COMMONWEALTH of VIRGINIA

M. Norman Oliver, MD. MA
State Health Commissioner

DEPARTMENT OF HEALTH
OFFICE OF DRINKING WATER
Richmond Field Office

Madison Building
109 Governor St., Ste
UB23 Richmond, VA
23219
Phone: 804-864-7409
Fax: 804-864-7520

SURFACE WATER TREATMENT PLANT SANITARY SURVEY REPORT

October 5, 2020

To: Ms. Rosemary Green, Deputy Director
Richmond Water Treatment Plant
3920 Douglasdale Road
Richmond, Virginia 23221

SUBJECT: CITY OF RICHMOND
Waterworks: Richmond Water System
PWSID: 4760100

Survey Date: 08/25/2020

Present at Survey: Doug Towne and others

Future Sampling Requirements: See attached

As a result of the sanitary survey noted above, the Department offers the following:

1. Comments from previous inspections:
   a. DPU is continuing their internal cross-connection control project (re-piping and labeling). UNRESOLVED – Plant [redacted] is complete and some of Plant [redacted] is complete. Maintenance has been addressing on-going items.
   b. Perform a tracer study of the finished water basins with the aerators now removed. UNRESOLVED- study postponed indefinitely.
   c. The sludge lagoon is starting to fill up again. Prioritize your current efforts to get a contract for solids removal.
      RESOLVED- Activities to start soon. Conducting on an as-needed basis
   d. Sign, date, and return the attached Bacteriological Sample Siting Plan (BSSP) within 30 days of the date of this letter, or the City of Richmond may be deemed to be in violation of the *Waterworks Regulations* for not having an approved BSSP that complies with the Revised Total Coliform Rule. I brought a copy of the BSSP to the inspection and requested that someone sign it, but thus far a signed copy has not been returned to me.
      UNRESOLVED- WTP indicated that should be done by either management or lab personnel. Copy provided to Lab Operations Manager via email (September 24, 2020) to review. **Please submit a signed copy of the BSSP by October 24, 2020 for our review and approval.**
   e. The filter appurtenances should be calibrated at least once per year, and once per quarter is recommended. We understand that they were last calibrated on July 25, 2017. Please schedule them to be calibrated in the near future.

RESOLVED- Appurtenances calibrated 10/31/19. Please schedule to occur annually.

2. Comments from this inspection:
   a. The population served has remained at 197,000 residents for the past several years and may need to be re-evaluated based on current population. The results of the 2020 census may be a good source of information, once released.
   b. Please ensure filter drop tests, rise tests, and expansion tests are conducted on a routine frequency.
   c. Please ensure reagents in the lab are not expired. Expired reagants can be labled "For Training Purposes Only", if desired for use as training devices.
   d. Richmond WTP and all associated staff should be commended for their hard work as essential workers during the 2020 COVID-19 pandemic. Potable water is critical for good hygiene and prevention of diseases and Richmond DPU has met the challenging times faced by this pandemic.

Our web site, www.vdh.virginia.gov/odw, contains helpful information and links for owners and operators. Owners can reach us during non-business hours to report emergencies at 866-531-3068; since this number is strictly for waterworks use only, please do not distribute it to customers or anyone outside your agency, company, or organization.

Survey By:

James Reynolds, P.E., Field Director

Enclosure(s):
1. Chemical Schedule (CS)
2. Sanitary Survey Report (SS)

ec/enc: Mr. Doug Towne, Acting Operations Superintendent (CS, SS) ✓
Mr. Roy Ritt, Maintenance Manager (CS, SS)
Richmond City Health Dept., attn: Environmental Health Manager (CS, SS)
VDH, ODW - Central Office (CS, SS)
ec: Mr. Calvin Farr, Director
cc: Mayor Levar Stoney, City of Richmond

Chemical Schedule for 4760100 RICHMOND, CITY OF

EP001 [redacted]PS - ENTRY POINT NO 1

EP001 [redacted]*PS*

Group	Last Sample	Freq.	Next Sample	Comments
Fluoride Split	4/9/2015	1	5/9/2015	
SOCs - Carbamates	2/18/2020	3	5/18/2020	
SOCs - Diquat	2/18/2020	3	5/18/2020	
SOCs - Semi-Volatile Organic Chemical	2/18/2020	3	5/18/2020	
SOCs - Volatile Fumigants	3/31/2020	3	6/30/2020	
Cyanide	2/27/2012	108	2/27/2021	
Inorganics	6/30/2020	12	6/30/2021	
Metals	6/30/2020	12	6/30/2021	
Nitrate + Nitrite (Combined)	6/30/2020	12	6/30/2021	
VOC	6/30/2020	12	6/30/2021	
Radiological	8/17/2018	72	8/17/2024	

Waivers

	Begin	End
CYANIDE2019	1/1/2011	12/31/2019
CYANIDE2028_B	1/1/2020	12/31/2028

IN001 RAW WATER INTAKE

RW001 *RAW WATER INTAKE*

Group	Last Sample	Freq.	Next Sample	Comments
TOC-Alkalinity (Raw)	4/15/2015	1	5/15/2015	

