

Stoneville Saloon

Source Water Delineation and Assessment Report

Public Water Supply: Stoneville Saloon
(PWSID #MT0001184)

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Introduction

This delineation and assessment report is intended to meet the technical requirements of the Montana Source Water Protection Program (DEQ, 1999) and the federal Safe Drinking Water Act (SDWA) Amendments of 1996 (P.L. 104-182). Jim Stimson, Hydrogeologist with the Montana Department of Environmental Quality (DEQ) prepared the final report with assistance from intern Marilee Simons. Information on land use and potential contaminant sources comes from a variety of sources including a preliminary land cover data layer produced by the United States Geological Survey (USGS), DEQ Public Water Supply files (including sanitary surveys), and other public sources of information. A web-based GIS application was also used to query and generate maps to support writing this report. This application is called the Source Water Protection Program Query System and is available at the following web address or URL:

<http://nris.state.mt.us/wis/swap/swapquery.asp>. The application was developed by the DEQ Source Water Protection Program (SWPP) and provides access to data from the U.S. EPA, DEQ, Montana Bureau of Mines and Geology (MBMG) and other sources.

Purpose

The purpose of this delineation and assessment report is to assess water quality threats to the Stoneville Saloon public water supply using information obtained from personnel managing the site, the most recent sanitary survey, which was completed in July 2002 by Dan Fraser, a subcontractor of The Cadmus Group, Inc. (available from DEQ upon request), and from published reports. Delineation is a process whereby areas that contribute water to aquifers or surface waters used for drinking water are identified on a map. These areas are referred to as source water protection areas. Assessment involves identifying locations or regions in source water protection areas where contaminants may be generated, stored, or transported and then determining the potential for contamination of drinking water by these sources.

Public Water Supply Information

Stoneville Saloon is a bar and restaurant located in Alzada, Montana in the southeast corner of the state ([Figure 1-B](#)). A single well located in a well pit inside a pump house south of the building serves the system. An airlift pump provides water to a buried storage tank. A

jet pump then pressurizes the system using suction from the storage tank. An air/water interface pressure tank controls the cycling of the jet pump. The Stoneville Saloon public water supply serves a transient population of 30 people year-round through one service connection. Because the tavern does not regularly serve the same 25 persons for at least six months a year, it is classified as a transient, non-community public water supply. Water demand is approximately 300 gallons per day, assuming water use is 10 gallons per day per person (EPA, 1991).

Because no well log is available for the Stoneville Saloon site, sufficient well completion and lithology information is lacking. According to the sanitary survey, the well was drilled in 1946 to an unknown depth between 850-1000 feet. It has a 4-inch casing. An airlift pump of unknown capacity pumps the water into a 2500-gallon storage tank. From there, the water is pressurized by a jet pump and pressure tank before it enters the distribution system. The wellhead is located in a pit but extends about 5 inches above the pumphouse floor. The airlift pump is located above ground in the pumphouse and the pressure tank and jet pump are located in the pit. Due to the fact that no well log was available for this site, there are no well completion details or information to confirm the lithology of the aquifer. Based on geology in the region and the depth of the well, it appears that the Stoneville Saloon well taps either the Belle Fourche or Mowry Shale Formation. Aquifers in these shale bedrock formations are interpreted to be confined and are assigned a low sensitivity rating to potential contaminant sources in the area, in accordance with the Source Water Protection Guideline document (MT DEQ, 1999). However, because no well log is available to confirm the composition of the aquifer, the well will be treated in a conservative manner. If a well log or additional accurate well completion information becomes available in the future, it may be possible to reduce the hazard and susceptibility ratings in Table 1 following this report. For more information on the hydrogeology in the general vicinity of Alzada, refer to the Source Water Delineation and Assessment Report (SWDAR) for Ekalaka Public Water Supply (City of Ekalaka SWDAR, 2003).

