

WYOMING WATER ASSESSMENT AND PROTECTION PROGRAM (SWAP)



SOURCE WATER ASSESSMENT PROGRAM EXECUTIVE SUMMARY

Source Water Assessment Prepared For:
Cheyenne BOPU

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SOURCE WATER ASSESSMENT SUMMARY FOR Cheyenne BOPU

PWS Source Water Assessment Summary

The City of Cheyenne Board of Public Utilities (BOPU) maintains a complex community water system that serves over 60,000 people through approximately 18,000 service connections. Facilities include 38 wells, seven raw water storage reservoirs, two water treatment plants, six treated water storage tanks, and the interconnecting pipeline systems.

Cheyenne obtains its water supply for the system from several groundwater and surface water sources. Groundwater is obtained from a total of 38 wells that are located in four well-field areas west of Cheyenne. Two of these wells, Ware and Riser #1, are not used for municipal water supply, but provide water to several lakes located in city parks and golf courses. Surface water is collected from the Douglas Creek drainage in the Medicine Bow Mountains and from the Laramie Mountains west of Cheyenne. Water from these sources is piped to Roundtop Treatment Plant (conventional treatment and disinfection) and Sherard Treatment Plant (direct filtration and disinfection) prior to distribution throughout the system.

The susceptibility of Cheyenne's surface sources varies with location. In the Medicine Bow Mountains, Cheyenne's diversions and intake structures along Douglas Creek and its tributaries, and Lake Owen received high susceptibility ratings for land use and transportation corridor contaminants, and low ratings for point source contaminants. In the Laramie Mountains, the City's six diversions and reservoirs received mixed susceptibility ratings that varied primarily by location and land use. Along North Crow Creek, the North Crow Reservoir received a high land use susceptibility rating, while Old North Crow Reservoir received a low rating. Along Middle Crow Creek, both the Devil's Playground intake and Granite Springs Reservoir received high land use susceptibility ratings, but the Hecla diversion garnered a low rating. The South Crow Reservoir received a low land use susceptibility rating. While most of the intakes in this area received low susceptibility ratings for point source contaminants, Granite Springs Reservoir received a high rating due to the presence of an underground tank and wastewater discharge point in Zone 2 west of the reservoir. With respect to transportation corridor contaminants, the Devil's Playground intake, Granite Springs Reservoir, the Hecla diversion, and South Crow Reservoir all have the potential for contamination due to the presence of Interstate 80 in their respective Zone 3s.

The overall susceptibility of Cheyenne's wellfields also varied with location. Wells in Cheyenne's Federal wellfield generally received low susceptibility ratings for land use, point source, and transportation corridor contaminants. Results of the contaminant inventory and susceptibility analysis revealed the Borie wellfield generally received high susceptibility ratings for transportation corridor and point source contaminants due to railroads, pipelines, a trichloroethylene plume, and oil wells; and low susceptibility ratings for land use contaminants. Wells in the Bell wellfield generally received high susceptibility ratings for land use contaminants due to the presence of forested and irrigated croplands along Crow Creek, and a few also scored high with respect to point source and transportation corridor contaminants because of oil wells, pipelines, and railroads. The Happy Jack wellfield generally received low susceptibility ratings for land use, point source, and transportation corridor contaminants. While

almost all the wells in this field rated low for point source susceptibility, Koppes Well #6 received a medium rating due to the presence of the Cheyenne Municipal Landfill. In addition to these sources for the wellfields, the Cheyenne Wellhead Protection Plan noted that livestock grazing in the vicinity of the wellheads, domestic wells, private septic systems, improperly abandoned oil and water wells, and a farm implement yard were also potential sources of contamination to the wellfields.

Delineation Methods

Because the City of Cheyenne obtains water for its community water system from both surface and groundwater sources, Lidstone conducted a conjunctive delineation using both surface water and groundwater delineation methods. Various consultants that have worked for the City on previous well projects have already delineated source water areas for each of Cheyenne's wells as part of its Wellhead Protection Plan. Those source water area delineations, or the two and five year time of travel zones, were incorporated directly into this source water assessment. With respect to its surface water sources, Lidstone completed delineations for each of Cheyenne's surface water sources using surface water delineation methods. The source water area delineation maps for each of Cheyenne's sources are attached to this report.

