



**STATE OF WEST VIRGINIA  
DEPARTMENT OF HEALTH AND HUMAN RESOURCES  
BUREAU FOR PUBLIC HEALTH  
OFFICE OF ENVIRONMENTAL HEALTH SERVICES**

**Earl Ray Tomblin  
Governor**

**Karen L. Bowling  
Cabinet Secretary**

March 21, 2014

Susanne Lawton, General Manager  
Jefferson County PSD  
340 Edmonds Road, Suite A  
Kearneysville, WV 25430

**RE: Jefferson County PSD Cavaland Water System  
PWS ID #WV3301972  
Jefferson County**

Dear Ms. Lawton:

On March 11, 2014, a Sanitary Survey was conducted of the Jefferson County PSD/Cavaland Water System by Bradley Reed, Office of Environmental Health Services (OEHS)/Kearneysville District Office. This survey was performed in accordance with the requirements of the *West Virginia Public Water System Legislative Rules*. We would like to thank you and the site visit participants for the courtesy and assistance provided during the inspection of your public water supply system.

This letter confirms and supplements items noted during the inspection. In addition to meeting the survey requirements of the Rules, the purpose of the survey is as follows:

- Determine whether the system is meeting the requirements of the "Safe Drinking Water Act." If not, determine what is required in facilities or operating procedures to enable the system to produce the required quality of water for present and future consumption.
- Provide the opportunity to offer technical assistance, to provide on-site training to operators and advise administrators of the need to enable their system to provide an adequate supply of high quality water on a continuous basis to their customers.
- Provide a report that presents the basis for future corrective actions; provide information for public relations efforts, and a document usable in applications to the Public Service Commission on rate cases and certificates of convenience and necessity.

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**KEARNEYSVILLE DISTRICT OFFICE  
1948 Wiltshire Road, Suite 6  
Kearneysville, West Virginia 25430  
Telephone: 304-725-9453 Fax: 304-725-3108**

## **PARTIES PRESENT**

<b>NAME</b>	<b>ORGANIZATION</b>
Bradley Reed	Kearneysville, District IV
Alan Marchun	Kearneysville, District IV
Joseph Freeze	Jefferson County PSD
David Staubs	Jefferson County PSD

### **Significant Deficiencies**

- No observations were recorded in this category.

### **Minor Deficiencies**

- The combined vent/overflow pipe for the chlorine contact/storage tank is not properly screened.
- The opening where the rope for the level indicator passes through the chlorine contact/storage tank roof is not sealed.

### **Recommendations**

WVDHHR strongly recommends that the following recommendations be addressed to maintain compliance with primary drinking water regulations.

- 1) Install a 24 mesh non corrodible screen over the chlorine contact/storage tank vent. Protect the vent so birds, insects or rodents, which may enter the pumphouse, cannot contaminate the water.
- 2) Seal the opening where the rope for the level indicator enters the tank roof. The seal should be made, as much as possible, without interfering with the proper functioning of the level indicator.

*Note: it was advised the level indicator is to be replaced as part of the water system's upgrade project.*

- 3) Continue with excellent compliance history of all monitoring and reporting requirements.

## REMINDERS

1. West Virginia and Federal rules require the records of all chemical analyses and copies of written communication relating to inspections be kept on file for a period of **ten (10) years**. Lead & Copper sample results must be maintained for **twelve (12) years**. Monthly Operational Reports and bacteriological sample results must be maintained for at least **five (5) years**.
2. According to West Virginia rules, all plans for the future use of a source of supply, treatment, construction of new wells, water treatment plants, pumping stations, finished water storage facilities and distribution facilities including line extensions greater than 1,000 feet used in connection with the public water supply system must be approved by DHHR in our Charleston office prior to construction. A permit application must be submitted and approved by DHHR/OEHS for any such improvements.
3. West Virginia rules require that you immediately notify the appropriate OEHS offices and responsible local officials when a major breakdown or serious loss of water service occurs which presents or may present an imminent and substantial endangerment to human health.
4. **Operator training hours are required during every two-year renewal period for water and wastewater operators.** Failure to attain the required continuing education hours (CEH) will result in non-renewal of an operator's certificates. Please contact the Certification and Training Unit at 304-356-4335 or our District Office if you need a list of training classes and dates.

