Festival organized by The Montana Natural History Center. Through this program, approximately 600 sixth-graders learn about conditions within our watershed and factors that affect water quality. They discuss the different types of pollutants that make up non-point source pollution and the cumulative impacts of residents' activities. This is done through a combination of classroom visits and time spent at the various stations at the festival.

Students collect water quality and quantity data from stream reaches within the Clark Fork River Basin. Water Quality District staff often present the Enviroscape Watershed Model, which explains point and non-point source pollution and their effects on surface water quality. Students also learn how Best Management Practices can treat storm water runoff and help protect surface water.

The Water Quality District and City of Missoula Wastewater Treatment Plant provide financial support to the Watershed Education Network to provide classroom and field education to students throughout the Clark Fork Watershed about surface and groundwater issues. Students learn how to assess surface water quality through macro-invertebrate identification and stream assessments of physical and chemical conditions. This work demonstrates the connection of manmade conditions in watersheds directly to water quality. Students get the opportunity to monitor streams with different levels of impact and are taught methods of determining a water body's health through correlating factors such as dissolved oxygen, ratios of pollutant-tolerant invertebrates, temperature, etc.

This BMP was chosen because children that learn about environmental issues are more likely to form good habits that take into account storm water quality and continue them for their entire lives. In addition, students often tell their parents what they learn in school, making it an effective way to pass environmental awareness to the entire community. The success of this BMP will be measured by the number of students educated.

The Water Quality District also promotes a Riparian Area Awareness campaign. Fliers have been distributed throughout the county focusing on owners of property adjacent to rivers. Print, television and radio ads have been placed. One major contribution of healthy riparian areas is their ability to treat and

reduce the effects of contaminated surface runoff. Riparian vegetation also stabilizes soil and helps prevent erosion. Several of these ads focus on the stabilization and filtering capabilities of riparian areas. A television ad was developed that depicts a healthy riparian area contrasting with a raw, eroding bank. The ad highlights the benefits provided by healthy native riparian areas and the importance of leaving these areas intact.

STATUS: Fully Implemented

Contractor Education Program (BMP 1.5)

The City of Missoula's Engineering Department works closely with the design community to develop rules and methods that work effectively and efficiently. Contractors receive information regarding runoff control, proper storm drain inlet protection, and management of potential pollutants. A subdivision toolbox (which actually applies to all construction projects, not just subdivisions) was created in 2007. This portion of the city web page contains links to related information such as applicable codes, checklists, standard drawings, as-built drawings, and storm and sanitary infrastructure maps. Requirements for the acquisition of City SWPPP permit are included in this information and design professionals are required to include completed checklists with their design submittals.

Since excavation contractors are often the first ones on a job site, and often require a SWPPP permit, a packet of information has been assembled for them. This packet includes information about permits, inspections, and ordinances. A copy of the Grading, Drainage, Erosion Control, and Storm Water Pollution Prevention Plan is included along with Montana Department of Environmental Quality's "Storm Water Requirements for Construction Activity" brochure.

In addition to these items, administrative rules clarifying ordinances and gathering related information into one place have been created to inform contractors of all requirements on a particular subject (Materials Storage on Public Rights-of-Way along with Construction Site Cleanup and Right-of-Way Protection are two examples). Standard drawings have also been created to give contractors some guidance in areas such as inlet protection and erosion control on construction sites.

All of these methods have been used successfully by the City of Missoula to direct contractor efforts in the past. With the advent of the MS4 program, City staff has added to these mediums to clarify and update requirements related to storm water pollution prevention. The success of this BMP will be measured by the items created or updated annually.

STATUS: Fully Implemented

Municipal Employee Training and Education Programs (BMP 6.2)

Municipal employees receive annual training related to proper maintenance and disposal techniques with respect to storm water pollution prevention. Field employees also receive training on how to identify illicit discharge and what to do about it. The Municipal Employee Training Program will be coordinated with Minimum Control Measure Six – Pollution Prevention / Good Housekeeping for Municipal Operations. See Section VI of this Program for more information about this BMP.

STATUS: Partially Implemented
IMPLEMENTATION SCHEDULE: June 30, 2010 – meet with division managers to inform them of new requirements. March 31, 2011 – review divisions' existing education programs with managers and determine ways to come into compliance with new regulations of General Permit regarding the Illicit

Discharge Detection and Elimination and Construction Site Storm Water Runoff Control Programs. October 31, 2011 – divisions' programs and documentation updated. December 31, 2011 – full implementation.

Responsibility and Evaluation

The Director of Public Works is responsible for the overall management and implementation of the public education and outreach program. Responsibilities for individual BMPs are listed on the following page. The success of this minimum control measure will be evaluated by internal review in annual reporting and feedback response from Montana Department of Environmental Quality.

MCM I. Public Education and Outreach on Storm Water Impacts

BMP	Regulatory Requirements	Measurable Goal(s)	Responsible Position
1.1 Web Pages	Part II.B.1.a. - The permittee shall implement a public education program to distribute educational materials to the community or conduct equivalent outreach activities about the impacts of storm water discharges on waterbodies and the steps that the public can take to reduce pollutants in storm water runoff. Part II.B.3.a.v. - Inform public employees, businesses, and the general public of hazards associated with illegal discharges and improper disposal of waste; and	Reach approximately 1,000 households annually through a combination of the City's and Missoula Valley Water Quality District's web pages.	MMS Engineering Technician
1.2 Educational Pamphlets and Utility Stuffers	Part II.B.1.a. - The permittee shall implement a public education program to distribute educational materials to the community or conduct equivalent outreach activities about the impacts of storm water discharges on waterbodies and the steps that the public can take to reduce pollutants in storm water runoff. Part II.B.3.a.v. - Inform public employees, businesses, and the general public of hazards associated with illegal discharges and improper disposal of waste; and	Distribute approximately 500 sets of brochures annually.	Environmental Health Specialist
1.3 TV, PSA, and Printed Advertising	Part II.B.1.a. - The permittee shall implement a public education program to distribute educational materials to the community or conduct equivalent outreach activities about the impacts of storm water discharges on waterbodies and the steps that the public can take to reduce pollutants in storm water runoff. Part II.B.3.a.v. - Inform public employees, businesses, and the general public of hazards associated with illegal discharges and improper disposal of waste; and	Place approximately 160 television spots during Earth Week. Place approximately 225 radio ads during Hazardous Waste Days. Distribute fliers and place newspaper ads for promotion of the riparian awareness campaign.	Environmental Health Specialist
1.4 Community Watershed Education	Part II.B.1.a. - The permittee shall implement a public education program to distribute educational materials to the community or conduct equivalent outreach activities about the impacts of storm water discharges on waterbodies and the steps that the public can take to reduce pollutants in storm water runoff. Part II.B.3.a.v. - Inform public employees, businesses, and the general public of hazards associated with illegal discharges and improper disposal of waste; and	Educate approximately 600 sixth graders annually.	Environmental Health Specialist
1.5 Contractor Education Program	Part II.B.1.a. - The permittee shall implement a public education program to distribute educational materials to the community or conduct equivalent outreach activities about the impacts of storm water discharges on waterbodies and the steps that the public can take to reduce pollutants in storm water runoff. Part II.B.3.a.v. - Inform public employees, businesses, and the general public of hazards associated with illegal discharges and improper disposal of waste; and	Annually update subdivision toolbox with information received from the construction industry as well as inspectors.	Engineering Technician/Inspector

MCM II – Public Involvement/Participation Program

Regulatory Requirement(s):

Part II.A.2. – The permittee shall maintain documentation describing how and why each of the BMPs and measureable goals for the SWMP was selected.

Part II.B.2.b. – The permittee shall maintain documentation with respect to the development of a storm water public involvement/participation program. This documentation must address both the overall public involvement/participation program and the individual BMPs, measurable goals, and responsible persons/positions for this program. This documentation must include the following information, at a minimum:

Part II.B.2.b.i. – Identify how the public was involved in the development and submittal of the permit application and the SWMP

Part II.B.2.b.ii. – Identify how plans to actively involve the public in the development and implementation of the SWMP.

