EXECUTIVE SUMMARY

VISTA WEST

WATER SUPPLY PROJECT
LEVEL I STUDY

FOR THE

WYOMING WATER
DEVELOPMENT COMMISSION

Baker & Associates

Engineers • Planners • Consultants
WITHDRAWN

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prepared by

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BACKGROUND

The Wyoming Water Development Commission is conducting a Level I reconnaissance study for the Vista West Improvement and Service District. Vista West is a community located approximately 4 miles northwest of Sundance in Crook County, Wyoming. Vista West borders the Black Hills National Forest near the Bear Lodge Mountains. The purpose of this study is to evaluate water supply alternatives for Vista West; prompted by operational and quality problems.

Vista West was originally built as a military base in the early 1960’s for the Air Force by the Army Corps of Engineers. The purpose of the base was to house support personnel for a nearby radar tower on Warren Peak, six miles to the north. The present water collection system was developed after unsuccessful attempts at a deep well source.

The base was decommissioned in the early 1970’s. Part of the decommissioned base, referred as the Cantonment area, was privately developed and platted in the mid 1970’s as Vista West No. 1. The barracks, headquarters and dining hall are now the home of Teen Challenge, a boarding school for troubled teens. The former officer housing area is now under private single family ownership.

In 1989, the Vista West Improvement and Service district was created to manage the water and sewer systems. The district is organized as a quasi-municipal corporation according to the laws of the state of Wyoming. State Statute 41-10 gives the district the power to acquire projects for the purpose of supplying, treatment, and distribution of domestic water. The district can acquire water rights, treatment facilities, water lines and appurtenances.
EXISTING SYSTEM

The existing water system consists of an infiltration gallery, a pump station, 18,400 feet of two and three inch galvanized iron transmission pipelines, two concrete storage tanks, a pressure filter and chlorination unit and 3800 feet of cast iron distribution lines.

The infiltration gallery collects water from a spring-fed stream in Ogden Canyon. There are only six years of stream flow data, of which the accuracy and methods of collection are suspect. Vista West owns the water rights to 20 gallons per minute (0.0446 cfs). Vista West possesses a special use permit to access National Forest lands for operating and maintaining their water supply system in exchange for furnishing water to Reuter Campground operated by the U.S. Forest Service.

The existing system has numerous operational deficiencies and access problems:

* The transmission pipeline condition is unknown and needs to be assessed by examination.

* The treatment method does not meet nor does it produce water that meets EPA guidelines. Operational methods produce wastes and shortcomings in supply.

* Sanitary conditions at the source are poor. This includes the collection pipe manhole and the pump house.

* Inefficient use of the pump and raw water storage leads to significant water waste.
The interior metal surfaces at the 50,000 gallon tank are covered with rust. Trees are growing in the cover soil over the tank.

The filter housing is severely corroded. Filter media has never been inspected or cleaned. Backwashing of the filter is performed on a periodic basis, and not on a performance basis. Chlorine is provided by liquid bleach; a highly diluted form.

Distribution system components such as valves and fire hydrants are in questionable condition. Air enters the system from some source, believed to be Reuter Campground. The campground experiences complete loss of pressure on a regular basis.

PRESENT USE AND POPULATION

The service area of Vista West includes approximately 89 persons served by 43 taps. Estimates made from meter readings suggest a present average daily use of about 25,000 gallons per day and a maximum day of 68,000 gallons per day. The average use is 300 gallons per person per day and the peak day use is 900 gallons per person per day. This is comparatively high and may be attributable to the fact that Vista West's water use is unmetered and population density is low.

Population is projected to grow at less than one percent per year. A grant from the Farm Loan Board for installing individual meters at the tap has been approved. Installing meters should decrease per capita water use to be more in line with neighboring communities.
DESIGN CRITERIA

The present system has a capacity of about 61,000 gallons per day (0.0947 cfs). Multiplying the projected population by the estimated per capita rates, future demand at the 20 year design life is expected to be 32,000 gallons and 80,000 gallons respectively, for average day and maximum day.

Realistically Vista West’s system should supply the minimum fire flow of 500 gallons per minute. The minimum pressures should remain above 20 psi during fire flows. The present finished water storage volume is 70,000 gallons. This provides about eighty per cent of the required storage to meet maximum day and fire flow, which is fairly good when compared to most small communities. Therefore, no additional storage is recommended.

