



# COMMONWEALTH of VIRGINIA

DEPARTMENT OF HEALTH  
OFFICE OF DRINKING WATER  
Lexington Field Office

131 Walker Street  
Lexington, VA 24450  
Phone: 540-463-7136  
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November 3, 2021

SUBJECT: Amherst County  
WATERWORKS: Amherst County Service Authority  
PWSID No.: 5009250

Mr. Robert Hopkins, Director of Public Utilities  
Amherst County Service Authority  
P.O. Box 100  
Madison Heights, VA 24572

Dear Mr. Hopkins:

On September 20 2021, I conducted a sanitary survey of your waterworks. Enclosed is a copy of the report developed as a result of that survey. Please note our list of comments and recommendations on page 5 of the inspection report. Additional items may be found in the body of the report.

If you have questions on the report, or would like to discuss my findings, please do not hesitate to contact me. This office would like to thank your staff for their assistance and professionalism during the inspection.

Sincerely,

Thomas L. Thompson, Jr., PE  
District Engineer

TLT/kl

Enclosure

cc: Amherst County Health Department  
ec: VDH-ODW-Central Office

**VIRGINIA DEPARTMENT OF HEALTH  
OFFICE OF DRINKING WATER  
SYSTEM SANITARY SURVEY REPORT**

SUBJECT: Amherst County  
WATERWORKS: Amherst County Service Authority  
PWSID: 5009250

**PART I - SYSTEM BACKGROUND & FINDINGS**  
**GENERAL INFORMATION**

Owner Name: Amherst County Service Authority	Waterworks Class: 2
Type of Waterworks: Community	
Contact Name: Robert Hopkins, Director of Public Utilities	
Contact Address: 113 Phelps Road, P.O. Box 100 Madison Heights, VA 24572	
Contact Phone Number: (434) 845-1606	WTP 434-384-1979 Elon Rd. (SR 130)

DO License Class: 1	DO Has Required License: Y
DO Legal Name: Glen Micklem	DO License No.1955003699/ Exp. Date: 02/23

Inspection By: Thomas Thompson	Inspection Date: September 20, 2021
Time Spent: 3 hours	Last Inspection Date: September 17, 2020
Date to Reviewer: October 29, 2021	Reviewed by/Date: <i>Steve Krah 11/3/2021</i>
Date to Reviewer:	Reviewed by/Date:
Inspection Type: : Routine	
Present at Inspection: David Fittro, Michael Maynard	
Facilities Inspected: Sources, Treatment plant, Tanks & Distribution system	

Operation Permit Effective Date: 11/14/2017	Engineering Description Sheet Date: 11/14/2017
Permit Up-to-Date: Yes	Description Sheet Up-to-Date Yes
No. Connections: 6,016	Population Served: 14,799
Avg. Daily Production: 1.12 MGD	Operation Permit Capacity: 3.0 MGD
Exceeds 80% Operation Permit Capacity? (max. 3 consecutive months)	No
Treatment Provided: Coagulation, flocculation, sedimentation, filtration, disinfection, pH and corrosion control	
SDWIS Inventory Information Current:	Yes

**Comments:**

## COMPLIANCE HISTORY

**Shaded boxes** indicate a potential Significant Deficiency

<b>REVISED TOTAL COLIFORM RULE</b>		
• BSSP Approved:	Yes	02/10/2016
• # of routine samples/monitoring period & frequency	15 / month	
• Is plan current & appropriate for distribution system & population?	Yes	
• Is monitoring frequency correct?	Yes	
• Rotates and uses approved sites?	Yes	
• Measures chlorine residual for all samples, if chlorine is added?	Yes	
• RTCR Level 1 or 2 Assessments since last Survey?	No	
<b>DDBP RULES (Community &amp; NTNC)</b>		
• Monitoring Plan approved and current?	Yes	11/26/2012
• Monitoring frequency required:	Quarterly	
• Operational Evaluation Level exceeded?	No	
<b>ESWT RULES</b>		
• Disinfection Profile submitted with Operation Reports or available for review?	Yes	
• LT2 Rule - Round 1	Bin # 1	08/20/2012
• LT2 Rule - Round 2	Bin # 1	01/30/2019
• Treatment upgrades required?	No	
• If yes, describe:		
<b>PHASE II/V RULE</b>		
• Waivers current for <u>all</u> entry points?	Yes	
<b>CONSUMER CONFIDENCE REPORTS (Community only)</b>		
• Final report issued by deadline?	Yes	
• Certification Statement Received?	Yes	
<b>LEAD &amp; COPPER RULES (Community &amp; NTNC)</b>		
• Materials Survey/Sampling Plan Approved:	Yes	07/13/2006
• Water Quality Parameter (WQP) routine monitoring required? (Mandatory for > 50,000 population) ○ If yes, WQPs meet quality and frequency requirements?	NA	
• Have Action Levels (90%) been exceeded in past? ○ If so, when?	No	
• Public Education requirements met if required?	NA	
• Optimized Corrosion Control Treatment (OCCT) required? ○ If "Yes", is Operational Control Monitoring performed and acceptable?	No	
• Are all consumer notice requirements met?	Yes	
• Comments: ①Previously exceeded OEL 3 <sup>rd</sup> Qtr. 2020		

Y = Yes; N = No; NA = Not Applicable; N/I = Not Inspected; None = None; OK = Acceptable



