



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. Boling
Cabinet Secretary

April 14, 2016

Ms. Amy Wilson, City Manager
City of Shinnston
40 Main St.
Shinnston, West Virginia 26431

RE: Shinnston Public Water Supply
PWSID #3301721
Harrison County

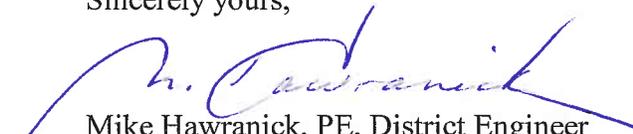
Dear Ms. Wilson:

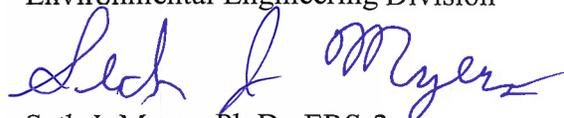
Enclosed is the report for the yearly site visit which was conducted on March 28, 2016 at Shinnston's community public water supply. The operations staff is commended for their efforts in operating the water supply in accordance with the mandates of the US EPA Safe Drinking Water Act (SDWA), as amended, and with the WV Public Water Systems Legislative Rule.

There have been some improvements since the 2015 sanitary survey, with a capital improvement project slated to address the other larger investment items.

After you have reviewed the attached report with your operations staff, please contact this office with questions or concerns. This office wants to work with you and your staff to insure that the Shinnston community public water supply is in compliance with all of the mandates imposed by the federal Safe Drinking Water Act, as amended and the West Virginia Public Water Systems Legislative Rule.

Sincerely yours,


Mike Hawranick, PE, District Engineer
Environmental Engineering Division


Seth J. Myers, Ph.D., ERS-2
Environmental Engineering Division

MH:mh

pc: Water Board, City of Shinnston
Scott Aldridge, Chief Operator
Central Office File, Water Sanitation Surveys

FAIRMONT DISTRICT OFFICE
416 Adams Street, Suite 530
Fairmont, West Virginia 26554
Telephone: 304-368-4420 Fax: 304-367-2755

**WEST VIRGINIA BUREAU FOR PUBLIC HEALTH
OFFICE OF ENVIRONMENTAL HEALTH SERVICES
ENVIRONMENTAL ENGINEERING DIVISION
PUBLIC WATER SUPPLY INSPECTION REPORT**

Date of Report April 14, 2016
County Harrison

System Name Shinnston Public Water System

PWSID # 3301721

System Address 599 Manley Chapel Road, Fairmont, WV 26554

Telephone 304-534-3758 WTP
304-592-2126 City Hall
304-592-0092 Public Works Office

Plant Classification II Source Tygart Valley River

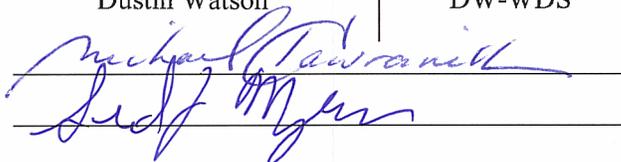
Purchasing Systems Bingamon PSD, Hutchinson Community Water Assoc., Tri-County Water Assoc., Worthington

Person(s) Contacted Scott Aldridge Title Chief Operator
Charles Dotson Operator

Operator(s) and Classification(s)	Name	Classification	WVOP #	Expiration Date
	Scott Aldridge	DW-2	00591	2/28/2018
	Charles Dotson	DW-2	00095	4/30/2017
	Dustin Watson	DW-WDS	27013	3/31/2017

Inspector's M. Hawranick

Signature Seth. Myers



Date 3/28/2016 Time AM

Violations and/or deficiencies were noted in the following areas:

OK	See: item 4g & 10	See: item 1	OK	OK	See: bullets below
Disinfection	Records	Operator Cert.	Turbidity	Safety	Other

Noteworthy items include:

- Continue to move forward regarding improvement project as being prepared by Stantec (Richard Gains) to addresses unresolved 2015 sanitary survey deficiencies.
- Clean sedimentation basin/Backwash holding basins regularly. Fix docks on the backwash holding basins
- Unaccounted-for losses in the distribution system are >15%. Approximately 20%
- Submit CCR confirmation form to Dan Parker EED, Charleston, WV on/before October 1 each year.
- Collect another round of Synthetic Organic Compound (SOC) samples before 2017.
- Implement an active cross-connection, backflow prevention program.
- Finalize RTCR Bacti Sample site plan to include specific addresses and a map.

Comments:

1. **Weekly operation time of 91 hrs per week indicates another certified water operator is needed at the plant.** PWS operators must renew their licenses every two years. Class 2, 3, and 4 water system operators must obtain 24 continuing education hours (CEHs) every two years before renewing their licenses. Class WDS operators must obtain 6 CEHs every two years before renewing their licenses.
2. Monthly operational reports (MORs) are kept on file at the water treatment plant. The February 2016 EW-90 MOR was reviewed during the recent visit, summarized as follows:

EW-90 Monthly Operational Report, February 2016	
Plant operation	376 hours (13 hours/day average)
Water produced	39,412,000 gallons (1748 gpm average)
Filter surface area	744 ft ² (2-372 ft ² filters) (2.4 gpm/ft ² ave)

	62 - 8"x9' cells in each filter
DelPAC 2020, pre-fed (~10.4 lbs/gal)	1006.5 lbs. (31 ppm average)
NaOH 50%, post-fed (~13.1 lbs/gal)	1802 lbs. (5 ppm average)
H ₂ SiF ₆ , post-fed (18.2% F @ 23% chemical purity)	1448lbs. (0.27 ppm F, average)
Powdered Activated Carbon	0 lbs., normally fed during summer/fall
Chlorine (gas), pre-fed	0lbs. (0 ppm average)
Chlorine (gas), post-fed	790 lbs. (2.05 ppm average)
Backwashes	402 total
Backwash water used*	~2.8 MG (7%) high (improvement from 2013)