TP001 RICHMOND WTP

UP001 *TOC COMB. FILTER EFF*

Group	Last Sample	Freq.	Next Sample	Comments
TOC-Low (Finished)	4/15/2015	1	5/15/2015	

DS001 DISTRIBUTION SYSTEM

DB002 [redacted]

Group	Last Sample	Freq.	Next Sample	Comments
HAA5	7/7/2020	3	10/7/2020	Sample: Jan-Apr-Jul-Oct
TTHM	7/7/2020	3	10/7/2020	Sample: Jan-Apr-Jul-Oct

DB006 [redacted]

Group	Last Sample	Freq.	Next Sample	Comments
HAA5	7/7/2020	3	10/7/2020	Sample: Jan-Apr-Jul-Oct
TTHM	7/7/2020	3	10/7/2020	Sample: Jan-Apr-Jul-Oct

DB007 [redacted]

Group	Last Sample	Freq.	Next Sample	Comments
HAA5	7/7/2020	3	10/7/2020	Sample: Jan-Apr-Jul-Oct
TTHM	7/7/2020	3	10/7/2020	Sample: Jan-Apr-Jul-Oct

Group	Last Sample	Freq.	Next Sample	Comments
HAA5	7/7/2020	3	10/7/2020	Sample: Jan-Apr-Jul-Oct
TTHM	7/7/2020	3	10/7/2020	Sample: Jan-Apr-Jul-Oct

50 Lead and Copper Samples due 6/25/2022

Data on this report is calculated from the date the last sample was collected and does not factor modifications to the monitoring requirements that may have been established since that last collection period. Current and future monitoring schedules should be reviewed in SDWIS to verify the accuracy of this report.

VIRGINIA DEPARTMENT OF HEALTH
OFFICE OF DRINKING WATER
SUBPART H SYSTEM SANITARY SURVEY REPORT

SUBJECT: CITY OF RICHMOND
WATERWORKS: Richmond City System
PWSID: 4760100

PART I - SYSTEM BACKGROUND & FINDINGS

GENERAL INFORMATION

Owner Name: City of Richmond Department of Public Works	Waterworks Class: 1
Type of Waterwork: Community	
Contact Name: Ms. Rosemary Green, Deputy Director of Public Utilities	
Contact Address: 3920 Douglasdale Road., Richmond, Virginia 23221	
Contact Phone Number: (804) 839-0294	

DO License Class: 1	DO Has Required License: Yes
DO Legal Name: Douglas Towne	DO License No.: 1955005005- exp. 2/2021

Inspection By: James Reynolds	Inspection Date: 08/25/2020 JR 10/5/2020
Time Spent: 5 hours	Last Inspection Date: 05/24/2019
Date to Reviewer: 09/28/2020	Reviewed by/Date: DS 10/1/2020 | 4:48:14 PM EDT
Date to Reviewer:	Reviewed by/Date:
Inspection Type: Routine	
Present at Inspection: Doug Towne	
Facilities Inspected: Treatment plant, pre-sed/lagoon	

Operation Permit Effective Date: 12/27/96	Waterworks Description Sheet Date: 11/14/96
Permit Up-to-Date No [1]	Description Sheet Up-to-Date No [1]
No. Connections: about 65,604 (4,000 inactive)	Population Served: about 197,000 residents[2]
Avg. Daily Production: 70.08 MGD (6/19-7/20)	Operation Permit Capacity: 132 MGD
Exceeds 80% Operation Permit Capacity? (max. 3 consecutive months) No If yes, explain:	
Treatment Provided: Coagulation, sedimentation, filtration and final disinfection.	
SDWIS Inventory Information Current: Yes, verified 08/24/2020	

Comments: 1. Many changes have been made to facilities and capacity.

2. Population served should be verified and updated as necessary. 2020 census results may be a good time to re-evaluate

COMPLIANCE HISTORY

Shaded boxes **indicate a potential Significant Deficiency**

TOTAL COLIFORM RULE		**DATE**
• BSSP Approved:	**Not yet**	**(1)**
• # of routine samples/monitoring period & frequency	**120 per month**	
• Is plan current & appropriate for dist. system & pop.?	**Yes**	
• Is monitoring frequency correct?	**Yes**	
• Rotates and uses approved sites?	**Yes**	
• Measures chlorine residual for all samples, if added?	**Yes**	
• RTCR Level 1 or 2 Assessments since last Survey?	**No**	
DDBP RULES (Community & NTNC)		
• Monitoring Plan approved and current?	Yes	02/26/13
• Monitoring frequency required:	4 sites per quarter	
• Operational Evaluation Level exceeded?	No	
ESWT RULES		
• Disinfection Profile with MOR or available for review?	With MOR	
• LT2 Rule - Round 1	Bin 1	9/24/08
• LT2 Rule - Round 2	Bin 1	5/2/17
• Treatment upgrades required?	None	
• If yes, describe:		
PHASE II/V RULE		
• Waivers current for all entry points?	**Yes**	
CONSUMER CONFIDENCE REPORTS		
• Final report issued by deadline?	**Yes (06/17/20)**	
• Certification Statement Received?	**Yes (07/13/20)**	
LEAD & COPPER RULE		**DATE**
• Materials Survey/Sampling Plan Approved:	**Yes**	**7/1/93**
• Water Quality Parameter (WQP) monitoring required? o If yes, WQPs meet quality and freq. reqmnt?	Yes Yes	
• Have Action Levels (90%) been exceeded in past? o If so, when?	Yes 1992	
• Public Education requirements met if required?	Yes	
• Optimized Corrosion Control Treatment (OCCT) required? o Is OCCT monitoring performed and acceptable?	Yes Yes	
• All consumer notice requirements met?	Yes (last done 10/11/19)	

