

**SOURCE WATER ASSESSMENT
EXECUTIVE SUMMARY
FOR
Mills**

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PROJECT: 424-001

ASSESSMENT COMPLETED BY: TRIHYDRO CORPORATION

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SOURCE WATER ASSESSMENT SUMMARY FOR Mills

PWS Source Water Assessment Summary

Mills maintains a complex community water system that serves over 2,600 people through approximately 1,400 service connections. Facilities include seven wells, one surface intake, two raw water storage tanks, one water treatment plant, three treated water storage tanks, and the interconnecting transmission system. The main well field is located in close proximity to the water treatment plant immediately northeast of the Natrona County Fairgrounds as shown on the delineation map. Water from these sources is piped to the treatment Plant (conventional treatment and disinfection) prior to distribution throughout the system.

Mills obtains its water supply from both groundwater and surface water sources. The system utilizes one surface water intake on the North Platte River and seven wells that draw water from the Platte River alluvial aquifer. Most of the sources used by the town of Mills scored high with respect to the combined integrity and source sensitivity ratings because there were documented chemical detections of constituents that may pose a threat to water quality. Another factor is that some of the wells were constructed prior to the more stringent construction standards required for wells installed after 1993.

In general, the Town of Mills scored high for land use susceptibility because much of the land surrounding the well is urban land associated with many small industrial facilities. The overall point source contaminant susceptibility rating is high due to the number of potential sources of contamination. Also, the transportation corridor susceptibility scored high due to the presence of pipeline, state highway and railroad corridors that cross the source water areas.

Delineation Methods

Mills is a community water system that obtains most of its water supply from an unconfined alluvial aquifer within the Platte River valley. The system also relies on surface water from the North Platte River. Because Mills obtains water for its community water system from both surface and groundwater sources, TriHydro completed a conjunctive delineation using both surface and groundwater delineation methods. Surface water delineation methods were used to identify the source water areas for the surface water intake on the North Platte River. The delineation was completed by combining a MODFLOW groundwater model and surface water mapping methods into a single source water delineation.

Mills relies primarily on groundwater drawn from the Platte River alluvium to supply its municipal system. TriHydro built a finite difference flow model to simulate the interaction of the Platte River with the alluvial aquifer in the vicinity of the Mills well field. MODFLOW, a three-dimensional finite difference groundwater flow model was used to simulate groundwater flow and estimate the aquifer response to pumping. MODPATH, a three dimensional advective particle tracking program was used in combination with MODFLOW to more accurately estimate 2-year and 5-year times of travel to delineate contaminant inventory zones. A large portion of the data used in this assessment was gathered from the sanitary survey and information received from John Carter, the water system superintendent. The surface water source area was delineated

using surface topographic techniques. Zone 2 included an area 1,000 feet on either side of the Platte River and its perennial streams that extended upstream of the intake for a distance of 15 miles, or the distance from the intake to the headwaters of the drainage. Zone 3 for the intake includes the entire stream drainage basin from Zone 2 to the basin headwaters.

Groundwater Sources

Mills owns and operates seven water wells and one surface water intake. The primary groundwater source for the municipal wells is the alluvial aquifer within the Platte River valley. The Platte River alluvium is derived from erosion of the surrounding plains and mountain ranges of the upper Platte River drainage. The aquifer is generally comprised of sands and gravels with minor amounts of silt, clay, and large cobbles. The thickness of the alluvial aquifer ranges from zero along the north and south boundaries of the river valley where the valley sediments encounter the Cody Shale and Frontier formations to approximately 60 feet thick within the central portions of the valley. The alluvial aquifer is generally recharged through the direct infiltration of precipitation and stream flow from the Platte River. Groundwater in the alluvial aquifer generally flows toward the northeast at a shallow gradient similar to that of the Platte River.

Well yields generally range from 200 to 450 gallons per minute. The wide range in yield within the well field is due in large part to the location of the wells within the alluvial aquifer and their relation to coarse-grained channel deposits found locally within the Platte River alluvium. The alluvium supplies water to the municipal wells through porous media flow. While the distribution of these channel deposits varies both laterally and vertically, it has generally resulted in permeability pathways that generally trend parallel to the Platte River channel. Transmissivities typical of the Platte River alluvium range from 30,000 to 300,000 gallons per day per foot. Basic data on each municipal well is included in the attached Well Information Sheets.