EW-90, February 2016 (Water Quality)			
Parameter	Raw Water	Settled Water	Treated Water
Chlorine residual, mg/l	--	--	1.0 – 1.8 ppm, free, WTP
Chlorine residual, mg/l	--	--	1.4 – 2.0 ppm, total, system
pH, std. units	7.1 – 7.4	7.1 – 7.4	7.1 – 7.4
Total alkalinity, mg/l	15 – 22	--	14– 20
Turbidity, NTU	6.0 – 48.9	1.2 – 1.5	0.05 – 0.06
Ca-hardness, mg/l	32 - 37	--	28 - 36
Iron, mg/l (every 3 days)	0.12 - 0.39	--	0.01 - 0.03
Manganese, mg/l (every 3 days)	0.00 – 0.2	--	0.012 – 0.039
Temperature, °C*	--	--	--
Total dissolved solids, mg/l*	--	--	--
Langelier Saturation Index*	--	--	--

*Consider populating these categories

EW-90A, pg. 1 February 2016 (Turbidity)	EW-90A, pg. 2 February 2016 (Turbidity)
97 entries/readings taken at least every 4 hours maximum entry = 0.07 NTU , OK 100% ≤0.30 NTU, OK & 100% ≤0.10 NTU, OK	No excursions reported.

Treatment facility met filtered water optimization goal of ≤0.10 NTU 100% of the time during 2015. The settled water goal of 1 NTU was not achieved, pointing toward the need to clean the sedimentation basin

EW-90B, February 2016 (Chlorine Residual)	EW-80 February 2016 (Fluoride)
Continuous monitoring, with the lowest value each day recorded on the EW-90.	39.4 MG produced. 1436 lbs. H ₂ SiF ₆ dosed (23%). F12 res.: 0.670 – 0.83 ppm, Ave. F12 res.: 0.74 ppm. 2/20/16 WV- Env Chem Lab result for: 0.64 mg/l Shinnston WTP lab result: 0,75 mg/l

A review of the EW-90C for January – December 2015 shows average raw water TOC of 1.0 ppm for the year, and an average treated water TOC of 0.7 ppm for the year...excellent results confirming the water treatment facility is in compliance with the Step 1 Enhanced Coagulation requirements of the S1DBPR.

MORs indicates that filtration/chemical feed rates and treated water parameters are all within expected and acceptable ranges for the month of February 2016.

- Customer base includes 2029 residential, 181 commercial, 11 governmental, 4 resale, and 1 industrial

customer. The system population is calculated as: $2029 \times 2.42 = 4,910$ persons.

Population served includes: Bingamon PSD (1247 persons), Worthington (680 persons), Hutchinson (377) and Tri County Monongah Hts Apts. (122). Added to Shinnston's base population of 4910, the total population served by the WTP is 7,336. Shinnston water system classification remains as a Class II public water supply.

4. Water Monitoring Programs include:

- a) Six routine **bacteriological samples** are collected each month for analyses of total coliform bacteria in accordance with the revised sample site plan submitted in 2016, for PWSs with populations of between 4901 and 5800 persons. Samples are analyzed by the Clarksburg Water Board. Satisfactory results have been reported for the past two years for all routine compliance samples.
- b) **Lead & copper** sampling was last performed on August 23, 2013, for the 2011 – 2013 sampling period, with satisfactory results reported by Reliance Labs (i.e., Lead and copper results were below the 90th % action level of 15 ug/l for lead and 1.3 mg/l for copper, OK).

Summary of 8/2013 Pb/Cu results	Pb	Cu
Detects	1 detect in 20 samples	20 detects in 20 samples
Highest value	0.018 mg/l	0.357 mg/l
Action Level	0.015 mg/l	1.3 mg/l
Results > 90 th percentile Action Level	1 (see above)	

Twenty lead and copper samples must next be collected between June 1 & September 30, 2016, for the 2014 – 2016 sampling period. Keep lead & copper test results on file for at least 12 years. Send a copy of the lead test results to each customer where samples were collected, and a certification form to the EED to confirm that all customers were advised of their test results. A copy of the notification forms can be downloaded from our web site at www.wvdhhr.org/oehs/eed.

- c) **Phase II, II-B, and V sampling** was reviewed for nitrates, inorganics, regulated VOCs, and regulated SOCs. The 1st quarter nitrate sample was last collected on 4/4/2015 with a satisfactory test result ($\text{NO}_3 = 0.54$ ppm) reported by Reliance Labs. During the site visit, staff operators indicated they collected the 1st quarter 2016 nitrate sample.

Inorganics were last collected on 6/17/2015 with satisfactory results reported by Reliance Labs (i.e., all parameters were “ND” except for Ba = 0.3 ppm, F = 0.50 ppm, and Na = 12.2 ppm, OK). The next round of inorganics must be collected anytime during 2016.

Volatile Organic Compounds (VOCs) were last collected 6/17/2015, with “ND” reported by Reliance Labs for all 21 parameters. The next round of VOCs must be collected anytime in 2016.

Two rounds of SOCs must be collected every three years. During the 2014 – 2016 period, one round of SOCs were collected 12/15/14 with no-detects for the 33 parameters analyzed. **Make sure to collect another round of SOC samples before 2017.**

- d) One round of **radionuclides** must be collected every six years. Radionuclides were last collected on 10/29/2013, with satisfactory test results reported by Summit Environmental (i.e., Gross Alpha <3

pCi/L, and Radium 226 and 228 were <1 pCi/L, OK).