Data collected during the survey is contained in the following report of the system's physical facilities and operations. Representatives of the water system are encouraged to carefully examine this report. Should any item appear misstated, omitted or you have any comments or questions concerning this report, please contact our office at 304-725-9453 or by e-mail at [bradley.r.reed@wv.gov](mailto:bradley.r.reed@wv.gov).

Sincerely,

*Brad Reed*

Bradley Reed, P.E.  
Kearneysville District Office

BRR:yw

pc: Lisa Coleman, WV Public Service Commission  
Jefferson County Health Department  
District Office Coordination and Enforcement Unit, EED



OFFICE OF ENVIRONMENTAL HEALTH SERVICES  
KEARNEYSVILLE DISTRICT HEALTH OFFICE

**SANITARY SURVEY**

Survey Date: March 11, 2014

**JEFFERSON COUNTY PSD  
CAVALAND WATER SYSTEM**

**(PWSID #WV3301972)**

**SOURCE:** Ground Water

**CLASSIFICATION:** Class I

**INSPECTED BY:** Bradley R. Reed, P.E.

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## REPORT SUMMARY

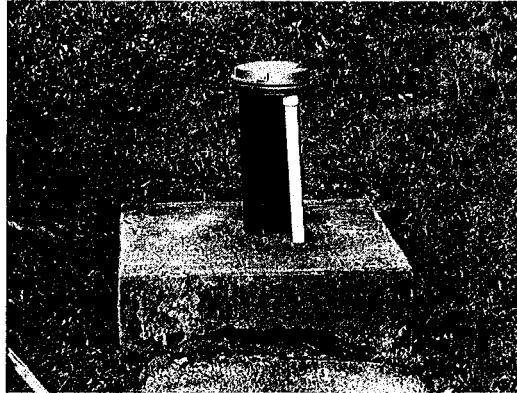
The Jefferson County PSD/Cavaland Water System serves 40 customers in the Cavaland Subdivision located on Engel Molers Road in Jefferson County. Based on the source being groundwater, complexity of treatment and population served, the Cavaland water system is classified a Class 1 Public Water System.

Source water for the system is supplied by a drilled well, with the treatment process consisting of disinfection and retention in a 5,500 gallon plant storage tank/clearwell. The distribution system consists of 3,135 LF of 4", 1,245 LF of 2" mains and four gate valves. Water is pumped on demand from the storage tank into the distribution system by two centrifugal pumps which are controlled by a pressure switch and cycles against a 525 gallon hydro-pneumatic pressure tank. All maintenance and operations of the treatment plant and distribution system is performed by the PSD staff.

All required monitoring is being performed and records of monitoring results and operational reports are maintained at the PSD office. There have been no violations issued to the system in the past three years. Since the last survey was conducted in March 2009, the PSD has obtained funding to replace the existing water mains, booster pumps, hydro-pneumatic tank, chemical feed equipment, and add a SCADA system (Permit No. 19,101). No significant deficiencies were observed during the survey.

## SOURCE

Source water for the system is supplied by a 6" diameter drilled well, constructed in in 1987. Information available on the construction of the well is summarized below:



Well #1

WELL #1	
<b>Well Name:</b>	Well #1
<b>Date Drilled:</b>	1987
<b>Well Depth:</b>	450 ft.
<b>Casing Type:</b>	Steel
<b>Casing Diameter:</b>	6 <sup>5</sup> / <sub>8</sub> "
<b>Casing Height above ground level:</b>	24"
<b>Casing Depth:</b>	40 ft.
<b>Grout Depth:</b>	40 ft.
<b>Well Cap:</b>	A & B Casting (Vermin Proof)
<b>Completion Report Available:</b>	No
<b>Well Yield:</b>	Reported to be 30 GPM
<b>Static Water Level:</b>	unknown
<b>Comments:</b> the source water is hard (278 mg/l CaCO <sub>3</sub> ).	