For this aspect of the project, Lidstone obtained and reviewed the Cheyenne Wellhead Protection Plan that had been previously completed by Weston Engineering and updated by various other consultants on subsequent well projects. Lidstone found that the source water area delineations that had been completed using hydrogeologic mapping techniques and version 2.2 of EPA's WHPA semi-analytical groundwater flow model were acceptable and incorporated them directly into this source water assessment without revision.

Groundwater Sources

The City of Cheyenne owns and operates 36 water wells in four wellfields located west of the Cheyenne city limits. The Bell wellfield is located four miles northwest of the City and currently has nine active wells. The Borie wellfield is located approximately six miles southwest of Cheyenne and contains four municipal wells. The Happy Jack wellfield lies approximately six miles west of the City along Happy Jack road, and consists of 15 active wells. The westernmost Cheyenne wellfield is the Federal wellfield, which is located 18 miles northwest of Cheyenne and has eight active wells.

The Cheyenne municipal wellfields lie along the northwestern part of the Denver-Julesberg basin, a broad asymmetrical synclinal structure. The axis of this structure generally is oriented north-south and lies east of Cheyenne. The municipal wellfields are located on the western limb of the syncline and the sediments underlying the wells dip gently east-northeast at approximately one to five degrees. The dips of the Upper Cretaceous formations are interrupted in the Borie wellfield and in the southwestern part of the Happy Jack wellfield by the north plunging Borie Anticline. The crest of the anticline trends north-northwest and passes through the eastern half of T12N, R68W then veers northwest where it ends near the center of T14N, R68W. The anticlinal crest is observable in cross sections through the Borie and Happy Jack wellfields. The Borie Anticline does not extend upward into the Tertiary Formations. The Horse Creek Anticline extends south into the northern section of the Bell wellfield.

Based on Cheyenne's Wellhead Protection Plan, the primary groundwater source for the Bell, Borie, and Happy Jack wellfields is the Ogallala Aquifer, which consists of saturated parts of the Ogallala Group. The Ogallala Group is exposed throughout the wellfields and its outcrop extends westward approximately six miles to the Islay Escarpment. This group is composed of up to 300 feet of heterogeneous deposits of well- to poorly-sorted, fine- to very coarse-grained sandstones; siltstones and claystones; variably cemented conglomerates; minor volcanic ash; and some algal limestones. The proportion of the coarse-grained materials that primarily yield water to wells decreases to the east. The thickness of the Ogallala Aquifer ranges from zero west of the wellfields where the sediments are unsaturated to a maximum of 150 feet in the Happy Jack wellfield. The Ogallala Aquifer is generally recharged through the direct infiltration of precipitation and from stream flow in losing reaches of streams. Groundwater in the Ogallala Aquifer generally flows toward the east.

Individual well yields in the Bell, Borie, and Happy Jack wellfields are dependent upon the local permeability of the Ogallala Aquifer. Reported well yields in these wellfields range from 150-800, 350-1,000, and 80-750 gpm, respectively. The wide range in yield within these wellfields is due in large part to the location and orientation of coarse-grained channel deposits in the Ogallala Group. It is these channel deposits that provide 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 have a northeasterly trend, at least in the Happy Jack wellfield. Similar pathways seem to exist in the other wellfields, but have not been as clearly documented. Transmissivities in these wellfields range from 4,100 to 43,000 gallons per day per foot. Basic data on each well in these wellfields is included in the attached Well Information Sheets.

As shown on the enclosed source water area delineation maps, contaminant inventory zones in the Bell, Borie, and Happy Jack wellfields generally reflect hydrogeologic characteristics of the Ogallala Aquifer. Cheyenne's consultants have completed delineations on each well in these wellfields using the General Particle Tracking (GPTRAC) module of the WHPA semi-analytical groundwater flow model, based on data compiled in the Wellhead Protection Plan. Generally, Zones 2 and 3 for these wells extend west to southwest from individual wellheads in an upgradient direction. Individual differences in the size of the source water areas are directly related to the confining conditions, transmissivity, aquifer thickness and lateral extent, porosity, hydraulic gradient, and groundwater flow direction data that were used in the WHPA model. In addition to these zones, an area west of the Borie wellfield was identified in the Wellhead Protection Plan as the Borie Wellfield Buffer Zone. This area was delineated using hydrogeologic mapping techniques to protect water in Lone Tree Creek. This area was specifically delineated because water from this creek recharges the Ogallala Aquifer west of the Borie wellfield and because several contaminants have been detected within this recharge area.

