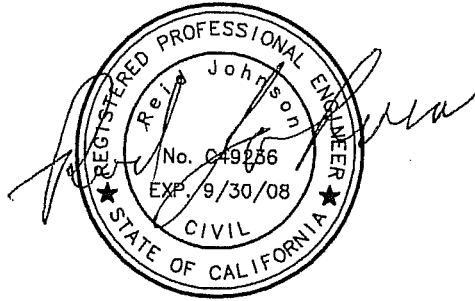


**VENTUCOPA WATER SUPPLY COMPANY**  
**Water System Evaluation Report**



**April 2007**

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# VENTUCOPA WATER SUPPLY COMPANY

## Water System Evaluation Report

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### INTRODUCTION

Ventucopa is a remote agricultural community of approximately 100 people located in the northeastern corner of Santa Barbara County (County) (see Figure 1). The majority of the population is comprised of low income retirees, farmers, and laborers. Based on the 2000 Census data (Appendix A), the median household income of the Census Tract is \$37,935 which is approximately \$1,700 less than single-person, low-income household earnings in the County.

The town is served by an antiquated water system constructed in the late 1940s. There have been minor repairs, but no major improvements have been constructed to the water system. The well that provides for the water system sits on private property. The owner of the property, as written in the Deed, is required to provide water service to the surrounding lots. The water system is a privately owned, registered non-profit community water system. The owner of the water system, Ventucopa Water Supply Company (VWSC), also maintains the system.

The system includes an existing well with a 3-inch submersible pump, a 750 gallon hydropneumatic tank, and approximately 2-inch diameter distribution piping. There are a number of issues with the existing water system including:

1. The primary well (Well #1) has high nitrate levels, possibly from adjacent fertilized vineyards.
2. A secondary well (Well #2) is available but is not integrated into the water system.
3. Sporadic power outages occur with no backup power for the well pump.
4. When there is a power outage and the well pump is inoperative, the existing hydropneumatic tank does not have sufficient storage capacity to serve the residents.
5. There are no individual water meters for the residences.
6. There is no fire system water protection for the community.

### BACKGROUND

Potable water systems and individual house wells in the Ventucopa area are regulated by the Santa Barbara County Public Health Department Environmental Health Services (SBCEHS). The VWSC is designated as Water System #4200872.

A meeting was held with Norman Fujimoto (SBCEHS), Wendall and Gayle Carpenter (VWSC), and Reid Johnson (Nolte Associates, Inc.) to discuss the water system, to identify the needs to be addressed in the water system evaluation report, and to obtain information. Santa Barbara County Ordinance 3458 (Chapter 34A of the County Code) regulates water wells in the unincorporated areas of the County. A copy of the ordinance is included in Appendix B.

The Ventucopa water system is classified as a transient non-community water system. When the water system has 15 connections or 25 full-time residents, the system will be reclassified as a small community system.

Well #1 has historically been the source of water for the Ventucopa water system and is an approved well, even though the well log and other information are not available. SBCEHS indicated that an approved well that is high in nitrates could be used for blending or emergency backup. SBCEHS also indicated that currently there is no building moratorium or any restrictions on the water system if the water meets the nitrate requirements.

The current sampling requirements for the Ventucopa water system are comprised of quarterly nitrate sampling (because some test results have exceeded the MCL of 45 mg/L), nitrite sampling every three years, and monthly bacteriological monitoring. A summary of water quality testing for Well #1 is included in Appendix C.

## **WATER SYSTEM EVALUATION**

After reviewing the available information, the needs of the Ventucopa water system were identified and prioritized as follows:

1. Water quality.
2. Water supply.
3. Distribution system upgrade, including storage.
4. Fire protection.

Water quality consistently meeting California Department of Health Services (DHS) requirements could be provided by water treatment or by integrating another water source or well into the system. There are no other water systems within a feasible distance to which the Ventucopa system could connect. Therefore, the only options for improved water quality would be water treatment, which requires significant capital, or another well with better water quality. There is an available well within the Ventucopa town site (Well #2) that has had favorable nitrate test results. As such, Well #2 could possibly solve the water quality problem and provide increased water supply capacity.

