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COKEVILLE WATER SUPPLY LEVEL II STUDY

Submitted to:

Wyoming Water Development Commission

and the

Town of Cokeville, Wyoming

Executive Summary

November, 1993
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Executive Summary

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COKEVILLE WATER SUPPLY

LEVEL II STUDY
EXECUTIVE SUMMARY

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EXECUTIVE SUMMARY

1.1 PROJECT OVERVIEW

The Town of Cokeville is a rural community situated near the Wyoming-Idaho-Utah borders in Lincoln County, Wyoming as shown in Figure 1.1. Cokeville presently has a population of approximately 500 residents, all of which are served by the town's municipal water system. The community receives its water from a series of three springs (Cokeville, Kenyon, and Wyman) located northeast of town in the Smith's Fork/Spring Creek drainage.

This Level II study is primarily the result of two basic concerns faced by the Town of Cokeville as follows:

1.1.1 Water Quality/EPA Compliance

In the sanitary survey report of the Cokeville water system completed in 1992, EPA staff indicated that there "some concern about the source water biological quality and risk of surface water infiltration." They felt that the testing completed relative to the recently completed Level I study was not conclusive on that question. A system evaluation report written by Jack Noblitt in 1983 indicated that continuous disinfection was necessary due to bacteriological problems. The need for continuous disinfection in the Cokeville system adds to the seriousness of that concern.

1.1.2 Adequate Supply

Historically, the Town of Cokeville has experienced supply shortages during very dry years. The worst problems generally occur during the late spring or early summer when demands are high and spring flows are at their lowest.

1.2 STUDY OBJECTIVES

The purpose of this study is to "examine appropriate improvements" to the Cokeville water system. The improvements recommended in this report are intended to address the water supply and water quality problems discussed above. Recommendations are also intended to address system reliability, fire storage and delivery capacity, system efficiency & costs, rate payer impacts, etc. Specifically, this Level II investigation was conducted in three phases as follows:

Phase I: Water Supply Alternatives: This phase of the study involved the evaluation of existing system components, determination of water supply needs, and the identification of the most promising alternatives for meeting those needs.

Phase II: Well Construction and Aquifer Testing: Based on the Phase I investigation, three test wells were sited and constructed to insure the viability of a groundwater source to meet Cokeville's primary of supplemental water supply needs. The most promising of the three wells was extensively tested for water quality and probable yield.
Phase III  Conceptual Designs and Cost Estimates: Based on the findings of Phases I & II above, and input from the town, conceptual designs and cost estimates were generated for the preferred system improvement alternative(s).

1.3 PRESENT POPULATION SERVED

The 1990 census shows a Cokeville population of 497 persons. There are presently 157 individual water service connections.

1.4 PRESENT USER RATES

Cokeville residents presently pay $10.00 per month per connection for their domestic water. Until recently, the town imposed an additional $5.00 monthly surcharge in order to build a capital improvements fund in anticipation of implementing the recommendations of this study.

1.5 EXISTING SYSTEM DESCRIPTION

The community of Cokeville presently receives its domestic water from a series of three springs (Cokeville, Kenyon, and Wyman) located approximately 2 1/2 miles northeast of town in the Smiths Fork / Spring Creek drainage. The combined summertime capacity of these springs is approximately 1200 gpm. The spring water is delivered to the town through two parallel 8-inch cast iron and 14-inch asbestos cement transmission lines. The older 8-inch line was recently abandoned based on preliminary recommendations made as part of this investigation.

The springs are approximately 45 feet lower in elevation than the town's 250,000 gallon water storage tank. The system includes a 40 HP pump station located on the east edge of town to lift the spring water to the tank. The water is in turn fed back into town through a PRV valve that reduces the head (pressure) by nearly the same magnitude as the pumping head. There is a high possibility that the suction pressures generated by the pump periodically result in open channel flow and/or negative pressures in the 14-inch and 8-inch transmission lines. These low or negative pressures, in our opinion, represent a significant health and safety risk to the community due to infiltration of raw water into the line.

The system is disinfected using a chlorine gas system located in the same building as the pump. There is virtually no contact time between the point of disinfection and the first user. A system evaluation report completed by Jack Noblitt in 1983 indicated that continuous disinfection was necessary due to bacteriological problems. It is our understanding that, until recently, this was still the case.