- e) In November 2014 DBP monitoring stitched from the S1DBP Rule to the S2DBPR. S2DBP Rule samples are collected from two locations: the Main Office location (THM only), and the Charles Dotson residence (HAA5 only). Monitoring for disinfection by-products (DBPs) is being conducted once per quarter, with analyses performed by Reliance Labs. The most recent 4 quarters include:

Date	TTHMs, ug/l Main Office	HAA5s, ug/l Dotson Res.
11/4/15, 4 th Qtr 2015	46.8	27.8
8/5/15, 3 rd Qtr 2015	62.9	27.0
5/5/2015, 2 nd Qtr 2015	14.4	10.9
2/3/16, 1 st Qtr 2016	0.8	6.3
total	124.9	72
Running Annual Average (RAA)	31.2	18
Max. Contaminant Level (RAA)	80 ug/l	60 ug/l

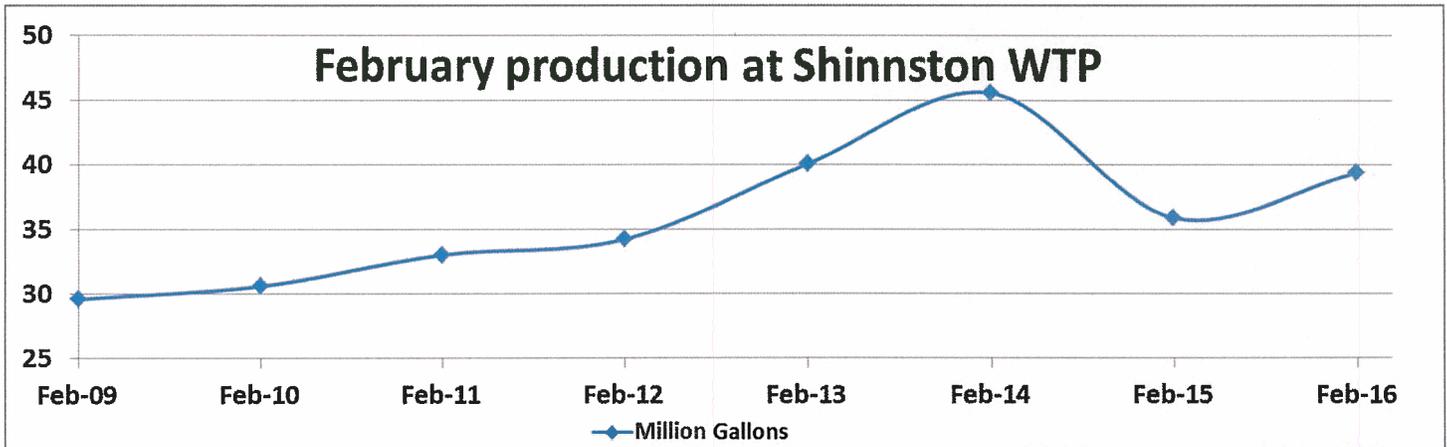
The RAA values are below the maximum contaminant levels (MCLs) for TTHMs and HAA5s. The City of Shinnston will continue compliance sampling for the DBPs on a quarterly schedule, from the approved sampling locations

- f) Round Two of the **Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR)** monitoring for **E. coli** will begin 7/1/2017 with plan submittal, and sampling to begin by October 2017. If **cryptosporidium** is required, plan are to be submitted by 1/1/2019, with sampling to begin by April 2019.

The **Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR)** required e-coli and/or Crypto analyses of the raw water. E-coli sampling was suspended in December 2008 and cryptosporidium analysis was performed (in conjunction with Monongah) between 6/17/2009 and 5/16/2011, with analyses performed by Analytical Services Inc., of Williston, VT. No cryptosporidium oocysts were identified in the 24 monthly samples, so Shinnston (and Monongah) have been placed in Bin-1 under the LT2ESWTR program, and additional treatment to remove cryptosporidium was not required.

- g) The most recent **Consumer Confidence Report (CCR)** was received by the EED on March 8, 2016, based on 2015 operational data. **The certification form that the CCR had been properly distributed to all customers has not yet been received.** Water system authorities are reminded that CCRs must be submitted by July 1 each year based on the previous year's data, and the certification form, to confirm that the CCR was properly distributed to all customers, must be received by the EED by October 1, each year. Keep copies of your CCRs on file for at least five years.

5. Distribution system accountability is reviewed monthly. According to water clerk records on file for Jan 2016 – Feb 2016 a total of 79.4 MG of water was produced, 57.7 MG (72.9%) was sold, non-revenue use was not available (assume 7%, say 5.5 MG); leaving about 16.2 MG (20%) as unaccounted-for losses. The State of West Virginia recommends that unaccounted-for losses of ≤15% be maintained, thus Shinnston is doing a fairly good job, with room for improvement. Please use WVRWA's Water Loss Report.



The above chart indicates an upward trend in plant production rates that may be connected to additional leakage in the Distribution System. In February 2015, 6.2 MG of the 25.2 MG of finished water sold (or 25%) was sold to the 4 bulk purchasers (Bingamon, Hutchinson, Worthington, and Monongah Hts Apts).