Comments: 1. The revised BSSP has not been signed by the owner's representative.
2. Stage 2 DBP dates on previous reports were conflicting and did not match with database date. Last signed/approved copy in files as 02/26/13. Date in database updated to reflect.

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

CROSS-CONNECTION CONTROL PROGRAM		DATE
• Approved:	Yes	8/7/06
• Inspected Records This Visit	No [1]	
o Program Active	NI	
o Satisfactory	NI [2]	
MONTHLY OPERATION REPORTS		
• All submitted for past 12 months	Yes	
• Operational treatment parameters monitored?	Yes	
• All required data reported?	Yes	
EMERGENCY MGMT. PLAN for Extended Power Outage		**DATE**
• Verification received?	Yes	7/14/05
• Current?	Yes	
SOURCE WATER ASSESSMENT PERFORMED		
• Source: James River	Yes	2/12/02
ENFORCEMENT		
• Administrative/Consent Order in Effect:	None	
• Violations / Enforcement Actions Since Last Survey	None	
• Owner issued Public Notice as required?	NA	
• Active Corrective Action Plan?	None	
o If yes, is waterworks on schedule?		
• SDWIS Violation & Enforcement Action, Public Notification data current?	Yes	
COMPLAINTS SINCE LAST INSPECTION	YES	
• If YES, summarize: Normal variety of complaints.		
Comments:		

\ Y = Yes; N = No; NA = Not Applicable; NI = Not Inspected; None = None; OK = Acceptable

MONITORING HISTORY

See Attachment 1 with the owner's report.

[1] See Part C for additional questions
[2] Based on Part C questions

SUMMARY

Evaluation Category	Last Inspection	Next Inspection Due
Treatment, Monitoring, Reporting and Data Verification, Operator Compliance	08/25/20	08/25/21
Raw Water Source	08/25/20	08/25/21
Distribution, Cross Connection Control, Finished Water Storage, Pumps, Meter & Valve Vaults	09/19/18	09/19/21
System Management & Administration	09/19/18	09/19/21

PART II-A
UNIT PROCESS EVALUATIONS
(Shading Identifies a Potential Significant Deficiency)

A. RAPID MIX

1. Number of units: [redacted] see comment c. Number in service: [redacted] see comment c.
2. Type of mixing provided: [redacted]
3. Operable mixer available to meet mixing requirements ☒Yes ☐No ☐N/A
4. If conventional units:
   Variable speed control operational? [redacted]
   Evidence of vortexing? ☐Yes ☒No
   Proper mixing obtained? ☐Yes ☒No
5. Chemicals being applied, point(s) of application:

Chemical Applied	Application Point	Feed Rate
$CuSO_4$	[redacted]	
$KMnO_4$		
Hypochlorite		
Powdered Activated Carbon		
Alum		
Coagulation Polymer		

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

COMMENTS:

a. When water temperature [redacted]
b. [redacted] when needed, to control algae. Selection balances cost and DBP formation:
   i. During warm weather [redacted] is added. Was fed at time of inspection [redacted]
   ii. During cold weather (typically December-March). [redacted]
c. There are [redacted] rapid mix units for each plant, but they are not used. [redacted] was in service in each [redacted]. The staff found they generally worked better than the rapid mix units, because the rapid mix blades sheared floc. The rapid mix units remain available for use, if needed.
   i. See page 14 for comments about SCM.

B. FLOCCULATION/SLOW MIX

1. Number of basins: [redacted] Number in service: [redacted]
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
9. Evidence of vortexing/basin short-circuiting? ☐Yes ☒No
10. Overall floc formation: ☒good ☐fair ☐poor ☐undetectable

    Floc type/appearance: ☐ pin floc ☐fluffy ☒ sweepfloc ☒other_____
11. Are polymers used? ☒Yes ☐No
12. General performance: ☒satisfactory ☐needs attention
13. Physical condition of unit: ☒satisfactory ☐needs attention

COMMENTS:

- Each of the [redacted] sedimentation basins has [redacted] flocculation basins. The [redacted] basins are both parallel and in series.
- Some mixing units were being refurbished

C. SEDIMENTATION

1. No. of basins provided: [redacted] No. in operation: [redacted]
2. Proper flow distribution between basins? ☒Yes ☐No
3. Signs of short circuiting/overloads? ☐Yes ☒No
4. Evidence of floc shear at stilling wall? ☐Yes ☒No
5. Floc carry-over observed? ☐Yes ☒No
6. Floc settleability: ☒satisfactory ☐needs attention
7. Sludge removal: ☒manual ☒mechanical