Stoneville Saloon has its own large capacity septic system and effluent lagoon located west-northwest of the well. The small evaporation lagoon treats septic tank effluent from the bar/restaurant and one residence. It does not appear that Stoneville Saloon utilizes any water treatment methods.

The sanitary survey for Stoneville Saloon listed two recommendations that may be helpful in the future. Because the well is located in a pit, there is a confined entry risk associated with it that poses obvious safety issues. In addition, potential contaminants that gain access the pit could impact the well water. It is recommended that the pit be eliminated and all elements of the water system be set up above ground. Secondly, the storage tank should have screened and inverted vents installed so as to keep dust and insects out while still allowing air to circulate.

Stoneville Saloon is required to test for microbiological contaminants and nitrate. The well system must complete monthly bacteriological sampling, as well as an annual nitrate sample. It appears as though the tavern has an agreement with the DEQ Public Water Supply Program that allows them to take bacterial samples quarterly rather than monthly beginning on 7/21/98. It is noted that in the past five years that there have been no

bacterial hits. The highest level of nitrate in the past five years was 0.28 mg/L on 11/8/99, which is below the maximum concentration level (MCL) for nitrate of 10 mg/L set by the U.S. Environmental Protection Agency (EPA).

Delineation

Two source water protection zones are delineated for Stoneville Saloon. They include a 100-foot radius control zone and a 1000-foot radius inventory region ([Figure 1-A, B](#)). Ground water flow direction in this area is interpreted to be from upland areas to the west towards the north-northeast ([Figure 1-B](#)). The recharge zone in this area is most likely to the south in the Black Hills of South Dakota. The control zone is the most critical area from which direct introduction of contaminants into the well or immediate area can occur. The inventory region encompasses the area from which water or contaminants can flow into the bar's water supply over a period of months to years.

Inventory

The Montana Source Water Protection Program (Montana DEQ, 1999) requires that land uses and all potential sources of nitrate and microbial pathogens within the control zone and inventory region be identified.

Analysis of the area surrounding the Stoneville Saloon complex reveals that the predominant land covers include grassland (91%), wetlands (7%), and agricultural land (2%). See figure 2 for a pie chart summarization of this data. Only agricultural land poses a threat to the well and due to the very small percentage of landuse attributed to agriculture, the threat is minimal ([Figure 1-C](#)).

The inventory region consists of entirely low septic density land, which does not pose a threat to the well. As previously mentioned, the bar has its own large capacity septic and lagoon system, which may be a potential contaminant source. However, the system is down-gradient from the well, so the threat is minimized.

Highway 212 runs just north of the well and could represent a potential source of contamination if accidents or spills were to occur near the site.

Susceptibility Assessment

Susceptibility to potential contaminant sources is assessed for a public water supply well. Because there is no well log available for Stoneville Saloon, the susceptibility analysis is conducted in a more conservative manner than if well log and lithology information were available. However, because it has been determined that the well was completed in a deep consolidated sandstone/shale aquifer, it is assumed that the aquifer is confined with a low sensitivity to potential contaminant sources located in the area (Montana DEQ, 2000, Table 2). If a well log becomes available for Stoneville Saloon, it may be possible to reduce the aquifer hazard and susceptibility ratings further. Well log information helps verify that the well is constructed properly and helps identify the aquifer that the well is completed in. When constructed properly, shallow ground water that is more vulnerable to contaminate

sources at the land surface is prevented from entering the well's bore hole and co-mingling with water from the deeper aquifer. Under some circumstances, the well bore would act as a conduit for contaminants entering the deeper aquifer. Multiple barriers have been identified for the Stoneville Saloon public water supply system.

The tavern's well system is susceptible to nitrate and bacterial contaminants from its large capacity septic system, agricultural land, spills and accidents along Highway 212, and possibly Class V injection wells. Stoneville Saloon's own septic system poses the greatest threat to the well and is considered to represent a moderate hazard (Montana DEQ, 2000, Table 9c). Its location and proximity to the well appears to be down-gradient relative to the well. Two barriers have been identified for this contaminant source that could slow or prevent nitrates and pathogens from entering the aquifer so the susceptibility to the septic system is classified as low (Montana DEQ, 2000, Table 10).

