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**Mailing Address:**
Water Resources Data System
University of Wyoming, Dept 3943
1000 E University Avenue
Laramie, WY 82071

**Physical Address:**
Wyoming Hall, Room 249
University of Wyoming
Laramie, WY 82071

**Phone:** (307) 766-6651
**Fax:** (307) 766-3785

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ETNA WATER AND SEWER DISTRICT
WATER SUPPLY SYSTEM

A Part of the

STAR VALLEY LEVEL II STUDY

Report for:
Wyoming Water Development Commission

Sponsored by:
Lincoln County, Wyoming

THE STATE OF WYOMING

Executive Summary
November, 1993
ETNA WATER AND SEWER DISTRICT
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Executive Summary
November, 1993

Foranen Associates, p.a.
549 Front St., Suite 251
Evanston, Wyoming 82930
(307) 789-6735
ETNA WATER AND SEWER DISTRICT
WATER SUPPLY SYSTEM

STAR VALLEY LEVEL II STUDY
EXECUTIVE SUMMARY

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EXECUTIVE SUMMARY

1.1 PROJECT OVERVIEW AND HISTORY

The Star Valley area, in Western Wyoming, can be characterized as a rural agricultural area. Most Star Valley communities are presently unincorporated and have no political jurisdiction or authority. Because of that fact, the residents of many areas formed independent Pipeline Companies to provide drinking water to their communities. These pipeline companies developed community water supply and distribution systems, most of which are 35-50 years old. Spring water was (and is) the preferred supply source wherever available. These pipeline systems typically consist of many miles of small diameter steel and galvanized iron pipe to serve large rural areas. Although the pipeline companies have generally been diligent in fixing leaks and performing normal maintenance operations, most of the systems have not significantly changed since their initial construction.

As these rural communities have grown and water use habits have changed, the pipelines have experienced increasing demands along with pipeline tuberculation and loss of system efficiency. Low (or negative) pressures are an increasing problem. Lines are aging and leakage is becoming more common. The alluvial soils of the area make both small and large leaks difficult to detect. Many pipeline companies, including Etna, have placed a moratorium on new connections, thereby forcing new residents to rely on individual wells. These individual wells vary widely in reliability and quality even within the same community.

Over the past several years, the Environmental Protection Agency has noted water quality problems with many of these systems. Microbiological contamination has been the most evident concern. This contamination is probably a result of the low pressures, leaking lines, unprotected sources, etc. EPA considers nearly all of the Star Valley systems "at risk" due to the lack of disinfection capabilities.

In 1987 and 1988, several Star Valley pipeline companies, including the Etna Pipeline Company, were given Administrative Orders by EPA to comply with EPA's MCL (Maximum Contaminant Level) Standards. Each of these orders mandated that a professional engineer be hired to examine the system and submit plans for EPA compliance. This Level II study is largely in response to those EPA mandates.

This report is intended to discuss the issues, recommendations, and conclusions of the Star Valley Municipal Water Supply Level II investigation specifically as they relate to the Community of Etna, Wyoming.

1.2 PRESENT POPULATION SERVED

This existing Etna Water System is owned and operated by the Etna Pipeline Company. There are presently 48 connections representing approximately 178 individuals served. The existing Etna water system serves the vast majority of residents living in the Etna area.
1.3 **EXISTING SOURCE OF SUPPLY**

Etna presently obtains its water supply from two sources as follows:

1) **Wolfley Spring** - This spring is located approximately 2½ miles east of Etna in the Wolfley Creek drainage. Measured spring capacity is between 30 and 140 gpm. The Wolfley Spring appears to be well protected from surface water influence. However, some minor piping repairs are needed at the spring site.

2) **Lee Spring** - This spring is located approximately 2½ miles east of Etna in the Lee Creek drainage. Measured spring capacity varies from 270 and 680 gpm. The Lee Spring appears to be subject to minor surface water influences.

