

# WYOMING WATER ASSESSMENT AND PROTECTION PROGRAM (SWAP)



## SOURCE WATER ASSESSMENT PROGRAM EXECUTIVE SUMMARY

Source Water Assessment Prepared For:  
WYDOT South Pass RA

Assessment Completed By:  
**Lidstone and Associates, Inc.**  
Engineering, Geology & Water Resource Consultants  
4025 Automation Way, Building E  
Fort Collins, CO 80525



**June 30, 2004**

## **SOURCE WATER ASSESSMENT SUMMARY FOR WYDOT South Pass RA**

### **PWS Source Water Assessment Summary**

The Wyoming Department of Transportation (WYDOT) South Pass Rest Area Water System is classified as a transient non-community groundwater supply. The facility is located 68 miles northeast of Farson on Wyoming Highway 28 between Farson and Lander. The system is designed to provide water to a transient population at the rest area and to a caretaker residence year round. Source water for this facility is obtained from a well completed in Upper Miocene and Metasedimentary Rocks. The well is fitted with a pitless adapter and a submersible pump. Water is pumped on demand to the distribution system. A hydropneumatic tank for maintaining system pressure and a sand separator complete the system configuration.

In general, the WYDOT South Pass Rest Area Water System scores high for land use susceptibility because much of the land surrounding the water sources is forested. The overall point source contaminant susceptibility rating is medium due to the presence of a contaminant source within the delineated zones.

### **Delineation Methods**

Because the WYDOT rest area is classified as a transient non-community groundwater system and obtains water from a porous sedimentary and/or fractured rock aquifer, Lidstone delineated the source water area for this system using calculated fixed radius (CFR) and hydrogeologic mapping methods. The CFR method was used to estimate the two and five year time of travel radii for the groundwater system in the immediate vicinity of the wellhead based on data obtained from the Wyoming SEO, the PWS sanitary survey, and the SWAP guidance document. The hydrogeologic mapping portion of the delineation relied upon geologic maps for the area.

CFR is an appropriate method to use when groundwater flow to the well, spring or tunnel can be characterized as porous. This process was implemented for small communities that derive water from deeper, confined aquifers, or for non-community water systems. A factor of safety of 1.5 was applied to all systems where portions of the data were suspect. At the ground surface, the radius can be used to delineate an area around the well to be used for wellhead protection. The radius is the distance from the well to a point where groundwater (and contaminant) can reach the well over a specified time period. Input data requirements are limited, consisting of the pumping rate, open (screened interval) of the well, porosity of the aquifer, and the selected time of travel (2 years and 5 years).

Hydrogeologic mapping techniques use surface observations in combination with subsurface geologic and hydrogeologic data to identify aquifer boundaries and areas that contribute water to the aquifer. These techniques were used when a PWS's source was derived from a spring, fractured bedrock, or from a limestone or dolomite aquifer. Conduit flow aquifers have extremely variable flow patterns and rates, making the calculation of time of travel difficult. In some instances, only one contaminant inventory zone was identified beyond Zone 1 due to the inherent difficulty in attempting to assign a particular time of travel to a given area. Because of this issue, aquifer vulnerability mapping techniques were also used as part of the hydrogeologic

mapping effort to identify and delineate vulnerable areas. These areas (faults, fractures, exposed bedrock, etc.) are anticipated to be more susceptible to the rapid infiltration of contaminants released at the ground surface.

## **Groundwater Sources**

The rest area obtains its source water from one well that is completed in Upper Miocene and Metasedimentary Rocks to a depth of 200 feet. Recharge to these rocks occurs through the direct infiltration of precipitation. Groundwater reaches the wells through porous media and potentially fracture flow. Additional information on this well is included on the attached Well Information Sheet.