6. Chemical feeders were reviewed briefly during the site visit, as summarized below:

- a. **DelPAC 2020** is stored in several 330-gallon solution barrels and is being pre-fed using a 170-gpd Stenner dual-head liquid feed pump. One dose line is injecting DelPAC ahead of the flash mixer, and one dose line is injecting DelPAC just after the flash mixer. During the 3/28/2016 site visit, feeder settings of 100% (i.e., 10 of 10) with plant production rate of 1734 gpm, yields: $[170\text{gpd} (10.2 \text{ \#/gal})] / [2.5 \text{ MG} (8.34 \text{ \#/gal})] = 83 \text{ ppm}$ does rate, higher than anticipated. In February 2016 an average DelPAC dose rate of 31 ppm was reported. A second dual-head Stenner feeder is also available on top of the flash mixer, which is used if the raw water turbidity exceeds 100 NTU.
- b. **Sodium hydroxide (50% NaOH)** is post-fed from a 525-gallon container in the exterior room. Chemical is fed using an LMI feeder, rated at 192 gpd and 60 psi (max). A setting of 20% speed & 40% stroke & a plant production rate of 1734 gpm, yields: $[192\text{gpd} (6.4 \text{ \#/gal})0.2(0.4)] / [2.5(8.34)] = 4.7 \text{ ppm}$ dose rate. (50% NaOH weighs 13.1 lbs/gallon, and contains 6.38 pounds of NaOH per gallon). In February 2016 an average NaOH feed rate of 5 ppm was reported.
- c. **Hydrofluosilicic acid (H₂SiF₆)** is post-fed from a 750-gallon tank using a Stenner feed pump rated at 170 gpd and 100 psi (max). The February 2016 EW-80 MOR indicated an average fluoride concentration in the treated water of 0.70 ppm, with a monthly confirmation test result of 0.76 ppm reported by the WV Office of Laboratory Services.
- d. **Chlorine gas** is pre- and/or post-fed from ton cylinders, using a cylinder-mounted Regal gas feeder, with rotameters rated to 100 lbs/day. During the recent visit, chlorine was only post-feed, with a rotameter setting of 55 lbs./day. At a production rate of 1800 gpm, a chlorine dose rate of 2.5 ppm is calculated. During February 2016, an average chlorine dose rate of 2.05 ppm was reported. The separate chlorination room is equipped with a 2-cylinder scale, a new gas sniffer/alarm, vent fan, room light, and a locked access door.

Yearly calibration of all chemical feeders is strongly endorsed.

7. Laboratory equipment in use during the visit is summarized as follows:

- a. **Chlorine residuals** can be analyzed with a Hach DR 2800 spectrophotometer. Also, a Hach CL-17 continuous chlorine monitor is in use to monitor the free chlorine residual of the plant effluent.
 - b. The **filter effluent turbidity** from each filter is monitored continuously using two 1720E in-line turbidimeters. The 1720E units download turbidity data every 15 minutes to an Excel spreadsheet on the WTP computer, currently under repair. Difficulty in easily accessing this information has been an issue. Patriot Automation should instruct staff on how to reliably access turbidity information. A Hach 2100N turbidimeter is also available to monitor the raw and settled water turbidity, and as a backup to the inline units. All three turbidimeters are calibrated on a quarterly basis, through a contract with Hach.
 - c. The **pH of the raw and treated water** is monitored with a Hach color wheel test kit, using phenol red indicator, with a range of 6.5 to 8.5 standard units, with an increment of 0.1 units.
 - d. **Calcium hardness and total alkalinity** are monitored by titration with standard reagents.
 - e. **Fluoride** is analyzed daily with a Hach DR 2800 spectrophotometer & AccuVac SPADNS reagents.
 - f. **Iron and manganese** are also analyzed with the DR 2800 using standard reagents.
8. The adequacy of the disinfection process was evaluated during the visit. **Plant personnel should determine the giardia cyst log inactivation at least once per week, with the most recent 52 weeks of calculations kept on file.** This tool is used when significant changes are proposed to the treatment process. The intent is to measure the pH, temperature, and free chlorine residual at the effluent end of each unit process and then to calculate the giardia cyst log inactivation of the entire treatment facility. The attached CT-calculation for indicates that an adequate log inactivation is being achieved. A giardia cyst log inactivation of at least 3.0 (i.e., 99.9%) is required to maintain compliance with the Surface Water Treatment Rule (SWTR).
9. A review of the filter design indicates that each filter is 9-feet wide by 41.33-feet long, containing 372 ft². Each filter is divided into 62 sections and each section is 8 inches wide and 9 feet long, thus containing 6.0 ft². The design media depth is 10 inches for these filters. Nine (9) inches was measured in filter #2. Operations staff should measure the filter media depths on a regular, frequent schedule, to insure that all portions of each filter contain plus or minus 10 inches of media.

Improvements were noted in the overall filter operation.

10. Establish a formal backflow prevention program. **A cross-connection ordinance was passed by city council on October 11, 2004, but is not yet being actively implemented.** After preparing an inventory of all commercial/industrial customers, which require backflow prevention, insure that all backflow prevention equipment is tested on a yearly basis by a certified tester, with written records maintained on file for at least two years. Yearly testing is to be conducted at the expense of the customer. Copies of the Cross-Connection and Backflow Prevention Manual and the Cross-Connections and Backflow Regulations are available from this office on request or can be downloaded from our web site at www.wvdhhr.org/oehs/eed.
11. During the visit, water samples were collected for analyses of selected chemical and microbiological parameters. Attached results indicate a satisfactory treated water quality for all parameters analyzed.
12. The West Virginia Public Water Systems Design Standards, Title 64 Series 77-8, Pumping Facilities,

requires that at least two pumping units shall be provided. It is important to replace or repair any pumping unit that is not in proper working condition. Shinnston has had difficulty with keeping 2 units (high service and raw water) in proper working order.

