

**Idaho Department of Environmental Quality
Idaho Falls Regional Office
Sanitary Survey Report
City of Victor PWS# 7410013
September 21, 2005**

INTRODUCTION

A. Purpose of Report

The purpose of this report is to present a sanitary survey review of the water system conducted on August 30, 2005 and to identify any deficient areas that represent a health risk and require immediate correction.

B. Summary Description of System

This community water system that serves the City of Victor consists of (6) groundwater springs, (1) well, (2) treatment facilities, and (2) storage tanks.

The "Spring" sources (1-6) are considered a "Manifolded" source mixing together within a common collection box and storage tank before serving the distribution.

The City of Victor public water system is rapidly growing and has increased significantly in size since the last sanitary survey. Since the last Sanitary Survey in 2000, this system has had several upgrades including a new storage tank, booster station, treatment facility, and additional distribution piping.

The following are new housing developments that have currently or will in the near future hook to this public water system serving full-time residential customers:

- The Ponds
- Mountain Shadows
- Mountain Side Village
- Golf Vista
- Settlement

C. Consumption and Production

During 2004, this facility served an average of (1,029) people with (460) connections. There have been no water shortages, reports of waterborne diseases or complaints about the water quality in the past two years.

INVESTIGATION AND ANALYSIS

A. Sources of Information

- Scott Golden, Certified Operator
- Rochelle Mason, Drinking Water Quality Analyst, DEQ
- Field Investigation
- Operation & Maintenance Manual, Sunset Engineering Inc.

1) Sources

Water for the City of Victor is derived from (6) springs and (1) groundwater well (Willow Creek Well). These facilities have adequate capacity to meet the current community demands. Currently the City of Victor is planning for an increase of future demands upon this system in which a new well source is being considered.

Land use in the vicinity of the each spring source is forestland owned by the Bureau of Land Management (BLM). Each of the spring source areas are properly maintained with no evidence of potential sources of contamination within the minimum fifty (50) feet of the spring sites. Vegetation growth surrounding each spring source is acceptable in visibly securing each source from the public and protecting from possible erosion.

The “**Manifolded**” spring sources are all developed similarly and are located within close vicinity of each other. Each spring collection area is contained in metal type coverts which are properly capped and securely bolted (**Fig. 1**). The gravel lined spring collection areas are fed by a collection pipe and then empties into the collection box. Each spring collection area is equipped with a heavy metal flap (red) that serves as an adequate over flow drain in preventing small animals, insects, or other potential contaminates from entering the spring collection area (**Fig. 1**).



Fig. 1 - Spring collection area showing overflow pipe.

Two large metal collection pipes from the spring sources empty into each side of this deep concrete **collection box** located below the spring sources (**Fig. 2**). This collection box is equipped with an elevated six inch locked metal access lid which is also surrounded with a polyurethane type material to add additional protection from any surface water intrusion. The vent is properly screened with a small mesh screen with the addition of a larger stainless steel meshed screen placed on the most outer side to avoid possible puncture holes and the intrusion of small insects, dust, and other potential contaminates from entering this facility. Similar to the surrounding vegetation growth around each spring source, the present vegetation surrounding this structure is acceptable to lessen erosion and visibility to the public.

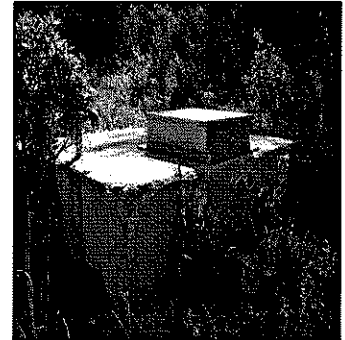


Fig. 2 – Spring collection box.

This collection facility is divided into three separate sections which can be accessed by a metal rebar type ladder (**Fig. 3**). Two of the sections serve as the actual spring collection area, while the third section extends the length of the facility so that the facility can be easily accessed for maintenance and monitoring. This collection facility is well maintained with no evidence of any potential contaminates or sediment build-up within the collection box.



Fig. 3 – Water from springs flowing into collection box.

Fall of 2005 Upgrade Note: The City of Victor has received a Homeland Security Grant which will be used towards the construction of a security fence around the collection box area.