Part II.B.2.b.iii. – Identify the target audiences for the public involvement program, including a description of the types of ethnic and economic groups engaged. The permittee is encouraged to actively involve all potentially affected stakeholder groups, including commercial and industrial businesses, trade associations, environmental groups, homeowners' associations, and educational organizations, among others.

Part II.B.2.b.iv. – Identify the types of public involvement activities included in this program. Where appropriate, consider the following types of public involvement activities:

(a) Citizen representatives on a storm water management panel;
(b) Public hearings;
(c) Working with citizen volunteers willing to educate others about the program; and
(d) Volunteer monitoring or stream/beach clean-up activities

Part II.B.2.b.v. – Identify who is responsible for the overall management and implementation of the storm water public involvement/participation program and, if different, who is responsible for each of the BMPs identified for this program.

Part II.B.2.b.vi. – Identify how the success of this minimum control measure will be evaluated, including how the measurable goals for each of the BMPs were selected.

Part III.A.1. – The permittee's SWMP must include a section describing how the SWMP will control discharges of pollutants of concern and ensure storm water discharges will not cause or contribute to instream exceedances of water quality standards. This discussion must specifically identify measures and BMPs that will collectively control the discharges of pollutants of concern.

Volunteer groups are essential to a successful non-point source management program as the sources of issues are often the very things that the general population can affect. Volunteers provide much needed assistance with labor and become more educated and engaged. The City of Missoula uses volunteers to help with three water pollution-related projects: the Annual Household Hazardous Waste Collection Event, Storm Drain Stenciling, and Riparian/Wetland Plantings.

Annual Household Hazardous Waste Collection Event (BMP 2.1)

Each year since 1993 the Missoula Valley Water Quality District with the City of Missoula Wastewater Division has conducted a household hazardous waste collection event. Unwanted hazardous and toxic materials are accepted from Missoula County residents for no charge, including oil-based paints and stains, paint thinner, degreasers, gasoline, other flammable liquids, aerosol paints, fertilizer, and non-alkaline household batteries.

In 2004, a mercury thermometer collection and exchange campaign was started. Each household that brings one or more mercury thermometers to the Household Hazardous Waste Collection Day is given a coupon for one free digital thermometer to be picked up at a participating pharmacy.

The Water Quality District coordinates volunteer efforts for the annual Household Hazardous Waste Collection. Volunteers are recruited from the University of Montana, local environmental consultants, interested citizens, and other local businesses. The success of this BMP will be measured by how often events are held.

STATUS: Fully Implemented

Storm Drain Stenciling (BMP 2.2)

Periodically, storm drains have been stenciled or re-stenciled to remind residents never to dispose of waste through storm drains. Past events have taken place at the University of Montana, downtown Missoula and in Lolo. This work has been done by university students, eagle scouts and community members. Currently, no volunteer groups are stenciling storm drains. City personnel will continue to seek volunteers for this project, or this BMP will be replaced with a similar BMP. The success of this BMP will be measured by how many volunteers are involved and how many storm drains are stenciled annually.

STATUS: Fully Implemented

Riparian/Wetland Plantings (BMP 2.3)

Working with local homeowners' associations, service groups, students, and community volunteers, the Water Quality District and the Parks and Recreation Department's Partners in Parks Volunteer Program, Conservation Lands Management Division, Urban Forestry Division, and annual sponsorship of National Public Lands Day has been conducting riparian and wetland planting events, re-vegetation and overall maintenance projects throughout the growing season since 2005. These projects and events take place in various locations throughout the roughly 350 acres of riparian habitat managed by the Missoula Conservation Lands program. Projects range from re-vegetation, rock dam removal, trash removal, tree planting and seeding of riparian and wetland areas in need. Native plants are obtained from the Montana Department of Natural Resources and Conservation and a portion are grown from seed in the Parks and Recreation greenhouse specifically for these types of projects. These plants help reduce runoff, stabilize channel banks, enhance and rejuvenate wildlife habitat, cleanse lands of waste and illicit discharges, create new riparian habitats, preserve existing wetlands, help keep water temperatures cool in summer, and educate the community about our precious natural resources and how to keep them thriving. Involving citizens in community work helps to build awareness about the Missoula Valley Habitat, it also builds a strong sense of pride in people who are currently or will become environmental stewards of our region.

The success of this BMP will be measured by how many volunteers are involved and how many sites are re-vegetated or maintained annually.

STATUS: Fully Implemented

Water Quality Advisory Council (BMP 2.4)

The Public Works Department makes an annual presentation to the Missoula County Water Quality Advisory Council and solicits comments. The Water Quality Advisory Council is comprised of 20 volunteers appointed by the Chair of the City-County Board of Health, representing technical advisors, large water users, conservation groups, and interested citizens.

The success of this BMP will be measured by how many presentations are given annually.

STATUS: Partially Implemented
SCHEDULE FOR IMPLEMENTATION: In February or March, a presentation will be made to the board concerning the Storm Water Management Program. In the following years, at least one meeting annually will be devoted to storm water issues.

Responsibility and Evaluation

The Director of Public Works is responsible for the overall management and implementation of the storm water public involvement/participation program. Responsibilities for individual BMPs are listed on the following page. The Health Department will serve as a resource to assist the Public Works Department in this effort. The success of this minimum control measure will be evaluated by internal review in annual reporting and feedback response from Montana Department of Environmental Quality.

MCM II. Public Involvement/Participation

BMP	Regulatory Requirements	Measurable Goal(s)	Responsible Position
2.1 Annual Household Hazardous Waste Collection Event	Part II.B.2.a. – The permittee shall at a minimum, comply with State, Tribal, and local public notice requirements when implementing a public involvement/participation program.	The City will hold one Household Hazardous Waste Collection Event annually.	Environmental Health Specialist
2.2 Storm Drain Stenciling	Part II.B.2.a. – The permittee shall at a minimum, comply with State, Tribal, and local public notice requirements when implementing a public involvement/participation program.	Involve 20 volunteers to stencil storm drains annually.	Environmental Health Specialist
2.3 Riparian / Wetland Planting	Part II.B.2.a. – The permittee shall at a minimum, comply with State, Tribal, and local public notice requirements when implementing a public involvement/participation program.	Involve 40 volunteers to re-vegetate or maintain sites annually.	Environmental Health Specialist
2.4 Water Quality Advisory Council	Part II.B.2.a. – The permittee shall at a minimum, comply with State, Tribal, and local public notice requirements when implementing a public involvement/participation program.	Make a presentation related to storm water at one meeting annually.	Director of Public Works

MCM III – Illicit Discharge Detection and Elimination (IDDE) Program

Regulatory Requirement(s):

Part II.A.2. – The permittee shall maintain documentation describing how and why each of the BMPs and measureable goals for the SWMP was selected.

Part II.B.3.b. – The permittee shall maintain documentation with respect to the development of a storm water IDDE program. This documentation must address both the overall IDDE program and the individual BMPs, measureable goals, and responsible persons/positions for this program. This documentation must include the following information, at a minimum:

Part II.B.3.b.i. – Identify how a storm sewer map was developed. Describe the sources of information used for the maps, and how verifying the outfall locations and storm sewer system components with field surveys was performed. Also, describe how the map will be regularly updated.

Part II.B.3.b.ii. – Identify the mechanism (ordinance or other regulatory mechanism) used to effectively prohibit illicit discharge into the Small MS4 and why that mechanism was chosen.

Part II.B.3.b.iii. – Identify the appropriate enforcement procedures and actions which are used to ensure the illicit discharge ordinance (or other regulatory mechanism) is implemented.

Part II.B.3.b.iv. - Identify the plan to detect and address illicit discharges to the system, including discharges from illegal dumping and spills. This plan must include documented procedures for screening outfalls, including frequency. The plan must include dry weather field screening for non-storm water flows and field tests of selected chemical parameters as indicators of discharge sources. The plan must also address on-site sewage disposal systems that flow into the storm drainage system. The description must address the following, at a minimum:

(a) Procedures for locating priority areas which include areas with higher likelihood of illicit connections (e.g., areas with older sanitary sewer lines, for example) and/or ambient sampling to locate impacted reaches.

(b) Procedures for tracing the source of an illicit discharge, including the specific techniques the permittee will use to detect the location of the source.