<b>CROSS-CONNECTION CONTROL PROGRAM</b>		<b>DATE</b>
• Approved:	Yes	11/10/2015
• Inspected Records This Visit <sup>1</sup>	No	
○ Program Active <sup>2</sup>	N/I	
○ Satisfactory <sup>3</sup>	N/I	
<b>(MONTHLY) OPERATION REPORTS</b>		
• All submitted for past 12 months	Yes	
• Operational treatment parameters monitored?	Yes	
• All required data reported?	Yes	
<b>EMERGENCY MGMT. PLAN for Extended Power Outage (Community only)</b>		<b>DATE</b>
• Verification received?	Yes	05/11/2005
• Current?	Yes	
<b>SOURCE WATER ASSESSMENT PERFORMED</b>		
• Source: Graham Creek Reservoir	Yes	02/21/2003
• Source: Harris Creek Intake	Yes	02/21/2003
<b>ENFORCEMENT</b>		
• Administrative/Consent Order in Effect:	No	
• Violations / Enforcement Actions Since Last Survey <sup>4</sup>	Yes – RTRC Monitoring 4/21	
• Owner issued Public Notice as required?	Pending	
• Active Corrective Action Plan?	NA	
○ If yes, is waterworks on schedule?		
• SDWIS Violation & Enforcement Action, Public Notification data current?	Yes	
<b>COMPLAINTS SINCE LAST INSPECTION</b>		No
• If YES, summarize:		
COMMENTS:		

Y = Yes; N = No; NA = Not Applicable; N/I = Not Inspected; None = None; OK = Acceptable

<sup>1</sup> See Part C for additional questions

<sup>2</sup> Based on Part C questions

<sup>3</sup> Based on Part C questions

<sup>4</sup> If yes, ODW staff shall review Violations from R&R database and include listing here.



# Chemical Schedule for 5009250 AMHERST CO SERVICE AUTHORITY (ACSA)

EP001 ENTRY POINT TAP  
EP001 FINISHED WATER

<u>Group</u>	<u>Last Sample</u>	<u>Freq.</u>	<u>Next Sample</u>	
Fluoride Split	10/6/2021	1	11/6/2021	
Inorganics	4/13/2021	12	4/13/2022	
Metals	4/13/2021	12	4/13/2022	
Nitrate + Nitrite (Combined)	4/13/2021	12	4/13/2022	
VOC	7/20/2021	12	7/20/2022	
Cyanide	10/8/2013	108	10/8/2022	
SOCs - Carbamates	7/28/2021	36	7/28/2024	2 qtrs
SOCs - Chlorinated Acidic Herbicides	7/28/2021	36	7/28/2024	2 qtrs
SOCs - Semi-Volatile Organic Chemical	7/28/2021	36	7/28/2024	2 qtrs
SOCs - Volatile Fumigants	7/28/2021	36	7/28/2024	2 qtrs
Radiological	4/20/2021	72	4/20/2027	

## Waivers

	<u>Begin</u>	<u>End</u>
CYANIDE2028	1/1/2020	12/31/2028
SOC-DIQ2022	1/1/2020	12/31/2022

IN003 COMBINED INTAKE - SAMPLING  
RW001 COMBINED INTAKE - SAMPLING

<u>Group</u>	<u>Last Sample</u>	<u>Freq.</u>	<u>Next Sample</u>
TOC-Alkalinity (Raw)	10/6/2021	3	1/6/2022

TP001 TREATMENT PLANT  
UP001 CLEARWELL TAP

<u>Group</u>	<u>Last Sample</u>	<u>Freq.</u>	<u>Next Sample</u>
TOC-Low (Finished)	10/6/2021	3	1/6/2022

DS001 DISTRIBUTION SYSTEM

DBP03 ABBITTS GARAGE

<u>Group</u>	<u>Last Sample</u>	<u>Freq.</u>	<u>Next Sample</u>
HAA5	8/10/2021	3	11/10/2021
TTHM	8/10/2021	3	11/10/2021

DBP05 EBENEZER ROAD

<u>Group</u>	<u>Last Sample</u>	<u>Freq.</u>	<u>Next Sample</u>
HAA5	8/10/2021	3	11/10/2021
TTHM	8/10/2021	3	11/10/2021

DBP06 KENTMOOR FARM RD

<u>Group</u>	<u>Last Sample</u>	<u>Freq.</u>	<u>Next Sample</u>
HAA5	8/10/2021	3	11/10/2021
TTHM	8/10/2021	3	11/10/2021

DBP07 ELON ROAD

<u>Group</u>	<u>Last Sample</u>	<u>Freq.</u>	<u>Next Sample</u>
HAA5	8/11/2021	3	11/11/2021
TTHM	8/11/2021	3	11/11/2021

30 Lead and Copper Samples due June – September 2024

## SUMMARY

### PROBLEMS / COMMENTS FROM THE LAST INSPECTION

### CORRECTED?

None

### NEW COMMENTS FROM THIS INSPECTION

1. The Henry L. Lanum Jr. Water Filtration Plant was found to be in good condition and very well operated. The WTP was producing excellent finished water quality at the time of inspection and was well maintained.
2. Congratulations on being the recipient of the Virginia Department of Health's Office of Drinking Water 2020 Silver Water Treatment Plant Performance Award for Excellence in Filtration and Backwash.
3. Your waterworks qualifies for reduced quarterly monitoring of TOCs. Please collect one set of TOC/alkalinity samples per quarter starting in the fourth quarter 2021.
4. The revised *Waterworks Regulations* recently became official. It is now required that the operator on site running the plant have a license that at least equals the Class of the plant. Under the revised *Regulations* this means the operator on duty must be a Class 1 or 2.
5. Please check the manufacturer's guidance for calibrating your new TL2300 bench top turbidimeter. It was last calibrated in December 2020. We recommend quarterly but please verify with the manufacturer's suggested calibration schedule.

Attachments:

☒Part II-A

☒Part II-B

☐Part II-C

☐Part II-D

cc/Att: Glen Micklem

☒Part II-A

☒Part II-B

☐Part II-C

☐Part II-D

cc: Amherst County Health Department

ec: VDH-ODW Central

PART I



## PART II-A UNIT PROCESS EVALUATIONS

(Shading Identifies a Potential Significant Deficiency)

### A. RAPID MIX

1. Number of units: 1 Number in service: 1
2. Type of mixing provided: ☒ conventional ☐ static in-line ☐ Other \_\_\_\_\_
3. Operable mixer available to meet mixing requirements ☒ Yes ☐ No ☐ N/A
4. If conventional units:
 

Variable speed control operational?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Evidence of vortexing?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> NI
Proper mixing obtained?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NI
5. Chemicals being applied, point(s) of application:

Chemical Applied	Application Point	Feed Rate
PACL	Raw Water Line	26.7 mg/L
KMnO4	Raw Water Line	0.2 mg/L
Fluoride	Raw Water Line	1.2 mg/L

6. Spare mixer provided? ☒ Yes ☐ No
7. General performance: ☒ satisfactory ☐ needs attention ☐ N/A
8. Physical condition of unit: ☒ satisfactory ☐ needs attention ☐ N/A

### COMMENTS:

- Constant speed drive, vertical shaft, radial mixer (Lightnin Mixer Series 10) driven by a 60-Hz, 7.5 HP motor.