   If manual: 2 times/year; last cleaned: Spring 2020: plan for next cleaning Fall 2020

   If mechanical, is equipment operable: ☒Yes ☐No

   Excessive sludge accumulation: ☐Yes ☒No

   If "Yes", estimate sludge blanket depth:_____

8. Chemicals added, application point(s):

Chemical Applied	Application Point	Feed Rate (mg/l)
Caustic	[redacted]	
Chlorine		
Filter Polymer		

9. General performance: ☒satisfactory ☐needs attention
10. Physical condition of unit: ☒satisfactory ☐needs attention

COMMENTS:

a. The new sludge removal system has been installed on all [redacted] basins, and is performing well. The plate settlers continue to perform well.
b. Some piles of sludge were observed where the vacuum collection heads pushed sludge to the side or where the heads can't reach. Not appreciable or seen to impact turbidity carry-over

D. FILTRATION

1. No. of filters provided: [redacted] No. in operation: [redacted]

2. Filter media: [redacted]

Date media last added or changed: 2005 / 2006

Frequency media depth checked: Periodically

Frequency operator checks filtration rate: monthly Date last checked 08/2020

Values observed for individual filters:

Filter No.	Effluent Turbidity (NTU)	Loading Rate (gpm/ft^2)
[redacted]	0.02-0.03 NTU	3.2 MGD (2.06 gpm/ft^2)
[redacted]	0.02-0.03 NTU	3.2 MGD (2.06 gpm/ft^2)

Design: [redacted] short term, see 3/13/02 letter}

Exceeds permitted rate? ☐Yes ☒No

Was filtration rate checked? ☐Yes ☒No

Filter Area + Gullet [redacted] Volume (per 6" drop) = [redacted]

3. Filter appurtenances operable and in good condition? Last Calibrated

All valves/controls (electrical PM#701): ☒Yes ☐No 10/31/19

Filter rate-of-flow controls (PM#1416): ☒Yes ☐No 10/31/19

Filter rate-of-flow indicator/recorder (#1416): ☒Yes ☐No 10/31/19

Loss of head indicator/recorder (PM#677): ☒Yes ☐No 03/08/19

Surface wash: ☐Yes ☐No ☒NA

Air scour: ☒Yes ☐No ☐NA

Backwash pump(s)/controls (PM#702): ☒Yes ☐No DNI

Backwash rate-of-flow indicator: (PM#702): ☒Yes ☐No DNI

4. Filter backwash practices:

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

Filter backwash based on: [redacted] feet

[redacted] hours

[redacted] NTU

☐particle counts_____particles

[redacted]

Average/maximum before backwash (May-July 2020):

head loss: [redacted] feet filter run times: [redacted] hours

turbidity: 0.021/0.06 NTU particles: n/a

Filter backwash observed? ☒Yes ☐No

Satisfactory? ☒Yes ☐No ☐NA

Frequency operator checks backwash rate: Monthly Date last checked: 08/2020

5. Filter-to-waste practiced: ☒Yes ☐No ☐NA

Is filter to waste at design filtration rate? ☒Yes ☐No

Average filter-to-waste (rewash) time: [redacted]

Is turbidity monitored during filter-to-waste? ☒Yes ☐No ☐NA

Criteria established for filter-to-waste duration: Set point

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:

1. WTP added [redacted] to existing data system, without an expensive system redesign. Data is normally captured, but reliability and redundancy were not provided. This has resulted in frequent missing and occasional incorrect data (skewing VOP summary).
   a. WTP-wide SCADA project proceeding with installation – conduit laying and screen development are complete. The maintenance staff is hooking up the new PLC's and the new consoles, many filters completed.
   b. [redacted]
2. Staff have been performing regular drop, rise and expansion testing.
   a. Results of the drop and rise were satisfactory.
   b. Results of the expansion testing show only 17-18 inches expansion at backwash rates of 22-26 MGD.
3. Some headloss indicators (Filters [redacted]) were offline for a brief period based on MORs. All back in service at time of inspection.
4. [redacted] A capital project is being discussed to fix this issue.
5. Media assessment was planned for the near future to determine if media replacement is necessary.
6. If a filter is sitting for an extended period, WTP wil[redacted] before placing online.

E. FINISHED WATER FACILITIES

1. Clear well

[redacted] ☒Yes ☐No

[redacted] ☐Yes ☐No ☒N/A

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

Sediment present ☐Yes ☒No

Last cleaned: Plant [redacted] in 2006 / Plant [redacted] in 2007

Physical condition: ☒satisfactory ☐needs attention

2. Filtered water pumps: Number provided/operable/in use: [redacted]

Pressure gauges provided/operable Not read psig ☒Yes ☐No

Flow meter operable Not read MGD ☒Yes ☐No

Physical conditions: ☒satisfactory ☐needs attention

3. Finished water pumps: Number provided/operable/in use: [redacted]

Pressure gauges operable [redacted] 1/2/3) 95[redacted] and 142 [redacted] psig ☒Yes ☐No