(c) Procedures for removing the source of the illicit discharge.

(d) Procedures for program evaluation and assessment.

Part II.B.3.b.v. – Identify the plan to inform public employees, businesses, and the general public of hazards associated with illegal discharges and improper disposal of waste. Include in this description how this plan will coordinate with the public education minimum control measure and the pollution prevention / good housekeeping minimum control measure programs. This plan must identify measures to train pertinent employees on the illicit discharge program.

Part II.B.3.b.vi. – Identify who is responsible for overall management and implementation of the storm water illicit discharge detection and elimination program and, if different, who is responsible for each of the BMPs identified for this program

Part II.B.3.b.vii. – Identify how the success of this minimum control measure will be evaluated, including how the measureable goals for each of the BMPs were selected.

Part III.A.1. – The permittee's SWMP must include a section describing how the SWMP will control discharges of pollutants of concern and ensure storm water discharges will not cause or contribute to instream exceedances of water quality standards. This discussion must specifically identify measures and BMPs that will collectively control the discharges of pollutants of concern.

Illicit discharge is defined as any discharge not comprised entirely of rainfall or snowmelt. In order to effectively control illicit discharges to the storm sewer system, the City of Missoula has created an Illicit Discharge Detection and Elimination Program consisting of the following components: a storm sewer system geographic database, ordinances prohibiting illicit discharges, an illicit discharge monitoring

program, and an education program. Each of these pieces serves a critical function in reducing illicit discharge to surface water. Particular attention will be paid to the pollutants of concern, but all potential pollutants will be targeted by this program, including cross connection of sanitary sewer, perchloroethylene, vehicle fluids, deicer, and regulated substances as defined by the Superfund Amendments and Reauthorization Act.

Storm Sewer System Geographic Database (BMP 3.1)

The geographic database of storm system components allows the creation of maps in order to better visualize possible sources of contamination or detail the area of a water body that an accidental spill may affect. A City map of storm drainage piping, sumps, inlets, outfalls, etc. has been placed on the City's website in order to educate citizens about the affects of illegal dumping by illustrating the direct connection between inlets and outfalls located at rivers and streams. In addition, the City has created maintenance schedules and associated maps for the storm water components so they may be properly and regularly cleaned and maintained.

The City's storm system geographic database was developed using a georeferenced aerial photo taken in 2006 as the basemap. GIS data for closed conduits, open channels, manholes, inlets, catch basins, outfalls, drywells, separators, etc. was gathered from engineers' project drawings, historic maps, an inventory study completed in 1966, and field verification. During the summers of 2008 and 2009, all permitted river and stream banks within the Urbanized Area and Missoula City Limits were walked in order to locate outfalls. New outfalls were added to the storm water GIS database, existing outfalls were confirmed, and outfalls which were not found were removed from the GIS data. Other storm water components are updated when field personnel inspect or maintain them. Field personnel report map discrepancies to GIS section staff so that corrections to the data can be made.

Realizing the importance of keeping the storm sewer database current, the City of Missoula created an administrative rule which requires storm water as-built drawings to be submitted prior to project close-out for any project constructed within the City Limits. Upon receipt of the as-built drawings, the data is updated to reflect the changes made during the construction project.

In addition to storm infrastructure information, the database also contains information relevant to the drainage area characterization. This data includes such things as land use, zoning, MPDES storm water permittees, age of development, historical industrial uses, known locations of illicit discharges, pollution complaints, etc. This information helps characterize the data collected and understand the effects of drainage area characteristics on storm water quality in Missoula's particular environment.

A geographic storm system database was selected over a traditional paper map because of its flexibility and usefulness. Paper maps are almost immediately out of date and updates are wasteful, costly and time-consuming to distribute. Electronic data can be used to create maps quickly and efficiently, with electronic copies being easy and cheap to distribute to multiple users. Other advantages that a GIS has over paper maps are the abilities to perform modeling and decision-making tasks. The success of this BMP will be measured by how quickly the data is updated. This measureable goal was chosen because the usefulness of the map is dependent on how accurate it is.

STATUS: Fully Implemented

Ordinances Prohibiting Illicit Discharges (BMP 3.2)

In 2000, the Missoula City Council and the Board of County Commissioners amended the Missoula Aquifer Protection Ordinance, originally adopted in 1993, which is intended to protect the public health, safety, and general welfare of those who depend upon the Missoula Valley Aquifer and surface waters in the Missoula Valley for drinking water, recreation, and other beneficial uses. The provisions of the ordinance were deemed to be a health ordinance and as such are to be applied to an area within five miles outside of the city limits.

The ordinance establishes prohibitions and/or restrictions on regulated substances and activities which have the potential of causing surface or groundwater contamination. Facilities that store Regulated Substances above the specific quantities are required to obtain a permit from the Water Quality District. This requires facilities to report chemical quantities and steps taken to reduce the likelihood of spills to the District every two years. Regulated Substances are those found in 40 CFR Part 261; regulated substances listed in Superfund Amendments and Reauthorization Act (SARA) Title III; any petroleum product; any hazardous waste; deicers; or any other substances that may threaten contamination of surface water or the Missoula Valley Aquifer, excluding substances used for personal household use. Further, it is unlawful for any person to "cause contamination or to place, cause to be placed, or allow to remain in place any substance in a location where it is likely to cause contamination".

The Missoula Valley Water Quality Ordinance also gives Water Quality District staff the authority to perform inspections and enforce the provisions of the ordinance. A Notice of Violation may be written, after which corrective action must be taken within five working days, unless the alleged violator requests an administrative review. Any person who violates any of the provisions of the ordinance is guilty of a misdemeanor and can be fined up to five hundred dollars and/or imprisoned in the county jail for up to sixty days.

This ordinance was chosen because it has been successfully used for years by the Water Quality District to protect Missoula's groundwater and surface water quality. Water quality complaints are registered with the District and staff follow up on each complaint that is received. The success of this BMP is measured by the percentage of complaints to which the District responds. This measurable goal is response to 100% of complaints and full compliance with each violation notice that is issued.

In addition to the Missoula Valley Water Quality Ordinance, Title 13.04 of the Missoula Municipal Code, entitled "Sewer Regulations", makes it "unlawful for any person to discharge or cause to be discharged into the storm sewage system any waste other than surface storm water drainage or clear water except when other connections are specifically allowed by the Director of Public Works." This allows for connects listed in parts II.B.3.a.vi and II.B.3.a.vii to be allowed if they are not found to be significant contributors of pollutants to the Small MS4.

The Montana Water Quality Act, Missoula City-County Health Code, Missoula Municipal Code, and Uniform Plumbing Code all prohibit on-site sewage disposal systems that flow into the storm drainage system. The majority of Missoula's storm water is handled by sumps, rather than piped systems. In nearly every location that there is storm sewer in Missoula, there is also sanitary sewer. The City of Missoula maintains connection records on buildings and if records are missing, a dye test is required to verify connection to the sanitary sewer before a building can legally be sold.

STATUS: Fully Implemented

Illicit Discharge Monitoring Program (BMP 3.3)

The City of Missoula's Illicit Discharge Monitoring Program was developed using the Center for Watershed Protection's Illicit Discharge Detection and Elimination manual for guidance. The Program includes a dry weather screening program; a citizen reporting hotline, where citizens may report suspected illegal dumping; and hazardous spill response.

Dry-weather screening is conducted during July when surface water levels and rainfall rates are low. During the first permit cycle, all rivers and streams were walked and existing outfall inventories verified or edited. During the first cycle, priority was given to older areas of town where illicit discharge was more likely to be found. During subsequent permit cycles, 20% of outfalls will be inspected annually, and outfalls having dry weather flows sampled. Samples are tested for total suspended solids, chemical oxygen demand, total phosphorus, total nitrogen, pH, ammonia, E. Coli, total coliform, chloride, surfactants, and potassium. Many areas within Missoula have high ground water or seasonal springs which integrate with the MS4. This testing helps to differentiate between ground water and illicit discharge.