Attachments to this report include:

- A. Water Quality Analyses
- B. CT Calculations
- C. 2015 Treatment Barrier Performance Summary
- D. Miscellaneous photos
- E. Sample Schedule



WATER ANALYSIS REPORT FAIRMONT DISTRICT LABORATORY

	PWSID # <u>3301721</u>		
WATER SUPPLY <u>City of Shinnston</u>	COUNTY <u>Harrison</u>		
ADDRESS <u>599 Manley Chapel Road</u>	DATE OF ANALYSIS <u>3/28/2016</u>		
<u>Fairmont, WV 26554</u>	DATE OF COLLECTION <u>3/28/2016</u>		
COLLECTED BY <u>M. Hawranick / S. Myers</u>	TIME OF COLLECTION <u>11:30 AM Raw 11:40 AM Fin</u>		

SECONDARY STANDARDS AND MISCELLANEOUS PARAMETERS

Sample Type	<input checked="" type="checkbox"/> Raw <input type="checkbox"/> Finished	<input type="checkbox"/> Raw <input checked="" type="checkbox"/> Finished	<input type="checkbox"/> Raw <input checked="" type="checkbox"/> Finished	<input checked="" type="checkbox"/> Raw <input type="checkbox"/> Finished	<input type="checkbox"/> Raw <input checked="" type="checkbox"/> Finished
	Raw Tap FDO lab	Finished Tap FDO lab	.	Raw WTP Lab result	Finished WTP Lab result
Alkalinity (PHTH) (as CaCO ₃) (mg/l)	0.0	0.0	.	.	.
Alkalinity (M.O.) (as CaCO ₃) (mg/l)	19.0	18.0	.	.	.
Calcium Hardness (asCaCO ₃) (mg/l)	34.0	32.0	.	39.	42.
Total Hardness (as CaCO ₃) (mg/l)	--. --	--. --	--. --	.	--. --
pH (std. units)	7.3	7.7	.	.	.
*Turbidity (0.3) (NTU)	23.3	0.21	.	38.1	0.06 (11:30)
*Iron (0.3) (mg/l)	0.39	0.00	.	0.16	0.00
*Manganese (0.05) (mg/l)	0.081	0.021	.	0.00	0.015
TDS (mg/l)	80.0	80.0	.	.	.
Temperature (°C) lab	10.0	10.0	.	.	.
LSI (0 = ideal, <0 = corrosive, >0 = scaling)	-2.08	-1.73	.	.	.
Chlorine Residual(mg/l) <input checked="" type="checkbox"/> free <input type="checkbox"/> total	--. --	1.74	.	.	.
Chlorine Residual(mg/l) <input type="checkbox"/> free <input checked="" type="checkbox"/> total	--. --	1.50	.	.	.
Fluoride, mg/l (0.7 target)	0.00	0.61	.	.	0.70

Remarks: _____

Analyst S. Myers

*Maximum desirable concentrations are shown in parenthesis.

FAIRMONT DISTRICT LABORATORY
416 Adams Street, Suite 530
Fairmont, West Virginia 26554
Telephone: 304-368-4420 Fax: 304-367-2755

WATER BACTERIOLOGICAL REPORT		COUNTY OF ORIGIN: <u>HARRISON</u>	
REPORT TO BE CHARGED TO:		NAME OF WATER SUPPLY: <u>SHINNISTON</u>	
NAME: <u>N/A</u>		P.W.S. I.D. # <u>3301721</u>	
ADDRESS: <u>N/A</u>		CODE <u>645725</u>	
CITY/STATE/ZIP:		COLLECTOR: <u>Antoine</u> TITLE: <u>D. Eng</u> CERTIFICATION #: <u>N/A</u>	
COLLECTORS ORGANIZATION: <u>WV-DPH-EE0</u>		PHONE: <u>641-5564</u>	
SAMPLE TYPE:			
<input type="checkbox"/> COMPLIANCE (SDWA): <input type="checkbox"/> CWS <input type="checkbox"/> NTNCWS <input type="checkbox"/> TNCWS <input type="checkbox"/> RAW (DILUTIONS REQUIRED): <input type="checkbox"/> SURFACE <input type="checkbox"/> GROUND <input type="checkbox"/> SPECIAL PURPOSE (need actual count) <input type="checkbox"/> REPLACEMENT FOR LAB#: _____ <input type="checkbox"/> REPEAT FOR LAB#: _____ <input type="checkbox"/> REPEAT ORIGINAL <input type="checkbox"/> REPEAT DOWNSTREAM <input type="checkbox"/> REPEAT UPSTREAM <input type="checkbox"/> REPEAT OTHER: _____		<input type="checkbox"/> INDIVIDUAL HOUSEHOLD <input type="checkbox"/> WELL <input type="checkbox"/> CISTERN <input type="checkbox"/> SPRING <input type="checkbox"/> IS SUPPLY PROTECTED? <input type="checkbox"/> YES <input type="checkbox"/> NO	
<div style="border: 1px solid black; padding: 5px; display: inline-block;"> Received APR 04 2016 WVDPH/EEH/EE0 FAIRMONT D.O. </div>			
REPORT TO BE MAILED TO:			
NAME: <u>WV-DHHR-OEHS</u>		BOTTLE NUMBER: <u>710</u>	
ADDRESS: <u>416 ADAMS ST, SUITE 530</u>			
CITY/STATE/ZIP: <u>FAIRMONT WV 26554</u>			
SAMPLE COLLECTION:		COLLECTOR'S INITIALS: <u>AD</u>	
DATE: <u>3/29/16</u> (MM/DD/YY) TIME: <u>11:00</u> <input checked="" type="checkbox"/> AM <input type="checkbox"/> PM			
CHLORINATED? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO RESIDUAL: <u>0</u> mg/L <input type="checkbox"/> TOTAL <input type="checkbox"/> FREE pH _____		SAMPLING POINT: <u>plant r/w tap</u>	
SAMPLE TRANSPORTATION: <input type="checkbox"/> US MAIL <input type="checkbox"/> UPS <input type="checkbox"/> FEDEX <input type="checkbox"/> OTHER: _____		"DO NOT WRITE BELOW THIS LINE"	
TRANSPORTATION CONDITION: <input type="checkbox"/> PROTECTED FROM SUNLIGHT <input type="checkbox"/> REFRIGERATED <10°C (50°F) "DO NOT WRITE BELOW THIS LINE"		LAB NO. <u>165713</u> DATE REC'D <u>MAR 29 16</u>	
METHOD OF ANALYSIS: <input type="checkbox"/> MUTLI TUBE FERMENTATION SM 9221 B/E		TIME REC'D: <u>9</u> <input checked="" type="checkbox"/> AM <input type="checkbox"/> PM	
<input type="checkbox"/> CHROMOGENIC/FLUOROGENIC SM 9223 <input type="checkbox"/> 18 HR <input type="checkbox"/> MULTIWELL		REC'D BY: <u>TBMF</u> TEMP: _____ °C	
<input type="checkbox"/> HETEROTROPHIC PLATE COUNT SM 9215 B		<input type="checkbox"/> *SAMPLES NOT EXAMINED DUE TO: <input type="checkbox"/> EXCEEDED TIME <input type="checkbox"/> INSUFF. VOLUME <input type="checkbox"/> INSUFF. INFO. <input type="checkbox"/> INVALID COLL. DATE <input type="checkbox"/> UNAUTH. COLLECTOR <input type="checkbox"/> CONT. RES CHLORINE <input type="checkbox"/> INSUFF. AIR SPACE <input type="checkbox"/> DELIQUENT ACCOUNT <input type="checkbox"/> TEMP NOT IN RANGE	
LABORATORY RESULTS:			
TOTAL COLIFORMS: <input checked="" type="checkbox"/> PRESENT <input type="checkbox"/> ABSENT	_____ PER 100mL		
FECAL COLIFORMS: <input type="checkbox"/> PRESENT <input type="checkbox"/> ABSENT	_____ PER 100mL		
E. COLI: <input checked="" type="checkbox"/> PRESENT <input type="checkbox"/> ABSENT	_____ PER 100mL		
HETEROTROPHIC PLATE COUNT: _____ CFU/mL			
<input type="checkbox"/> *INVALID DUE TO: <input type="checkbox"/> TURBID <input type="checkbox"/> COLOR INDETERMINATE <input type="checkbox"/> *LABORATORY ACCIDENT <input type="checkbox"/> *SEND REPLACEMENT SAMPLE			
REMARKS: <input type="checkbox"/> REPORTED <input type="checkbox"/> FAXED TO: _____		DATE REPORTED: <u>30 2016</u>	
<input type="checkbox"/> NOT VALID FOR SDWA COMPLIANCE REPORTING		DIRECTOR: _____	
WEST VIRGINIA DEPARTMENT OF HEALTH AND HUMAN RESOURCES BUREAU FOR PUBLIC HEALTH - OFFICE OF LABORATORY SERVICES		SO. CHARLESTON, WV 25303 KEARNEYSVILLE, WV 25430	