The Lee Spring and Wolfley Spring flows are combined at a junction box approximately 300 feet downstream from the Lee Spring. The box is not sealed and is subject to significant surface water influence during high run-off periods.

1.4 **EXISTING WATER QUALITY HISTORY**

As indicated in Section 2.0, Etna Pipeline Company received an EPA Administrative Order in March of 1988 for bacteriological maximum contaminant level (MCL) violations and for failure to monitor water quality. A second Administrative Order was issued in April of 1989, also for MCL violations. The EPA has informally agreed to postpone further action relative to the Etna Water System pending the results and implementation of this Level II Study.

Over the past two years, the Etna Water System has regularly experienced bacteriological contamination problems. Samples submitted from seven of the last twelve months were labeled "unsafe" due to bacteriological MCL violations.

1.5 **WATER SUPPLY NEEDS**

The present and future water supply needs for the community of Etna are summarized in Table 1.1. Present demands are based on measured water usage and are comparable to surrounding Star Valley communities. Future projections assume a 30-year, 1% annual population growth. Given Star Valley’s (and Etna’s) relatively high per-capita water consumption, future projections were reduced by 25% to reflect a fully "metered" water system.

Etna’s average spring capacity was measured at 588 gpm. The legal availability of that water however, is limited to approximately 100-125 gpm during the summer months due to senior irrigation rights.
TABLE 1.1
ETNA WATER SUPPLY NEEDS

NUMBER OF CONNECTIONS:  
48 Existing  
66 Possible

WATER SUPPLY NEEDS:  
(Based on Star Valley Averages)

<table>
<thead>
<tr>
<th></th>
<th>EXISTING UNMETERED</th>
<th>FUTURE METERED</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(48 CONN.)</td>
<td>(89 CONN.)</td>
</tr>
<tr>
<td>Winter Day</td>
<td>3.10 gpm/conn</td>
<td>2.33 gpm/conn</td>
</tr>
<tr>
<td></td>
<td>0.21 MGD</td>
<td>0.29 MGD</td>
</tr>
<tr>
<td>Average Day</td>
<td>3.33</td>
<td>2.50</td>
</tr>
<tr>
<td></td>
<td>0.23</td>
<td>0.32</td>
</tr>
<tr>
<td>Peak Day</td>
<td>4.20</td>
<td>3.15</td>
</tr>
<tr>
<td></td>
<td>0.29</td>
<td>0.40</td>
</tr>
<tr>
<td>Peak Hour</td>
<td>4.60</td>
<td>3.68</td>
</tr>
<tr>
<td></td>
<td>0.32</td>
<td>0.47</td>
</tr>
</tbody>
</table>

1.6 RECOMMENDED SYSTEM IMPROVEMENTS

1.6.1 Long-term Improvements vs. Immediate Needs

The recommendations of this Level II Study are presented herein as "immediate needs" and "long-term" system improvements. "Immediate needs" are viewed as those improvements needed to bring the system into compliance with federal and state safe drinking water requirements. The immediate recommendations are also intended to address the legal water supply shortages presently faced by the Etna District.

"Long-term" recommendations are intended to address the long-term growth of the Etna community. As major system components (piping, storage, etc.) reach the end of their useful life, they should, in our opinion, be replaced with components suitably sized for fire protection and projected community growth. The long-term recommendations of this report will provide the District with a masterplan for the future.

This approach was used at the request of the Etna District Board to allow them to easily identify what must be done now vs. what should be done in the future. The District has elected to proceed with the funding, design, and construction of only the immediate needs at this time. The remainder of this Executive Summary, therefore, address only that portion of the recommended project.
1.6.2 Recommended *Immediate Needs*

The following specific improvements are recommended for immediate implementation by the Etna District. These items are discussed in detail in the body of the Level II report.