As part of this study, the transmission pipelines were exposed at various locations to determine their condition and capacity. The 8-inch pipe was determined to be over 50 years old, badly deteriorated, and seeping from a significant percentage of the joints uncovered. Since the 8-inch line does not significantly increase delivery capacity, it was recommended that it be abandoned immediately. Bacteriological tests were subsequently taken upstream of the chlorinator for a period of six weeks after isolation of the pipe from the system. These samples all tested as clean.
1.6 WATER QUALITY HISTORY

Cokeville does not have a history of serious water quality problems. Nor are we aware of a single instance of anyone becoming ill from drinking Cokeville’s water. The 1983 Noblitt report, however, suggests that continuous disinfection has been necessary to control bacteriological problems. The abandonment of the deteriorated 8-inch transmission line may have corrected that problem.

Cokeville experienced only one EPA violation in 1991. That violation was a result of a sample being lost in the mail. In 1992, higher than usual nitrate levels triggered quarterly monitoring requirements. We are unaware of any serious water quality violations over the past 4 years.

In a sanitary survey report of the Cokeville water system completed in June of 1992, EPA staff indicated that they were "concerned about the source water bacteriological quality and risk of surface water infiltration." The Cokeville springs are, in our opinion, true groundwater sources. Forsgren Associates concurs, however, with EPA’s concerns relative to potential surface water infiltration.

1.7 WATER SUPPLY NEEDS

The Town of Cokeville diligently maintained daily water use records until 1991 when their master meter malfunctioned. Based on those records, water supply needs for Cokeville (present and future) were estimated as shown in Table 1.1. Future use is based on a 1% annual population growth. It was assumed that future per-capita consumption would be reduced by approximately 25% to reflect a "metered" system.
TABLE 1.1

PROJECTED COKEVILLE WATER SUPPLY NEEDS
(Minimum Design Standards)

<table>
<thead>
<tr>
<th>POPULATION</th>
<th>497 Present</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>670 Future (30 year, 1% growth)</td>
</tr>
</tbody>
</table>

WATER SUPPLY NEEDS:

<table>
<thead>
<tr>
<th></th>
<th>PRESENT UNMETERED</th>
<th>FUTURE METERED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Winter Day</td>
<td>935 gal/per/day (0.465 MGD)</td>
<td>700 gal/per/day (0.469 MGD)</td>
</tr>
<tr>
<td>Average Day</td>
<td>1070 gal/per/day (0.532 MGD)</td>
<td>805 gal/per/day (0.539 MGD)</td>
</tr>
<tr>
<td>Summer Day</td>
<td>1460 gal/per/day (0.726 MGD)</td>
<td>1095 gal/per/day (0.736 MGD)</td>
</tr>
<tr>
<td>Peak Day</td>
<td>2205 gal/per/day (1.096 MGD)</td>
<td>1655 gal/per/day (1.112 MGD)</td>
</tr>
</tbody>
</table>

Note: Projected usage reduced by 100 gpm to reflect leakage (now repaired) identified in Cokeville Level I Study.

1.8 RECOMMENDED IMPROVEMENTS

Specific recommendations for addressing Cokeville's water needs are summarized below. These improvements are discussed in detail in Section 6.0 of the final report and shown schematically in figure 6.1.

a. Source of Supply (Groundwater Well)

We are very concerned about the Town's ability to protect their existing spring sources from surface water influence. This is particularly true of the Cokeville/Kenyon Spring collection area. Even if remedial measures such as diking are implemented, we believe this will remain a "question" with EPA. It is felt that the classification of Cokeville's springs as "true" springs without surface water influence has significant future regulatory (and cost) implications to the town.

It is recommended that Cokeville's springs be abandoned as a municipal source of supply. The test well constructed adjacent to the Cokeville Spring as part of this study indicates that a shallow (150'±) production well in that vicinity could meet the town's needs. That well would be located northeasterly and upgradient of the springs. It appears that the Cokeville spring aquifer would be tapped. The techniques inherent in
well construction (30 foot surface casing, etc.) will better protect that supply source from potential surface contamination.