Land use in the vicinity of the **Willow Creek Well** is designated as a residential park. A locked chain linked fence defines the designated well lot area that is properly maintained with no evidence of potential sources of contamination within fifty (50) feet of the well site (**Fig. 4**). Electrical well control panels and other miscellaneous phone controls are situated within the perimeter of the well lot fence that poses no health or safety concerns. No pesticides, fertilizers or other potential hazardous materials are stored or applied to the well lot. The Willow Creek well is satisfactorily located away from any existing sanitary hazards including sewer lines, sewage disposal or other potential hazardous materials.



Fig. 4 – Secured well lot with Willow well head and misc. electrical panels.

• **ADDITIONAL SECURITY TO WELL CONTROL PANEL RECOMMENDATION:**

It is recommended that the well control panel be locked to prevent unauthorized entry.

The **Willow Creek well** was constructed in 1993 to a depth of 300 feet. The source is cased the total depth of the well with 16-inch welded steel casing (**Fig 5**). Extending approximately six (6) inches above the ground surface, the casing is perforated from 200 to 300 feet. This source has been surfaced sealed with 40 feet of granite. An acceptable capped well vent is present (see recommendation below). The static water level was measured at 130 feet.

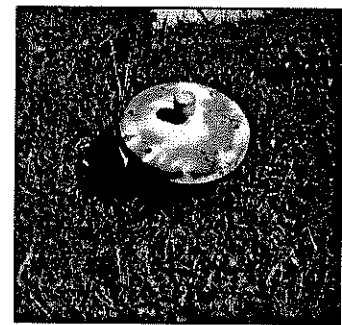


Fig. 5 – Willow well head

The Willow Creek well is equipped with a submersible turbine pump and was designed to supplement the spring sources and comes on when the new 1.0 mg. reservoir water level reaches a defined set point. Currently the Willow Creek well is considered a full time active source that is operated by radio telemetry to support the demands of this growing community, producing approximately 1200 – 1300 gpm. The overall integrity of the well appears to be in reliable operation.

• **FUTURE WELL CASING EXTENSION RECOMMENDATION:**

In accordance with the Idaho Rules for Public Drinking Water Systems IDAPA 58.01.08.550.I.i Casings shall extend a minimum of eighteen (18) inches above the finished ground surface...

It is recommended to extend the well casing of the Willow well to meet the minimum (18) inches above the finished ground surface when future upgrades are done upon the system. Currently bacteria monitoring results do not indicate an immediate need to extend the well casing and therefore extending the casing is a recommendation at this time.

2) Treatment

The City of Victor has chosen to voluntarily use (2) two **Gas Chlorination** treatment systems. Approximately 1 lb/Chlorine is used daily by each chlorination system. The amount of chlorine used is recorded by the operator and is kept on a clipboard located in each treatment facility.

These types of facilities operate under a vacuum by a venture tube. As a safety feature in the event there is a break in one of the components in the chlorinator the vacuum will be lost and the chlorinator will shut down without allowing gas to escape. This vacuum is produced by the injector which opens the valves allowing gas to enter the chlorinator. As the gas flows through the chlorinator to the injector where it mixes with the water. This concentrated chlorine solution is then mixed with the main system flow.

Both gas chlorination treatment systems are secured in facilities that meet the current OSHA and Uniform Building Code requirements (Fig. 6 – 6a). associated. The plastic line leading from the cylinders to the chlorinator indicates that this system is a remote vacuum system. The gas is drawn from the tank by a vacuum created in the venture tube by the flow of water to the ejector where the chlorine is mixed with water. A small booster pump is used to boost pressure to overcome the system differential Head which allows the chlorine system to function properly.

All (4) 150 pound steel chlorine gas cylinders in each of the treatment facilities are securely chained 2/3 of the way from the bottom of each cylinder to prevent them from falling. Each cylinder is clearly marked and is stored in a manner that indicates which cylinders are in use and which is not in use. The cylinder scale used to determine the amount of chlorine used and amount of chlorine remaining in the cylinders appears to be maintained with no evidence of corrosion. Air ventilation systems have been installed that can be accessed from the outside of the chlorine gas room to allow the operator to turn on the vent prior to entry of the facility. A 2X2 window is installed at the second (newest) treatment facility that allows the operator to observe the conditions in the chlorine room without entry in reducing any exposure to hazardous conditions.

