EXECUTIVE SUMMARY

SQUAW CREEK WATER SUPPLY PROJECT

LEVEL I

A.V.I. PROFESSIONAL CORPORATION
2035 WESTLAND ROAD
HEYENNE, WYOMING 82001

IN ASSOCIATION WITH

DSTONE & ANDERSON, INC.
October 31, 1991

Mr. Patrick Erger  
Wyoming Water Development Commission  
Herschler Building  
Cheyenne, WY 82002

RE: Level I Study - Squaw Creek Water Supply Project

Dear Mr. Erger:

A.V.I. Professional Corporation is pleased to submit the attached study to you. We sincerely appreciate the opportunity to be of service to the Wyoming Water Development Commission.

Again, we would like to thank you and the Squaw Creek Water District for all of your help. A special thank you to Bob Scott who spent numerous hours of time gathering the records and background data for the District. We look forward to the opportunity to work with you again in the near future.

Sincerely,

James D. Voeller, P.E./R.L.S.  
President, A.V.I. p.c.

P.S. This letter was inadvertently not bound into the Report. Please insert into the front of all copies.

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EXECUTIVE SUMMARY

SQUAW CREEK WATER SUPPLY PROJECT
LEVEL I

A.V.I. PROFESSIONAL CORPORATION
2035 WESTLAND ROAD
CHEYENNE, WYOMING 82001

IN ASSOCIATION WITH

LIDSTONE & ANDERSON, INC.
I. INTRODUCTION

The initial Squaw Creek water system was designed and constructed in the mid 1970s. The original system consisted of partially developing a spring, pumping water through a 4 inch transmission line to a water tank located near the southeast corner of the District (southeast corner Section 35, T40N, R116W) and then gravity feed through a 3 inch transmission line to the homes. The company providing water at the time was called "Squaw Creek Supply Company, Inc." In April of 1978, the Squaw Creek Supply Company filed an application to appropriate surface water with the State Engineer. As of that date, they were supplying water to 25 residences and anticipated a maximum of 72 domestic points of use, or homes. This permit was canceled August 18, 1979 because the proper paperwork had not been submitted nor was an extension of time asked of the State Engineer.

In 1981 the Squaw Creek Water Supply Company then became the Squaw Creek Water District and on December 29, 1981 the District refiled a permit to appropriate surface water.

Realizing the shortcomings of the existing system, the District hired Jorgenson Engineers of Jackson, Wyoming to redesign system improvements. The firm of Willard Owen's Associates, Inc. of Denver was hired to evaluate the spring and redesign a new collection system. The system was reconstructed in the fall of 1982 with the aid of a Wyoming Farm Loan in the amount of $308,000.00. Since that time, only necessary maintenance has been performed on the system.

In 1990 the District, in anticipation of future problems associated with new homes being constructed and new EPA regulations, asked the Wyoming Water Development Commission for assistance.
The Wyoming Water Development Commission selected the A.V.I./Lidstone & Anderson team to complete this Level I Study.
II. PURPOSE

The purposes of this Level I Study was as follows:

A. Evaluate water supply alternatives which could replace and/or supplement the District's existing spring source.

B. Evaluate the District's existing water supply demands and estimate future water supply demands.

C. Evaluate the District's existing water supply system and make recommendations for operational improvements.

D. Provide recommendations for proceedings into a Level II Study and cost estimates for the Level II Study and proposed operational improvements.
III. FINDINGS

A. WATER SUPPLY ALTERNATIVES

The A.V.I. team studied the geology and hydrogeology of the area thoroughly. Five potential water supply alternatives were found. These include:

1. Drilling a deep groundwater well.
2. Purchase of water from Teton County's well located near the transfer station, approximately 1 mile northwest of the District.
3. Using water from Game Creek approximately 1/2 mile north of the District.
4. Additional improvements to the existing spring to provide for more flow.
5. Improving and connecting to other known springs in the vicinity of the District.

A cost/benefit analysis was performed on the above alternatives and the recommended alternative was to drill a deep well together with improving the existing spring.

B. WATER SUPPLY DEMANDS

The District began a meter reading program this spring. An evaluation of spring and summer usage found that current demands on the system are:

| Typical winter day | 90 gallons per capita per day |
| Typical summer day | 170 gallons per capita per day |
| Peak day           | 366 gallons per capita per day |

The meter reading also helped locate a number of large leaks in the system, most of which were recently corrected.
Based on a maximum density of 80 lots within the District, future demands were estimated as follows:

<table>
<thead>
<tr>
<th></th>
<th>Gallons per day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical winter day</td>
<td>24,600</td>
</tr>
<tr>
<td>Typical summer day</td>
<td>45,240</td>
</tr>
<tr>
<td>Peak day</td>
<td>90,840</td>
</tr>
</tbody>
</table>

With the current pump running at 43 gallons per minute and past experiences with the spring running low with a high demand, it was evident that an additional water source is needed for the District.

C. OPERATIONAL SYSTEM IMPROVEMENTS

The existing system was evaluated using Wyoming Water Quality and EPA Regulations and comments. The map on page 7 delineates the location of some of these improvements. A number of system recommendations were made as follows.

A - HIGH PRIORITY

- Establish a leak monitoring program and fix all leaks as soon as they are detected.
- Reconstruct the surface runoff ditch around the spring to divert runoff around the spring.
- Seal the top of the spring collection area with an impervious membrane. A P.V.C. liner is preferable.
- Repair the fence around the spring to make animal proof.
- Keep the gate to the spring locked and lock the storage tanks.
- Read meters monthly and record the meter reading in the vault as well as water height in the storage tanks.
- File recommended Partial Beneficial Use on the water rights and file an extension of time for the remainder.
- Post a warning sign at the vault to work in pairs and be aware of noxious gases.
• Rotate bacteriological sampling sites throughout the system.