WATER QUALITY

Water quality is an area of increasing concern. The Safe Drinking Water Act (SDWA) defines quality parameters of potable water supplied by community water systems. The 1986 amendments to the SDWA made new regulations and gave time periods for implementing these regulations. At the present time there are no requirements for chlorination, either continuous or standby, for groundwater sources. As part of the 1986 amendments to the Safe Drinking Water Act, the US EPA is proposing changes to the chlorination requirements. Currently these regulations are in the development stage. The proposed rulings are expected in September of 1991 with final rulings expected to be
completed in the fall of 1992. Using this time schedule, a spring 1994 effective date of the regulations is anticipated.

From a public health safety standpoint, the ability to chlorinate the water system in an emergency is a logical and desirable safeguard. Vista West has a history of demand exceeding supply, running the tank dry, and loosing pressure on the system. It is the pressure that provides the primary protection to the system against the introduction of microorganisms. The ability to quickly add chlorine to the water system in these types of situations, provides assurances that any potential contaminates will be quickly eradicated, thus preserving perhaps the most vital service of a community; that of potable water.

The quality of Vista West’s water supply is relatively good except for high turbidity levels in the spring. This occurs during runoff from snow melt.

**ALTERNATIVES**

Several possible alternatives are available to Vista West as a water supply. They include modifying the existing system; purchasing water from Sundance; drilling a Madison Formation well; and developing a tertiary formation well field in Reuter Canyon.

**MODIFY EXISTING SYSTEM**

Two methods of treatment are considered as to modify the existing system, they are: a package water treatment plant and a slow sand filtration unit. For these methods to be viable, certain variables must be assessed. One variable is the amount of stream flow. The second
variable is the condition of the galvanized pipeline. Along with either treatment method, several improvements to the existing system are required.

**Package Water Treatment**

A "package water treatment plant" is a factory assembled, skid mounted, plant that is set on a pre-prepared foundation at the site. Advantages to a package water treatment plant are that it can be configured to treat most contaminants, producing good quality water and that design and construction costs typically are less than a treatment plant constructed entirely in the field.

The disadvantage of a package treatment plant for Vista West, is that it would require a full time operator.

The cost of construction would be about $265,000 and this would calculate to a per tap cost of $73 per month when the operational costs are added.

**Slow Sand Filtration**

Slow sand filtration, the second treatment plant alternative, is a treatment method dating back to the 1800's. A slow sand filter works by percolating raw water through a layer of fine sand.

The advantages of a slow sand filter over a package plant are the ease of operation, and lower costs, both initial and operational. The ease of
operation means that a Level II operator can run the system. The simplicity of the system allows for low construction costs.

The disadvantage of the slow sand filter option is that, even though it should effectively treat clear raw water, it may not be able to handle the high turbidity experienced during spring runoff.

The cost of construction would be about $300,000 and the per tap cost associated with it would be $58 per month.

PURCHASE WATER FROM SUNDANCE

One alternative is to purchase water from the town of Sundance which recently built a well within 1-1/2 miles of Vista West. The disadvantage to this is the relatively high costs ($2.75 per 1000 gallons). The construction costs of tying into Sundance would be about $230,000 which would equate to a monthly per tap cost of about $100 when adding water and operator costs.

CONSTRUCT MADISON WELL

The possibility of Vista West drilling its own deep well is supported by the recent construction of the Sundance well. This would supply Vista West with a good source of water. There is a certain amount vulnerability associated with a single water source. The cost of constructing a Madison well is about $315,000. The operational costs and payback would generate a $57 monthly per tap charge.
SHALLOW WELLS IN REUTER CANYON

Reuter Canyon, which the transmission pipeline follows to Vista West, is another potential water source. There is the possibility of intercepting water moving through the fractured bedrock of this canyon. This source is speculative and a test well should be constructed to confirm the adequacy of the water quality and quantity. The cost of developing this source is $105,000. This would equate to an monthly per tap cost of $47 per month.

RECOMMENDED ALTERNATIVE

The recommended alternative is not easily chosen since several questioned remain unanswered. Although, there are two that seem to stand out above the others. Drilling a Madison well and drilling shallow wells in Reuter canyon are the two standout alternatives. The unanswered questions should be addressed in further study.

Some of the questions to be answered are: the condition of the existing pipeline, the potential for water in Reuter Canyon, the availability of power and access to possible sources, the adequacy of a single source, the location of proposed wells and the necessary easements and permits. These questioned may best addressed in a Level II study.