Using the Center for Watershed Protection's Indicator Parameters Used to Detect Illicit Discharges table in the Illicit Discharge Detection and Elimination manual, the list of possible contaminants can be narrowed. Once a problem area is located, the upstream system is evaluated and various areas chosen to perform additional sampling. These locations are chosen so as to sample each branch of the system and various places along stretches with no branches in order to isolate the area of discharge. After the area has been narrowed, if the illicit discharge cannot easily be detected, a video inspection is performed in the pipe. Once the source is identified, the process of removing the discharge will begin using the procedures outlined in Title 13.26 - Missoula Valley Water Quality Ordinance. All actions taken during the process will be documented in the asset management software.

The citizen reporting hotline is coordinated with the Construction Site Storm Water Runoff Control program. Potential storm water pollution can be reported to this number 24 hours a day. Office hours are 8:00 AM to 5:00 PM Monday through Friday and messages can be left after hours. The messages are checked daily. Calls can be made anonymously. The hotline number can be found on the City's webpage, Missoula Valley Water Quality District's webpage, and Missoula Valley Water Quality District's education publications. See Section IV of this Program for more information.

Hazardous spill response is accomplished by Water Quality District staff along with the City of Missoula Fire Department. Both agencies are trained in proper hazardous spill mitigation techniques.

STATUS: Partially Implemented
IMPLEMETATION SCHEDULE: June 30, 2010 – complete draft document for procedures for screening outfalls. Use draft document during 2010 dry weather screening and make changes as necessary. Add procedures for tracing the source of illicit discharge, removing the source of illicit discharge, and program evaluation and assessment. June 30, 2011 – complete final document for procedures for screening outfalls based on changes made during previous season and review comments. December 31, 2011 – full implementation.

Illicit Discharge Education Programs (BMP 3.4)

The Missoula Valley Water Quality District administers a permitting program for facilities that store regulated substances above certain threshold quantities listed in the Missoula Valley Water Quality

Ordinance. Water Quality District staff performs periodic inspections to ensure proper materials handling. When deficiencies are found, the inspector uses the opportunity to educate staff on proper procedures.

Restaurants and food service businesses located within the Missoula sanitary sewer service area are required to discharge wastewater to grease collection devices. Collection device locations are tracked in the City's asset maintenance software and an inspector makes regular visits to agencies with collection devices. Inspections are performed and the visit is used to educate users about the importance of the device for preventing sanitary sewer overflows and storm sewer contamination. The Health Department plans to conduct an education program for downtown businesses, including restaurants and bars, which store solid wastes and may conduct activities such as cleaning in alleys that drain to the City storm water system. This educational program would inform businesses of the connection of storm drains to the river, and potential alternatives to activities that may cause pollution.

In addition to these activities, area businesses and the general public are educated via the Water Quality District's educational pamphlets, utility stuffers, TV advertising, PSAs, and printed advertising. The City's and Water Quality District's web pages also serve as sources of education. This part of the Program is coordinated with Minimum Control Measure I – Public Education and Outreach on Storm Water Impacts. See Section I of this Program for more information on this BMP.

This BMP was chosen because targeted education is an important aspect of identifying behaviors that have a direct impact on storm water and subsequent surface and ground water quality. Citizens must be informed that storm drains are not simply a conduit to sanitary sewer where waste is adequately sanitized before discharge. The success of this BMP will be measured by the number of educational activities that take place as well as the number of people reached.

STATUS: Fully Implemented

Municipal Employee Training and Education Programs (BMP 6.2)

Informing public employees of hazards associated with illegal discharges and improper disposal of waste will be accomplished in conjunction with the Pollution Prevention and Good Housekeeping for Municipal Operations program along with the Public Education and Outreach on Storm Water Impacts program. At least once a year, field employees in Parks and Recreation and Public Works receive training geared toward their respective maintenance responsibilities and the City's required good housekeeping techniques. In addition, the training discusses the importance of proper handling, storage, and disposal of potential contaminants. Employees are educated about various forms of illicit discharge and asked to look for them during the course of their work days. This part of the program is coordinated with Minimum Control Measure Six – Pollution Prevention / Good Housekeeping for Municipal Operations. See Section VI of this Program for more information on this BMP.

STATUS: Partially Implemented
IMPLEMENTATION SCHEDULE: June 30, 2010 – meet with division managers to inform them of new requirements. March 31, 2011 – review divisions' existing education programs with managers and determine ways to come into compliance with new regulations of General Permit regarding the IDDE and Construction Programs. October 31, 2011 – divisions' programs and documentation updated. December 31, 2011 – full implementation.

Responsibility and Evaluation

The Director of Public Works is responsible for the overall management and implementation of the illicit discharge detection and elimination program. Responsibilities for individual BMPs are listed on the

following page. The success of this minimum control measure will be evaluated by internal review in annual reporting and feedback response from Montana Department of Environmental Quality.

MCM III. Illicit Discharge Detection and Elimination (IDDE)			
BMP	**Regulatory Requirements**	**Measurable Goal(s)**	**Responsible Position**
3.1 Storm Sewer System Geographic Database	Part II.B.3.a.i. – Develop, implement, and enforce a program to detect and eliminate illicit discharges (as defined in ARM 17.30.1102(7)) into the permitted Small MS4;	Data will be updated when construction as-built drawings are received or field staff identifies corrections that need to be made.	MMS Engineering Technician
	Part II.B.3.a.ii. – Develop, and keep updated a storm sewer system map, showing the location and number of outfalls (as defined in ARM 17.30.1102(14) and Part VI. of this General Permit), and the names and locations of all surface waters that receive discharges from those outfalls. Development of this map to accommodate the provisions of a complete IDDE program would typically include mapping storm sewer system components including inlets, open channels, subsurface conduits/pipes, dry wells (discharges to ground water directly), and other similar discrete conveyances. The permittee must provide a copy of the developed map(s) or any updates to the Department with the next annual report required under Part IV.I.;		
3.2 Ordinances Prohibiting Illicit Discharges	Part II.B.3.a.i. – Develop, implement, and enforce a program to detect and eliminate illicit discharges (as defined in ARM 17.30.1102(7)) into the permitted Small MS4;	All illicit discharge will be removed using procedures described in Missoula City Ordinances.	Director of Environmental Health
	Part II.B.3.a.iii. - To the extent allowable under State, Tribal or local law, effectively prohibit, through ordinance, or other regulatory mechanism, non-storm water discharges (except those listed under Part II.B.3.vi below) into the permitted storm sewer system and implement appropriate enforcement procedures and actions;		
	Part II.B.3.a.iv. - Develop and implement a plan to detect and address non-storm water discharges, including illegal dumping, to the permitted system;		
	Part II.B.3.a.vi. - Address the following categories of non-storm water discharges or flows (i.e., illicit discharges) only if the permittee identifies them as significant contributors of pollutants to the Small MS4; water line flushing, landscape irrigation, diverted stream flows, rising ground waters, uncontaminated ground water infiltration (as defined in ARM 17.30.1102(8)), uncontaminated pumped ground water, discharges from potable water sources, foundation drains, air conditioning condensation, irrigation water, springs, water from crawl space pumps, footing drains, lawn watering, individual residential car washing, flows from riparian habitats and wetlands, dechlorinated swimming pool discharges, and street wash water (discharges or flows from fire fighting activities are excluded from the effective prohibition against non-storm water and need only be addressed where they are identified as significant sources of pollutants to state waters).		
	Part II.B.3.a.vii. - The permittee may also develop a list of other similar occasional incidental non-storm water discharges (e.g. non-commercial or charity car washes, etc.) that will not be addressed as illicit discharges. These non-storm water discharges must not be reasonably expected (based on information available to the permittee) to be signigicant sources of pollutants to the Small MS4, because of either the nature of the discharges or conditions the permittee established for allowing these discharges to the Small MS4 (e.g., a charity car wash with appropriate controls on frequency, proximity to sensitive waterbodies, BMPs for the wash water, etc.). The permittee must document, as part of the SWMP, any local controls or conditions placed on these discharges. The permittee must include a provision prohibiting any individual non-storm water discharge that is determined to be contributing significant amounts of pollutants to the Small MS4.		
3.3 Illicit Discharge Monitoring Program	Part II.B.3.a.i. – Develop, implement, and enforce a program to detect and eliminate illicit discharges (as defined in ARM 17.30.1102(7)) into the permitted Small MS4;	Monitor twenty percent of outfalls annually during dry weather.	MMS Engineering Technician, Environmental Health Specialist
	Part II.B.3.a.iv. - Develop and implement a plan to detect and address non-storm water discharges, including illegal dumping, to the permitted system;		

BMP	Regulatory Requirements	Measurable Goal(s)	Responsible Position
3.4 Illicit Discharge Education Programs	Part II.B.3.a.i. – Develop, implement, and enforce a program to detect and eliminate illicit discharges (as defined in ARM 17.30.1102(7)) into the permitted Small MS4;	Number of educational activities offered and number of people reached.	Environmental Health Specialist
	Part II.B.3.a.a. - Inform public employees, businesses, and the general public of hazards associated with illegal discharges and improper disposal of waste; and		

MCM IV – Construction Site Storm Water Runoff Control Program

Regulatory Requirement(s):

Part II.A.2. – The permittee shall maintain documentation describing how and why each of the BMPs and measureable goals for the SWMP was selected.

