

# WYOMING WATER ASSESSMENT AND PROTECTION PROGRAM (SWAP)



## SOURCE WATER ASSESSMENT PROGRAM EXECUTIVE SUMMARY

Source Water Assessment Prepared For:  
Burns BOPU

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## **SOURCE WATER ASSESSMENT SUMMARY FOR Burns BOPU**

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

The Burns Board of Public Utilities water facility is a community groundwater system that is located about 27 miles east of Cheyenne and about two miles north of I-80. This PWS provides water to 254 people through 96 service connections on a year round basis. Source water for the facility is obtained from four wells that are completed in the Ogallala, White River, and Arikaree Formations. Produced water that is disinfected with sodium hypochlorite automatically at each wellhead is pumped through the distribution grid on demand. As demand decreases, flow is directed to the 200,000-gallon storage tank which floats on the system.

The Burns Board of Public Utilities scores high for land use susceptibility because much of the land surrounding the water sources is urban. The Board of Public Utilities should be aware of the railroad and several point source contaminants within the delineation zone.

### **Delineation Methods**

The Town of Burns has a community water system that obtains its source water from porous sandstone formations. WhAEM methods were used to delineate the two and five year source water areas based on information obtained from the sanitary survey, the Wyoming SEO, and Wyoming Water Research Institute reports. Hydrogeologic mapping techniques were also used to expand the source water areas.

EPA's Wellhead Analytic Element Model, or WhAEM, method was used for community water systems that derive their sources from alluvial or shallow bedrock aquifers. The WhAEM model uses well and limited hydrogeologic data to estimate time-of-travel capture zones in relatively simple hydrogeologic settings for either confined or unconfined aquifers. For the source water assessment, the WhAEM model was used to develop two year and five year groundwater capture zones. Due to this methodology, the delineated source water areas may be larger than the true capture zones for each well. However, use of this method typically results in source water protection areas that can be used to more reliably protect the water supply.

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**

Burns obtains groundwater for its community supply from four wells that are completed to depths ranging from 200 to 240 feet. These wells obtain water from sufficiently saturated sandstone beds of the Ogallala, White River, and Arikaree Formations. Recharge to these Tertiary formations occurs through the direct infiltration of precipitation on outcrops. Groundwater flows through these sandstone beds to the wells through porous media. Additional information on the wells is available on the enclosed Well Information Sheets.

As shown on the attached source water area maps, contaminant inventory zones for the wells encompass areas immediately adjacent to and northwest of the wells. The WhAEM model delineated Zones 2 and 3 as narrow elongate capture zones that extend upgradient from each well. Because groundwater flow directions on such a small scale are somewhat uncertain, hydrogeologic mapping methods were used to expand the contaminant inventory zones between and upgradient from the wells.

### **Integrity Summary**

The Burns Board of Public Utilities obtains its source water from four wells. While the A-2 water well was constructed prior to 1983, when less stringent construction standards were required by the State of Wyoming, the Town's other three wells were completed after 1993 when stringent standards were in place. Available records indicate that all of the wells were properly sealed to protect against surface infiltration of potential contaminants and flooding around the wellhead. As shown on the Integrity Summary Table, integrity scores for the wells ranged from 1 to 3. The A-2 water well had the highest score due to its completion date, while A-1 and A-4 had the lowest scores having been completed after 1993. A-5 scored two points due to its completion date and wellhead accessibility.

### **Water Source Sensitivity Summary**

All of Burns water wells are completed in an unconfined aquifer. As shown on the Source Sensitivity Summary Table, the wells all received sensitivity scores of 10.

These wells received the maximum sensitivity score for two reasons. The first reason is that the wells are completed in an unconfined aquifer which at this location is known to be sensitive to contamination. The second reason is that laboratory analysis of water samples from the Town within the last five years detected several contaminants that are listed on EPA's primary and secondary drinking water standards. These included nitrate, uranium, and gross alpha among others. Despite detection, 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. The Burns Board of Public Utilities scores high for land use susceptibility because much of the land surrounding the water sources is urban. The presence of underground storage tanks and solid/hazardous waste sites

within Zone 2 resulted in a high point source contaminant susceptibility for the wells. The presence of solid\ hazardous waste sites within Zone 3 resulted in a medium rating. The wells were assigned a high susceptibility for Zone 2 and low for Zone 3 for transportation corridor contaminants due to the presence of a railroad. 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 Burns BOPU**

**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 Tank	N/A	N/A	36
Sol/Haz Waste Site	N/A	4	4

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