For the Federal wellfield, the primary source for ground water is the White River Aquifer, which consists of sufficiently saturated parts of the White River Group. The White River Group crops out in the wellfield and ranges up to 600 feet in thickness. This group is predominantly composed of a buff to gray siltstone with a few coarse-grained deposits near the base of the unit. While these siltstones account for most of the White River Group, it is coarser-grained sandstones and gravels in the vicinity of the Federal wellfield that provide groundwater to the

wells through porous media flow. These sediments were deposited by streams in an alluvial fan, which resulted in the lateral and vertical lithologic variations. While it is presumed these channel sediments were deposited in an east northeast direction, it is known that the fraction of these coarse-grained materials diminishes east of the wellfield. The thickness of the White River Aquifer ranges from zero where it is unsaturated to approximately 400 feet in the Bell, Borie, and Happy Jack wellfields. Recharge to the aquifer occurs primarily through the direct infiltration of precipitation and stream losses on outcrops. Groundwater in the White River Group generally flows toward the east.

Similar to the other wellfields, well yields and aquifer permeability characteristics in the Federal wellfield are highly variable and anisotropic. Individual well yields range from 110 to 400 gpm. The range in well yield is due to the predominant lithologies encountered in individual wells and the degree of hydraulic communication between the discontinuous channel deposits. The transmissivity of the White River Aquifer in the Federal wellfield ranges from 2,600-25,000 gallons per day per foot based on aquifer testing. Basic data on each well in this wellfield is included in the attached Well Information Sheets.

As shown on the enclosed source water area delineation maps, contaminant inventory zones in the Federal wellfield generally reflect hydrogeologic characteristics of the White River Aquifer. Cheyenne's consultants have completed delineations on each well in this wellfield using both hydrogeologic mapping techniques and the General Particle Tracking (GPTRAC) module of the WHPA semi-analytical groundwater flow model, based on data compiled in the Wellhead Protection Plan. This combination of techniques was utilized because of the extreme lateral and vertical heterogeneity of the White River Group lithology in this area that has resulted in highly anisotropic aquifer permeabilities. Generally, Zones 2 and 3 that were completed for the wells using the WHPA model extend west to southwest from individual wellheads in an upgradient direction. Individual differences in the size of the source water areas are directly related to the confining conditions, transmissivity, aquifer thickness and lateral extent, porosity, hydraulic gradient, and groundwater flow direction data that were used in the WHPA model. The larger contaminant inventory zone that encompasses the Federal wellfield was developed from geologic and potentiometric maps to define the areal extent of the White River Aquifer that could likely contribute groundwater to the wells. Within this area, Zone 2 lies along the western outcrops of the White River Formation and Zone 3 includes the remaining area of the wellfield.

Surface Water Sources

The City of Cheyenne obtains its municipal surface water supplies from drainages located in the Laramie and Medicine Bow Mountains west of Cheyenne. Within the Laramie Mountains, Cheyenne primarily obtains surface water supplies from the North and Middle forks of Crow Creek, and stores this water in the Granite Springs, Crystal Lake, Upper North Crow, and Old North Crow Reservoirs. Water from these reservoirs is then transmitted via pipeline to the Sherard and Round Top water treatment plants. While generally used for raw water, surface water from South Crow Creek and the South Crow Creek Reservoir could also be utilized for potable supply if necessary. Additional information on these surface water sources is included on the enclosed Surface Water Information Sheets.

Within the Medicine Bow Mountains, Cheyenne obtains surface water from Douglas Creek and

several tributaries through an interbasin water transfer. Because the City does not have water rights to surface water obtained from Douglas Creek, Cheyenne diverts water from the Little Snake drainage to Hog Park Creek and Hog Park Reservoir which are tributary to the Encampment and North Platte Rivers. In exchange for this water delivery, Cheyenne diverts surface water from Douglas Creek and its tributaries below Rob Roy Reservoir (Horse Creek, Podunk Creek, Gold Crater Creek, Nugget Gulch Creek, Little Beaver Creek, and Camp Creek) and pipes that water to the City through Lake Owen, Granite Springs and Crystal Reservoirs. In essence, Cheyenne must release water from Hog Park Reservoir to replace water for downstream users on the North Platte River who have surface water rights to the water from Douglas Creek. Additional information on these surface water sources is included on the enclosed Surface Water Information Sheets.