**SOURCE**

**WELLHEAD PROTECTION PROGRAM**

**Has a Wellhead Protection Area (WHPA) been established?**

Yes  No

*2,000 ft. fixed radius around the wellhead.*

**Have the potential contamination sources been identified?**

Yes  No

*List of potential contamination sources updated in August 2012.*

**Is the area around the wellhead protected?**

Yes  No

*Potential sources of contamination have been maintained greater than 100 ft. from the wellhead.*

**Does the system have an emergency response plan?**

Yes  No

*The Source Water Protection Plan and Emergency/Contingency Plan were updated by Jefferson County PSD and approved by the Source Water Unit in August 2012. With Well # 1 being the lone source, the PSD must rely on the storage in the 5,500 gallon clearwell and hauling of potable water in the event of contamination or a shortage of source water.*

**Watershed Characteristics (soil types, activities)?**

*The well is located in karst limestone geology and has been classified by the Source Water Unit as having a high susceptibility to contamination by the potential contamination sources. The primary activity within the wellhead protection area is agriculture and residential.*



**SOURCE**

**SOURCE WATER QUALITY  
(ALL SOURCE WATER TYPES)**

**Does the system regularly monitor raw water?**  Yes  No

*Jefferson County PSD does not routinely monitor the source water quality (prior to any treatment). Source water samples collected during the survey showed Coliform –absent, pH 7.4 SU, Hardness 278 mg/l CaCO<sub>3</sub> and Alkalinity 120 mg/l CaCO<sub>3</sub>.*

*Samples collected at the entry point to the distribution system (after treatment) have shown all regulated Inorganic Contaminant (IOCS) levels, Volatile Organic Chemicals (VOCS), Synthetic Organic Chemicals (SOCS) as well as radiological materials to be non-detected or if detected, to be at levels below the established maximum contaminant levels (MCLs). A sample collected for Nitrates in May 2013 (5.45 mg/l) and a confirmation sample collected in August 2013 (6.10 mg/l) showed the Nitrate level to be greater than 50% of the MCL of 10 mg/l. The system was required to begin quarterly monitoring for Nitrate beginning January 2014.*