Contact time is accomplished with the transmission line after the 500,000 reservoir and also by the new 1 mg. storage tank.

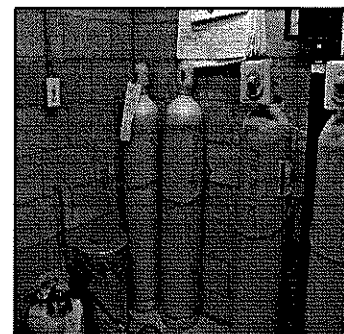


Fig 6 – Chlorination room
associated with the 500,000
storage tank.



Fig. 6a – Chlorination room
associated with the 1 mg.
storage tank.

Disinfectants and Disinfection Byproducts Rule (DBP):

In accordance with the Disinfection By-Product Rule (DBP), the chlorine residual concentration is measured monthly in the distribution system at the same point in the distribution system and at the same time total coliform samples are taken. The City of Victor's Annual Running Average (RAA) of free chlorine residual for 2004 was .3207. One total trihalomethans (TTHM) and haloacetic acids (HAA5) sample is required to be taken per year during the month of the warmest water temperature at the location representing the maximum distribution system residence time, also in accordance with the DBP Rule.

3) Distribution System

Water is delivered from Springs (1-6) into the collection box. Flow then continues into the 100,000 gallon storage tank and is disinfected before serving the distribution system on demand while maintaining proper system pressure.

Water from the Willow Creek well flows through a dedicated line into the 1.0 Million gallon tank and is treated before serving the distribution system.

The **general distribution system** predominately consists of 8 -12-inch ductile iron piping. System pressure is adequately maintained to meet peak day and fire and peak hourly demands. All distribution piping is routinely maintained with no evidence of leaks.

Isolation valves are properly placed within the distribution piping providing the ability for each well, manifold Springs, treatment facilities and storage tanks to be isolated from the distribution for routine maintenance or in the event of a contamination occurrence.

Smooth-nosed **sample taps** are provided on the discharge piping of each entry point where pressure is maintained prior to any treatment.

Pressure gauges are provided at all installations. There have been no reports of service interruptions or chronic low-pressure problems.

Flow meters are properly installed upon each discharge piping of each entry point. All flow meter are functioning properly.

Accessible "Cla-Val" type **check valves** are appropriately installed above ground in the discharge line of each entry point.

Each discharge line is equipped with the necessary valves and appurtenances to allow each source (Well/Springs) to be **pumped to waste** prior to the first service connection.

- **CONTROL IDENTIFICATION SUGGESTION**

A suggestion that may be useful in identifying system components quickly using the Operation and Maintenance Manual that Sunrise Engineering has developed: upon all appurtenances that are identified within the Operation and Maintenance Manual a facilities identification tag with an assigned code number or color tab would be placed upon the appurtenance that corresponds to the facility's operational maintenance manual. This would make accessing information regarding a specific component of the system more efficient in the event of malfunction or failure.

4) Pumps/Pump Facilities & Controls

All well and treatment facilities are adequately maintained and protected against vandalism and unauthorized entry. The structural condition of each facility including walls, roof, windows and doors are in excellence condition. Neither rain nor surface water can enter these buildings. Each facility is satisfactorily insulated to prevent freezing of pipes and equipped with thermostat controlled electrical heaters. General facility lighting and ventilation is adequate. There is no evidence of potential hazardous materials stored within the water facilities or surrounding area. The overall appearances of the well facilities and treatment buildings are exceptionally maintained. The overall operation of this system is managed by a Supervisory Control and Data Acquisition (SCADA) system.

The purpose of the booster pump station is to maintain pressure to the distribution system. Pressures are maintained to meet maximum demand and fire in peak hourly flows. This facility contains partitioned rooms that contain a gas chlorination system, standby generator, booster pumps, and the SCADA (supervisory Control and Data Acquisition) system. Two (2) vertical turbine “Emerson” **booster pumps** pump water to the 1.0 mg. storage tank (**Fig. 7**). Both 50 Hp pumps were installed in 2004 and have the capability to produce 1250 GPM. Neither pump shows to be cycling excessively that would indicate a problem. There were no signs of dirt around the motor cooling fins or air take ports that would inhibit the flow of air necessary for cooling the motor windings.