As shown on the attached source water area delineation maps, contaminant inventory Zones 2 and 3 were completed for each surface water diversion in the Laramie Mountains. For the diversions on North Crow Creek, Zone 2 includes a 1,000 foot buffer around the high water marks for both Upper North Crow and Old North Crow Reservoirs. Zone 3 encompasses the remaining North Crow Creek watershed upstream from the Old North Crow diversion. For diversions on Middle Crow Creek, Zone 2 includes a 1,000 foot buffer around the high water marks for both Granite Springs and Crystal Lake Reservoirs in addition to a 1,000 foot wide buffer on both sides of the creek above the Hecla Diversion below Crystal Lake Reservoir. Zone 3 includes the remaining Middle Crow Creek, including the South Fork, above the Hecla Diversion. A separate Zone 2 was also delineated for the Devil's Playground Intake which is located on an unnamed tributary of Middle Crow Creek near Vedauwoo. This area was delineated to protect surface water discharged from the Lake Owen aqueduct. For the South Crow Creek diversion, Zone 2 was delineated as a 1,000 foot radius around the South Crow Creek Reservoir and Zone 3 encompasses the remaining watershed upstream from the diversion.

For the diversions in the Medicine Bow Mountains, contaminant inventory Zones 2 and 3 were completed to encompass all the drainages that contribute water to Cheyenne's Douglas Creek diversions near Rob Roy Reservoir. For Lake Owen, Zone 2 included the reservoir and a 1,000 foot buffer zone around the high water mark, while Zone 3 included some areas immediately adjacent to the reservoir and one unnamed drainage that extends westward up the eastern flank of Lake Mountain. For the Rob Roy diversion, Zone 2 includes Rob Roy Reservoir, while Zone 3 includes the remaining Douglas Creek watershed upstream from the diversion. For the Horse Creek intake, Zone 2 includes a 1,000 foot buffer on both sides of Horse Creek to the point it is no longer perennial, while Zone 3 includes the remaining watershed. For diversions in the Little Beaver Creek drainage and east between Keystone and Muddy Mountain, Zone 3 was delineated to include the small watershed associated with each diversion structure, while Zone 2 was delineated as a 1,000 foot buffer zone along Little Beaver Creek above the diversion. Zone 2s were not delineated for any of the other diversions in this area because they did not appear to be perennial.

Integrity Summary

The City of Cheyenne supplies its municipal system with surface water from the Medicine Bow and Laramie Mountains, and groundwater obtained from four wellfields located west of the City. The integrity of the wells and intakes associated with the sources located in these areas is described below according to the source type and location.

Cheyenne obtains surface water from 29 diversions that are located on Douglas Creek and its tributaries, and from one diversion on Lake Owen in the Medicine Bow Mountains. The intakes on the Douglas Creek drainage were constructed between 1983 and 1993, when more stringent construction standards were required by the State of Wyoming, while the diversion at Lake Owen and Rob Roy Reservoir were completed after 1993. Conversations with BOPU personnel and available records indicate that while the Douglas Creek intakes are screened, the areas around the intakes are generally publicly accessible. As shown on the Integrity Summary Table, Cheyenne's Douglas Creek intakes typically received integrity scores of 7, while Lake Owen and Rob Roy Reservoir received integrity scores of 2. While Lake Owen and Rob Roy Reservoir's more recent completion dates and long conveyance to the treatment plant accounted for their 2 points, the Douglas Creek intakes' scores reflected their construction dates, long conveyance length, accessibility, and lack of regular inspections.

Within the Laramie Mountains, the BOPU obtains surface water from six diversions that are located on the North, South, and Middle forks of Crow Creek. The intakes on the Crow Creek drainages were constructed after 1983, when more stringent construction standards were required by the State of Wyoming. In contrast to those in the Medicine Bow Mountains, the Crow Creek intakes are typically inspected regularly and are not easily accessible to the general public. As shown on the Integrity Summary Table, Cheyenne's Crow Creek intakes received integrity scores of 2 or 3. These scores reflect slight differences in the completion dates of these facilities in addition to the long conveyance length to the Sherard and Roundtop Treatment Plants.