Flow meter operable (See comments) ☒Yes ☐No

Physical conditions: ☒satisfactory ☐needs attention

4. Is clearwell water level monitored/controlled? ☒Yes ☐No ☐NA

5. Are level sensors operable? ☒Yes ☐No ☐NA

6. Chemicals added, point(s) of application:

Chemical Applied	Application Point	Dose (mg/l)
Hypochlorite	[redacted]	
Ammonia		
Fluoride		
Lime		
Phosphate		
Caustic		

7. Approved device to isolate process water at treatment plant from distribution system? Plant RPZ devices tested annually. ☒Yes ☐No

COMMENTS:

a) [redacted] A detailed description of the filterwells/clearwells is provided in the October 2003 special inspection report.

b) Viewing ports (to the 'clearwell') are not routinely used by operators. The "water quality" can be observed in the aeration basins.

c) Finished water [redacted] schematic is complicated, servicing several very different demands. This is why the pressures are so different and the flow is [redacted]

d) [redacted]

e) [redacted]

f) [redacted] feed was offline due to maintenance. Awaiting replacement parts to complete maintenance. **Update: [redacted] feeders back online per email dated September 28, 2020.**

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
☐ $KMnO_4$	[redacted]	☒ chlorine	[redacted]
☐ activated carbon		☒ ammonia	
☒ alum		☒ fluoride	
☒ polymer (coag. aid)		☒ phosphate	
☐ polymer (filter aid)		☒ lime	
☒ caustic		☐ other	

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? Non-potable, isolated by RPZ. ☒Yes ☐No

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

   Feeders calibrated on a regular basis? (recommend quarterly) ☐Yes ☒No
   Frequency operators calibrate feeders: Pumps not calibrated
   Date last calibrated: NA
   Frequency operators check calibrations: Rate checked once/month
   Date last checked: 08/2020, with drawdown tube

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

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

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

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

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

9. Other safety problems for the operators or public noted? ☐Yes ☒No
   Describe:

Comments:

- WTP is using interim [redacted] It is working well.

G. HYPOCHLORITE (The hypochlorite is fed to the applied water channels.)

1.	Solution tank in good condition	☒Yes ☐No
2.	Solution tank covered	☒Yes ☐No
3.	Drain provided	☒Yes ☐No
4.	Spill containment adequate	☒Yes ☐No
5.	Stored away from organics and acids	☒Yes ☐No
6.	Gloves, apron & eye protection	☒Yes ☐No
7.	Eyewash/safety shower provided	☒Yes ☐No

H. FLUORIDE ACID

1.	Weighing scale and recorder provided and in good condition	☒Yes ☐No
2.	Gloves, apron & goggles provided	☒Yes ☐No
3.	Chemical respirator, rated for acid use (SCBA)	☒Yes ☐No
4.	Water meter/fluoride feed pacer/other control system provided, in good operating condition	☒Yes ☐No
5.	Anti-siphon protection (Back pressure sustaining valve)	☒Yes ☐No
6.	Feeder/metering pump operable and in good condition	☐Yes ☒No
7.	Injection line in good condition	☒Yes ☐No
8.	Separate feeder/storage room	☐Yes ☒No (for storage only)
9.	Room ventilation adequate	☒Yes ☐No
10.	Carboy/tank vented to outdoors	☒Yes ☐No
11.	Carboy/tank openings sealed	☒Yes ☐No

Comments: Fluoride feeders offline for maintenance. Awaiting parts. **Update: Fluoride feeders back online per email dated September 28, 2020.**

I. OPERATIONAL/PERFORMANCE DATA

Constant Monitoring Equipment	Operable	Inline Reading	Bench Reading	Corresponds To Desk Unit
raw pH	Yes	7.62,7.69	7.5	Yes
flash mix pH	Yes	6.5,6.2	6.2	Yes
finished pH	Yes	7.4,7.6	7.7	Yes
raw turbidity	Yes	11.81, 12.83	13	Yes
sed basin 1-2 turbidity	Yes	0.27,0.29	0.3	Yes
sed basin 3-4 turbidity	Yes	0.35,0.41	0.4	Yes
		Inline Reading	SCADA Reading	Corresponds to Inline
filter [redacted] turbidity	Yes	0.02	0.02	Yes
filter [redacted] turbidity	Yes	0.02	0.02	Yes
filter [redacted] turbidity	Yes	0.02	0.02	Yes
filter [redacted] turbidity	Yes	0.02	0.02	Yes
filter [redacted] turbidity	Yes	0.02	0.02	Yes
filter [redacted] turbidity	Yes	0.02	0.02	Yes
filter [redacted] turbidity	Yes	0.02	0.02	Yes
filter [redacted] turbidity	Yes	0.03	0.03	Yes
filter [redacted] turbidity	Yes	0.02	0.02	Yes
filter [redacted] turbidity	Yes	0.03	0.03	Yes
filter [redacted] turbidity	Yes	0.03	0.03	Yes
filter [redacted] turbidity	Yes	0.03	0.03	Yes
filter [redacted] turbidity	Yes	0.03	0.03	Yes
filter [redacted] turbidity	Yes	0.02	0.02	Yes
filter [redacted] turbidity	Yes	0.021	0.02	Yes
filter [redacted] turbidity	Yes	0.03	0.03	Yes
filter [redacted] turbidity	Yes	0.02	0.02	Yes
filter [redacted] turbidity	Yes	0.02	0.02	Yes
filter [redacted] turbidity	Yes	0.03	0.03	Yes
filter [redacted] turbidity	Yes	0.03	0.03	Yes
filter [redacted] turbidity	Yes	0.02	0.02	Yes
filter [redacted] turbidity	Yes	0.05	0.05	Yes
finished turbidity	Yes	0.156	0.16	Yes
finished chlorine	Yes	4.41	4.43	Yes