State Highway 212 poses a potential threat to the well as it is just north and in close proximity to the site. Hazard for this source is rated as moderate (Montana DEQ, 2000, Table 9c). An emergency response barrier as well as the depth to the aquifer has been identified as barriers and susceptibility to the highway is rated as low (Montana DEQ, 2000, Table 10).

As mentioned previously, 2% of the land cover surrounding the tavern is used for agricultural purposes. There is potential for mismanagement or over-application of fertilizers and/or pesticides on the ag-land. This percentage of ag-land present in the inventory region is considered to represent a low hazard (Montana DEQ, 2000, Table 9c). Although the agricultural land is up-gradient of the well, it represents a very small portion of the inventory region. Two barriers have been invoked and susceptibility to the ag-land is rated as very low (Montana DEQ, 2000, Table 10). Class V Injection Wells could represent a possible hazard although the rating and susceptibility is unknown as no data is available to inventory.

Management Options

Possible management options for potential contamination from individual and municipal septic systems includes encouraging and supporting efforts to extend the city sewer, and promoting the maintenance of septic tanks and distribution lines. Options for managing contamination by agricultural land surrounding the well include encouraging and supporting efforts to provide educational information, materials, and resources to land owners on the proper application and storage of pesticides and fertilizers and implementing agricultural BMPs. Awareness of accidents and spills on the highway is a management option for contamination from that source. To manage potential contamination by Class V injection wells, options include encouraging efforts to inventory such wells and provide educational information to business owners and the public on proper waste disposal and recycling. The hazard and susceptibility ratings for each potential contaminant source as well as management options are summarized in the table below.

Table 1:

Source	Contaminant	Hazard Rating	Barriers	Susceptibility	Management
Large capacity septic system	Pathogens, nitrate	Moderate	-Depth to aquifer > 100 ft. - Down-gradient location	Low	Encourage and support city and county efforts to extend city sewer or to promote maintenance of septic tanks and distribution lines.
Highway 212	Fertilizers, pathogens, nitrate	Moderate	-Emergency Response -Depth to aquifer > 100 ft,	Low	Remain vigilant to accidents on the highway especially involving tank trucks.
Cultivated Cropland	Fertilizers, pesticides, pathogens, nitrate	Low	-Depth to aquifer > 100 ft. -Represents very small portion of inventory region	Very Low	Encourage and support city and county efforts to provide educational information, materials and resources to land owners on the proper application and storage of pesticide and fertilizers; implement agricultural BMPs
Class V Injection Wells	VOCs, SOCs, pathogens, nitrate	Unknown	None	Unknown	Encourage city and county efforts to inventory Class V wells, to provide educational information, materials and resources to business owners and the public on proper waste disposal and recycling.

References:

- City of Ekalaka SWDAR, 2003. Montana DEQ Source Water Protection Report. Available from the Source Water Protection Program and on the web at: <http://nris.state.mt.us/wis/swap/swapquery.asp>
- DEQ Permitting and Compliance Division, 2002. Sanitary Survey for Stoneville Saloon. PWS- PWS ID: #MT0001184.
- Montana DEQ, 1999. Montana Source Water Protection Program, Approved by EPA in November 1999.
- Montana DEQ, 2000. Montana Source Water Protection Program, Template for Non-Community Transient Public Water Supplies, Revised 2002.
- Montana State Library - Natural Resources Information System (NRIS) 2000 map base of the USGS Topographical coverage at 1:24,000 scale in MrSID format.
- U.S. EPA, Office of Water, 1991. Manual of Small Public Water Supply Systems, EPA 570/9-91-003, 211 p.
- U.S. Geological Survey, 2000. National Landcover Dataset, Montana. 30-meter electronic digital landcover/land use dataset interpreted from satellite imagery.

Figure 2: Land use pie chart