## B. FLOCCULATION/SLOW MIX

1. Number of basins: 4 Number in service: 4
2. Mode of operation: ☒ series ☐ parallel ☐ NA
3. All mixers operational? ☒ Yes ☐ No
4. Operable mixers available to meet mixing requirements: ☒ Yes ☐ No
5. Variable speed control operational? ☒ Yes ☐ No ☐ NA
6. Tapered flocculation practiced? ☒ Yes ☐ No ☐ NA
7. Isolation of basins/continued plant operation? ☒ Yes ☐ No ☐ NA
8. Are proper baffles/compartments provided? ☒ Yes ☐ No ☐ NA
9. Evidence of vortexing/basin short-circuiting? ☐ Yes ☒ No ☐ NI
10. Overall floc formation: ☒ good ☐ fair ☐ poor ☐ undetectable
- Floc type/appearance: ☐ pin floc ☒ fluffy ☐ sweepfloc ☐ match head
11. Are polymers used? ☐ Yes ☒ No
12. General performance: ☒ satisfactory ☐ needs attention
13. Physical condition of unit: ☒ satisfactory ☐ needs attention
14. Chemicals being applied, point(s) of application:

Chemical Applied	Application Point	Feed Rate
Carbon	Slow mix basin	Not in use

### COMMENTS:

- Flocculation basins are separated into two trains, each with two basins. The two basins in each train are operated in series, the trains run in parallel to each other. Train No. 1 serves the two oldest sedimentation basins and Train No. 2 serves the three newest basins. There are gates and valves that allow any train to serve any basin, if necessary.
- Both Train Nos. 1 and 2 are provided with variable speed drive vertical shaft axial mixers (Lightnin Series 10 mixer, motor model number- 15Q3, 3 HP, 47 rpm).
- Tapered flocculation is provided in each train. The first basin is set at approximately 40% speed and the second basin in the series is set at approximately 20% speed.



### C. SEDIMENTATION

1. No. of basins provided: 5 No. in operation: 4
2. Proper flow distribution between basins? ☒ Yes ☐ No ☐ NI
3. Signs of short circuiting/overloads? ☐ Yes ☒ No
4. Evidence of floc shear at stilling wall? ☐ Yes ☒ No ☐ NI
5. Floc carry-over observed? ☐ Yes ☒ No
6. Floc settleability: ☒ satisfactory ☐ needs attention
7. Sludge removal: ☒ manual ☒ mechanical  
 If manual: 4 times/year last cleaned: \_\_\_\_\_  
 next schedule cleaning \_\_\_\_\_  
 If mechanical, is equipment operable? ☒ Yes ☐ No ☐ N/A  
 Excessive sludge accumulation: ☐ Yes ☒ No  
 If "Yes", estimate sludge blanket depth: \_\_\_\_\_
8. Chemicals added, application point(s):
- | Chemical Applied | Application Point | Feed Rate |
|------------------|-------------------|-----------|
| Chlorine         | End of basin      | 0.4 ppm   |
9. General performance: ☒ satisfactory ☐ needs attention
10. Physical condition of unit: ☒ satisfactory ☐ needs attention

#### COMMENTS:

- The stilling walls provided with tapered ports with inlet diameter of 3 inches and an outlet diameter of 4 inches.
- Submerged tube settlers are installed in the effluent end of each basin with a 60-degree angle from horizontal. The tube settlers are designed for an overflow rate of 2 gpm/sq. ft. at a design flow rate of 4 MGD. Settled floc on top of the tube settlers observed. The sedimentation basins are drained for periodic cleaning and the tube settlers are washed down at this time.
- Automatic sludge collectors are operated once per week in a staggered fashion (Basin 1 operated Mondays, Basin 2 operated Tuesdays, etc). There was evidence of sludge chunks rising due to denitrification in two of the basins. The operators indicated that they knock this down with a water hose to allow it to resettle when necessary. Every quarter the plant drains the sedimentation basins for a manual sludge cleaning. Operators usually manually clean one basin per day. Operators indicate automatic sludge collectors work well.

## D. FILTRATION

1. No. of filters provided: 4 No. in operation: 4

2. Filter media: ☐ sand ☒ sand/anthracite ☐ sand/anthracite/garnet ☐ other \_\_\_\_\_

Date media last added or changed: 2011 filters 1&2; 2005 filter 3; 2004 filter 4

Frequency media depth checked: quarterly

Frequency operator checks filtration rate: twice weekly Date last checked 9/18/21

(Tuesdays and Saturdays)

Values observed for individual filters:

Filter No.	Effluent Turbidity (NTU)	Loading Rate (gpm/ft <sup>2</sup> )
1	0.024	2.31
2	0.036	2.31
3	0.028	1.97
4	0.020	1.94