**List known causes of raw quality fluctuations:** *It was reported there are no fluctuations in the raw water quality.*

**Does source generally supply enough quantity to meet demand?**  Yes  No

**Does the system regularly have seasonal shortages of raw water?**  Yes  No

**Has the system ever had a shortage of raw water?**  Yes  No

**Has the system ever instituted a conservation plan?**  Yes  No

**Is there a master meter to measure quantity of water treated?**  Yes  No

**Are there problems with silting, debris, or clogged screens?**  Yes  No

**Is there system duality (can system meet demand with a unit out)?**  Yes  No

**Are there regular checks of the actual capacity vs. design capacity?**  Yes  No

**Are the source facilities visited/inspected daily?**  Yes  No

**Do the source facilities appear to be well maintained?**  Yes  No

**Are the source facilities protected from entry by animals?**  Yes  No

**Do the raw water lines deliver water directly to the treatment plant?**  Yes  No

**Are the raw water lines reliable for continuous flow?**  Yes  No

**Is the source used as the best possible available source?**  Yes  No

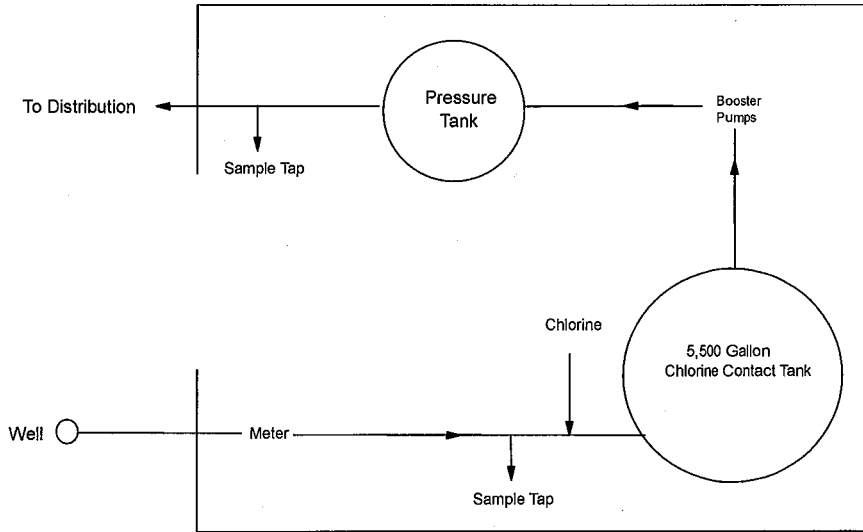
**Raw water facility design capacity:** 30 GPM

**Actual measured raw water facility capacity:** 29 GPM

**TREATMENT**

The treatment process consists of disinfection and retention in a 5,500 gallon chlorine contact tank. Operational records show that during the past year, water was treated an average 3.07 hours per day producing 5,438 gallons of water. The water treatment plant is controlled automatically based on the water level in the 5,500 gallon contact tank. All treatment facilities are housed in a concrete block and wood frame building which is locked when an operator is not present.

**Treatment Schematic**



**Treatment Facility Name:** Cavaland Treatment Plant

**Is the treatment facility out of the 100-year flood plain elevation?**       Yes     No

**Does the system have a backup source of power?**       Yes     No  
*Portable generator with manual transfer switch.*

**If the system has a generator, how often is it tested?** Portable generator is tested only when used

**Does the system have duality (can system meet demand with a unit out)?**     Yes     No

**Does the system regularly check the actual capacity vs. design capacity?**     Yes     No  
*High service pumps are not metered.*

**Average Production Data**

	YEAR		
	2013	2012	2011
<b>Daily Water Treated (gal.)</b>	5,438		
<b>Daily Pumping Time (hours)</b>	3.07		

Specify the treatment process/objective which best describes the facility:  
 (See pages 3-38, 3-39, and 3-40 of the EPA Guidance Manual for description of each)

Conventional Filtration		Direct Filtration		In-Line Filtration	
Slow Sand Filtration		Single Stage Softening		Two Stage Softening	
Conventional Filtration/Softening		Split and Complex Treatment		Membrane Filtration	
Greensand Filtration		Simple Aeration Plant		Disinfection Treatment	√

**CHEMICALS AND CHEMICAL FEED SYSTEMS**

List the chemicals currently being used /applied:

Name of Chemical	Point of Application	ANSI/NSF Std. 60 Approved	
		YES	NO
[Hatched area]			
8.25% Chlorine Bleach	Ahead of contact tank		

Are the chemicals used appropriate for treatment desired/required?  Yes  No

List the chemical feed systems being used:

Chemical	Feeder Type/Model	Size	Max. Pressure	Current Settings
Chlorine	LMI Metering Pump	1 GPH	100 psi	90% stroke 90% speed

Are all feeders sized above the historical maximum dosage rate?  Yes  No

Are the feeders used compatible with chemicals used?  Yes  No

Are the feeders used in good condition?  Yes  No

Do all feeders have adjustable feed rates?  Yes  No

Are the feed rate adjustments made manually or automatic? Manual  Automatic

How often are chemical feeders calibrated/checked for accuracy? Never

How are the quantities of chemicals fed determined? Estimated  
 (weighted by scales, calculated, etc.)?