Giardia Cyst Log Inactivation Calculations

PLANT: Shinnston

DATE: 03/28/16

PWSID#: 3301721

* UNIT 1	* UNIT 2	* UNIT 3	* UNIT 4	* UNIT 5	* UNIT 6
Rapid Mix	Floc Tank	Sed Basin	Clearwell	Pipeline	Tank
56377	103403	581645	86638	3100	0
1734	1734	1734	1734	1734	1734
10.00	10.00	10.00	10.00	10.00	10.00
7.20	7.20	7.20	7.80	7.80	7.80
0.00	0.00	0.00	1.81	1.81	1.81
0.10	0.30	0.30	0.70	1.00	0.10
32.51	59.63	335.44	49.96	1.79	0.00
3.25	17.89	100.63	34.97	1.79	0.00
0.00	0.00	0.00	63.30	3.24	0.00
4.53	4.53	4.53	4.99	4.99	4.99
92.83	92.83	92.83	147.00	147.00	147.00
0.00	0.00	0.00	1.13	0.06	0.00

2.50

3.69 (3.0 REQUIRED)

ok

$$\text{LOG} = \frac{\text{CT}}{0.353 * (12.006 + e^{(2.46 - 0.073 * \text{temp} + 0.125 * C + 0.389 * \text{pH})})}$$

$$\text{LOG} = \frac{\text{CT}}{0.361 * \{-2.261 + e^{(2.69 - 0.065 * \text{temp} + 0.111 * C + 0.361 * \text{pH})}\}}$$

Notes:

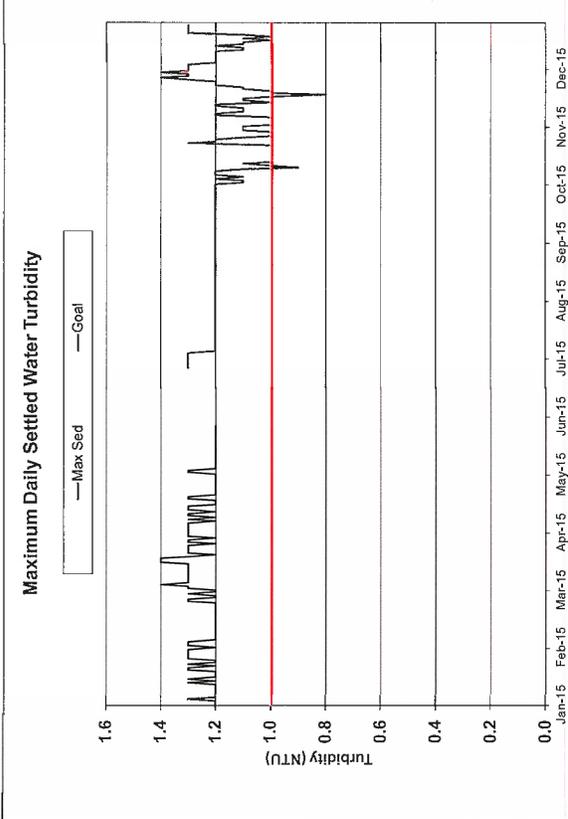
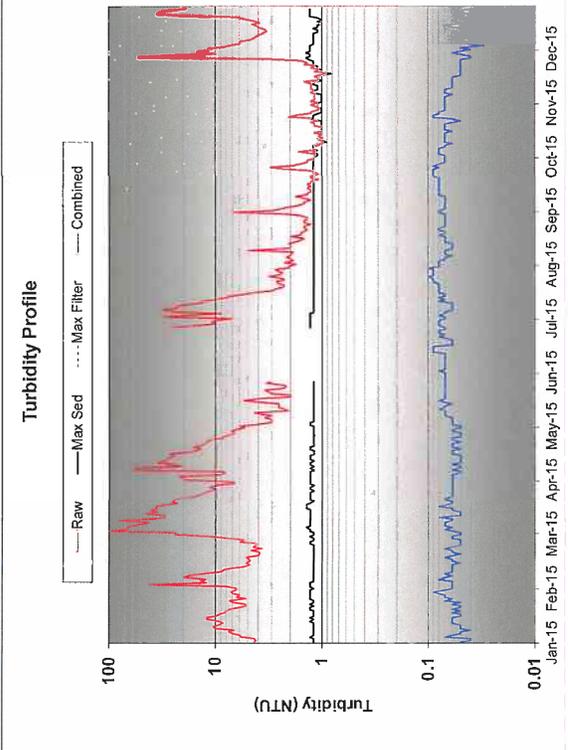
EPA and West Virginia standards require a minimum giardia cyst log inactivation of 3.0 (99.9% reduction), for surface water sources or for ground water under the direct influence (GUDI) of surface water.

