MUNICIPAL WATER SUPPLY SOURCE PROBLEMS
TOWN OF MEDICINE BOW, WYOMING

SUBMITTED TO
WYOMING WATER DEVELOPMENT COMMISSION
I. Background Information

A. Medicine Bow's Water Supply

The Town of Medicine Bow, Wyoming, initially obtained its municipal water supply from two artesian wells. A third well was drilled in 1978. The new well was intended to provide the primary water supply for Medicine Bow, leaving the artesian wells available to provide a backup supply.

B. EPA Testing Program

A radioactive-contaminant water quality testing program was initiated in 1981, in compliance with the Safe Drinking Water Act. Tests indicated that the new well has unacceptable levels of radioactivity according to the National Interim Primary Drinking Water Regulations established in 1976, by the U.S. Environmental Protection Agency (EPA). Consequently, operation of the new well was discontinued. The old artesian wells were also shown to be contaminated, but to a lesser degree, so water from these wells has been supplying Medicine Bow's needs. The EPA has recommended that the Town should alleviate its water quality problem before the end of 1983.

C. Feasibility Study

In January, 1983, the Town of Medicine Bow authorized Banner Associates, Inc. to conduct a feasibility study to determine the most usable option to correct the Town's water quality problem. Banner concluded that the drilling of a new, deeper well would be economically and technically preferable to reconstructing the existing well, treatment of the water, or obtaining an entirely new water supply. After discussions with the EPA, Banner recommended that a small-diameter monitor well be constructed and tested, followed by construction of a new production well if the observation well results proved favorable. The Town accepted Banner's conclusions and authorized Banner to prepare an application to obtain Community Block Grant funds in order to implement the recommended option.

D. Funding Applications

1. Department of Economic Planning and Development (DEPAD) Community Block Grant

An application was submitted in January, 1983, requesting funds totalling $225,300. The funds were targeted for the design, construction, and testing of a monitor well, a production well, the design and construction of a new pumphouse, abandonment of existing wells, and connection of the new well to the existing water transmission system. The application was denied on the basis that the Wyoming Water Development Commission and the State Farm Loan Board have available funds for such a project.

2. Wyoming Water Development Commission (WWDC) Groundwater Exploration Grant

An application was submitted in April, 1983, requesting funds totalling $47,000. The funds were intended for the design, construction, and testing of a monitor well. The application was accepted and funds totalling $50,000 were granted to the Town.
3. **State Farm Loan Board (SFLB) Mineral Royalty Grant**

An application was submitted in April, 1983, requesting additional funds totalling $180,300. Proposed use of the funds was for the design, construction, and testing of a production well, design and construction of a pumphouse, abandonment of the existing well, and connecting the proposed well to the existing water transmission system. The funding proposal as requested was denied. The SFLB proposed an alternative funding package consisting of $105,000 grant money and a $75,000 loan. The Town requested the SFLB to re-evaluate the application based on the alternative funding package. A decision by the SFLB is pending. Due to hardships incurred by the current recession, the grant/loan package is not favorable to the Town.

4. **WWDC Groundwater Exploration Grant**

A meeting attended by WWDC staff, the Town Mayor and the Town Engineer (Banner) was held at Medicine Bow. The WWDC staff suggested that a monitor well would not be worth its cost and that one production-sized test well should be constructed. It was recommended that the Town should request additional funds from the WWDC to cover the costs of a production-sized well. Accordingly, an application was submitted in May, 1983, requesting additional funds totalling $60,000, thus providing $110,000 for the design, construction, and testing of a production-sized well. A decision by the WWDC is pending.

5. **DEPAD Community Block Grant**

The Town was notified by DEPAD that additional funds were available under the new “Jobs Bill” and that the original application for funds should be resubmitted. The Town resubmitted their application in July, 1983. A decision by DEPAD is pending.

II. **Present Status - WWDC**

The Town of Medicine Bow is seeking an additional $60,000 from the WWDC to be used with the $50,000 previously granted in order to design, construct, and test a production-sized test well. Two major questions were asked by the WWDC in conjunction with the grant request during the last Commission meeting.

1. Why can't Como Well #3 (new well) be reconstructed? and
2. Wouldn't contaminated water circulate down into presently uncontaminated water?

A. **Response to Question #1**

Improving Como #3 Well is not advisable for improving the quality of the water supply because of the following reasons:

1. Although the screened intervals could be sealed on the inside of the casing, the gravel pack between the casing and the rock formations could allow contaminated water to circulate down the outside of the casing and into the water supply (Hunt, Weston Engineering, 1983);

2. The steel plate at the base of the casing would have to be milled out. This procedure could damage the existing screen and casing which could render additional construction uneconomical (Lanser, Layne-Western, 1983); and
3. The concrete vault located over the well is not sturdy enough to support a drilling rig suitable for deepening the well (Lanser, Layne-Western, 1983).

It is the opinion of representatives of Layne-Western and Western Engineering that constructing a new well would present fewer risks than reconstructing the existing well.

B. Response to Question #2

Dr. Mike Homenick, Civil Engineering, University of Wyoming, was consulted at the direction of the WWDC. He recommended the following procedure:

1. The water treatment option should be investigated further, but Dr. Homenick indicated that a well that produced water of sufficient quality and quantity probably would be more cost effective than treatment;

2. Dr. Homenick did not think that the existing information is sufficient to justify drilling a new well without additional testing. He recommended that an existing 800 foot deep exploration well be re-logged and drill stem tested in order to determine the exact location of aquitards and the water quality at depth; and

3. If the testing of the exploration well produced favorable results, then a new well should be constructed with casing set below a good aquitard (approximately 400 feet deep) and the pump set well down the casing in order to limit the risk of well contamination.

C. Comments on Dr. Homenick’s Recommendations

1. The costs of a full-time qualified treatment plant operator and disposal of the radioactive waste would place an unfavorable financial burden on the Town;

2. The existing exploration well did not flow upon completion and is located 1000 feet from the site of the proposed well. These two factors suggest that test results taken from the exploration well may not accurately reflect the conditions encountered at the proposed well site. Additionally, this type of testing would not determine available quantities.

3. A good aquitard can be located by drilling and logging a pilot hole at the proposed well site.
III. Summary of Recommendations

A. Drill and test a small diameter monitor well and, if the results are satisfactory, construct a production well. Estimated cost = $50,000.

B. Drill and test a production-sized well according to Banner’s original design (i.e. 200 feet of casing) and, if the results are satisfactory, complete the well and appurtenances. Estimated cost = $110,000.

C. Drill and test a production-sized well incorporating Dr. Homenick’s design suggestions (i.e. 400 feet of casing) and, if the results are satisfactory, complete the well and appurtenances. Estimated cost = $140,000.

D. Test the existing exploration well, and if the results are satisfactory, construct a production well. Estimated cost = $25,000.

IV. Town of Medicine Bow / Banner Preferred Alternatives

Alternative A, B, or C is preferred by the Town subject to the discretion of the WWDC. The Town feels Alternative D presents risks and uncertainties.

Of the three alternatives acceptable to the Town, Alternative C would allow the flexibility to utilize the more conservative well design suggested by the University of Wyoming. If during testing it is determined that Alternative B is sufficient, then the remaining WWDC monies would be returned.

Although Alternative A is acceptable to the Town, its completion will not result in a production well. Therefore, should testing prove successful, an additional $110,000-$140,000 will be required to construct the new well.