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

Parameter	RAW Freq/Results	APPLIED Freq/Results	FINISHED Freq/Results
Alkalinity (mg/L as $CaCO_3$)	[redacted] 44	[redacted] 16,16	N/A
Hardness (mg/L as $CaCO_3$)	N/A	N/A	N/A
Temperature °C	[redacted] 23.3	N/A	N/A
Fluoride (mg/L)	N/A	N/A	[redacted] Offline
Iron (mg/L)	N/A	N/A	N/A
Manganese (mg/L)	As needed	N/A	[redacted]
Phosphate (mg/l)	N/A	N/A	1.58, 1.46 (phosphate)

Plant flow at time of inspection: Raw Water 76.8 MGD Filtered/Finished Water 67.9 MGD (daily totals)

Comments:

J. OPERATIONAL/LABORATORY STAFF MONITORING PROCEDURES

1. Hours plant is operated per day: [redacted]

2. Designated Operator (DO) - Hours/Day present: [redacted]

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

Name (as shown on license)	License Class	License Number	Expiration Date	Remarks
Leroy A. Rice, Jr.	1	1955001901	2/28/21	Operations
Douglas Park Towne	1	1955005005	2/28/21	DO-Acting Super II
Ronnie T. Bartholomew	1	1955004688	2/28/21	Chief Operator
James E. Baty	1	1955003876	2/28/21	Chief Operator
Jason D. Russell	1	1955006243	2/28/21	Chief Operator
Robert Arnold Thompson	1	1955003216	2/28/21	Chief Operator
William Jae Wright	1	1955006328	2/28/21	Chief Operator
Toby Michael Bryant	1	1955005487	2/28/21	Sr Operator
Kevin L. Coleman	1	1955000404	2/28/21	Sr Operator
Bradley Morgan Halsey	1	1955006781	2/28/21	Sr Operator
Matthew D. Hicks	1	1955004513	2/28/21	Sr Operator
Thomas Stanley Marsh	1	1955006269	2/28/21	Sr Operator
Donald Jackson Murray	1	1955005058	2/28/21	Sr Operator
Travis Parker	1	1955003607	2/28/21	Sr Operator
Floyd M. Quesenberry	1	1955003652	2/28/21	Sr Operator
Rembert J. Wallace	1	1955004689	2/28/21	Sr Operator
Charles Gary Watts III	1	1955006639	2/28/21	Sr Operator
Jerry Wayne White Jr.	1	1955004976	2/28/21	Sr Operator
Zachary Andrew Fisher	1	1955006867	2/28/21	Sr Operator
Shaka Ade Smith, Sr.	1	1955007418	2/28/21	Sr Operator
Bill Whitaker (trainee)				Sr Operator
Jermaine Murray (trainee)	2	1955007750	2/28/21	Sr. Operator

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

*Ricky Hatfield has changed positions. Doug Towne was Acting Superintendent at time of inspection, however interviews were pending for the position.

3. How are operating decisions made and communicated? The shift supervisors (Class 1 operators) are authorized to make operating decisions, but must abide by the operating parameters in the SOP's. They record any operational changes on the daily log sheet, and verbally inform the shift supervisor for the next shift of any operational changes that they made. The plant superintendent learns of operational changes by reading the daily log sheet each day.

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

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

5. 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 ☐NA

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

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

Comment:

6. How is the COAGULATION PROCESS controlled?

[redacted] ☐Pilot Filter

[redacted] ☐Jar Tests

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

Were the procedures adequate? ☒Yes ☐No ☐NA

7. Is equipment in good condition?

pH meter ☒Yes ☐No

Jar test machine ☒Yes ☐No

[redacted] ☒Yes ☐No ☐NA

Pilot filters ☐Yes ☐No ☒NA

Streaming current monitor ☒Yes ☐No ☐NA reading (if applicable): 1.2 (avg)

Particle counter/monitor ☐Yes ☐No ☒NA

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

☐____ times per shift ☒ 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

Alarm set point(s): [redacted] Alarm type: SCADA alert

Is data recorded at least every 15 minutes? ☒Yes ☐No

Is data kept for 3 years? ☒Yes ☐No

Desk-top turbidimeter manufacturer: [redacted] Model No. [redacted]

Date last calibrated: 11/19/19

Calibration date posted: ☒Yes ☐No

Date bulb last changed: [redacted] Spare bulb on hand? ☐Yes ☒NA

Condition of cuvettes: Satisfactory

Primary standard used: [redacted]