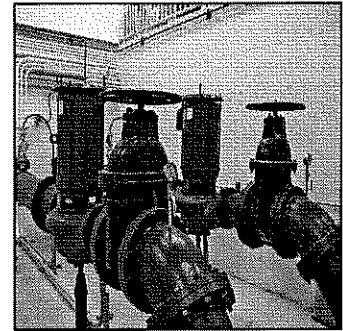


Fig. 7 – booster pumps

A small vertical turbine booster pump mounted to the floor next to the distribution line is used to currently operate the chlorine disinfection system (**Fig. 8**).

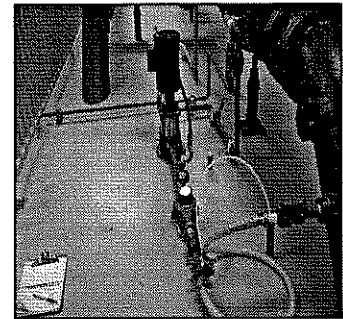


Fig. 8 – Chlorine injection site booster pump.

The booster pump/treatment building is efficiently cooled by circulating water from the distribution piping through two copper pipes (**Fig. 9 – 9a**). Flow is contained within a “closed” system and therefore a backflow device is not indicated. Water is circulated through cooling coils and then flows back into the distribution piping.

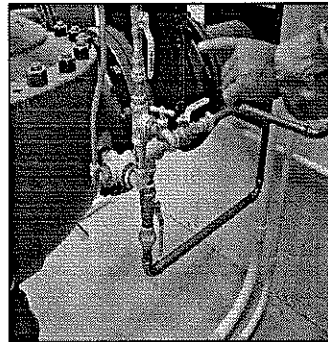


Fig 9 – copper cooling piping

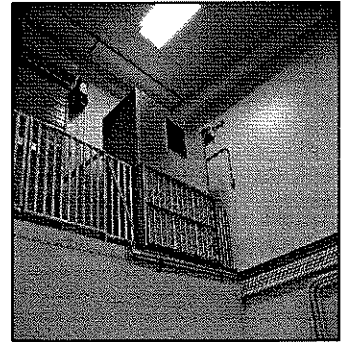


Fig. 9a – cooling unit

Installed in the booster pump facility building in 2004, a “Volvo Penta” diesel generator serves as standby power (**Fig 10**). This well maintained generator is designed to operate automatically in the event of power loss. Proper secondary containment surrounds the fuel tank and generator. The certified operator is present during filling of the tank.

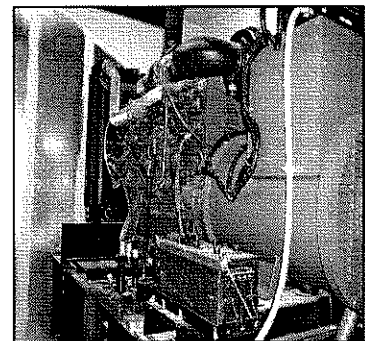


Fig. 10 – Standby diesel generator.

All general components (pumps, valves, piping, flow meter, pressure gauge, electrical controls, and alarm system) showed to be in good working condition. Valves are in good working order according to operator. There is no evidence of leaking water or rust.

Water Storage

Located next to one of the treatment buildings, this storage facility is adequately located away from any municipal, industrial wastewater treatment plant and sanitary sewer. Originally constructed in 1987, this partially buried square concrete **100,000 gallon-storage** reservoir shows to be structurally sound. The overall integrity of the reservoir is well maintained (**Fig. 11**). There is no evidence of cracks or leaks among the external walls or roof of the tank.