The equations used in this program were provided by the USEPA.

Note: Free chlorine residual < or = 3.0 ppm, pH < or = 9.0.

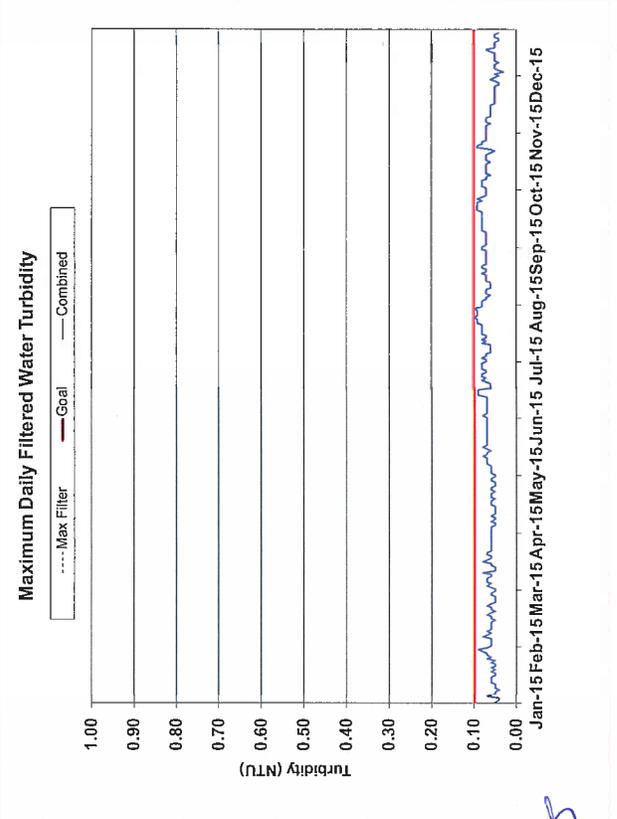
This log inactivation calculation is based on data provided by the operations staff, for the date indicated.