This option will, of course, involve a low-head well pump to "lift" the water from underground to the town's tank. The resulting increased transmission line pressures will, in our opinion, greatly reduce the risk of bacteriological contamination to the community. This could also significantly increase transmission line delivery capacity.

b. **System Storage**

An additional 250,000 gallon partially buried concrete storage tank is recommended. This tank should be located and adjacent to (and at the same elevation as) the town's existing tank. This tank will provide Cokeville with needed peaking and fire storage in accordance with DEQ requirements.

c. **Transmission line from tank(s) to town**

A new 12-inch transmission line is recommended from the tank(s) to the town. This line will enhance tank circulation during low use periods. The line will also enhance delivery capacity and simplify the system telemetry and control.

d. **Abandon Booster Pump Station**

The existing booster pump station is recommended for abandonment after construction of the new well source. This inefficient pump will simply no longer be required.

e. **System Disinfection**

Wyoming DEQ requires "stand-by" disinfection for groundwater sources. It is recommended that this equipment be included with the well facility for convenience and to insure adequate contract time should it be needed. It may be possible to salvage and reuse much of the town's existing equipment.

It is also recommended that the existing disinfection facility simply be abandoned along with the booster pump station. This change will eliminate a serious worker safety concern evident in the system.

f. **System Telemetry and Control**

It is recommended that the proposed well pump be automatically operated based on tank levels. This is much the same as done now with the booster pump. Telemetry would likely consist of a simple radio communication system, a pressure transducer or level control at the tank site, and a modest micro-processor unit.

g. **Abandon 8-inch Cast Iron Transmission Line**

The deteriorated condition of this pipe represents a serious health risk to the community while providing no tangible benefit. This line was already taken out of service in 1992 based on preliminary study recommendations. It should also be physically disconnected from the system.
1.9 **PROJECT ECONOMIC DATA**

1.9.1 **Recommended Project Budget**

The budget for the recommended project is $727,500 as summarized in Table 1.2.

1.9.2 **Probable Project Financing**

Based on discussions with WWDC staff and funding experience with similar projects, it is believed that the project recommendations included herein are all eligible for WWDC funding. The Town of Cokeville has also obtained a Community Development Block Grant (CDBG) from the federal government in the amount of $112,000 for use on this project.

It is anticipated the recommended project will be funded using a 67% grant from Wyoming Water Development Commission. The remaining 33% would be funded using CDBG grant monies along with the town's resources and/or a low interest (4%) loan from WNDC.

1.9.3 **Projected User Rate Impact**

Based on $128,075 WWDC project loan as shown above, Cokeville's annual payment would be $7,406.60. This translates into a rate increase of $3.93/connection/month for the town's 157 taps. This represents a 39% increase over the present $10.00/month user rate.
TABLE 1.2
RECOMMENDED PROJECT BUDGET
SUPPLY, TRANSMISSION, AND STORAGE NEEDS
WWDC ELIGIBLE COSTS

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
<th>Est. Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Transmission Line Piping</td>
<td>$124,700</td>
</tr>
<tr>
<td>2</td>
<td>250,000 Gallon Storage Tank</td>
<td>$164,500</td>
</tr>
<tr>
<td>3</td>
<td>Groundwater Well Supply</td>
<td>$201,000</td>
</tr>
<tr>
<td>4</td>
<td>System Telemetry &amp; Control</td>
<td>$18,500</td>
</tr>
<tr>
<td></td>
<td><strong>Subtotal</strong></td>
<td><strong>$508,700</strong></td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Preparation of Plans and Specs</td>
<td>$61,000</td>
</tr>
<tr>
<td>Permitting &amp; Mitigation</td>
<td>$3,000</td>
</tr>
<tr>
<td>Legal Fees</td>
<td>$2,500</td>
</tr>
<tr>
<td>R.O.W. Acquisition</td>
<td>$5,000</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction Cost (from above)</td>
<td>$508,700</td>
</tr>
<tr>
<td>Construction Engineering (10%)-(exclusive of well drilling)</td>
<td>$45,000</td>
</tr>
<tr>
<td>Well Inspection/Geohydrologist</td>
<td>$26,000</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td><strong>$579,700</strong></td>
</tr>
<tr>
<td>Contingency (15%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Construction Total</strong></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<p>| | |
|                        |                                                   |
|                        | <strong>PROJECT TOTAL</strong>                                  | <strong>$727,500</strong> |</p>
<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>WWDC Grant (67%)</td>
<td>$487,425</td>
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<tr>
<td>CDBG Grant</td>
<td>$112,000</td>
</tr>
<tr>
<td>WWDC Loan (4%, 30-year)</td>
<td>$128,075</td>
</tr>
<tr>
<td></td>
<td>$727,500</td>
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</table>