**A) Spring Renovation & Report:** It is recommended that the Wolfley Spring be retained and that minor piping repairs be made to protect it from contamination. The Lee Spring should be redeveloped due to problems with surface water influence. The Lee Creek channel should be rerouted away from Lee Spring to further protect it from surface water contamination.

The spring junction box should be replaced with a new water-tight weir box, also to protect the system from contamination.

**B) New Groundwater Well:** A new well was sited and constructed as part of the Level II Study. Recommended long-term well capacity is between 180 gpm and 300 gpm. *Immediate* capacity should be no less than 110 gpm to meet peak day demands based on the assumption that the legally available summer-time spring supply will be at least 100 gpm.

**C) Disinfection:** Based on discussions and input from EPA staff relative to this and other projects, it is our opinion that EPA regulations will require at least stand-by disinfection for all water supplies in the near future. Regardless of EPA's regulatory requirements; however, it is felt that such disinfection capability is a wise precaution. A simple hypo-chlorite system is recommended for this project.

**D) System Control Valving:** In order to reduce system pressures (and associated system demands), it is recommended that the PRV valve located immediately east of Highway 89 be repaired or replaced. It is also recommended that a pressure sustaining valve be installed on the mainline immediately upstream of the Etna tank to insure safe pressures for the three houses served by that line.

**E) "Bateman" Line Extension:** It is recommended that the "Bateman" connection be moved upstream approximately 700 feet to the east (upstream of the storage tank). The Bateman line must, of course, be extended accordingly. This modification will allow for more efficient utilization and increased capacity of the transmission line from the springs to the tank while maintaining safer working pressure in the Bateman pipeline.

**F) Well Telemetry and Control:** It is recommended that the well pump ultimately be operated directly by tank levels and/or system pressures. This will simplify system operation and minimize the potential for inadvertently draining the tank.
1.7 **PROJECT BUDGET**

The recommended budget for the "immediate needs" portion of the Etna project is summarized in Table 1.2.

---

**TABLE 1.2**

Recommended Project Budget
"Immediate" Health & Safety/Water Supply Needs

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
<th>Est. Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Existing Spring Renovation &amp; Repair</td>
<td>$ 50,225</td>
</tr>
<tr>
<td>2</td>
<td>Spring Weir Box</td>
<td>$ 5,800</td>
</tr>
<tr>
<td>3</td>
<td>Stand-by Disinfection for Springs</td>
<td>$ 20,000</td>
</tr>
<tr>
<td>4</td>
<td>Pressure Sustaining Valve/Meter Sta.</td>
<td>$ 9,250</td>
</tr>
<tr>
<td>5</td>
<td>&quot;Bateman&quot; Line Extension</td>
<td>$ 6,525</td>
</tr>
<tr>
<td>6</td>
<td>Supplemental Well Source</td>
<td>$143,820</td>
</tr>
<tr>
<td>7</td>
<td>Stand-by Disinfection for Well</td>
<td>$ 4,500</td>
</tr>
<tr>
<td>8</td>
<td>Well Telemetry &amp; Control</td>
<td>$ 8,800</td>
</tr>
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</table>

**Subtotal**  

$248,920

<table>
<thead>
<tr>
<th>Description</th>
<th>Est. Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preparation of Plans and Specs</td>
<td>$ 27,380</td>
</tr>
<tr>
<td>Permitting &amp; Mitigation</td>
<td>$ 5,000</td>
</tr>
<tr>
<td>Legal Fees</td>
<td>$ 1,500</td>
</tr>
<tr>
<td>R.O.W. Acquisition</td>
<td>$ 3,500</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Est. Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction Cost (from above)</td>
<td>$248,920</td>
</tr>
<tr>
<td>Construction Engineering (10%)</td>
<td>24,890</td>
</tr>
</tbody>
</table>

**Subtotal**  

$273,810

<table>
<thead>
<tr>
<th>Description</th>
<th>Est. Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contingency (15%)</td>
<td>41,070</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Est. Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction Total</td>
<td>$314,880</td>
</tr>
</tbody>
</table>

**PROJECT TOTAL**  

$352,260
1.8 PROBABLE PROJECT FINANCING

The Etna District has elected to pursue only the construction of the "immediate needs" portion of the recommended project at this time. Based on discussions with WWDC staff and recent funding experience with similar projects, it appears that the recommended immediate needs are all eligible for WWDC funding. It is assumed that WWDC will provide grant funding for 67% of the project costs. The remaining 33% would be loaned to the District at 4% interest over 30 years.