Design: 2778 (4MGD) gpm at 4 gpm/ft<sup>2</sup>

Exceeds permitted rate? ☐ Yes ☒ No

Was filtration rate checked? ☐ Yes ☒ No

3. Filter appurtenances operable and in good condition?

Last Calibrated

All valves/controls: ☒ Yes ☐ No

May 2021

Filter rate-of-flow controls: ☒ Yes ☐ No

May 2021

Filter rate-of-flow indicator / recorder: ☒ Yes ☐ No

May 2021

Loss of head indicator / recorder: ☒ Yes ☐ No ☐ NA

Surface wash: ☐ Yes ☐ No ☒ NA

If yes, backflow preventer provided? ☐ Yes ☐ No ☒ NA

Air scour: ☒ Yes ☐ No ☐ NA

Backwash pump(s)/controls: ☒ Yes ☐ No May 2021

Backwash rate-of-flow indicator: ☒ Yes ☐ No May 2021

4. Filter backwash practices:

Filter backwash based on plant established maximum values: ☒ Yes ☐ No

Filter backwash based on: ☒ head loss 6.0 feet  
☒ time 88 hours  
☒ turbidity 0.10 NTU  
☐ particle counts \_\_\_\_\_ particles/ \_\_\_\_\_ ml: size range \_\_\_\_\_

Filter backwash observed? ☐ Yes ☒ No

Satisfactory? ☐ Yes ☐ No ☒ NA

Frequency operator checks backwash rate: monthly Date last checked: last backwash



5. Filter-to-waste practiced: ☒ Yes ☐ No ☐ NA  
 Is filter to waste at design filtration rate? ☒ Yes ☐ No  
 Average filter-to-waste (rewash) time: Approx. 17 minutes  
 Is turbidity monitored during filter-to-waste? ☒ Yes ☐ No ☐ NA  
 Criteria established for filter-to-waste: duration when turbidity reaches 0.10 NTU  
 Are particles counted/monitored during procedure? ☐ Yes ☒ No
6. Is filter backwashed after any/all shutdowns? ☐ Yes ☒ No  
 If "No", does operator start filter with filter-to-waste after filter has been idle, before delivering flows to system? ☒ Yes ☐ No
9. General performance: ☒ satisfactory ☐ needs attention
10. Physical condition of units: ☒ satisfactory ☐ needs attention

#### COMMENTS:

- Stainless steel filter control consoles at each filter.
- Filters No. 1 and No. 2 were modified by replacing the existing underdrain system. Porous plates cover the filter bottoms and are secured in place by anchor rods.
- The media in filters provided with 3 inches of gravel, 12 inches of filter sand, and 18 inches of anthracite. The gravel has an effective size from 3/16 inch to No. 10 mesh and is placed on top of the filter insert plates. The filter sand has an effective size of 0.45 to 0.55 mm and a uniformity coefficient no more than 1.6 and is placed on top of the filter gravel. The anthracite has an effective size of 0.90 to 1.00 mm and a uniformity coefficient no more than 1.7 and is placed on top of the filter sand.
- Two backwash flow meters with a range of 900 gpm to 3600 gpm.
- Air scour provides agitation evenly across the entire filter surface, including the corners. Air blowers are rotated monthly.
- DelPac is added to the filters at the end of the backwash cycle (100 mL).
- SOPs are available at the filter consoles, which allows for consistent backwashing procedures and an invaluable training tool.

#### E. FINISHED WATER FACILITIES

##### 1. Clear well

- Access protected from contamination ☒ Yes ☐ No  
 Overflow protected from contamination/flooding ☒ Yes ☐ No  
 Adequate drain ☒ Yes ☐ No  
 Screened vent(s) ☒ Yes ☐ No  
 Watertight roof/cover ☒ Yes ☐ No  
 Hatch(s) secure ☒ Yes ☐ No  
 Viewing port with light ☒ Yes ☐ No-see cmts  
 Sediment present ☐ Yes ☒ No  
 Last cleaned: operator estimates 2010-2011  
 Physical condition: ☒ satisfactory ☐ needs attention

2. Finished water pumps: ☐ NA
- Number of pumps provided: 6
- Number of pumps operable: 6
- Number of pumps in use: 2
- Pressure gauges provided/operable 150 psig ☒ Yes ☐ No
- Flow meter operable ☒ Yes ☐ No
- Pumping rate: 2.72 MGD
- Physical conditions: ☒ satisfactory ☐ needs attention
3. Is clearwell water level monitored/controlled? ☒ Yes ☐ No ☐ NA
4. Are level sensors operable? ☒ Yes ☐ No ☐ NA
5. Chemicals added, point(s) of application:

Chemical Applied	Application Point	Feed Rate
Soda Ash	At entrance to old clearwell	10.8 mg/L
Chlorine	At entrance to clearwell	1.9 mg/L
Corrosion inhibitor (Dab-Coat 22)	At entrance to old clearwell	2.4 mg/L

6. Approved backflow device to isolate process water at treatment plant from distribution system? ☒ Yes ☐ No

#### COMMENTS:

- Clearwell with dimensions of 43 ft x 80 ft x 6.9 ft deep has 2 flow trains, one for filters 1&2 and the second for filters 3&4. Each flow train has serpentine baffles and perforated steel baffle inlets and outlets. The clearwell has six 2.5 foot square roof hatches with manhole steps. The elevations for the following are: floor 625 feet, top of the baffle wall 633 feet, and top of the weir plate 632 feet. A 16 inch diameter overflow is provided and a 6 inch diameter drain line with flap valve is provided.
- The operational level of the clearwell is maintained by an overflow weir. The clearwell is used for post filter disinfection to meet the required CT to provide 0.5 log reduction for Giardia. The tank configuration has a 0.7 baffling factor.
- In order to consistently achieve the required minimum 0.5 log reduction of Giardia within each flow train in the clearwell, the following parameters must be maintained:
  - Minimum required free chlorine residual in clearwell- 1.1 mg/L
  - Minimum temperature- 3 C
  - Maximum pH- 8
  - Maximum peak hour flow in each flow train – 2.0 MGD
  - Minimum effective unit volume of each basin- 86,000 gallons (6.7 ft depth)
- Each clearwell train is equipped with three vertical turbine pumps each rated at 694 gpm @ 480 feet TDH and driven by 125 HP motors. With one pump out of service, each clearwell train pump system delivers 2 MGD for a total of 4 MGD. The finish water pumps are manually operated.
- The new clearwell feeds into the old clearwell which acts as a sump for the finish water pumps. Soda Ash and DC-22 are only added in the old clearwell. Chlorine is added at the entrance to the new clearwell to allow for proper CT.
- DC-22 feed line was moved back to original position near Soda Ash feed.
- Train 1 is provided with variable speed control and Train 2 is not. The operators vary the speed of Train 1 motors to control flow to the distribution system.
- New clearwell has multiple access hatches that can be opened for viewing, but no light provided.



