

**SOURCE WATER ASSESSMENT
EXECUTIVE SUMMARY
FOR
Central Wyoming Reg. Water System**

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PROJECT: 424-001

ASSESSMENT COMPLETED BY: TRIHYDRO CORPORATION

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PWS Source Water Assessment Summary

The Central Wyoming Regional Water System maintains a complex community water system that serves over 51,900 people through approximately six consecutive service connections that supply water to six other communities; the City of Casper (PWS # 5601415C), Pioneer Water and Sewer District (PWS # 5600828C), Wardwell Water District (PWS # 5600067C), Poison Spider Water District (PWS #5600073C), Sandy Lakes Improvement District (no PWS # assigned) and Salt Creek Water District (PWS # 5600201). Facilities include 26 wells, three Ranney collectors, and one infiltration gallery, one water treatment plant, six treated water storage tanks, and the interconnecting transmission systems. The system relies primarily on groundwater from the North Platte River alluvium. Water drawn from the water supply wells and Ranney collectors is classified as groundwater under the influence of surface water (GWUDISW). The main well field is located in close proximity to the water treatment plant immediately west of the Natrona County Fairgrounds as shown on the delineation map. Water from all sources is piped to the treatment Plant (conventional treatment and disinfection) prior to distribution throughout the system.

The surface water intakes and infiltration galleries rated high for the combined integrity and susceptibility scoring criteria. However the wells scored medium, mainly because of good well construction practices. All of the sources rated high for land use, point source contaminants, and transportation corridor contaminants.

Delineation Methods

The Central Wyoming Regional Water System is a community water system that obtains 85% of its water supply from an unconfined alluvial aquifer within the North Platte River valley. The system also relies on surface water from the North Platte River. Because the system obtains water 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 infiltration gallery 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.

The Central Wyoming Regional Water System (CWRWS) is a community system that uses both groundwater and surface water sources for its water supply. CWRWS relies primarily on groundwater drawn from the North Platte River alluvium. Black and Veatch developed a wellhead protection plan for the system in 1995 that included a groundwater model of the alluvial aquifer, however Trihydro corporation could not obtain the report. Trihydro built an updated finite difference flow model to simulate the interaction of the North Platte River with the alluvial aquifer in the vicinity of the city's 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 for the CWRWS.

Groundwater Sources

The Central Wyoming Regional Water System owns and operates 26 water wells, three Ranney collectors, and one infiltration gallery. The primary groundwater source for the municipal wells is the alluvial aquifer within the North Platte River valley. The North Platte River alluvium is derived from erosion of the surrounding plains and mountain ranges of the upper North 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 North Platte River. Groundwater in the alluvial aquifer generally flows toward the northeast at a shallow gradient similar to that of the North Platte River.

Well yields generally range from approximately 200 to 450 gpm. The wide range in yield within these respective wellfields 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 North Platte River channel. Transmissivities in these wellfields range from 30,000 to 300,000 gallons per day per foot. Basic data on each municipal well is included in the 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 North Platte River valley. Data from pump test, 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 pathlines calculated by the groundwater model. Generally, zones 2 and 3 for these wells extend west to southwest from individual wellheads in an upgradient direction.

Surface Water Sources

The Central Wyoming Regional Water System obtains surface water supplies for its municipal system from one infiltration gallery along the North Platte River. In 1996, The Central Wyoming Regional Water System received notification from the U.S. EPA that water obtained from the infiltration gallery required treatment as groundwater under the direct influence of surface water. The Central Wyoming Regional Water System has upgraded its water treatment plant to meet these requirements. Additional information on these surface water sources 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 infiltration gallery, 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, while zone 3 includes the remaining perennial North Platte drainage which also includes the Sweetwater River watershed.

Integrity Summary

The Central Wyoming Regional Water System supplies water from 26 wells three Ranney collectors and one surface water intake. In general, half of the wells were constructed before 1983, when less stringent construction standards were required by the State of Wyoming, the other half were completed after 1993, when stringent construction standards were required by the State of Wyoming. All of the wells received the an integrity score between 2 and 4. As shown on the Integrity Summary Table, the Ranney collectors, infiltration gallery, and surface water intake received a integrity score of 6. The wells are shallow and are considered under the direct influence of surface water. Records indicated that the area around the intake is restricted, the intake is screened, and is inspected regularly to protect against the infiltration of potential contaminants.

Water Source Sensitivity Summary

As shown on the Source Sensitivity Summary Table, all of the system's wells and intakes received a sensitivity score of 10. The intake and infiltration gallery 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 wells and the intakes scored the maximum of 5 for chemical sensitivity due to documented chemical detections in the groundwater. Also, the wells are shallow and are considered under the direct influence of surface water.

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 Central Wyoming Reg. Water System scores 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 and railroad lines cross the source water areas which may pose a threat due to the possibility of pipeline breaks or railroad derailments.

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 Central Wyoming Reg. Water System
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	N/A	1
Underground Tank	N/A	N/A	140
Underground Injection	N/A	N/A	68
TRI	N/A	N/A	1
Sol/Haz Waste Site	N/A	29	127
Misc. Site	N/A	N/A	30

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