Part II.B.4.b. – The permittee shall maintain documentation with respect to the development of a construction site storm water control program. This documentation must address both the overall construction site storm water control program, and the individual BMPs, measureable goals, and the responsible persons/positions for the program. This documentation must include the following information, at a minimum:

Part II.B.4.b.i. - Identify the mechanism (ordinance or other regulatory mechanism) which will be used to require erosion and sediment controls at the construction sites and why this mechanism was chosen.

Part II.B.4.b.ii. - Identify the plan to ensure compliance with the erosion and sediment control regulatory mechanism, including the sanctions and enforcement mechanisms to be used to ensure compliance. Describe the procedures for when certain sanctions will be used. Possible sanctions include non-monetary penalties (such as stop work orders), fines, bonding requirements, and/or permit denials for non-compliance.

Part II.B.4.b.iii. - Identify the requirements for construction site operators to implement appropriate erosion and sediment control BMPs and control waste at construction sites that may cause adverse impacts to water quality. Such waste includes, but is not limited to, discarded building materials, concrete truck washouts, chemicals, litter, and sanitary waste.

Part II.B.4.b.iv. - Identify the procedures for site plan review, including the review of pre-construction site plans, which incorporate considerations of potential water quality impacts and appropriate storm water pollution prevention BMPs. Describe procedures and the rationale for how certain sites for site plan review will be determined, if not all plans are to be reviewed. Describe the estimated number and percentage of sites which will have pre-construction site plans reviewed.

Part II.B.4.b.v. – Identify the procedures for receipt and consideration of information submitted by the public. Consider coordinating this requirement with the public education program.

Part II.B.4.b.vi. - Identify procedures for site inspection and enforcement of control measures, including how sites for inspection will be selected and prioritized.

Part II.B.4.b.vii. – Identify who is responsible for overall management and implementation of the construction site storm water control program and, if different, who is responsible for each of the BMPs identified for this program.

Part II.B.4.b.viii. – Identify how the success of this minimum control measure will be evaluated, including how the measureable goals for each of the BMPs were selected.

Part II.B.4.b.ix. – Identify measures to train pertinent municipal employees on the construction program.

Part II.B.5.b.ii. – Identify how the program will be specifically tailored to the local community, to minimize water quality impacts, and to attempt to maintain pre-development runoff conditions and hydrology. This includes the process, where such practices are practicable, to implement low impact development practices that infiltrate, evapotranspire, or capture for reuse the runoff generated from the first 0.5 inches of rainfall from a 24-hour storm preceded by 48 hours of no measurable precipitation.

Part II.B.5.b.iv. – Identify any structural BMPs in the program, including as appropriate:

(a) Storage practices such as wet ponds and extended-detention outlet structures;

(b) Filtration practices such as grassed swales, bioretention cells, sand filters and filter strips; and

(c) Infiltration practices such as infiltration basins and infiltration trenches.

Part II.B.5.b.v. - Identify the mechanisms (ordinance or other regulatory mechanisms) which will be used to address post-construction runoff from new developments and redevelopments and why that mechanism was chosen. If a mechanism needs to be developed, describe the plan and a schedule to do

so. If the ordinance or regulatory mechanism is already developed, include a copy of the relevant sections with the program.

Part II.B.5.b.ix. – Identify the procedures for site plan review of post-construction storm water management BMPs which incorporate considerations of potential water quality impacts. Describe procedures and the rationale for how certain sites for site plan review will be determined, if not all plans are to be reviewed. Describe the estimated number and percentage of site plan reviews to be performed.

Part II.B.5.b.x. – Identify procedures for site inspection and enforcement of post-construction storm water management BMPs, including how sites for inspection will be selected and prioritized. Inspections must include an evaluation of whether BMPs were built properly and are being maintained properly.

Polluted storm water runoff from construction sites can enter storm drain systems and be discharged into local rivers and streams. Sediment is the main construction pollutant of concern in the Missoula Valley. Sedimentation/siltation is one pollutant for which the Bitterroot River is listed as impaired. Sediment in rivers reduces the amount of sunlight reaching aquatic plants, clogs fish gills, smothers aquatic habitat, covers riffles which oxygenate the water, impedes navigation and contributes to flooding by reducing the size of channels. Sediment runoff rates from construction sites are typically 10 to 20 times greater than those of agricultural lands, and 1,000 to 2,000 times greater than those of forest lands. During a short period of time, construction sites can contribute more sediment to streams than can be deposited naturally during several decades. In addition to sediment, construction sites can contribute solid and sanitary wastes, phosphorus, nitrogen, pesticides, oil and grease, concrete truck washout, construction chemicals, and construction debris to our local water bodies.

In order to reduce the discharge of these pollutants to our local rivers and streams, the City of Missoula has developed a Construction Site Storm Water Runoff Control Program. The Program consists of five parts: a construction storm water pollution prevention ordinance, construction site standard drawings, site plan review procedures, a dedicated water pollution complaint phone number, and a site inspection checklist.

Construction Ordinance (BMP 4.1)

On November 23, 2009, the City Council of Missoula unanimously passed Ordinance 3414, repealing Chapter 15.64 of the Missoula Municipal Code and establishing Chapter 15.65 entitled "Grading, Drainage, Erosion Control and Storm Water Pollution Prevention Plan (SWPPP)". This newly adopted chapter establishes the requirement for acquiring Grading and Storm Water Pollution Prevention Plan Permits before commencing grading associated with a subdivision, project, building permit, or zoning compliance permit on public or private property. The purpose of the chapter is to provide minimum standards for site grading and the control of storm water runoff, both quantity and quality. It creates permitting, submittal and development design standards for erosion control and sediment control, preservation of natural drainage systems, flood mitigation, site grading, and protection of property. Requirements for multifamily, commercial, and industrial parcels to retain all storm water on site are addressed. This chapter also establishes a fee structure, penalties for commencing work without a permit, and penalties for violation of the code.

This ordinance was chosen because contractors were already familiar with Chapter 15.64 and were accustomed to acquiring Grading, Drainage, and Erosion Control Permits. By adding another similar permit to this chapter, contractors can easily assimilate this into their routines. Another convenience of this permit is that it uses the State SWPPP Permit, so contractors don't need to fill out multiple applications. One hundred percent of applications will be reviewed for compliance with City and State requirements.

STATUS: Partially Implemented
SCHEDULE FOR IMPLEMENTATION: March 31, 2011 – complete review of current ordinance for compliance with new General Permit conditions. September 30, 2011 – complete revisions to ordinance for referral to City Council. November 30, 2011 – passed City Council and received Mayor's signature. December 31, 2011 – full implementation.

Standard Drawings (BMP 4.2)

Seven construction site storm water pollution prevention standard drawings were created in 2005 and 2006. The drawings are required to be part of applicable projects constructed within City Limits by Section 15.65.130 of the Missoula Municipal Code. Drawings include Temporary Access to Construction Sites, Silt Fence Installation, Post-Paving Gravel Curb Intake Filter, Pre-Paving Gravel Intake Filter, Straw Bale Check Dams, and Sediment Control at Field Catch Basins. All projects within Missoula city limits disturbing an acre or more are required to have storm water pollution prevention measures.