MM/CD
3/22/2016

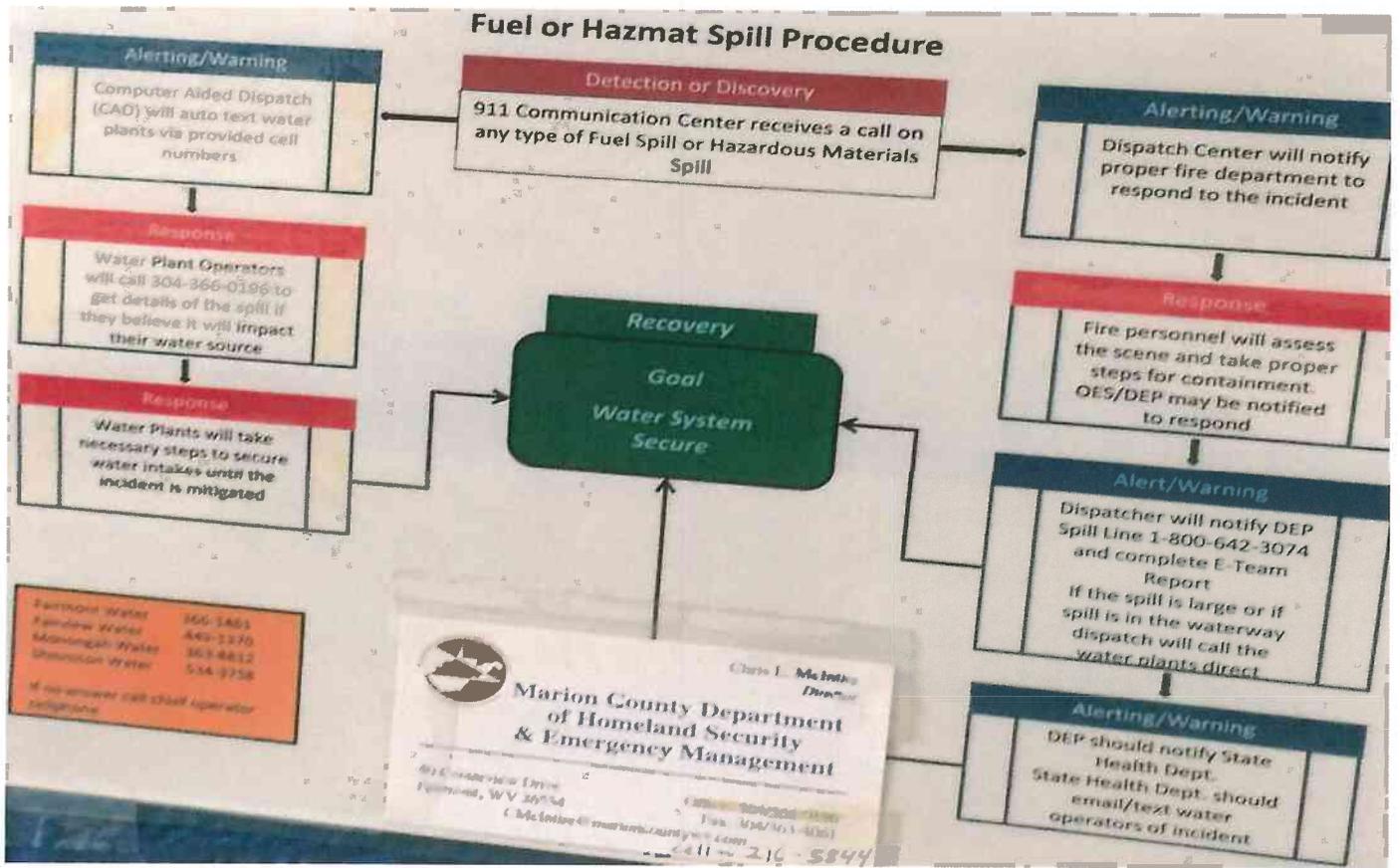


ANNUAL DATA						
	Avg	Min	Max	RSQ	95%	Opt. Goal
	NTU	NTU	NTU		NTU	% Values
Raw Turbidity	9.3	0.9	99.3	n/a	35.5	n/a
Max. Settled Turbidity	1.2	0.8	1.4	0.24	1.3	8.1
Max. Filtered Turbidity					#N/A	n/a
Combined Filtered Turbidity	0.07	0.03	0.10		0.09	100.0

RSQ = Correlation Coefficient for two selected data sets
 95% = 95th Percentile value for data set
 Opt. Goal = % of values in data set that are less than or equal to the selected optimization turbidity goal
 Reg. = % of values in data set that are less than or equal to the regulated turbidity requirement



Good, meets 95% goal



Below left: valves to be upgraded in improvement project. Measured raw water flow rate 1734 gpm 13% below permitted design flow rate of gpm.





New check valve placed on high service pump allowing pumps to meet alternating usage requirement

Sample Schedules

Water System No. :	WV3301721	Federal Type :	C
Water System Name :	SHINNSTON CITY OF	State Type :	C
Principal County Served :	HARRISON	Primary Source :	SW
Status :	A	Activity Date :	02-01-1976

TCR Schedules

Sample Count	Sample Type	Sample Frequency	Effective Begin Date	Effective End Date	Seasonal Start MM/DD	Seasonal End MM/DD	Analyte Name
6	RT	MN	09-01-2005		1/1	12/31	COLIFORM (TCR)

Frequent Field Sample Schedules

Water System Facility Name	Analyte Code	Analyte Name	Days to Monitor per month	Samples Required per day	Effective Begin Date	Summary Type
TREATMENT PLANT	0100	TURBIDITY	31	3	01-01-2005	MAXT
TREATMENT PLANT	0100	TURBIDITY	31	3	01-01-2005	95PT
DISTRIBUTION SYSTEM	0999	CHLORINE	31	1	01-01-2004	SDRD
TREATMENT PLANT	0999	CHLORINE	31	24	01-01-2004	EPRD

Non-TCR Group Schedules

Water System Facility Name	Analyte Group Code	Analyte Group Name	Sample Count	Sample Type	Sample Frequency	Effective Begin Date	Seasonal Start MM/DD	Seasonal End MM/DD
DISTRIBUTION SYSTEM	CHA5	HALOACETIC ACIDS	1	RT	QT	10-01-2014	2/1	2/28
DISTRIBUTION SYSTEM	CL90	LEAD AND COPPER	20	RT	3Y	01-01-2002	6/1	9/30
DISTRIBUTION SYSTEM	CTHM	TRIHALOMETHANES	1	RT	QT	10-01-2014	2/1	2/28
INTAKE-TYGART VALLEY RIVER	CTOA	TOC & ALKALINITY CDS	3	RT	QT	10-01-2009	0/0	0/0
TREATMENT PLANT	CARS	ARSENIC TOTAL	1	RT	YR	01-01-2002	0/0	0/0
TREATMENT PLANT	CIOC	INORGANICS C	1	RT	YR	01-01-2002	0/0	0/0
TREATMENT PLANT	CNO3	NITRATE	1	RT	YR	01-01-2002	1/1	3/31
TREATMENT PLANT	CRAD	RADIONUCLIDES	1	RT	6Y	01-01-2008	0/0	0/0
TREATMENT PLANT	SC02	SYNTHETIC ORGANICS 2	2	RT	3Y	01-01-2011	1/1	12/31
TREATMENT PLANT	CVOC	VOLATILE ORGANICS	1	RT	YR	01-01-2002	0/0	0/0

Non-TCR Individual Schedules

Water System Facility Name	Analyte Code	Analyte Name	Sample Count	Sample Type	Sample Frequency	Effective Begin Date	Seasonal Start MM/DD	Seasonal End MM/DD
TREATMENT PLANT	2920	CARBON, TOTAL	3	RT	QT	10-01-2009	0/0	0/0

Highlighted in yellow, 1 HAA5 sample required at Dotson Res) 1-THM sample (at Main Office)
Another SOC required before in 2016