As shown on the enclosed source water area maps, the contaminant inventory zones for this well are centered around the wellhead and also include an area to the northwest of the well. CFR methods determined that Zone 2 extends approximately 1,004 feet radially from the wellhead, while Zone 3 extends approximately 1,588 feet. Based on geologic maps of the area, the outcrop of metasedimentary rock to the northwest was also delineated because of the potential for recharge from this area to reach the well through fracture flow.

## **Integrity Summary**

The WYDOT South Pass Rest Area Water System is classified as a transient non-community groundwater supply. The well was constructed prior to 1983 when less stringent construction standards were required by the State of Wyoming. However, records show that the well was properly sealed to protect against surface infiltration of potential contaminants around the wellhead. As shown on the Integrity Summary Table, the South Pass Rest Area Number 1 Well received a low score of 4, due primarily to the well completion date and the well not being protected from flooding.

## **Water Source Sensitivity Summary**

The WYDOT South Pass Rest Area Water System obtains source water for this facility is from a well completed in Upper Miocene and Metasedimentary Rocks which is a fractured aquifer. As shown on the Source Sensitivity Summary Table, the well received a sensitivity score of 10.

The well received a high score for two reasons. First, the well is completed in an aquifer that is known to be vulnerable to contamination due to the typically high flow velocities associated with fractured rocks. Second, the well received the highest score of 5 for chemical sensitivity due to documented chemical contaminant detections in the water supply. These included nitrate and total coliform. These contaminants were generally detected at concentrations below the EPA's maximum contaminant levels.

## **Water System Susceptibility Rating**

Susceptibility is defined as the potential for a public water supply to draw water contaminated at concentrations that would pose a threat or concern to human health. In general, the WYDOT

South Pass Rest Area Water System rated high for land use susceptibility because much of the land surrounding the water sources is forested. The overall point source contaminant susceptibility rating is medium due to the presence of an underground injection point in Zone 3. Susceptibility ratings for each type of potential contaminant source are summarized on the attached susceptibility tables.

A review of your PWS's routine water analysis results revealed that one or more chemicals that are considered contaminants in drinking water were detected at some time within the last five years. Chemical detections have a large impact on your PWS's sensitivity score because it may indicate that there is a pathway for contaminants to reach the water supply. However, it is likely that these chemicals are present only in small amounts and are not a danger to your health. Some of these chemicals may also occur naturally in water.

For more information about which chemicals were detected, please contact the PWS for a copy of the most recent Consumer Confidence Report or water analysis results. Chemical detections at levels that are a concern to human health are reported on the EPA's website: [http://www.epa.gov/enviro/html/sdwis/sdwis\\_query.html](http://www.epa.gov/enviro/html/sdwis/sdwis_query.html). To see if your PWS has exceeded the federal primary or secondary drinking water standards, just click on the State of Wyoming and then type in the name of your PWS. Consumer Confidence Reports are prepared by the PWS on a yearly basis. The reports should include information about any chemicals found in the water, even those found at very low levels. Please contact Kim Parker at DEQ, 307-777-7781, or WARWS for assistance. You may also contact EPA to find out what contaminants were detected. You may have to fill out a Freedom of Information Act request to obtain the water test results for your PWS. Please call EPA's Safe Drinking Water Hotline at 1-800-426-4791.

**POINT SUSCEPTIBILITY SUMMARY TABLE  
FOR WYDOT South Pass RA  
Point Source Susceptibility Summary**

It may appear from the results of this point source susceptibility summary table that your system has too many PSOCs influencing the final ratings. In some cases, a specific PSOC falls within a specific contaminant inventory zone shared by multiple wells or intakes. When this is the case, that PSOC will be scored for each intake. For example, an underground storage tank may appear within a contaminant inventory zone shared by four different wells. This would cause that single storage tank to be entered into the table four times, or once for each well or intake.

Point Source Type	Low	Medium	High
Underground Injection	N/A	1	N/A

- \* Illustrates the number of PSOCs in a particular rating class for all water sources
- \* N/A - Not Applicable