The City and County have cooperatively developed standard drawings for post-construction structural BMPs which include means to retain storm water on site. Standard drawings include storage practices, filtration practices, and infiltration practices. Designers can use any of the standard drawings which meet the needs for the specified project, create their own BMPs, or use approved commercially available BMPs.

In 2006, the City began requiring special covers for drywells and storm manholes. Standard drawings detail the requirements which must be followed on all new construction projects. Covers must have a trout logo and contain the phrases "Dump No Waste" and "Drains to Streams". These new covers will serve as permanent reminders to citizens that only storm water should enter the storm drainage system.

STATUS: Fully Implemented

Site Plan Review Procedures (BMP 4.3)

The City of Missoula has created a "Subdivision Toolbox" for engineering consultants performing subdivision and other construction work. In 2007, City staff held a conference for all design professionals and the new toolbox was introduced. The toolbox is located on the City's website and has links to related information such as applicable codes, checklists, standard drawings, as-built drawings, and storm and sanitary sewer maps. Requirements for the acquisition of a City of Missoula SWPPP permit are included in this information and design professionals are required to include completed checklists with their design submittals. Filling out the checklists helps ensure that submittals are complete. Site plan reviewers use the completed checklists to review the plans and ensure that required elements are present. If designers omit any applicable SWPPP component, the plans can be amended or rejected. All site plans are reviewed for compliance with the Grading, Drainage, Erosion Control, and Storm Water Pollution Prevention Plan. Site plans and storm water controls for major projects, including City road construction projects, are also reviewed by Health Department, Water Quality District staff for potential storm water pollution issues.

STATUS: Partially Implemented
SCHEDULE FOR IMPLEMENTATION: June 30, 2011 – complete preliminary written procedures / checklist for site plan review. September 30, 2011 – complete administrative review of written procedures / checklist and make changes to document. December 31, 2011 – full implementation.

Citizen Reporting Hotline (BMP 4.4)

Two employees of the Water Quality District serve in an on-call position for the Environmental Health Division Hazardous Materials Response Program. An employee of the division is on-call at all times. When dispatched by 9-1-1, employees work to minimize the threat to the public and the environment that may be present. Vehicle accidents and hazardous material spills are managed to reduce the potential ground water, surface water, soil, and air contamination. Storm drains are of particular concern and every effort is made to prevent spills from reaching an inlet. If the spill does reach the storm drain, Fire Department, Health Department, and Hazardous Material Team Members are trained in the use of booms and are equipped with sorbent pads to capture as much material as possible.

This hotline has been in use for a number of years and is already printed on a number of brochures and appears on the City and the Water Quality District's website. The number and the associated investigation and tracking system have been effectively used to address citizens' concerns about illicit discharge. All complaints will be responded to and all illicit discharges will be removed.

STATUS: Fully Implemented

Site Inspection Checklist (BMP 4.5)

A checklist has been developed for use by inspectors when checking pollution prevention controls at construction sites. The format follows the state SWPPP which the City of Missoula requires for all construction projects of one acre or more. In addition to standard information being required, the inspector is prompted to evaluate each BMP type on the construction site. Weather conditions and the most recent weather event are also required to be recorded. Finally, the inspector must record if punitive action is being taken. Completed forms are filed in project files and can also be scanned and attached to the electronic permit for online viewing. The checklist is used to help ensure complete and consistent inspections. The inspection checklist will be used for all SWPPP site inspections.

STATUS: Fully Implemented

Responsibility and Evaluation

The Director of Public Works is responsible for the overall management and implementation of the construction site storm water control program. Responsibilities for individual BMPs are listed on the following page. The success of this minimum control measure will be evaluated by internal review in annual reporting and feedback response from Montana Department of Environmental Quality.

MCM IV. Construction Site Storm Water Runoff Control

BMP	Regulatory Requirements	Measurable Goal(s)	Responsible Position
4.1 Construction Ordinance	Part II.B.4.a. – The permittee shall develop, implement, and enforce a program to reduce pollutants in any storm water runoff to the permitted Small MS4 from construction activities that result in a land disturbance of greater than or equal to one acre. Reduction of storm water discharges from construction activity disturbing less than one acre must be included in the program if that construction activity is part of a larger common plan of development or sale that would disturb one acre of more.	One hundred percent compliance with construction ordinances.	City Engineer
	Part II.B.4.a.i. – An ordinance or other regulatory mechanism to require erosion and sediment controls, as well as sanctions to ensure compliance, to the extent allowable under State, Tribal, or local law;		
	Part II.B.4.a.ii. – Requirements for construction site operators to implement appropriate erosion and sediment control BMPs;		
	Part II.B.5.a.vii. – For new development or redevelopment projects greater than or equal to one acre, the program shall include a process, where such practices are practicable, to require the implementation of low impact development practices that infiltrate, evapotranspire, or capture for reuse the runoff generated from the first 0.5 inches of rainfall from a 24-hour storm preceded by 48 hours of no measureable precipitation. This process must be in place by January 1, 2012.		
4.2 Standard Drawings	Part II.B.4.a. – The permittee shall develop, implement, and enforce a program to reduce pollutants in any storm water runoff to the permitted Small MS4 from construction activities that result in a land disturbance of greater than or equal to one acre. Reduction of storm water discharges from construction activity disturbing less than one acre must be included in the program if that construction activity is part of a larger common plan of development or sale that would disturb one acre of more.	Use of standard drawings or equivalent on all construction projects reviewed by Engineering Division staff.	Engineering Technician/Inspector
	Part II.B.4.a.iii. – Requirements for construction site operators to control waste such as discarded building materials, concrete truck washout, chemicals, litter, and sanitary waste at the construction site that may cause adverse impacts to water quality;		
4.3 Site Plan Review Procedures	Part II.B.4.a. – The permittee shall develop, implement, and enforce a program to reduce pollutants in any storm water runoff to the permitted Small MS4 from construction activities that result in a land disturbance of greater than or equal to one acre. Reduction of storm water discharges from construction activity disturbing less than one acre must be included in the program if that construction activity is part of a larger common plan of development or sale that would disturb one acre of more.	Review all site plans within Missoula City Limits for compliance with SWPPP ordinance.	Engineering Technician/Inspector
	Part II.B.4.a.iv. – Procedures for the Small MS4 permittee to perform site plan review (i.e. the Storm Water Pollution Prevention Plan (SWPPP)) for consistency with state and local requirements, and which incorporates consideration of potential water quality impacts including storm water pollution prevention through appropriate erosion, sediment, and waste control BMPs;		
	Part II.B.5.a.v. – Develop and implement procedures for the Small MS4 permittee to perform site plan review which incorporates consideration of potential water quality impacts including appropriate post-construction BMPs; and		
4.4 Citizen Reporting Hotline	Part II.B.4.a. – The permittee shall develop, implement, and enforce a program to reduce pollutants in any storm water runoff to the permitted Small MS4 from construction activities that result in a land disturbance of greater than or equal to one acre. Reduction of storm water discharges from construction activity disturbing less than one acre must be included in the program if that construction activity is part of a larger common plan of development or sale that would disturb one acre of more.	Response to one hundred percent of complaints and full compliance with each violation notice that is issued.	Environmental Health Specialist
	Part II.B.5.a.v. – Procedures for receipt and consideration of information submitted by the public; and		

BMP	Regulatory Requirements	Measurable Goal(s)	Responsible Position
4.5 Site Inspection Checklist	Part II.B.4.a. – The permittee shall develop, implement, and enforce a program to reduce pollutants in any storm water runoff to the permitted Small MS4 from construction activities that result in a land disturbance of greater than or equal to one acre. Reduction of storm water discharges from construction activity disturbing less than one acre must be included in the program if that construction activity is part of a larger common plan of development or sale that would disturb one acre of more.	Use of site inspection checklist for all SWPPP inspections.	Engineering Technician/Inspector
	Part II.B.4.a.vi. – Procedures for the Small MS4 permittee to perform site inspection and enforcement, in part based upon the site plan in Part II.B.4.a.iv., of erosion, sediment, and waste control BMPs.		