The groundwater flow model used to develop the 2-year and 5-year contaminant inventory zones was MODFLOW 2000. The model is a single layer model and used the MODFLOW stream package to simulate the influence of the Platte River on the groundwater flow regime. The model domain extends four miles southwest and one mile northeast of the well field with no-flow boundaries to the north and south that follow the edges of the Platte River valley. Data from pump tests, and previous studies served as input for the aquifer parameters. The model was calibrated to match the gradient and elevation of the North Platte River.

As shown on the enclosed source water area delineation maps, contaminant inventory zones reflect the 2-year and 5-year time of travel path lines calculated by the groundwater model. Generally, zones 2 and 3 for these wells extend west to northwest from individual wellheads in an up-gradient direction.

Surface Water Sources

Mills obtains water from a surface water intake on the North Platte River to supply its municipal system. Additional information on this surface water source is included in the attached Surface Water Information Sheets. As shown on the enclosed source water area maps, contaminant

inventory zones 2 and 3 were delineated for the surface water source on the North Platte River. For the surface water intake, Zone 2 includes a 1,000 foot buffer on both banks of the river and perennial tributaries a distance of 15 river miles upstream from each intake. Zone 3 includes the remaining perennial streams within the North Platte drainage which also includes the Sweetwater River watershed.

Integrity Summary

Mills supplies water from seven wells and one surface water intake. While Wells #8 and #1 were completed before 1983, when less stringent construction standards were required by the State of Wyoming, the other five wells were completed after 1993, under strict construction requirements. With the exception of Well #9, all wells completed after 1993 received an integrity score of 1. Well #9 received an integrity score of 7 primarily due to the potential lack of a surface seal. Wells #8 and #1, received integrity scores of 5 and 3, respectively. Well #8 received a higher integrity score primarily because it is not protected from flooding and may lack an annular seal. As shown on the Integrity Summary Table, Mills' surface water intake received a high integrity score of 10. The intake was constructed before 1983, when less stringent construction standards were required by the State of Wyoming. Records indicated that the area around the intake is unrestricted and the intake may not be screened or inspected regularly to protect against the infiltration of potential contaminants.

Water Source Sensitivity Summary

As shown on the Source Sensitivity Summary Table, the Mill's source water intake received a sensitivity score of 10 and each well received a sensitivity score of 9. The intake received the maximum sensitivity score for two reasons. The first reason is that surface water intakes are more vulnerable to contamination due to unpredictable flow pathways and their proximity to the ground surface. The second reason is that there are documented chemical detections in the groundwater. The City's seven wells scored a score of 4 for aquifer sensitivity due to drawing water through porous media flow in an unconfined aquifer. The wells also received a score of 5 for chemical sensitivity due to documented chemical detections in the groundwater.

Water System Susceptibility Rating

Susceptibility is defined as the potential for a public water supply to draw contaminated water at concentrations that would pose a threat or concern to human health. In general, the Town of Mills scored high for land use susceptibility because much of the land surrounding the well is urban land associated with many small industrial facilities. The overall point source contaminant susceptibility rating is high due to the number of potential sources of contamination present within the contaminant inventory zones. In addition, several pipelines, a state highway, and railroad lines cross the source water areas which may pose a threat due to the possibility of pipeline breaks or railroad derailments. Therefore the system scored high with respect to transportation corridor susceptibility.

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. 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 Mills**

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 |
|-----------------------|-----|--------|------|
| Wastewater Discharge | N/A | 6 | 24 |
| Underground Tank | N/A | 78 | 366 |
| Underground Injection | N/A | 12 | 11 |
| TRI | N/A | N/A | 16 |
| Storage Tank | N/A | 24 | 36 |
| Sol/Haz Waste Site | N/A | 30 | 157 |
| Misc. Site | N/A | 30 | 34 |

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