An alternative funding analysis indicated that no rate-payer benefit would result from the involvement of FmHA on this project based on current FmHA funding formulas. This is primarily due to the limited cost and scope of the proposed project.

It should be noted that the District could construct their immediate needs and long-term improvements with approximately the same rate payer impact with FmHA and Wyoming Farm Loan Board involvement. It is the District's feeling, however, that present funding availability does not justify long-term system expansion at this time.

The proposed project financing scenario for "immediate needs" is summarized in Table 1.3.

<table>
<thead>
<tr>
<th>Proposed Project Funding</th>
<th>&quot;Immediate &quot; Health &amp; Safety/Water Supply Needs</th>
</tr>
</thead>
<tbody>
<tr>
<td>WWDC Grant (67%)</td>
<td>$236,014</td>
</tr>
<tr>
<td>WWDC Loan (33%)</td>
<td>$116,246</td>
</tr>
<tr>
<td>Farm Loan Board Grant</td>
<td>-0-</td>
</tr>
<tr>
<td>Farm Loan Board Loan</td>
<td>-0-</td>
</tr>
<tr>
<td>FmHA Grant</td>
<td>$-0-</td>
</tr>
<tr>
<td>FmHA Loan</td>
<td>$-0-</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>$352,260</strong></td>
</tr>
</tbody>
</table>
1.9 PROJECTED USER RATE IMPACT

Projected user rates could vary depending on the actual number of rate payers. That is because some costs, such as water quality testing and district audits remain constant regardless of the number of users. Table 1.4, shows a range of projected rates for 48, 53, and 58 users respectively. There are presently 48 homes served by the Etna water system. Public comments indicate an average a "willingness to pay" of $20 to $25 per connection per month. The projected user rates are reasonably close as indicated in Table 6.5.

---

**TABLE 1.4**

*Projected Rate Impact  
Etna Water System Improvements*

<table>
<thead>
<tr>
<th>Expense</th>
<th>No. of Connections</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>48 conn</td>
</tr>
<tr>
<td>WWDC Loan Payment (1)</td>
<td>$11.67</td>
</tr>
<tr>
<td>Power (2)</td>
<td>2.00</td>
</tr>
<tr>
<td>O&amp;M (3)</td>
<td>10.42</td>
</tr>
<tr>
<td>Reserve (4)</td>
<td>1.17</td>
</tr>
<tr>
<td><strong>Total Rate</strong></td>
<td>$25.26/Mo.</td>
</tr>
</tbody>
</table>

**Notes:**

(1) Based on $116,250 loan @ 4% over 30 years.
(2) Power costs based on projected summer (4 months) shortfall, Power cost = 6c/kwh.
(3) Estimated District O&M = $6,000/year.
(4) Reserve calculated as 10% of loan payment.
1.10 WHERE DO WE GO FROM HERE?

The Etna water system is presently experiencing serious bacteriological contamination problems. It is felt that the "immediate needs" recommendations outlined in this report should be implemented as soon as possible and that the Etna Water Supply Project should be advanced for Level III WWDC funding accordingly.

The Etna District Board has indicated that they do not wish to implement long-term recommendations at this time.

There are some procedural questions relative to the county’s handling of the Etna District formation. The Etna Water and Sewer District should repeat the district formation process to insure that it is in full compliance with State Statutes. This should be completed as quickly as possible to avoid funding and construction delays.