MCM V – Post-Construction Storm Water Management in New Development and Redevelopment Program

Regulatory Requirement(s):

Part II.A.2. – The permittee shall maintain documentation describing how and why each of the BMPs and measureable goals for the SWMP was selected.

Part II.B.5.b. – The permittee shall maintain documentation with respect to the decision process used for the development of a post-construction storm water program. This documentation must address both the overall post-construction storm water program and the individual BMPs, measurable goals, and responsible persons/positions for the program. The documentation must include the following information at a minimum:

Part II.B.5.b.i. – Identify how the program to address storm water runoff from new development and redevelopment projects was developed. Include in this description any specific priority areas for this program.

Part II.B.5.b.iii. – Identify any non-structural BMPs in the program, including, as appropriate:

(a) Policies and ordinances that provide requirements and standards to direct growth to identified areas, protect sensitive areas such as wetlands and riparian areas, maintain and/or increase open space (including a dedicated funding source for open space acquisition), provide buffers along sensitive waterbodies, minimize impervious surfaces, and minimize disturbance of soils and vegetation;

(b) Policies or ordinances that encourage infill development in higher density urban areas, and areas with existing storm sewer infrastructure;

(c) Education programs for developers and the public about project designs that minimize water quality impacts; and

(d) Other measures such as minimization of the percentage of impervious area after development, use of measures to minimize directly-connected imperious areas, and source control measures often thought of as good housekeeping, preventative maintenance, and spill prevention.

Part II.B.5.b.vi. - Identify how the long-term operation and maintenance (O&M) of the selected BMPs will be ensured. Options to help ensure that future O&M responsibilities are clearly identified include an agreement between the permittee and another party such as the post-development landowners or regional authorities.

Part II.B.5.b.vii. – Identify who is responsible for overall management and implementation of the construction site storm water control program and, if different, who is responsible for each of the BMPs identified for this program.

Part II.B.5.b.viii. – Identify how the success of this minimum control measure will be evaluated, including how the measureable goals for each of the BMPs were selected.

Part III.A.1. – The permittee's SWMP must include a section describing how the SWMP will control discharges of pollutants of concern and ensure storm water discharges will not cause or contribute to instream exceedances of water quality standards. This discussion must specifically identify measures and BMPs that will collectively control the discharges of pollutants of concern.

There are generally two forms of substantial impacts of post-construction runoff. The first is caused by an increase in the type and quantity of pollutants in storm water runoff. As runoff flows over areas altered by development, it picks up harmful sediment and chemicals such as oil and grease, pesticides, heavy metals, and nutrients (e. g., nitrogen and phosphorus). These pollutants often become suspended in runoff and are carried to receiving waters, such as lakes, ponds, and streams. Once deposited, these pollutants can enter the food chain through small aquatic life, eventually entering the tissues of fish and humans. The second kind of post-construction runoff impact occurs by increasing the quantity of water delivered to waterbodies during storms. Increased impervious surfaces (e. g., parking lots, driveways, and rooftops)

interrupt the natural cycle of gradual infiltration of water through vegetation and soil. Instead, water is collected from surfaces such as asphalt and concrete and routed to drainage systems where large volumes of runoff quickly flow to the nearest receiving water. The effects of this process include stream bank scouring and downstream flooding, which often lead to a loss of aquatic life and damage to property. The City's zoning ordinances and asset management software are BMPs implemented to address these impacts.

Zoning Ordinances (BMP 5.1)

Various portions of Missoula's Zoning Ordinance address growth, and the protection of sensitive areas, riparian resources, and open space in order to provide watershed protection. Chapter 20.20 Open Space and Public Districts defines two types of open space which offer watershed protection. The ordinance defines uses and development options, and references other regulations that apply. Zoning district OP1 is primarily intended to preserve open space and sensitive natural resource areas, including environmentally sensitive and agricultural areas. Zoning district OP2 is primarily intended to preserve open space and sensitive natural resource areas, while also allowing very low-density residential use, ideally in the form of cluster development.

Chapter 20.25 Overlay Districts defines a Planned Unit Development Overlay which is intended to accommodate development that may be difficult If not impossible to carry out under otherwise applicable zoning district standards. One such example would be developments that offer enhanced protection of natural resources and sensitive environmental features, including streams, water bodies, floodplains, wetlands, steep slopes, woodlands, wildlife habitats, and native plant communities. The developer must provide a written explanation describing the community benefits of the proposed development and how the proposed development provides greater benefits to the City than would a development carried out in accordance with otherwise applicable zoning ordinance standards.

Chapter 20.50 Natural Resource Protection sets requirements for developments and disturbances on average slopes greater than fifteen percent and in areas of riparian resource. The purpose of this chapter, among other things, is to preserve drainage channels and streams, encourage innovative pollution prevention techniques in environmentally sensitive areas, and mitigate adverse impacts including erosion and the degradation of air and water quality. This chapter is part of the zoning compliance permit process and must be completed before a zoning compliance permit is issued.

Section 20.50.030: Riparian Resource Protection of the Missoula City Zoning Ordinance defines areas of riparian resource and restricts development within those areas. A map of known Missoula riparian areas is maintained in the Office of Planning and Grants, but additional areas may be determined by stipulations outlined in the ordinance. Construction is permitted in areas of riparian resource only when a detailed management plan provides for restoration and-or replacement of the riparian area so that there is no net loss of area of riparian resource. All development within the city limits of Missoula must comply with this ordinance and compliance is determined by the Director of the Office of Planning and Grants. The success of this BMP will be measured by how many plans are reviewed and percentage that comply with these regulations.

STATUS: Fully Implemented

Asset Management Software (BMP 5.2)

In conjunction with the storm sewer system geographic database, the long-term operation and maintenance of storm water BMPs will be ensured using the City's asset management software. BMPs are

entered into the systems upon receipt of as-built drawings. BMPs located on public property or within public rights-of-way are added to a regular City maintenance schedule. The success of this BMP will be measured by the number of public assets inspected or maintained annually.

STATUS: Fully Implemented

Responsibility and Evaluation

The Director of Public Works is responsible for the overall management and implementation of the post-construction storm water program. Responsibilities for individual BMPs are listed on the following page. The success of this minimum control measure will be evaluated by internal review in annual reporting and feedback response from Montana Department of Environmental Quality.

MCM V. Post-Construction Storm Water Management in New Development and Redevelopment

BMP	Regulatory Requirements	Measurable Goal(s)	Responsible Position
5.1 Zoning Ordinances	Part II.B.5.a.i. – Develop, implement, and enforce a program to address storm water runoff from new development and redevelopment projects that disturb greater than or equal to one acre, including projects less than one acre that are part of a larger common plan of development or sale, that discharge into the permitted Small MS4. This program must ensure that controls are in place that would prevent or minimize water quality impacts;	One hundred percent compliance with zoning ordinances for all new development.	Director of Office of Planning and Grants
	Part II.B.5.a.ii. – Develop and implement strategies which include a combination of structural and/or non-structural BMPs appropriate for the community;		
	Part II.B.5.a.iii. - Use an ordinance or other regulatory mechanism to address post-construction runoff from new development and redevelopment projects to the extent allowable under State, Tribal or local law;		
	Part II.B.5.a.iv. – Ensure adequate long-term operation and maintenance of BMPs;		
5.2 Asset Management Software	Part II.B.5.a.i. – Develop, implement, and enforce a program to address storm water runoff from new development and redevelopment projects that disturb greater than or equal to one acre, including projects less than one acre that are part of a larger common plan of development or sale, that discharge into the permitted Small MS4. This program must ensure that controls are in place that would prevent or minimize water quality impacts;	Storm water assets will be inspected on a regular schedule and maintained as needed.	MMS Engineering Technician
	Part II.B.5.a.ii. – Develop and implement strategies which include a combination of structural and/or non-structural BMPs appropriate for the community;		
	Part II.B.5.a.vi. – Develop and implement procedures for the Small MS4 permittee to perform site inspection and enforcement of post construction BMPs.		
	Part II.B.5.a.iv. – Ensure adequate long-term operation and maintenance of BMPs;		

MCM VI – Pollution Prevention/Good Housekeeping for Municipal Operations Program

Regulatory Requirement(s):

Part II.A.2. – The permittee shall maintain documentation describing how and why each of the BMPs and measureable goals for the SWMP was selected.