• The District should continually test the spring to provide E.P.A. documentation that it is a groundwater not a surface water influenced system.

B - MEDIUM PRIORITY

• Installation of an additional 30,000 gallons of storage. Secure and lock all storage tanks.

• Install a french drain around the north and east sides of the spring to divert potential groundwater from these areas away from the spring.

• Provide maintenance to the spring collection system by rodding out collection lines as needed. Also disinfect, flush, and maintain storage tanks annually.

• Remove unsightly trash, junk autos, etc. from the spring area.

C - LOW PRIORITY

• Installation of a 6" fire hydrant on 6" main.

• Provide turnouts intermittently throughout subdivisions in District capable of handling fire truck.

• Secure easements for all water lines which do not currently have them or are not in road right-of-ways.

• Plan for the addition of chlorination equipment for the system. The equipment shall have the capacity to provide a 5 mg/l disinfection dose. This equipment may be located in the existing vault, however, because of potential hazards it would be best to locate in a separate structure.

• Plan for standby equipment and have available for a one-day replacement. This should include pump motor, generator, chlorination equipment and all necessary appurtenances for proper connections.

• Loop all dead end mains (not included in cost estimates). In interim, put flushing valves at dead ends.

• The District should be cautious about allowing lot splits which result in capacities beyond those planned for.

• The existing valves should be moved out of the roadway.

• Those lots in the Game Creek Subdivision which express an interest (NE\(^1\), NE\(^2\) Section 35, T40N, R116W) should be considered for inclusion into the District.
Section 35, Township 40 North, Range 116 West, Teton County, Wyoming

1. Increase existing storage to 50,000 gallons by adding new 30,000 gallon tank or equivalent.

2. Add 6" fire hydrant and improve a turn around for fire trucks.

3. Animal-proof fence and lock spring area and pump house. Add cover to spring, place French drain around north and east ends. Remove junk.

4. Provide flushing hydrants at dead end mains.
D. Recommendations and Cost Estimates

The following are A.V.I.'s and Lidstone & Anderson's recommendations for a Level II study for the District.

1. Drill a deep groundwater well.

2. Drill a series of shallow exploration holes to investigate bedrock conditions of the existing spring and potential for further development.

3. Pump test existing spring to determine its yield.

4. Investigate the potential for development of other existing spring sources (Scott Spring), including consents, clearances and rights of way.

5. Revise engineering estimates and plans, depending on drilling results.

6. Revise project economics depending on drilling results.
Estimated costs for these recommendations are as follows.

A. **PREPARATION OF LEVEL II STUDY**

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permitting and Mitigation</td>
<td>$500.00</td>
</tr>
<tr>
<td>Legal Fees</td>
<td>$1,000.00</td>
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<tr>
<td>Acquisition of Access and Rights-of-Way</td>
<td>$3,000.00</td>
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</table>

Construction Cost Level II Engineering of Project Components

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump Testing Existing Spring</td>
<td>$4,000.00</td>
</tr>
<tr>
<td>Drilling Existing Spring</td>
<td>$1,750.00</td>
</tr>
<tr>
<td>Drilling 850' Well (Rock)</td>
<td>$117,000.00</td>
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<tr>
<td><strong>Subtotal</strong></td>
<td><strong>$222,250.00</strong></td>
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**Estimated Total for Level II Study**

(Subtotal plus 15% Contingency)

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
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</thead>
<tbody>
<tr>
<td><strong>Subtotal</strong></td>
<td><strong>$255,600.00</strong></td>
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B. **PRELIMINARY CONSTRUCTION COST OF OPERATIONAL IMPROVEMENTS LEVEL I**

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
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</thead>
<tbody>
<tr>
<td>Pump &amp; Power 850' Well &amp; Controls</td>
<td>$35,000.00</td>
</tr>
<tr>
<td>Pipeline to Tanks or Spring</td>
<td>$95,000.00</td>
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<tr>
<td>Clean up and Fix Spring Fence</td>
<td>$8,000.00</td>
</tr>
<tr>
<td>Additional 30K Water Storage</td>
<td>$50,000.00</td>
</tr>
<tr>
<td>Fire Hydrant &amp; Valve</td>
<td>$2,500.00</td>
</tr>
<tr>
<td>Cover &amp; French Drain Spring</td>
<td>$25,000.00</td>
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<tr>
<td>Standby Equipment Pump/Generator</td>
<td>$20,000.00</td>
</tr>
<tr>
<td>Rehabilitate Spring (Optional)</td>
<td>$10,000.00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Construction Cost Subtotal #1</strong></td>
<td><strong>$245,500.00</strong></td>
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<tr>
<td>Engineering Costs = CCS#1 x 10%</td>
<td>$24,550.00</td>
</tr>
<tr>
<td><strong>Subtotal #2</strong></td>
<td><strong>$270,050.00</strong></td>
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<tr>
<td>Contingency = Subtotal #2 x 15%</td>
<td>$40,507.00</td>
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**CONSTRUCTION COST TOTAL**

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
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</thead>
<tbody>
<tr>
<td><strong>CONSTRUCTION COST TOTAL</strong></td>
<td><strong>$310,557.00</strong></td>
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**PROJECT COST TOTAL (A & B)**

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PROJECT COST TOTAL (A &amp; B)</strong></td>
<td><strong>$566,157.00</strong></td>
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