A copy of the Well #2 completion report and the County inspection report were provided by SBCEHS and are included in Appendix D. The report shows that the well has a 50-foot annular seal and therefore could be acceptable for use as a public water system well.

## Water Quality

To determine if Well #2 would be a good water source, the SBCEHS requirements for test pumping and permitting of water wells were obtained; and well pumping and sampling was planned.

Due to the summer of 2006 being a busy period for test pumpers and the remote location of Ventucopa, scheduling of a pump test was problematic. Well #2 has been inactive but was previously used for agriculture. When a pump was installed, there was very little production water, indicating restrictions in the well perforations. Remedial work was performed on the well before the pumping test was completed. The pump test report indicates that Well #2 stabilized at a pumping rate of 55 gpm, a water level of 82 feet, and only 5 feet of drawdown. The test was conducted with a 5 hp pump. The well production may be significantly more with a larger pump or with additional remedial work to the well and screens. The water quality testing indicated a nitrate level of only 12 mg/L and an overall good water quality that meets DHS requirements. The Well #2 pump test report and water analysis are included in Appendix D.

This testing indicates that Well #2 would be a good water source for solving the water quality concerns while significantly adding to the water supply capacity of the system. Water treatment would likely not be necessary if Well #2 was utilized as a source. Therefore, it is recommended that VWSC proceed with filing an application with SBCEHS to permit Well #2 as a water source for the system. It should be noted that the water in Well #2 exceeds the secondary standards for total dissolved solids and electrical conductivity.

## Water Supply

The existing Ventucopa water system is shown in Figure 2 and serves eleven connections from a 750 gallon hydropneumatic tank which is supplied by a 3-inch submersible pump in Well #1. This is an antiquated water system with inadequate capacity by current standards that provides no fire protection.

Well #2 is in the northwest section of Ventucopa while Well #1 is southeast of the town, as shown in Figure 3. A pipeline of approximately 2,100 feet is required to connect Well #2 to the hydropneumatic tank at Well #1, which is at a higher elevation. The Well #1 parcel would also be a good location for a water storage tank. The Well #2 pipeline should be at least 6-inch diameter to function as a main distribution line and provide fire protection flows.

County Ordinance 4181 provides requirements for domestic water systems, but only applies to private water systems. Public water systems in Santa Barbara County are subject to DHS regulations. The new DHS Revision of Waterworks Standards R-14-03, Section 64554, provides a procedure for permitting source capacity when water usage records are not available, and states:

*(4) If no water usage data are available, utilize records from a system that is similar in size, elevation, climate, demography, residential property size, and metering to determine the*

*average water usage per service connection. From the average water usage per service connection, calculate the average daily demand and follow the steps in paragraph (3) to calculate the MDD and PHD.*

*(c) Community water systems using only groundwater shall have a minimum of two approved sources before being granted an initial permit. The system shall be capable of meeting MDD with the highest-capacity source off line.*

*(3)(c) To calculate the MDD, multiply the average daily usage by a peaking factor of 2.25.*

The Cuyama Community Services District (CCSD) is the closest community to Ventucopa and has similar climatic conditions. The CCSD serves 250 connections and the maximum day demand (MDD) to date has been approximately 450,000 gal/day. This would be an MDD of 1,800 gal/day per connection, or a 24-hour supply flow of 1.3 gpm. If this factor was used for source capacity, the 55 gpm Well #2 pump test would support 42 connections with only 5 feet of drawdown. Using the peaking factor of 2.25 from the DHS Waterworks Standards, the average day demand (ADD) would be 800 gal/day per connection

The 5 hp pump test on Well #2 indicated that with only 5 feet of drawdown, the well could at a minimum provide for the needs of the existing connections, allow for new connections, and comply with the County requirements. A pump test with a larger pump would likely stabilize at a larger flow rate and deeper well drawdown and would probably verify that Well #2 could provide for more connections. Additionally, water from Well #1 could be used if the water was blended with water from Well #2, thus increasing the system supply capacity.

In view of the pump test results, it is recommended that the capacity of the water sources, and amount of growth that could be supported, be determined after: 1) a pump is installed in Well #2; 2) the pump is on line; and 3) meters have been installed at both wells.