Part II.B.3.b.v. – Identify the plan to inform public employees, businesses, and the general public of hazards associated with illegal discharges and improper disposal of waste. Include in this description how this plan will coordinate with the public education minimum control measure and the pollution prevention/good housekeeping minimum control measure programs. This plan must identify measures to train pertinent municipal employees on the illicit discharge program.

Part II.B.6.b. – The permittee shall maintain documentation with respect to the decision process for the development of a pollution prevention/good housekeeping program for municipal operations. This documentation must address both the overall pollution prevention/good housekeeping program and the individual BMPs, measureable goals, and responsible persons/positions for the program. This documentation must include the following information, at a minimum:

Part II.B.6.b.i. - Identify the operation and maintenance program to prevent or reduce pollutant runoff from municipal operations. The program must specifically list the municipal operations which are impacted by this operation and maintenance program. The permittee shall also include a list of facilities or activities (excluding construction) which are owned or operated by the permittee that are subject to the Department's other MPDES storm water discharge permits, and which discharge into the permitted Small MS4. Include the Department's MPDES permit number for each facility or activity.

Part II.B.6.b.ii. – Identify the municipal government employee training program, including frequency, which will be used to prevent and reduce storm water pollution from activities such as park and open space maintenance, vehicle fleet and building maintenance, new construction and land disturbances, and storm water system maintenance. Describe any existing, available materials which are planned to be used. Describe how this training program will be coordinated with the outreach programs developed for the public information minimum control measure and the illicit discharge minimum control measure.

Part II.B.6.b.iii. – The program description must specifically address the following areas:

(a) Maintenance activities, maintenance schedules, and long-term inspection procedures (including frequency) for controls to reduce floatables and other pollutants to the permitted Small MS4.

(b) Controls for reducing or eliminating the discharge of pollutants from streets, roads, highways, municipal parking lots, maintenance and storage yards, waste handling and disposal areas, vehicle fleet or maintenance shops with outdoor storage areas, salt/sand storage locations, and snow disposal areas operated by the permittee.

(c) Procedures for the proper disposal of waste removed from the permitted Small MS4 through the permittee's municipal operations, including dredge spoil, accumulated sediments, floatables, catch basin cleaning, and other debris.

(d) Procedures to ensure that new flood management projects are assessed for impacts on water quality and existing projects are assessed for incorporation of additional water quality protection devices or practices.

Part II.B.6.b.iv. – Identify who is responsible for overall management and implementation of the pollution prevention/good housekeeping program and, if different, who is responsible for each of the BMPs identified for this program.

Part II.B.6.b.v. – Identify how the success of this minimum control measure will be evaluated, including how the measureable goals for each of the BMPs were selected.

Part III.A.1. – The permittee's SWMP must include a section describing how the SWMP will control discharges of pollutants of concern and ensure storm water discharges will not cause or contribute to

instream exceedances of water quality standards. This discussion must specifically identify measures and BMPs that will collectively control the discharges of pollutants of concern.

Montana DEQ's 2010 303(d) list of impaired water bodies lists the Clark Fork River and Bitterroot River and attributes some of the pollutants to the MS4. Listed pollutants of concern attributed to the MS4 are: Chlorophyll-a, Nitrogen (Total), Organic Enrichment (Sewage), Biological Indicators, and Phosphorus (Total) for the Clark Fork River; Alteration in stream-side or littoral vegetative covers, Nitrogen/Nitrate, and Sedimentation/Siltation for the Bitterroot River. The City of Missoula addresses these pollutants in its pollution Prevention/Good Housekeeping for Municipal Operations Program. Divisions/departments that are involved are: Parks & Recreation, Street Maintenance, Traffic Services, Vehicle Maintenance, Wastewater, and Engineering. The City of Missoula's Pollution Prevention and Good Housekeeping for Municipal Operations Program consists of two parts: Department/Division Pollution Prevention Plans and Department/Division Training and Education.

In addition to the City of Missoula's MS4 MPDES Permit, it also has a discharge permit for the municipally-owned waste water treatment plant. That permit number is MT0022594.

Pollution Prevention Plans (BMP 6.1)

Pollution Prevention Plans for municipal divisions are created on a division-by-division basis. Each division creates its own plan based on activities and pollutants common that the particular division. Input is gathered from both managers and field personnel within a department or division to determine the most appropriate and effective BMPs for each activity and/or pollutant. Pollution Prevention Plans are reviewed periodically to ensure they are up to date and contain the most effective BMPs. The success of this BMP will be measured by the number of plans reviewed each year.

STATUS: Fully Implemented

Municipal Employee Training and Education Programs (BMP 6.2)

Training and education of employees in Public Works and Parks and Recreation Departments is accomplished on a department-by-department or division-by division basis. Each department/division creates its own training program which includes standard operating procedures that incorporate storm water BMPs for activities common to the individual department/division. Input is gathered from both managers and field personnel within each department/division to determine the most appropriate and effective BMPs for each activity and/or pollutant. At least once a year, field employees receive training geared toward their respective maintenance responsibilities and the City's required good housekeeping techniques. In addition, training discusses the importance of proper handling, storage, and disposal of potential contaminants. Employees are educated about various forms of illicit discharge and asked to look for them during the course of their work days.

Employees responsible for reviewing construction projects attend annual training in order to improve their skills, update their knowledge, and remain current on the latest technology.

The Water Quality District has a permitting program for certain municipal departments. Periodic inspections are made at these facilities to ensure proper materials handling. When deficiencies are found, the inspector uses the opportunity to educate staff on proper procedures.

STATUS: Partially Implemented

IMPLEMENTATION SCHEDULE: June 30, 2010 – meet with division managers to inform them of new requirements. March 31, 2011 – review divisions' existing education programs with managers and determine ways to come into compliance with new regulations of General Permit regarding the IDDE and Construction Programs. October 31, 2011 – divisions' programs and documentation updated. December 31, 2011 – full implementation.

Responsibility and Evaluation

The Director of Public Works is responsible for the overall management and implementation of the pollution prevention/good housekeeping program. Responsibilities for individual BMPs are listed on the following page. The success of this minimum control measure will be evaluated by internal review in annual reporting and feedback response from Montana Department of Environmental Quality.

MCM VI. Pollution Prevention/Good Housekeeping for Municipal Operations

BMP	Regulatory Requirements	Measurable Goal(s)	Responsible Position
6.1 Pollution Prevention Plans	Part II.B.6.a.i. – Develop and implement an operation and maintenance program which includes a training component, and has the ultimate goal of preventing or reducing pollutant runoff from municipal operations; and Part II.B.6.a.ii. – Using training materials available from EPA, the State of Montana, the Tribe, or other organizations, the program must include employee training to prevent and reduce storm water pollution from activities such as park and open space maintenance, vehicle fleet and building maintenance, new construction and land disturbances, and storm water system maintenance.	Review pollution prevention plans once annually.	Street Maintenance Superintendent, Vehicle Maintenance Superintendent, Wastewater Superintendent, Traffic Services Coordinator, Safety Training Coordinator
6.2 Municipal Employee Training and Education Programs	Part II.B.1.a. - The permittee shall implement a public education program to distribute educational materials to the community or conduct equivalent outreach activities about the impacts of storm water discharges on waterbodies and the steps that the public can take to reduce pollutants in storm water runoff. Part II.B.3.a.v. - Inform public employees, businesses, and the general public of hazards associated with illegal discharges and improper disposal of waste; and Part II.B.6.a.i. – Develop and implement an operation and maintenance program which includes a training component, and has the ultimate goal of preventing or reducing pollutant runoff from municipal operations; and Part II.B.6.a.ii. – Using training materials available from EPA, the State of Montana, the Tribe, or other organizations, the program must include employee training to prevent and reduce storm water pollution from activities such as park and open space maintenance, vehicle fleet and building maintenance, new construction and land disturbances, and storm water system maintenance.	Train field employees at least once annually on items related to storm water pollution prevention and illicit discharge detection and elimination.	Street Maintenance Superintendent, Vehicle Maintenance Superintendent, Wastewater Superintendent, Traffic Services Coordinator, Safety Training Coordinator