The City of Cheyenne uses 36 wells to supply water to its municipal system from four wellfields. While most of these wells have been completed since 1993 when the State began applying stringent construction standards, nine of the wells were completed before 1983 and five were completed between 1983 and 1993. With the notable exception of King #2, the wells were completed with surface seals. As shown on the Integrity Summary Tables, wells in the Borie wellfield received scores ranging from 2 to 5. Most of the differences in this wellfield are due to completion dates, but Finnerty #2 scored highest due to its age, reported lack of an annular seal, and long conveyance length. For the Bell wellfield, integrity scores ranged from 2 to 6. The higher scores for Bell #6, Bell #10, Bell #12, Bell #17, and North Bell Well #16 were attributed primarily to the age of the wells, but were also higher due to flood protection and annular seal issues. For wells in the Federal field, integrity scores ranged from 2 to 5. While most of the wells received a 2 or 3 due to the age, flood protection, and long conveyance length, Merritt #5, Merritt #15, and State #1 received slightly higher scores due to wellhead accessibility and annular seal issues. For the Happy Jack wellfield, integrity scores were generally 2 to 3, but ranged from 4 to 10 for Happy Jack #3, Koppes #6, and King #2. The higher scores for these wells were due to wellhead accessibility issues and the lack of a surface seal on King #2.

Water Source Sensitivity Summary

The BOPU obtains water for its municipal system from both surface water sources in the Laramie and Medicine Bow Mountains, and from confined portions of the Ogallala and White River Aquifers through 36 wells. As shown on the Source Sensitivity Summary Table, the surface water sources received sensitivity scores of 10, while the wells received sensitivity scores of 6.

The intakes received the maximum sensitivity score for two reasons, while the wells received intermediate sensitivity scores. The source water obtained from Laramie and Medicine Bow Mountain watersheds scored high because it is obtained from surface water sources. In contrast, the confining conditions in the Ogallala and White River Aquifers resulted in the lowest possible well score of one. The additional reason both these sources scored intermediate and maximum scores is that laboratory analysis of water samples within the last five years detected several contaminants that are listed on EPA's primary and secondary drinking water standards. These included fluoride, nitrate, and total trihalomethane 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 susceptibility of Cheyenne's surface and groundwater sources is detailed in the following sections based on a source water type and location.

In the Medicine Bow Mountains, Cheyenne's diversions and intake structures along Douglas Creek and its tributaries, and Lake Owen received high susceptibility ratings for land use and transportation corridor contaminants, and low ratings for point source contaminants. The high land use susceptibility ratings reflect the high percentage of forested land within Zone 1 and 2 of the source water areas for these diversions. While forested land is not considered an immediate threat, it can be problematic following forest fires when hard rains wash the resulting ash and debris into surface water intakes and reservoirs. The high transportation corridor susceptibility rating for Lake Owen resulted from the fact a railroad crosses through Zone 2. While the intakes were assigned a low susceptibility to point source contaminants, the City should be aware of the Rambler Mine (64040) in Zone 3 northwest of Rob Roy Reservoir. This abandoned mine land site discharges up to 250 or 400 gallons per minute of 10 mg/l copper laced water that is currently being treated with an engineered wetland and an anoxic limestone drain. Susceptibility ratings for each type of potential contaminant source are summarized on the attached susceptibility tables.

In the Laramie Mountains, the City's six diversions and reservoirs received mixed susceptibility ratings that varied primarily by location and land use. Along North Crow Creek, the North Crow Reservoir received a high land use susceptibility rating, while Old North Crow Reservoir received a low rating. Along Middle Crow Creek, both the Devil's Playground intake and Granite Springs Reservoir received high land use susceptibility ratings, but the Hecla diversion garnered a low rating. The South Crow Reservoir received a low land use susceptibility rating. The high land use susceptibility ratings reflect the high percentage of forested land within Zone 2

of the respective source water areas. While most of the intakes received low susceptibility ratings for point source contaminants, Granite Springs Reservoir received a high rating due to the presence of an underground tank and wastewater discharge point in Zone 2 west of the reservoir. With respect to transportation corridor contaminants, Interstate 80 crosses through Zone 3 of the following source water areas: the Devil's Playground intake, Granite Springs Reservoir, the Hecla diversion, and South Crow Reservoir. Susceptibility ratings for each type of potential contaminant source are summarized on the attached susceptibility tables.