## F. CHEMICAL FEED FACILITIES – GENERAL

1. The following chemicals are fed at this facility:

Chemical	No. of Feeder/Pumps. Available / In Service	Chemical	No. of Feeder/Pumps Available / In Service
<input checked="" type="checkbox"/> PACL	2/1 (2 backup dry alum feeders available)	<input checked="" type="checkbox"/> KMnO <sub>4</sub>	2/1
<input type="checkbox"/> ferric salt		<input checked="" type="checkbox"/> activated carbon	1/1
<input type="checkbox"/> ferrous salt		<input checked="" type="checkbox"/> fluoride	1/1
<input type="checkbox"/> polymer (coag. aid)		<input type="checkbox"/> phosphate	
<input type="checkbox"/> polymer (filter aid)		<input checked="" type="checkbox"/> chlorine	6/3
<input type="checkbox"/> lime	1/0 (2 backup lime feeders available)	<input type="checkbox"/> ammonia	
<input type="checkbox"/> caustic		<input type="checkbox"/> ozone	
<input checked="" type="checkbox"/> soda ash	1/1	<input type="checkbox"/> sodium chlorate (ClO <sub>2</sub> generation)	
<input checked="" type="checkbox"/> other DC 22	1/1		

Chemicals certified to meet NSF Standard 60?

☒ Yes ☐ No

2. Any chemical feed changes that could affect Pb/Cu monitoring? ☐ Yes ☒ No

3. All feeders in good condition? ☒ Yes ☐ No

Adequate ventilation provided? ☒ Yes ☐ No

4. Adequate backflow prevention on solution water? ☒ Yes ☐ No

Date last inspected? 2016- exact date not obtained

Anti-siphon devices on feed lines? ☒ Yes ☐ No

5. Feeders calibrated on a regular basis? ☒ Yes ☐ No

(Recommend quarterly)

Frequency operators calibrate feeders: quarterly

Date last calibrated: 9/15/2021

Frequency operators check calibrations: Weekly

Date last checked: 9/15/2021

6. Adequate chemical storage area provided (space, spill prevention)? ☒ Yes ☐ No

5. Is CORROSION CONTROL practiced at this facility? ☒ Yes ☐ No

If Yes, indicate method(s): ☒ pH/alkalinity adjustment  
☒ corrosion inhibitor  
☐ other: \_\_\_\_\_

6. Physical condition of chemical feed facilities: ☒ satisfactory ☐ needs attention

7. Do any of the chemical storage or handling facilities offer potential for explosions? ☐Yes ☒No

8. Other safety problems for the operators or public noted? ☐Yes ☒No

Describe:

**COMMENTS:**

- The plant kept the volumetric dry chemical feeders for backup. There are two feeders for lime and two for alum. Dry alum is kept on site for use, if necessary. The feeders are Wallace & Tiernan Series 32-055 volumetric screw feeders. Dry feeders run weekly to ensure functional.
- The fluoride feeder is a dry fluoride feeder, Wallace & Tiernan Series 32-055. The feeder room and feeder configuration makes it somewhat difficult to load the hopper.
- The lime feeder is also a Wallace & Tiernan Series 32-055.
- DelPAC, DC-22, and  $\text{KMnO}_4$  are all fed by peristaltic pumps. The pumps are Cole Parmer Instrument Company, Masterflex L/S series models. DC-22 and  $\text{KMnO}_4$  pumps have single heads, DelPAC has a double head which allows for two tubes to be fed by the same pump, if necessary.
- DelPAC is pumped from one of two 150 gallon day tanks. The day tanks are gravity filled by bulk storage located in the shed on plant grounds.
- Carbon is being fed 3 times per day currently.
- $\text{KMnO}_4$  is fed at the plant when Harris Creek is in use and at the reservoir when it is in use.

**G. CHLORINE GAS**

- |   |   |
|---|---|
| 1. Adequate ventilation   | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| 2. Cylinders chained  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| 3. Panic hardware   | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| 4. Cylinder repair kit  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| 5. Chlorine scales operable   | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| 6. Automatic change-over provided/operable                            | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| 7. Regulator vent properly installed/screened                         | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| 8. Leak detection provided/operable (type: <u>W&amp;T Acutec 35</u> ) | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| 9. Outside entrance/exit  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| 10. Room gas-tight, floor drains sealed                               | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| 11. Breathing apparatus available                                     | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |

**COMMENTS:**

- Automatic changeover and chlorinators are installed, Siemens S10K (formerly Wallace & Tiernan).
- The chlorine room has two exits, one inside the plant and one that exits to the outside. Both equipped with crash bar doors.
- Chlorine Repair Kit A available outside the chlorine room.
- Two pairs of chlorine tanks available with valving and piping that allows any pair to feed applied or finish water chlorine. Scales (Scaletron Industries). A third pair of chlorine tank scales and changeover equipment serve as an emergency spare.