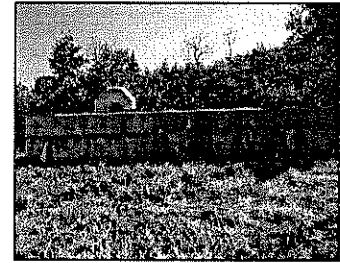


Fig. 11 – 100,000/gal storage tank

The overflow drain flows into Trail Creek located directly across old Hwy. from the storage tank. A locked overlapping manhole opening extends at least four (4) inches above the reservoir roof adequately protecting against surface water contamination. A rubber type material has been placed around the manhole for additional surface water protection. Screened with a mesh screen to exclude potential sources of contamination such as birds or insects, the reservoir vent is properly constructed with a 12 inch air gap. The surrounding area is properly graded away from the reservoir. The storage capacity of the tank is adequate for this facility with no reports of system pressure loss and has the capability to be isolated from the distribution system without necessitating loss of pressure in the distribution system. This storage reservoir is overall satisfactorily constructed to protect the stored water against any potential hazards.

Fall of 2005 Upgrade Note: The City of Victor has received a Homeland Security Grant which will be used towards the construction of a security fence around this storage tank and associated treatment facility.

A buried round **1.0 million gallon** concrete storage reservoir was constructed in 2004 to meet the additional growth demands of the system as well as providing additional fire protection. Both manholes are fitted with overlapping watertight locked metal lids that extend at least (4) inches above the surface of the roof (**Fig. 12**). A stainless steel ladder that extends to the floor of the reservoir provides access to this tank (**Fig. 12a**). The two stainless steel air vents properly extend twelve (12) inches above the roof and are adequately screened in a manner to exclude rain, snow, animals, insects, dust and other potential sources of contamination. “Danger” signs are posted around this storage facility that have kept this facility secure from public access.



Fig. 12 – manhole

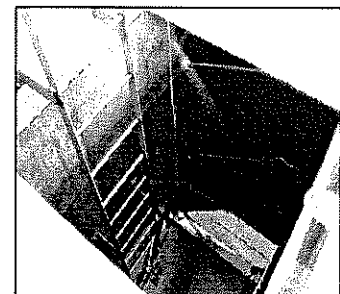


Fig. 12a – access ladder

6) Monitoring Reports/Data Verification

Monitoring and maintenance records with sampling reports are kept by the water operator. Current monitoring has shown that these sources provide safe, adequate and a reliable supply of water, indicating no existing contaminant problems or violations. Scott Golden (Cert. Operator) properly performs all required monitoring for the City of Victor water system; bacteriological quality is completed quarterly along with annual nitrate and every three years organic chemicals. Scott is adequately knowledgeable of the monitoring requirements for this system. Certified Energy Laboratory is utilized for most water analysis.

7) Water System Management/Operations

This system is under the direct supervision of a "Certified Operator". As the "Certified Operator", Scott Golden's knowledge regarding the water system is acceptable in demonstrating an adequate level of understanding of the technical and operational characteristics of the system.

Operation and Maintenance Manuals have been prepared by Sunset Engineering Inc.

- A **Cross-Connection Control** program is implemented to prevent the entrance of toxic or hazardous substances to the system. A certified tester annually inspects all backflow devices.
- The **Water Main Flushing Program** is part of the maintenance program.
- **Routine operational maintenance** includes a daily check from the water operator of the overall operation of the water system including treatment processes.

8) Operator Compliance w/ State Requirements

The operator Scott Golden is committed to providing adequate and responsive service, as well as supplying a safe and reliable supply of drinking water to the area served by the City of Victor. Scott is properly certified at Class (1) Water Treatment System level (DWT1-12021) for this system and is current with his professional growth educational requirements. Scott should be commended for his level of professional commitment to maintaining the City of Victor's compliance with the Idaho Rules for Public Drinking Water Systems.

APPRIASAL OF SANITARY HAZARDS AND SAFEGUARDS

Under the federal Surface Water Treatment regulations (SWTR) all groundwater sources serving community public drinking water systems must be evaluated to determine if they are directly influenced by surface water or at risk with respect to giardia, cyptosporidium or other microbial contamination.

Criteria used to determine the vulnerability of microbial contamination includes a well's distance to a surface water source (<500 feet), fractured basalt aquifers, and well construction features such as an annular seal and depth of casing. Each source does not appear to be under the direct influence of surface water, and therefore is not subject to the requirements of the SWTR. The final source classification was determined on October 17, 1994 for each spring source and willow well. There appears to be no change to the final classification of ground water.