Expiration Date of primary standard: 3/21

Secondary standard used: None

Age of secondary standard: NA

Date secondary last compared to primary: NA

Turbidity-free water available? ☒Yes ☐No

9. Method of CHLORINE RESIDUAL monitoring: [redacted]

Continuous residual monitor operational? (required for Population > 3,300) ☒Yes ☐No ☐NA

Does each analyzer have local readout and continuous recording (SCADA) ☒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

Applied Set limits: Min: [redacted] Max: [redacted]

Finished Set limits: Min: [redacted] Max: [redacted]

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? [redacted]

If system serves ≤ 3,300, frequency of residual monitoring (Grab Sampling): N/A

Expiration date of colorimeter gel standards: DNI

Frequency of monitoring satisfactory? ☒Yes ☐No

Free chlorine residual measured and reported? ☒Yes ☐No

Calibration Checks performed? ☒Yes ☐No

If yes,

Are results of calibration checks within the larger of +/- 0.1 mg/l or +/- 15%? ☒Yes ☐No

Are emergency calibration checks performed as soon as possible when an on-line chlorine analyzer indicates a large (≥50%) unexpected change? ☒Yes ☐No ☐NA

Are records of calibration recorded and maintained for 3 years? ☒Yes ☐No

Do all chemical reagents and standards for on-line analyzers and grab sample methods have an unexpired shelf life? ☒Yes ☐No

Chlorine residual necessary to meet CT requirements: [redacted]

Location of measurement: [redacted]

Staff aware of the required minimum residual? ☒Yes ☐No

(WTP target of [redacted] exceeds minimum to meet CT)

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

10. Are adequate LAB EQUIPMENT AND REAGENTS available to run necessary operational tests? ☒Yes ☐No

Are reagents dated? ☒Yes ☐No

Are test procedures appropriate? ☒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

11. FLUORIDE test utilized: [redacted]

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: NA

12. 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: Weekly or as needed

13. Adequate BACKFLOW PREVENTION devices at sinks, etc. Air-vacuum breaker ☒Yes ☐No

COMMENTS:

- DPU has had successful coagulation as measured by VOP awards.
- DPU has requested eliminating the [redacted] devices as DPU controls their process with [redacted] meter readings. ODW has responded that [redacted] is required for [redacted]
    - In 2016, DPU asked if they could move their [redacted] devices in [redacted] to the [redacted] after the [redacted]. ODW responded this could be included as part of the project when the installation of the [redacted] is formalized, after 2018.
    - For clarification, regulations state that a jar test and ONE or more of the following means of controlling coagulation [redacted] potential, pilot filters, streaming current)
    - [redacted] currently used for trending purposes only, [redacted] meter is used to find approximate coagulation dosage requirements

K. WASTE HANDLING

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

   ☒lagoons ☐holding tank/sand beds ☐other_____

2. Ultimate discharge of waste flows: Lagoon sludge to landfill, lagoon supernatant recycled,

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): 0.9-1.71 MGD (August 2020)

   % of Raw Water Flow (should be < 10%): 1-2% (August 2020)

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

   If Yes, Describe: Lagoon sedimentation

   * 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: DPU submitted FBRR information 9/18/02

5. Are floor drains in chemical storage and feed areas separated from waste flow streams? ☒Yes ☐No ☐NA

COMMENTS:

a. [redacted]

b. DPU has decided to remove sludge by annual contracts for one year's worth of accumulation.
   (1) DPU planning on removing sludge from the lagoons in near future.

L. EMERGENCY POWER

☐ Portable generator connection(s). Identify generator supplier:
☒ Permanent equipment installed
☐ No Provisions

Fuel: [redacted]
Generator Rating: [redacted]

- % of Total Power Demand met [redacted]
- Describe water production capability & critical elements supplied: [redacted]

[redacted]

Not read
Not determined

[redacted] Fuel Tanks:

• Fuel tank a minimum of 50 feet from any well or 100 feet from intake	☒ Yes	☐ No
• Containment provided for fuel tank (tank in tank)	☒ Yes	☐ No
• Leak detection provided	☐ Yes	☒ No
• Fuel tank double walled	☐ Yes	☒ No
• Refueling protected from spills	☒ Yes	☐ No
• Evidence of fuel leaks	☐ Yes	☒ No

How often is the Emergency Power exercised? 2/yr under load, 10/yr w/o load
Duration? 4-6 hr under load, 1-2 hr w/o load
How often is the transfer switch exercised? 2/yr under load, 10/yr w/o load
Duration? 4-6 hr under load, 1-2 hr w/o load

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:

A. VIRGINIA OPTIMIZATION PROGRAM REVIEW

Virginia Optimization Program Goal	Filter-months met		Improvement Shown?
	03/2019 to 2/2020	3/2018 to 2/2019	
Clarified Water Turbidity (use 'clarifier'-months) ≤ 1.0 NTU when average raw water turbidity ≤10.0 NTU ≤ 2.0 NTU when average raw water turbidity > 10.0 NTU	100% (48 of 48)	48 of 48	Optimal
Filtered Water Turbidity ≤ 0.3 NTU in 100% of readings	96.8% (245 of 253)	99.6%(253 of 254)	No
Filtered Water Turbidity ≤ 0.1 NTU in 95% of readings	99.6% (251 of 252)	99.6%(253 of 254)	No; near optimal
Filtered Water Turbidity peak ≤ 0.3 NTU in backwash recovery period for each backwash	99.6% (251 of 252)	96.5%(245 of 254)	Yes; near optimal
Backwash recovery period ≤ 15 minutes for each backwash	56%(141 of 252)	88.6%(225 of 254)	No; sig drop
Filtered Water Turbidity ≤ 0.1 NTU when filter returned to service after each backwash	91.7% (231 of 252)	81.1% (206 of 254)	Yes