Wells in Cheyenne's Federal wellfield generally received low susceptibility ratings for land use, point source, and transportation corridor contaminants. While Merritt #9 received a high land use susceptibility rating due to forested land in Zone 1, the remaining wells in this field received low scores across the board due to the lack of contaminant sources in the area. The railroad which crosses through Merritt #9's Zone 3 on the east also received a low transportation corridor susceptibility rating. In addition to these sources, the Cheyenne Wellhead Protection Plan noted that livestock grazing in the vicinity of the wellheads, domestic wells, and private septic systems were also potential sources of contamination to these wells. Susceptibility ratings for each type of potential contaminant source are summarized on the attached susceptibility tables.

Results of the contaminant inventory and susceptibility analysis revealed the Borie wellfield generally received high susceptibility ratings for transportation corridor and point source contaminants. While land use susceptibility ratings were categorically low, the transportation corridor susceptibility ratings for Borie #1, Finnerty #2, and Weber #1 were medium to high due to the presence of railroads and pipelines that crossed through Zone 2 of their source water areas. Point source susceptibility ratings for all four wells were medium to high due to the presence of a trichloroethylene (TCE) contaminant plume. This plume originated from a former Atlas missile site and currently affects the area shown on the attached source water area maps. Other potential point contaminant sources in the area include the Borie Oil field which produces hydrocarbons from the Muddy Sandstone that lies approximately 8,500 feet below land surface. In addition to these contaminant sources, the Cheyenne Wellhead Protection Plan noted that livestock grazing adjacent to the wellheads, a recreational vehicle storage area, domestic water wells, and private septic systems are also potential sources of contamination to the wells. Susceptibility ratings for each type of potential contaminant source are summarized on the attached susceptibility tables.

Wells in the Bell wellfield generally received medium to high susceptibility ratings for land use contaminants, and a few also scored high with respect to point source and transportation corridor contaminants. Elevated land use susceptibility ratings in the wellfield resulted from the presence of forested and irrigated croplands along Crow Creek. While these land uses have the potential to contaminate the wells, the overall likelihood is low due to the fact that these wells are completed in a confined aquifer. Bell #11 and Bell #25 received medium to high susceptibility ratings for point source contaminants due to the presence of oil wells in their respective Zone 2s. The actual vulnerability of these two wells depends upon the completion and integrity of the oil wells. Bell #8 and Bell #11 also received medium to high susceptibility scores for transportation corridor contaminants due to the presence of pipelines and railroads, respectively, that cross through Zone 2. The Cheyenne Wellhead Protection Plan document also listed livestock grazing near the wellheads, a farm implement yard, private septic systems, domestic water wells, and improperly abandoned oil and water wells as other potential sources of contamination in the wellfield. Susceptibility ratings for each type of potential contaminant source are summarized on

the attached susceptibility tables.

Wells in Cheyenne's Happy Jack wellfield generally received low susceptibility ratings for land use, point source, and transportation corridor contaminants. The low land use susceptibility ratings are attributed to the lack of potential contaminant sources in the area of the wellfield. While almost all the wells rated low for point source susceptibility, Koppes Well #6 received a medium rating due to the presence of the Cheyenne Municipal Landfill in Zone 3. The Cheyenne Wellhead Protection Plan document noted that this source presents a long term contaminant threat to the Happy Jack wellfield and that leachates have been traced to the eastern edge of the landfill. While not listed and scored in this assessment, the Cheyenne Police Firing Range near King #4 is also a potential source of contamination due to the presence of untold thousands of copper jacketed lead bullets that could be leached into the groundwater there. With respect to transportation corridor contaminants, Koppes #1 and King #4 received medium susceptibility ratings due to two pipelines that cross through their respective Zone 2s. In addition to these sources, the Cheyenne Wellhead Protection Plan noted that livestock grazing in the vicinity of the wellheads, domestic wells, and an improperly abandoned well were also potential sources of contamination to the wellfield. 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. 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 Cheyenne 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
Wastewater Discharge	N/A	N/A	1
Underground Tank	N/A	N/A	1
Sol/Haz Waste Site	N/A	1	1
Oil & Gas Well	N/A	1	1
Misc. Site	2	4	2

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