## H. OPERATIONAL/PERFORMANCE DATA

Constant Monitoring Equipment	Operable	Inline Reading	Bench Reading	Corresponds To Desk Unit	Computer Reading	Corresponds To Computer
raw pH	Y	N/I	7.0	N/A	N/I	N/A
flash mix pH	Y	N/I	7.0	N/A	N/I	N/A
finished pH	Y	N/I	7.5	N/A	N/I	N/A
raw turbidity	Y	N/I	9	N/A	N/I	N/A
combined sed basin turbidity	Y		0.8			
filter 1 turbidity	Y	0.025	0.03	Y	0.025	Y
filter 2 turbidity	Y	0.030	0.03	Y	0.030	Y
filter 3 turbidity	Y	0.027	0.03	Y	0.027	Y
filter 4 turbidity	Y	0.026	0.03	Y	0.026	Y
finished turbidity	Y	0.10	0.03	Y	0.10	Y
finished chlorine	Y	1.9	2.2	Y		Y

-Finished turbidity was calculated by taking the average of turbidity on top of filters from instrumentation in pipe gallery

### 1. At time of inspection (Check last lab bench instrument values)

Parameter	RAW Frequency/ Results		APPLIED Frequency/ Results		FINISHED Frequency/ Results	
Free Cl <sub>2</sub> (mg/L)		N/A	2 hr	0.4	2 hr	1.9
Turbidity (NTU)	2 hr	9	2 hr	0.81	2 hr	0.03
pH	2 hr	7.0	2 hr	7.0	2 hr	7.5
Alkalinity (mg/L as CaCO <sub>3</sub> )	1/day	30	1/day	28	1/day	43
Hardness (mg/L as CaCO <sub>3</sub> )	2/day	17	N/A		2/day	21
Temperature °C	24 hr	24				
Fluoride (mg/L)					1/day	0.81
Iron (mg/L)		N/A				
Manganese (mg/L)	2/day	0.025	0.049		1/day	0.010
CO <sub>2</sub> (mg/L)	1/day	4	5		1/day	

Plant flow at time of inspection: Raw Water 2.46 MGD Finished Water 2.72 MGD



## I. OPERATIONAL/LABORATORY STAFF MONITORING PROCEDURES

- Hours plant is operated per day: 12 hrs. avg
- Designated Operator (DO) - Hours/Day present: As needed

List all operators and their classification that work at this facility:

Name (as shown on license)	License Class	License Number	Expiration Date
Dale Fulcher	1	1955003698	02/2023
Glen Micklem	1	1955003699	02/2023
David Fittro	1	1955003092	02/2023
Michael Maynard	1	1955007332	02/2023
Hunter Glass	3	1955007462	02/2023
Nathan Trumbo	Trainee		
William Taylor	Trainee		

Is the staffing in accordance with the Waterworks Regulations? ☒ Yes ☐ No

- How are operating decisions made and communicated? Normally can make changes as needed. Major changes generally discussed with OIRC.

Are there criteria and procedures established for plant shut down in case of unit process failure or upset or in event of significant overall quality degradation? ☒ Yes ☐ No

- RECORDS RETENTION in accordance with *Regulations*? ☒ Yes ☐ No

- Are daily log/data sheets readily available? ☒ Yes ☐ No

Were these daily log/data sheets reviewed? ☒ Yes ☐ No

Are the daily log/data sheets adequate? ☒ Yes ☐ No

Is the frequency of operational data collection adequate? ☒ Yes ☐ No

Are there any obvious problems noted from the log entries? ☐ Yes ☒ No

- How is the COAGULATION PROCESS controlled?

☐ Pilot Filter

☒ Jar Tests

☐ Zeta Meter

☒ Streaming Current Monitor

Were coagulation control procedures observed / discussed? ☒ Yes ☐ No

Were the procedures adequate? ☒ Yes ☐ No

- Is equipment in good condition?

pH meter ☒ Yes ☐ No

Jar test machine ☒ Yes ☐ No

Zeta meter ☐ Yes ☐ No ☒ NA

Pilot filters ☐ Yes ☐ No ☒ NA

Streaming current monitor ☒ Yes ☐ No ☐ NA reading (if applicable): +97

Particle counter/monitor ☐ Yes ☐ No ☒ NA

- What is the frequency of (combined) FILTER EFFLUENT TURBIDITY monitoring?

☒ 7 times per day

☐ continuous

Is this frequency adequate (at least every 4 hours)? ☒ Yes ☐ No ☐ NA  
 Are continuous monitoring units operational? ☒ Yes ☐ No ☐ NA  
 Are the on-line (continuous) units calibrated at least quarterly? ☒ Yes ☐ No ☐ NA  
 Do continuous monitor readings correspond to desk-top unit readings? ☒ Yes ☐ No ☐ NA  
 Does each filter effluent have an individual continuous turbidity monitor? ☒ Yes ☐ No  
 Does the filter effluent turbidity monitoring system have alarm set points? ☐ Yes ☐ No ☒ DNI  
 Alarm set point(s): \_\_\_\_\_ Alarm type: \_\_\_\_\_  
 Is data recorded at least every 15 minutes? ☒ Yes ☐ No  
 Is data kept for 3 years? ☒ Yes ☐ No  
 Desk-top turbidimeter manufacturer: Hach Model No. TL2300 (also kept 2100 N)  
 Date last calibrated: 12/21/2020  
 Calibration date posted: ☒ Yes ☐ No  
 Date bulb last changed: New Spare bulb on hand? ☒ Yes ☐ No  
 Condition of cuvettes: Good  
 Primary standard used: ☒ Stabcal ☐ Formazin ☐ Amco AEPA-  
 Expiration Date of primary standard: August 2022  
 Secondary standard used: Gelexl  
 Age of secondary standard: New  
 Date secondary last compared to primary: 8/2021  
 Turbidity-free water available? ☒ Yes ☐ No ☐ NA