Does the system have duality for each of the feed systems?  Yes  No

If the system does not have duality for each, are adequate spares available?  Yes  No

Does the system achieve a 4-log virus inactivation as required by the Ground Water Rule? *See CT calculation below*  Yes  No

What is the free chlorine residual in the contact unit/zone? 0.9 mg/l

What is the minimum required free Cl<sub>2</sub> residual to achieve 4-log virus reduction? 0.6

List the storage used for each chemical:

Chemical	Storage container type	Where Stored	Normal Quantity Stored
Chlorine	64 oz. containers	pumphouse	4-6 containers

If bulk tanks are used, are day-use tanks provided? *N/A*  Yes  No

Are all chemical storage areas adequately labeled/marked?  Yes  No

Does the system have backflow prevention on each of the feed units?  Yes  No

Is adequate ventilation provided in all chemical feed/storage areas?  Yes  No

**CLEARWELL**

What is the clearwell volume? 5,500 gallons

Is the clearwell protected from contamination?  Yes  No  
*Seal where level indicator rope enters tank and screen needs installed on combined vent/overflow.*

Is the clearwell baffled?  Yes  No

Calculation of Virus Inactivation and Removal		
Cavaland 3301972		
Variables		
4100	gallons	contact tank volume
0.30	gals / gal	baffling factor for contact tank
120	gpm	flow rate of water through plant
0.9	mg / L	concentration of Cl <sub>2</sub> in water
10.0	deg C	temperature of water
7.4	pH	pH of water
Log inactivation / removal =		6.24
<i>Valid for pH between 6 and 9</i>		

**DISTRIBUTION SYSTEM**

**Does the system have accurate and up-to-date distribution mapping?**       Yes    No  
*As-built maps will be provided as part of water main replacement project.*

**Does the mapping show all line, valve and hydrant locations?**       Yes    No

**Does the mapping show pipe sizes and materials?**       Yes    No

**Does the system maintain a distribution maintenance record?**       Yes    No

**Does the system maintain a customer complaint record?**       Yes    No

**Minimum pressure in the system:** 40 psi in pumphouse (minimum distribution pressure unknown)

**Maximum pressure in the system:** 70 psi in pumphouse

**Piping materials/sizes used:** 3,135 LF of 4", 1,245 LF of 2" PVC mains

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**Does the system flush mains regularly?**       Yes    No      **How often?** \_\_\_\_\_

**Are the valves exercised regularly?**       Yes    No      **How often?** \_\_\_\_\_

**Does the system disinfect all new lines?**       Yes    No

**Does the system disinfect all repaired lines?**       Yes    No

**Does the system perform bacteriological testing for all new lines?**       Yes    No

**Does the system perform bacteriological testing for all repaired lines?**       Yes    No  
*BWN only*

**Does the system maintain adequate repair materials on-hand?**       Yes    No

**Does the system have a formal Cross-Connection Control Program?**       Yes    No

**Has the system made inspections for cross-connections?**       Yes    No

**Has the system required the installation of any backflow prevention assemblies?**       Yes    No  
*All customers are residential. Public education material has been distributed to all customers.*

**Are all customers metered, including facilities such as fire stations?**       Yes    No  
*One customer is not metered.*

**What is the latest reported/calculated water loss?** 36%  
*All water mains are to be replaced.*

**DISTRIBUTION SYSTEM**

Service Connection Summary			
	Commercial	Residential	Public
Number of connections		40	
Meter Size		5/8" x 3/4"	

Population served: 107

Any purchase system?       Yes    No    List them: \_\_\_\_\_

Does the system purchase from another:       Yes    No    List: \_\_\_\_\_

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Total population served (with all purchase systems)? 107

**FINISHED WATER STORAGE**

HYDROPNEUMATIC TANKS

Name of unit/facility: Booster Pumps

Location: Treatment Plant

Total volume (air + water): unknown      Maximum water volume: unknown

Current Pressure Settings:      High setting 70 psi      Low setting 40 psi

Air relief valve?       Yes    No      Pressure gauge?       Yes    No

Tank visually appears to be in good operating order?       Yes    No

General Comments: tank is to be replace with a diaphragm pressure tank as part of the  
construction project.