## **Water System Upgrade**

The only water storage capacity the system has is the operational volume of the existing 750 gallon hydropneumatic tank. The SBCEHS would prefer this remote community have three days of storage capacity, which would be 2,400 gallons per connection. A 50,000 gallon tank would provide adequate water storage for 21 connections. Additional storage tanks could be installed as the number of connections increases.

As indicated, the Ventucopa water system has several significant deficiencies. The major needed elements are discussed above. Additional improvements recommended to upgrade system reliability and meet current standards include a larger hydropneumatic tank, water meters, and larger water distribution lines.

Replacing the existing 750 gallon hydropneumatic tank with a new hydropneumatic tank with at least a 3,000 gallon capacity would provide more pressurized water supply during power outages, reduce the pump cycling times, and make the water system more reliable. Water meters should be provided at both wells and at each service connection. Any main water line that does not terminate at a fire hydrant should have a flush valve. If a fire protection system was

constructed, many of the service connections can be moved to the larger pipelines and some of the older small water lines could be disconnected and abandoned.

## **Fire Protection**

Previously, the County Fire Department provided a letter for VWSC (Appendix E) referencing the fire protection requirements for water systems. Water systems must be designed to deliver the required fire flow at a residual pressure during peak demand of at least 20 psi. Fire hydrant spacing in residential areas must not exceed 500 feet and be located so all residences are within 250 feet of a fire hydrant. In the Ventucopa town site, all the fire hydrants would be within 2,100 pipeline feet from a water storage tank near Well #1. As shown in calculations included in Appendix F, a 6-inch PVC pipeline could provide a minimum fire flow of 1,000 gpm at a minimum fire hydrant pressure of 20 psi from a fire pump generating less than 90 psi. The fire flow velocity in a 6-inch pipeline would be 11.35 fps and the headloss would be significant. However, the fire pump would deliver the needed flow and pressure. Also, 6-inch pipelines would be advantageous in small systems for maintaining chlorine residual and to reduce costs.

The fire protection requirements specify a residential water storage volume of two hours at the required flow. At a minimum residential fire flow of 1,000 gpm, the fire protection water storage volume would need to be 120,000 gallons.

The water stored for fire protection will be a large volume in relationship to the quantity used on a daily basis by the water system. Therefore, a chlorination system and water circulation piping will be required to maintain water quality in the tank.

The Ventucopa water system and well are not capable of meeting fire requirements and have historically provided very limited fire protection. The fire protection situation was discussed in a phone call with Captain Martin Johnson of the Santa Barbara County Fire Department.

It may not be possible for Ventucopa to obtain a large enough grant to construct and maintain a water system that meets the health and fire standards required for new property owners to obtain building permits. Captain Johnson explained that houses can be built outside of adequate water systems by meeting individual fire protection requirements, including a tank with a minimum reserve of 2,500 gallons.

To provide some level of fire protection for the existing community and surrounding area and to avoid having individual tanks on separate lots, it is recommended that a phased fire protection plan be developed. A proposed plan is included in this report for consideration by Santa Barbara County. The proposed steps to develop a fire protection system for the Ventucopa community are as follows:

1. Construct a 6-inch C-900 PVC pipeline between Wells #1 and #2 which will be the main waterline through the community and will be able to provide a minimum of 1,000 gpm from a fire pump to future branch lines and fire hydrants throughout the community.
2. In Phase 1 of a fire protection system, as shown on Figure 4, provide the following:

- a. A 50,000 gallon tank dedicated to fire protection.
  - b. A fire booster pump which would automatically be activated when the water system pressure indicates a major draw from a fire hydrant.
  - c. Three fire hydrants installed on the 6-inch pipeline previously constructed.
  - d. Chlorination equipment to keep the fire protection water disinfected.
3. In Phase 2, as shown on Figure 5, the fire protection system could be completed to full standards throughout the community by providing:
- a. Additional 6-inch waterlines to fire hydrants spaced within 250 feet of all properties in the community.
  - b. Additional fire storage tanks to meet residential standards of two hours fire flow. The total fire flow storage would be increased to a minimum of 120,000 gallons.