9. Method of CHLORINE RESIDUAL monitoring: Hach CL17 inline and Lamotte (bench) DC1500  
 Continuous residual monitor operational? (required for Population > 3,300) ☒ Yes ☒ No ☐ NA  
 Does each analyzer have the readout at its installation and continuous recording (hard copy chart or electronic data)? ☒ Yes ☐ No  
 Is data recorded at least every 15 minutes? ☒ Yes ☐ No  
 Is an alarm activated when chlorine concentration is outside normal operating range? ☐ Yes ☒ No  
 Set limits: Min: DNI Max: DNI  
 Are grab samples collected at least weekly for routine calibration checks for each on-line analyzer? ☒ Yes ☐ No  
 Is a sample tap for grab samples located as close as feasible to where samples enter the on-line analyzer? ☒ Yes ☐ No  
 What method is used to analyze grab samples? DPD  
 If system serves  $\leq 3,300$ , frequency of residual monitoring (Grab Sampling): N/A  
 Expiration date of colorimeter gel standards: 01/2022  
 Frequency of monitoring satisfactory? ☒ Yes ☐ No ☐ NA  
 Free chlorine residual measured and reported? ☒ Yes ☐ No ☐ NA  
 Calibration Checks performed? ☒ Yes ☐ No ☐ NA  
 If yes,  
 Are results of calibration checks within the larger of +/- 0.1 mg/l or +/- 15%? ☒ Yes ☐ No ☐ NA  
 Are emergency calibration checks performed as soon as possible when an on-line chlorine analyzer indicates a large ( $\geq 50\%$ ) unexpected change in chlorine residual concentration? ☒ Yes ☐ No ☐ NA  
 Are records of calibration recorded and maintained for 3 years? ☒ Yes ☐ No ☐ NA  
 Do all chemical reagents and standards for on-line analyzers and grab sample methods have an unexpired shelf life? ☒ Yes ☐ No

PART II-A



Chlorine residual necessary to meet CT requirements: 1.1 mg/L free chlorine

Location of measurement: Clearwell

Staff aware of the required minimum residual?  
(Disinfection Profile Calculator Used) ☒ Yes ☐ No

Is this concentration being continuously met? ☒ Yes ☐ No

If No, is staff checking other parameters/taking appropriate steps to ensure CT requirements are being met on continuous basis? ☐ Yes ☐ No ☒ NA

Are adequate LAB EQUIPMENT AND REAGENTS available to run necessary operational tests?

☒ Yes ☐ No

Are reagents dated?

☒ Yes ☐ No

Are test procedures appropriate? *Did not observe directly*

☒ Yes ☐ No

Are desk-top units calibrated at appropriate intervals?

☒ Yes ☐ No

Does plant have LABORATORY CAPABILITY for:

algae counts and identification?

☐ Yes ☒ No

threshold odor determinations?

☐ Yes ☒ No

iron and manganese analyses?

☒ Yes ☐ No

Overall appearance of laboratory: ☒ satisfactory ☐ needs attention

10. FLUORIDE test utilized: Specific Ion 4

Equipment in good condition? ☒ Yes ☐ No ☐ NA

Standards up-to-date? ☒ Yes ☐ No ☐ NA

Is a continuous analyzer provided? ☐ Yes ☒ No ☐ NA

Do continuous analyzer reading correspond to test kit readings? ☐ Yes ☐ No ☒ NA

Frequency of continuous monitoring unit calibration: \_\_\_\_\_

11. Is CONTINUOUS pH monitoring equipment provided and in good condition? ☐ Yes ☐ No ☒ NA

Do continuous monitor readings correspond to desk-top readings? ☐ Yes ☐ No ☒ NA

Frequency of continuous monitoring unit calibration: \_\_\_\_\_

12. Adequate BACKFLOW PREVENTION devices at sinks, etc. ☒ Yes ☐ No

Airgap at sinks

#### COMMENTS:

- A continuous chlorine analyzer installed to measure the chlorine residual of treated water leaving the plant. Continuous flow turbidimeters installed as follows:
  - Raw water-high range 0-100 NTU; Applied- 5 low range 0-10NTU; Filter effluent- 4 low range 0-5 NTU
- Bench pH meter- Hach HQ440d. Probe changed annually.
- Hach DR 3900 spectrophotometer used for various chemical tests
- Lamote 1200 DPD chlorine meter provided with secondary colored gel standards.
- Microscope available in the laboratory for possible algae identification operations.



**J. WASTE HANDLING**

1. Filter backwash, rewash, and settling basin wastewaters discharged to:

☒ lagoons      ☐ holding tank/sand beds      ☐ other \_\_\_\_\_

2. Ultimate discharge of waste flows: Harris Creek

3. Provisions for water recycle to head of plant? ☐ Yes ☒ No

4. Is FILTER BACKWASH RECYCLE practiced? ☐ Yes ☒ No ☐ NA

Is recycle stream monitored for flow? ☐ Yes ☐ No\* ☒ NA

Is recycle stream monitored for quality parameters? ☐ Yes ☐ No\* ☒ NA

\*Recycled filter backwash that is not measured is a Significant Deficiency

Recycle Flowrate (total range): \_\_\_\_\_

% of Raw Water Flow (should be < 10%): \_\_\_\_\_

Is approved treatment provided for recycle flows? ☐ Yes ☐ No\* ☒ NA

If Yes, Describe: \_\_\_\_\_

\_\_\_\_\_ \* Recycled flow should be returned to the plant headworks. If additional approved treatment is not in service, it is a Significant Deficiency

VDH approval date: \_\_\_\_\_

5. Are floor drains in chemical storage and feed areas separated from waste flow streams?

☒ Yes ☐ No ☐ NA

**COMMENTS:**

- Two sludge lagoons located on plant grounds.
- Operator indicated security system installed at WTP- Allied Security.

**M. EMERGENCY POWER**

☐ Portable generator connection(s). Identify generator supplier:

☒ Permanent equipment installed

☐ No Provisions

*Use remaining table for permanent installations only:*

Fuel: ☒ Diesel ☐ Gasoline ☐ Propane gas ☐ Natural gas

Generator Rating:

600KWH

• % of Total Power Demand met

100%

• Describe water production capability & critical elements supplied: Entire WTP per OIRC

Power transfer switch: ☐ Manual ☒ Automatic

If auto switch provided, does operator know how to manually switch power source?

☒ Yes ☐ No ☐ N/A

Fuel Supply - Level

100%

Fuel Supply - Approx. Duration

5 days

Diesel Gasoline Fuel Tanks:

- Fuel tank a minimum of 50 feet from any well or 100 feet from intake
- Containment provided for fuel tank
- Leak detection provided
- Fuel tank double walled
- Refueling protected from spills
- Evidence of fuel leaks

☒ Yes ☐ No

☒ Yes ☐ No

☒ Yes ☐ No

☒ Yes ☐ No

☒ Yes ☐ No

☐ Yes ☒ No

How often is the Emergency Power exercised?