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**PUMPS / PUMP FACILITIES AND CONTROLS**

Pump Name/Use: Well Pump

Displacement Pump:            Reciprocating             Rotary             Other

Centrifugal Pump:            Vertical Turbine             Submersible             Other

Pump Capacity: 30 GPM

Pumps Controls: floats in clearwell

Flow Meter?             Yes  No            Hour Meter?  Yes  No

P&M schedule?             Yes  No            Properly working?  Yes  No

Spare available/duality?             Yes  No

Is pump at a booster station (other than treatment area, well, or intake)?             Yes  No

Pump Name/Use: Booster Pumps (120 GPM close coupled centrifugal pumps operated in series)

Pumps are to be replaced with 120 GPM duplex pumps with VFD as part of the water project.

Displacement Pump:            Reciprocating             Rotary             Other

Centrifugal Pump:            Vertical Turbine             Submersible             Other

Pump Capacity: 120 GPM

Pumps Controls: pressure switch

Flow Meter?             Yes  No            Hour Meter?             Yes  No

P&M schedule?             Yes  No            Properly working?             Yes  No

Spare available/duality?             Yes  No

Is pump at a booster station (other than treatment area, well, or intake)?             Yes  No

**MONITORING / REPORTING/ DATA VERIFICATION**

**Current violations?**  Yes  No

**If so, list violations:** \_\_\_\_\_

**Have all required sampling plans been submitted?**  Yes  No

**Have all Monthly Operational Reports (MORs) been submitted?**  Yes  No

**Have the MORs been completed properly?**  Yes  No

**Have all Phase II/V tests been conducted / submitted?**  Yes  No

**Have the Phase II/V tests been conducted properly?**  Yes  No

**Have all bacteriological tests been conducted / submitted?**  Yes  No

**Have the bacteriological tests been conducted properly?**  Yes  No

**Have all Lead & Copper tests been conducted / submitted?**  Yes  No

**Have the Lead & Copper tests been conducted properly?**  Yes  No

**Is the system conducting all DBPR testing?**  Yes  No

**Have all Public Notices been conducted as required?**  Yes  No

**Does the system have proper monitoring equipment?**  Yes  No

*HACH CN 67 test kit for free & total chlorine and pH.*

**Is monitoring equipment properly calibrated?**  Yes  No

*Chlorine color wheels must be replaced annually.*

**Any Boil Water Notices issued since the last sanitary survey?**  Yes  No

**If so, list reasons:** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



**WATER SYSTEM MANAGEMENT / OPERATION**

Are the administrative files up-to-date?  Yes  No

Are files maintained for correct time frames?  Yes  No

Do files contain all required items?  Yes  No

**SYSTEM EMPLOYEES / PERSONNEL**

Employee / Personnel Name	Title
Peter Appignani	Chairman/ Board of Directors
William Strider	Treasurer /Board of Directors
Susanne Lawton	General Manager
April Williams	Finance Manager
Joe Freeze	Operations Manager
Amanda Robinson	Billing
Trish Fowler	Receptionist
Matt Piepenburg	Engineering Tech
Ashley Wilt	Administrative Assistant

Are personnel adequate to maintain the system?  Yes  No

**WATER SYSTEM MANAGEMENT / OPERATION**

**Describe the planning / purchasing process:** Can purchase up to \$600 for supplies. Anything over \$600 must be approved by the General Manager.

**Does system have O&M manuals?**  Yes  No  
*O&M manuals will be provided with all equipment installed as part of the construction project*

**Does system have a SOP?**  Yes  No

**Is system self-supporting?**  Yes  No

**Income/revenue for previous year:** \$15,358.88

**Expenses for previous year:** \$15,003.02

**OPERATOR COMPLIANCE WITH STATE REQUIREMENTS**

LIST OF OPERATORS

Operator Name/Title	Certification Level / Number	Expiration Date
David Staubs/Chief Operator	Class DW-1	6/30/2014
Dewayne Ainsworth/Operator	Class WD	4/30/2015
Collin Cole/Operator	Class WD	2/28/2014
Joseph Freeze/Operations Manager	Class WD	12/31/2014

**Is number of operators sufficient to operate/maintain system?**  Yes  No

**Do operators have proper knowledge to operate/maintain system?**  Yes  No