## **SUMMARY AND RECOMMENDATIONS**

It is anticipated that the water system improvements may need to be implemented in a sequential process beginning with water supply/water quality upgrades. Therefore, the following summary of needed water system improvements is presented in a phased approach.

### **Water Supply and System Upgrade Improvements**

1. Well #2 has been successfully test pumped and sampled, verifying that it is an adequate source of water meeting DHS requirements. Therefore, it is recommended that VWSC complete the application process to permit Well #2 as a water supply source.
2. Water supply/water quality improvements to be completed initially include:
  - a. Install Well #2 pump, electrical service, and controls
  - b. Construct a water supply pipeline (6-inch) from Well #2 to the hydropneumatic tank near Well #1.
  - c. Install meters at both wells to record well production.
  - d. Install SCADA (telemetry cable or radio system) from Well #2 to a water system controller at the tank near Well #1.
  - e. Install piping, valves, and inline mixer to blend Well #1 water with Well #2 water.



3. System upgrade items needed include:
  - a. Install emergency water storage tank.
  - b. Replace hydropneumatic tank.
  - c. Provide emergency generator.
  - d. Install service connection meters.

### **Fire Protection**

A phased fire protection system could be constructed as follows:

1. Phase 1 provides an initial 50,000 gallon tank, booster pump, and three fire hydrants.
2. Phase 2 completes the fire protection pipelines and fire hydrants throughout the town site and adds more water storage tanks.

### **OPINION OF PROBABLE CONSTRUCTION COST**

Tables 1 and 2 summarize opinions of probable construction cost to provide the system modifications discussed above.

**Table 1**  
**Ventucopa Water Supply Company**  
**Water Supply and System Upgrade Improvements**  
**Opinion of Probable Construction Costs**

Item	Quantity	Unit	Unit Cost, \$	Total, \$
<b>Water Supply</b>				
Well #2 pump and electrical	1	LS	15,000	15,000
6-inch water line	2,200	FT	40	88,000
6-inch gate valves	4	EA	1,000	4,000
Well meters	2	EA	3,000	6,000
Buried telemetry cable	2,200	FT	2	4,400
Well #1 blending piping, valves, etc.	1	LS	3,000	3,000
Well control instrumentation	1	LS	2,000	2,000
Subtotal Water Supply				122,400
<b>System Upgrade</b>				
Water storage tank, 50,000 gallons	1	LS	75,000	75,000
Booster pumps and electrical	1	LS	15,000	15,000
Hydropneumatic tank and controls	1	LS	12,000	12,000
Service meters in existing connections	11	EA	200	2,200
Emergency generator (20 kw min)	1	EA	7,000	7,000
Subtotal System Upgrade				111,200
<b>Water Supply and Water System Upgrade</b>				<b>233,600</b>
<b>Contingency 20%</b>				<b>46,400</b>
<b>Total Water Supply and System Upgrade</b>				<b>280,000</b>

**Table 2**  
**Ventucopa Water Supply Company**  
**Fire Protection System Improvements**  
**Opinion of Probable Construction Costs**

Item	Quantity	Unit	Unit Cost, \$	Total, \$
<b>Phase 1</b>				
Storage tank (50,000 gallons)	1	LS	75,000	75,000
Booster/recirculating pump station	1	LS	25,000	25,000
Electrical Service	1	LS	20,000	20,000
6-inch waterline	160	EA	40	6,400
Fire Hydrants	3	EA	3,000	9,000
6-inch gate valves	3	EA	1,000	3,000
Chlorination system	1	LS	15,000	15,000
Subtotal Phase 1				153,400
Contingency 20%				30,600
<b>Total Phase 1</b>				<b>184,000</b>
<b>Phase 2</b>				
6-inch water lines	2,400	FT	40	96,000
Fire hydrants	5	EA	3,000	15,000
6-inch gate valves	5	EA	1,000	5,000
Highway crossing	2	LS	10,000	20,000
Steel storage tank, (70,000 gallons)	1	LS	90,000	90,000
Subtotal Phase 2				226,000
Contingency 20%				45,000
<b>Total Phase 2</b>				<b>271,000</b>
<b>Total Fire Protection System Improvements</b>				<b>455,000</b>