Duration?

Weekly on Sundays for  
about 1 hour  
(Automatic)

How often is the transfer switch exercised?

Duration?

Weekly with the  
exercising of generator

Maintenance records of engine and generators kept

☒ Yes ☐ No

Maintenance records reviewed during inspection

☐ Yes ☒ No ☐ N/A

- Adequate?

☐ Yes ☐ No ☒ N/A

General Condition: ☒ Good ☐ Fair ☐ Poor

**Comments:** CAT generator, 1,600 gallon fuel capacity. ACSA has a contract for maintenance of the generator.

**PART II - B**  
**RAW WATER SOURCE**

(Shading Identifies a Potential Significant Deficiency)

**A. RAW WATER INTAKE / SURFACE SOURCE EVALUATION**

Source Name: Harris Creek / Graham Creek Reservoir

1. Intake located on: ☒ stream/free flowing river ☒ reservoir  
2. Observed (visible) water quality: ☒ clear ☐ turbid ☐ colored \_\_\_\_\_  
☐ other \_\_\_\_\_  
3. Conditions (Activities or pollution sources) in the immediate intake area that represent a potential health risk: ☐ Yes ☒ No

Describe: \_\_\_\_\_

4. Observed conditions of surrounding area: Forested, Agricultural, WTP, and Some Residential
5. Reservoir level/stream flow: ☒ normal ☐ high ☐ low
6. For in-stream intake:  
check dam provided: ☒ Yes ☐ No  
condition of check dam: Good  
stream flow monitoring provided: ☒ Yes ☐ No
7. Condition of intake structure: Good  
screen provided: ☒ manual ☐ mechanical ☐ none  
condition of screen: ☒ good ☐ average ☐ poor  
number of intake levels provided: 1 depths: river level intake  
draw-off depth/level being used: Normal river level intake  
access provided to intake structure: On WTP grounds, stairs to intake  
method of cleaning screen: Manually with a brush  
is it operable/used: Yes
8. Raw water pumps (at creek intake) – reservoir is gravity feed  
number provided: 3 number operable: 2  
number in use: 2 pumping rate: 1,492 gpm  
pump station subject to flooding: ☐ Yes ☒ No  
protected against trespassing/vandalism: ☒ Yes ☐ No  
access to pump station: On WTP grounds  
when were pumps/valves last maintained/checked: checked daily when used, maintained as needed;
9. Treatment provided at intake (describe): None at stream pump station / KMnO4 at reservoir



10. Physical condition of intake: ☒satisfactory ☐needs attention

11. Capacity Evaluation

Intake components restrict ability of the waterworks to meet present demand?

☐Yes ☒No

Present water demand exceeds source safe yield?

☐Yes ☒No

Safe Yield: 3 MGD combined capacity of Graham Creek Reservoir and Harris Creek

Determination Date: From Virginia Water Protection (VWP) documentation dated 5/03/2010

Present demand exceeds raw water pumping capacity?

☐Yes ☒No

**COMMENTS:**

- $\text{KMnO}_4$  treatment for raw water from the river provided inside WTP.
- Stream gauge monitoring is provided and accessible on the USGS website.



## **AMHERST COUNTY SERVICE AUTHORITY**

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**Board Meeting Date:** December 7, 2021

**Agenda Item No.:** VII.A

**Agenda Item Topic:** ACSA Water Treatment Plant Annual Sanitary Survey

**Topic Discussions:**

ACSA's Henry L. Lanum, Jr. Water Filtration Plant received its annual inspection by the VA Dept. of Health on 9/20/2021 and the attached inspection report on 11/3/2021. It is a long, comprehensive report, but the inspection comments can be found on the fifth page of Part I. The top of the page shows no problems or comments from the 2020 inspection. The first three new comments were all beneficial to and complimentary of ACSA and its staff for the condition and operation of the water plant. The fifth comment was discussed with VDH in followup phone conversations and was rescinded; the inspector did not realize that ACSA plant staff are trained in the calibration of the referenced equipment and calibrate the turbidimeter monthly, rather than the quarterly interval recommended by VDH.

The fourth comment concerns revisions to the regulations manual that require ACSA to now have a Class 1 or Class 2 Water Treatment Operator at the plant any time potable water is being produced. Before the rules change, ACSA needed to have a Class 3 Operator or above. With the departure of two Class 2 operators early in 2021, the rules change was initially viewed as a big problem for ACSA, since it would create scheduling problems due to the lack of enough operators of the required licensure classes. ACSA has five Class 1 operators, one Class 3, and two apprentices. One of the five Class 1 operators is also ACSA's Wastewater Supervisor and does not work at the water plant; it was thought that he might have to begin working dual jobs, spending some of his time at the water plant. After discussions with Operations Manager Micklem, Treatment Manager Fulcher, Class 1 Water Treatment Operator/Water Plant Shift Supervisor Fittro, and Wastewater Supervisor Cunningham about how to deal with the problem, Executive Director Hopkins called the VDH District Engineer to discuss how VDH expected the sudden rules change to be addressed by water utilities, as it affects many more than just ACSA in the same way. Hopkins was told that utilities are being given a grace period of one year, until the next sanitary survey, to comply with the new rule.

This relieves the immediate scheduling problem, but senior staff immediately initiated plans to ensure that ACSA is compliant before autumn 2022. ACSA's Class 3 Operator took his Class 2 licensure examination within a week of the new VDH rules being issued; he did not pass, but ACSA staff are helping him study to re-take the test in early 2022. The two apprentice operators are being urged to accelerate their studies to pass the Class 4 licensure test as soon as possible and then immediately initiate studying for their Class 3 licenses. The experience requirements and test schedule will not allow them to achieve Class 2 licensure before the end of 2022, but such licensure by the end of 2022 will position them for Class 2 status in early 2023. ACSA also hired a new apprentice operator (see Agenda Item VII.B) to improve the flexibility of operator scheduling.