Virginia Optimization Program Goal	Why is the VOP goal not met? What are the operator's plans to improve?
Clarified Water Turbidity	Note: DPU has not adopted clarifier goals because they have found meeting these goals does not produce the best water for filtration.
Filtered Water Turbidity ≤ 0.3 NTU in 100% of readings AND ≤ 0.1 NTU in 95% of filtered water readings	Plant has [redacted] operational trigger to take filter offline. Values above 0.3 NTU do not appear to happen often, may be blips that are captured in recording/instrumentation.
Filtered Water Turbidity peak ≤ 0.3 NTU in backwash recovery period for each backwash	The majority of excursions are due to a failure of the SCADA system to capture the actual operating data. WTP-wide SCADA improvements are almost completed.
Length of backwash recovery period ≤ 15 minutes for each backwash	Recovery period may point to issues getting below 0.1 NTU since not many instances of peaks above 0.3 NTU. Plant does appear to step backwash flow down prior to finishing backwash which some plants have seen as helpful. Other possible things to investigate is length of backwash (possibly too long). filter expansion impact on backwash, and if timing of recovery period is accurate. The recovery period is the time filter to waste is initiated to the time that turbidity falls below 0.10 NTU.
Filtered Water Turbidity ≤ 0.1 NTU when filter returned to service after each backwash	See above.

COMMENTS:

PART II - B
RAW WATER SOURCE

(Shading Identifies a Potential Significant Deficiency)

A. RAW WATER INTAKE / SURFACE SOURCE EVALUATION

Source Name: James River, [redacted]

1. Intake located on: ☒stream/free flowing river ☐reservoir
2. Observed (visible) water quality: ☐clear ☒turbid[1] ☐colored _____ ☐other _____
3. Activities or pollution sources in immediate intake area represent a potential health risk: ☐Yes ☒No
   Describe: N/A
4. Observed conditions of surrounding area: Relatively undeveloped. Unchanged.
5. Reservoir level/stream flow: ☐normal ☒high[1] ☐low
6. For in-stream intake:
   check dam provided: ☒Yes ☐No
   stream flow monitoring provided: ☒Yes ☐No
7. Condition of intake structure: Satisfactory
   screen provided: [redacted]
   condition of screen: ☐good ☒average ☐poor
   number of intake levels provided: none depths: n/a
   drawoff depth/level being used: n/a
   access provided to intake structure: Yes
   method of cleaning screen: [redacted]
   is it operable/used: Yes
8. Raw water pumps
   number provided: [redacted] number operable: [redacted]
   number in use: [redacted] pumping rate: 76.8 MGD (Daily total)
   pump station subject to flooding: ☐Yes ☒No
   protected against trespassing/vandalism: ☒Yes ☐No
   access to pump station: Paved plant road
   When were pumps etc. last maintained/checked? Major work 2009, monthly and other PM 5/17. Pump [redacted] was rebuilt in 2018.
9. Treatment provided at intake (describe): [redacted]
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: N/A Determination Date: N/A – grandfathered allowance to withdraw water.
    Present demand exceeds raw water pumping capacity? ☐Yes ☐No ☒NA

Comments:
1. [redacted] estimated. For algae control.
2. Dredging of the basin is due and in planning stages.
2. The [redacted] will be replaced.

B. SOURCE WATER ASSESSMENT/PROTECTION

1. List land use activities of concern found but not listed in Zone 1 for the original source water assessment.

LUA TYPE	RISK	NAME OF PROPERTY OWNER	OWNER ADDRESS	LATITUDE/ LONGITUDE

2. Source Water Protection:

Does the waterworks have a written source water protection plan? ☐Yes ☒No

If "Yes":

Has the source water protection plan been submitted for review? ☐Yes ☐No ☒NA

When was the last evaluation performed? _____

Has there been sufficient additional development in the watershed to warrant a revised source water protection plan? ☐Yes ☐No ☒NA

If "No":

Has a schedule been established to develop a plan? ☐Yes ☒No

What is nature of watershed?

☒agricultural ☐industrial ☒forested ☒residential

How is the watershed controlled/protected?

☐ordinances ☐owned by waterworks ☐zoning

☒other DEQ and other agencies

What is size of the watershed? Owner does not know and does not intend to find out.

Percent of watershed protected/controlled: Unknown %

Any sources of pollution in proximity of intakes: No response.

Discuss:

3. Does waterworks have a spill response plan? ☒Yes ☐No

Has it been tested? ☒Yes ☐No

4. Has there been a contamination event since last survey? ☐Yes ☒No

If "Yes", provide summary (date, source, materials and quantities involved, & effects on waterworks):

Comments: