

RAPIDAN SERVICE AUTHORITY

Final Report on Objectionable Odor Event of August 21 – August 27, 2024

Tim Clemons
General Manager
Rapidan Service Authority

Investigative Summary Report

After a thorough review of the Virginia Department of Health, Office of Drinking Water (VDHODW) Investigative Summary Report – Objectionable Odor Event and the Notice of Alleged Violation, Rapidan Service Authority (RSA) offers the following responses:

As noted in the VDH Investigative Summary Report, an Objectionable Odor Event began on August 21, 2024, after RSA received phone calls from customers complaining of a petroleum type odor in their water. Customers described the odor as “WD-40,” “diesel,” “gasoline,” “kerosene,” or a “mechanics shop.”

Upon consultation with VDHODW, a Do Not Use advisory was put in place for the Locust Grove, Virginia water service area. After multiple rounds of analysis for Volatile Organic Compounds (VOC’s) and Semi-volatile Organic Compounds (SVOC’s) primarily, beginning on August 21, 2024, each showing that the water met federal and state drinking water standards, the Do Not Use advisory was changed to Do Not Drink on August 24, 2024. On August 27, 2024, the Do Not Drink advisory was lifted, with support from VDHODW. During this period, beginning on August 23, 2024, after analysis continued to show that the water met federal and state drinking water standards, RSA staff began flushing fire hydrants in an effort to remove the objectionable odor from the water distribution system. This flushing effort went on for the better part of a week. During this same time, RSA was interacting with its customers, through its webpage, email, phone calls and visits to homes, to explain what the testing analysis had shown and to assist the customers in flushing their individual homes, when necessary.

Coincidental to this incident, RSA has an ongoing project related to both increasing water production capability at the Wilderness Water Treatment Plant (WTP) and upgrading the associated raw water intake, located on the Rapidan River. On August 19, 2024, the project electrical subcontractor installed temporary wiring to the raw water river intake pumps in order to upgrade the permanent wiring to the pumps. RSA’s Project Engineer, Mangrum Consulting and Design of Lynchburg, Virginia, was onsite when the temporary wiring was installed. On August 20, 2024, one of these river intake pumps failed. Given that the failure of a raw water intake pump is not uncommon, RSA WTP staff activated a second pump in order to be able to

continue providing water to the WTP. When the raw water intake pump failed on August 20, 2024, RSA assumed the cause to be related to the newly installed temporary wiring. As a result of the pump failure, however, the Project Engineer directed the contractor on August 21, 2024, to measure the voltage with the pump running to ensure sufficiency of the temporary wiring (copy of correspondence attached as "Attachment A").

When the objectionable odor event began on August 21, 2024, it did not occur to RSA that the failed pump and objectionable odor were related as pump failures are not uncommon.

On August 24, 2024, RSA and VDHODW met by phone to discuss lifting the Do Not Use advisory based on multiple rounds of testing data showing that the water met federal and state drinking water standards. After reaching an agreement on that issue, RSA management learned that the second and third raw water intake pumps had just failed in succession. RSA immediately notified VDHODW of these pump failures but again, at this point, RSA was looking to the project contractor, thinking this was an electrical issue, not the cause of the odor event. As stated previously, hindsight would lead to a different reaction under similar circumstances. RSA's onsite manager contacted the project contractor, Patterson Construction, and the project electrical sub-contractor, McGee Electric, to advise them that the two remaining raw water intake pumps had just failed. Patterson Construction came onsite later that afternoon and removed two of the failed pumps to be picked up later by Atlantic Pump. As a result of pumps 2 and 3 failing, RSA contacted Xylem/Godwin Pumps and ordered a diesel pump be set up on the river to provide water to the WTP. A diesel pump was installed and operational later on the evening of August 24, 2024, service continued to the plant and the Do Not Use advisory was then moved to a Do Not Drink advisory. Atlantic Pump came onsite the week of August 25, 2024, to remove the third failed pump and to take all three pumps to their shop for inspection and repair. During this activity, no food grade oil mineral oil was observed.

On August 25 and 26, 2024, VDHODW staff were on site to evaluate the taste and odor of the finished water throughout the water distribution system. VDHODW staff were accompanied by an RSA manager to various fire hydrants throughout the Locust Grove area for this purpose. The August 25, 2024, evaluation indicated that taste and odor still lingered in the water. The August 26, 2024, evaluation did not reveal any lingering taste or odor and the Do Not Drink advisory was lifted later that

same day. After the Do Not Drink advisory was lifted, the investigation continued into the cause of the objectionable odor. Given that this was a public water-related event, VDHODW spearheaded the investigation and was the lead agency in putting out bulletins and information and responding to various inquiries from news agencies and individuals. The bulletins were given in draft form to RSA and Orange County before being placed on VDHODW's website in final form. These were put out regularly to keep the community informed of what was being learned. Even with these regular VDHODW bulletins, RSA received criticism from various customers complaining of a lack of communication about the incident. While RSA has never had a public relations department/officer like many organizations, it is an area for sincere consideration for the future.

Running parallel to VDHODW's investigation, RSA's Project Engineer investigated the electrical sufficiency of the temporary wiring that had been installed by the project electrical sub-contractor, McGee Electric. This investigation led to the determination that the temporary wiring used was not only smaller than the then current permanent wiring, but it was also significantly smaller than the new permanent wiring called for in the project specifications and contract. This was conveyed to the contractor by the Project Engineer on September 3, 2024 (copy of correspondence attached as "Exhibit B"). RSA's Project Engineer has since confirmed that the failure of the three river intake pumps was directly tied to the undersized temporary wiring placed by the electrical sub-contractor as part of the project construction. The General Contractor has been advised of this finding and is responsible for costs associated with rebuilding the three river intake pumps, rental of emergency diesel pumps in the interim and other costs as determined by the Project Engineer.

On September 4, 2024, RSA management contacted Atlantic Pump to determine the status of the three pumps that had failed. It was during that conversation that RSA management first learned that the pump failures were considered "catastrophic" in nature. In inquiring further with Atlantic Pump, it was explained that the failures were not what was normally seen in the past as a normal pump failure usually originated with a seal failure caused by the abrasiveness of the raw water (bottom-up failure). This type of failure would cause the pump to shut down and then Atlantic Pump would be contacted to come and remove and replace the pump. In this instance, the failure was considered by Atlantic Pump to be top-down. It was explained that the main electrical components in the pump motor had received a severe electrical charge resulting in a significant thermal overheating event causing

extensive damage to the pump windings and scorching of the food grade mineral oil. This type of damage is consistent with undersized wiring being unable to carry the correct voltage needed by the pump to start. Atlantic Pump further advised that while a normal pump failure would cause a cup of food grade oil to be lost, this failure caused the loss of one to two gallons of food grade oil. RSA conveyed that same information to VDHODW and the Project Engineer that same day. While the VDHODW report states that RSA knew of this condition sooner than September 4, 2024, that is the earliest date that RSA management was made aware of this fact.

Upon learning this information from RSA on September 4, 2024, VDHODW began looking at this food grade oil as the possible source of the objectionable odor. Over the next nine days, considerable analysis was carried out in trying to determine if there was a link between the food grade oil used in the river intake pump and the objectionable odor. VDHODW secured the services of a laboratory in Texas that has specialization in taste and odor and furnished them with samples of both the water taken from the river intake wetwell and the food grade mineral oil. VDHODW continued investigating the raw water pumps including the mineral oil lubricant, wire stator varnishes, and other internal components that might have caused the detections of isovanillin, benzaldehyde, and BCEE as these constituents had been found in the water. Isovanillin is an organic compound and isomer of vanillin and is the primary component of the extract of the vanilla bean. Isovanillin was identified as possibly a contributor to the odor's cause. Benzaldehyde is an organic compound and is among the simplest aromatic aldehydes and one of the most industrially used. BCEE is a colorless, nonflammable liquid used as a solvent for lacquers and oils. VDHODW received preliminary results from the taste and odor laboratory in Texas that samples submitted from both raw water wet wells #1 and #2 sampled on September 9, 2024, contained isovanillin but no traces of benzaldehyde.

VDHODW received sampling reports from the VELAP-certified private laboratory for samples collected on September 9, 2024 from these same wet wells that again showed no detections for VOCs or SVOCs but did show detections of Total Petroleum Hydrocarbons Diesel Range Organics (TPH DRO) at a concentration of 0.603 mg/L in Wet Well #1 and 1.06 mg/L in wet well #2. TPH ORO were also detected in wet well #2 at a concentration of 1.5 mg/L. These results, along with the field observation of a mineral oil-like substance on sampling equipment, led VDHODW to conclude the failed pump from August 20, 2024, to be a cause of the oil detected in the wells.

On September 13, 2024, the taste and odor laboratory in Texas confirmed that heated food grade mineral oil, received from Atlantic Pump produced a “WD-40” odor identical to the odor observed in the drinking water samples. From that, this laboratory expressed a high level of confidence that the odor event was related to the mineral oil release on August 21, 2024, because of the raw water intake pump failure.

Due to the information provided by the Texas laboratory, VDHODW concluded that the failed river pump was the probable cause of the odor event that began on August 21, 2024. While RSA questioned the analytical methods and results provided by the Texas laboratory, it does not disagree with this finding regarding the possible cause of the odor event.

VDHODW issued a final report on the matter on September 25, 2024. In its final report VDHODW provided comments on their observations related to this incident. These comments were associated with:

1. Multiple Pump Failures and Electrical Issues
2. Temporary Wiring and Installation Issues
3. Delayed Reporting and Lack of Timely Communication
4. Response and Mitigation Measures Were Reactive Rather Than Proactive
5. Contractor Management and Oversight Issues
6. Poor Raw Water Monitoring and Delayed Identification of the Contaminant
7. Escalating Equipment Failures

As a result of these observations, VDHODW made the following recommendations:

1. RSA should install additional treatment processes to address taste and odor, which would also likely address concerns about disinfection by-products.
2. RSA should be more present and directly involved with its contractors when critical equipment is being pulled for repairs to make sure information is timely shared and understood.
3. RSA should improve its communication channels and develop an emergency response plan for future events. RSA should consider additional outreach to its customers, perhaps on a routine and ongoing schedule, to regain the public’s trust.
4. RSA should examine its resource and operator training needs and develop a more robust procedure to routinely monitor raw water quality, including odor.

In response to these four recommendations, RSA offers the following response:

1. RSA had already met virtually with Culpeper VDHODW staff and discussed the issue of reducing disinfection by-products. Further, RSA had already begun soliciting engineering assistance in pursuing granular activated carbon filtration. This effort is ongoing and continuing.
2. RSA's Project Engineer and local staff were and are on-hand regularly throughout any construction activity. RSA staff are always present when any critical equipment is being removed for repair.
3. RSA already has an emergency response plan, as required by EPA. VDHODW quickly assumed the command posture when this event began and wanted all information disseminated to go through them. RSA did not object to this structure given VDHODW's vast resources but will consider a different approach in any future events.
4. RSA will revise its procedures for monitoring raw water quality.

Along with its final investigative report, VDHODW also issued a Notice of Alleged Violation (NOAV) to RSA (attached as Exhibit "C"). The NOAV in part stated:

"RSA failed to identify and evaluate factors with the potential for impairing the quality of the water delivered to customers by not sufficiently overseeing the work of its contractors when the electrical contractor installed the undersized, temporary wiring and when the general contractor had cause to remove the failed pumps. Additionally, following RSA's receipt of customer reports of the odor on August 21, 2024, RSA failed to further investigate the nature and extent of the failure of the pump that occurred on August 20, 2024. An odor of unknown origin has the potential to impair the quality of water delivered to customers. Furthermore, RSA's monitoring systems and early warning mechanisms were either insufficient or not utilized effectively such that RSA did not identify the odor at the Wilderness WTP waterworks until RSA began receiving complaints from customers."

RSA accepts VDHODW's comments about project oversight without necessarily agreeing with them. RSA's Project Engineer, as well as RSA staff, were onsite when the electrical sub-contractor was installing the temporary wiring. The contract with the General Contractor for this project contains a "Means and Methods" clause. Means and Methods of construction refer to the techniques, procedures and materials used during the construction process. Only the contractor is responsible for the means and methods of the construction project. On complex projects, design engineers may provide suggested methods of construction, but the contractor is still the party responsible for developing the means and methods. This is not a complex

project and is straightforward in its scope. As stated previously, failed pumps are not uncommon in this industry therefore, the failure of the pump on August 20, 2024, was not initially considered at the onset of the objectionable odor event. Further, as stated by VDHODW personnel, they had never seen anything like this in Virginia previously. Neither had RSA staff nor, during the many VDHODW inspections over the years, had an issue like this ever been discussed with RSA. RSA, however, will utilize this experience to revise its procedures related to raw water pump use and raw water monitoring.

The requested corrective actions associated with the NOAV are:

1. Within 60 days of RSA's receipt of this notice, submit to ODW's Culpeper Field Office, by electronic mail, a detailed and comprehensive plan to address the concerns outlined herein and detailed in the enclosed Investigative Summary Report, and including the following elements:

- a. A listing of causal and contributing factors that resulted in the objectionable odor event from RSA's post analysis of the event, including how RSA will effectively respond to those observations and the lessons learned to prevent a similar event from occurring.

- b. Operational changes at RSA to actively and routinely monitor raw water quality and odor, which should include updating daily bench sheets completed by RSA's licensed operators.

- c. Changes in RSA's policy and procedures to ensure infrastructure improvements at the Wilderness WTP waterworks are closely monitored and overseen with a proactive construction inspection program before equipment is placed into operation.

- d. An appropriate and ongoing communication strategy with consumers to address public concerns about water quality.

- e. Ensuring a responsive capital improvement plan to reduce disinfection by-products and improve RSA's ability to respond to taste and odor concerns.

- f. Ensuring an effective emergency response plan and asset management plan.

- g. Other items that RSA would feel important to share based on the Investigative Summary Report dated September 25, 2024, and this notice.

2. Schedule at least monthly meetings with ODW's Culpeper Field Office to review progress on RSA's plan, including its asset management, emergency response, and capital improvement plans.

RSA has addressed each of VDHODW's four recommendations in their final report and the requested corrective actions in the NOAV. A copy of that correspondence is attached as Exhibit "D".

In closing, RSA wants to acknowledge the effort and assistance provided by VDHODW, the Virginia Department of Environmental Quality (DEQ), Virginia Department of Emergency Management (VDEM) and Orange County throughout this incident.

EXHIBIT "A"

From: Rob Mangrum <Rob@mangrumconsulting.com>
Sent: Wednesday, August 21, 2024 12:30:49 PM
To: dansites.pcc@gmail.com <dansites.pcc@gmail.com>
Cc: David Jarrell <djarrell@Rapidan.org>
Subject: Wilderness Phase IB

Dan, a priority item, please have the electrical subcontractor measure voltage (running) of the pump that's presently operating today at the river. Don't think the Owner should start and stop a pump at this time for any reason other than operational since we are down at least one pump.

While onsite Monday, I noticed that there was only one set of 350 kcmil AL conductors per pump as temp. connections between the existing disconnects and the river pumps (for 2 pumps). The design has two (2) sets of 400 kcmil Copper conductors per pump. When AL conductors are used, increased sizing is required.

C. Robert L. Mangrum, P.E., BCEE

Consultant / Process Engineer



434.665.1515 Rob@MangrumConsulting.com

You are hereby advised that, pursuant to the Virginia Freedom of Information Act, written correspondence (including, but not limited to, letters, e-mails and faxes) from and to Rapidan Service Authority and its Board of Members and employees, and others acting on its behalf, may be subject to disclosure as a public record. This includes the e-mail address(es) and other contact and identifying information for parties involved in the correspondence.

EXHIBIT "B"

September 3, 2024

Jim Patterson
Patterson Construction
12315 McClain Street
Fredericksburg, VA 22407

RE: RSA G-WWIP Phase Ib

All three river pumps suffered successive motor failures during the week of August 19 to 24, 2024 which all occurred after the temporary electrical feeders to these pumps were put into operation under the Patterson Construction contract. Emergency diesel pumping was put into operation on Saturday August 24, 2024 and continues. The Owner anticipates receiving the re-wound river water pumps this week.

Each of the temporary feeders (4/0 Al SER/SEU, 200A) installed under the Patterson Construction Contract has a smaller ampacity rating for each conductor than each of the existing feeders being bypassed.

The existing conductors that ran from the intermediate disconnect to the wet well that contains one pump based on Owner's information was 3/0 Cu THWN-2 with a rated ampacity of 225 A. This matches the line side of the intermediate disconnect.

The existing conductors that ran from the intermediate disconnect to the wet well that contains two pumps based on Owner's information were 250 MCM Cu THWN-2 with a rated ampacity of 290 A. This matches the line side of the intermediate disconnect.

The contract documents require two sets of 400 MCM Cu (335A) for each pump conductor to be installed in the new duct bank.

The temporary feeders also have a longer run length than the existing feeders being bypassed.

The temporary feeders are contained within a protective conduit for greater than 100 linear ft which results in six (6) ungrounded current carrying conductors being contained within a single conduit, which requires de-rating of each conductor per NEC 310.15(B)(3) below their rated ampacity. The existing system does not prevent two (2) pumps from being operated at the same time.

The Owner requests that Patterson Construction submit a detailed plan to the Owner by 4 PM Wednesday September 4th, 2024 for furnishing and installing appropriately sized temporary feeders on or before 8:00 AM Monday September 9th, 2024. Time is of the essence.

With Regards,



Rob Mangrum, P.E., BCEE

Consultant / Process Engineer

*Board Certified by the American Academy of Environmental Engineers
Water Supply and Wastewater Treatment*

EXHIBIT "C"



COMMONWEALTH of VIRGINIA

Department of Health
OFFICE OF DRINKING WATER
Culpeper Field Office

Karen Shelton, MD, FACOG
State Health Commissioner

400 S. Main Street, 2nd Floor
Culpeper, VA 22701
Phone: 540-829-7340

NOTICE OF ALLEGED VIOLATION

Via Electronic Mail

tclemons@rapidan.org

Mr. Tim Clemons
General Manager
Rapidan Service Authority

Re: Wilderness WTP Waterworks (PWSID VA6137999) - Orange County

Dear Mr. Clemons:

Based on observations and facts discovered from the Virginia Department of Health (VDH), Office of Drinking Water's (ODW) investigation into the odor event at the Wilderness WTP waterworks that led to Rapidan Service Authority (RSA) issuing a Do Not Use Water Advisory followed by a Do Not Drink Water Advisory, VDH has reason to believe that RSA may have violated the Virginia Public Water Supplies Law, Va. Code § 32.1-167 *et seq.*, and the Waterworks Regulations, 12VAC5-590-10 *et seq.* Attached to this notice is ODW's investigative summary, which is provided for RSA's reference.

Please refer herein and to the attached investigative summary for further observations and facts about the specific conditions and events for corresponding compliance requirements.

The purpose of this notice is to share VDH's concerns about the incident, to outline VDH's expectations with respect to next steps and action items, and to get RSA's commitment to work together to improve public trust of the drinking water supplied to consumers by RSA.

Observations and Legal Requirements:

RSA is alleged to be in violation of 12VAC5-590-360.A (Responsibilities of the Owner) of the Waterworks Regulations as follows:

1. RSA owns, and holds a permit to operate, the Wilderness WTP waterworks in Orange County, Virginia. The Wilderness WTP waterworks draws water from the Rapidan River. The Wilderness WTP waterworks provides drinking water to a population of about 13,000 people and has over 5,400 service connections. The Wilderness WTP waterworks operates 14 to 18 hours per day, treating and delivering about 1.2 million gallons per day (MGD) to subdivisions, restaurants, businesses, medical facilities, and other industries. The Wilderness WTP waterworks has several chemical feeds for treatment, including poly-aluminum chloride and sodium permanganate (pre-filter), caustic soda, chlorine, and fluoride (post-filtration).

2. On August 19, 2024, RSA had temporary wiring installed to the raw water pumps serving the Wilderness WTP waterworks. RSA later determined that this wiring was undersized, which starved the pumps of current and caused the pump failures, discussed below.
3. On August 20, 2024, a raw water pump at the intake from the Rapidan River suffered a catastrophic electrical failure that led to the release of approximately two to three gallons of food grade mineral oil from the pump.
4. On August 21, 2024, RSA began receiving complaints from customers about an odor in the water. RSA issued a Do Not Use Water Advisory after receiving complaints of an odor associated with the drinking water. Customers were asked to only use the water for toilet flushing. Customers described the objectionable odor in various ways, including "WD-40," "diesel," "gasoline," or a "mechanics shop." RSA confirmed the objectionable odor was also evident at the Wilderness WTP waterworks. VDH and the Department of Environmental Quality (DEQ) began assisting RSA in its emergency response to the odor complaints and the shutdown of the Wilderness WTP waterworks' operations.
5. While RSA was aware that the pump at the intake had failed, and subsequently two other nearby pumps failed, RSA personnel first became aware of the catastrophic nature of the pump failure on or about August 27, 2024, when RSA was notified by Atlantic Pump, which serviced the failed pump. From August 21 through August 23, 2024, the Department of Environmental Quality (DEQ) asked RSA and its contractor about equipment function at the Wilderness WTP waterworks, and neither the contractor nor RSA reported any concern with plant equipment. Despite the ongoing, multi-agency investigation into the reason for the odor in the water, RSA did not inform the state agency investigative team about the catastrophic nature of the pump failure until September 4, 2024.
6. On August 24, 2024, following extensive water quality sampling, RSA, with VDH support, changed the Do Not Use Water Advisory to a Do Not Drink Advisory, meaning that water could be used for all purposes other than consumption.
7. On August 27, 2024, RSA lifted the Do Not Drink Advisory with VDH support, which allowed customers to use the drinking water for all purposes.
8. On September 13, 2024, VDH determined that the effects of a catastrophic failure of a raw water pump at the intake from the Rapidan River caused the objectionable odor. The catastrophic pump failure occurred on August 20, 2024, the day before customers noticed the objectionable odor. About two to three gallons of food grade mineral oil was released due to the catastrophic pump failure. The mineral oil was likely thermally altered, burned, or scorched from the catastrophic pump failure. A taste and odor (T&O) expert in Texas recreated the "WD-40" odor by heating the mineral oil. The T&O expert followed the new *Standard Method* 2150D Attribute Rating Test to determine that the food grade mineral oil in the pump matched the odor experienced by customers. Additionally, the internal stator of the pump showed that internal components of the pump were scorched, burned, or heated because of the catastrophic pump failure.
9. The National Primary Drinking Water Regulations (40 CFR Part 141), the Public Water Supplies Law (Va. Code § 32.1-167), and the Waterworks Regulations (12VAC5-590) establish standards

for drinking water quality, drinking water infrastructure, and oversight of the drinking water program.

10. The Waterworks Regulations, at [12VAC5-590-360.A](#), state, “The [waterworks] owner shall provide and maintain conditions throughout the entirety of the waterworks in a manner that will assure a high degree of capability and reliability to comply with Part II ([12VAC5-590-340 et seq.](#)) of [the Waterworks Regulations]. This requirement shall pertain to the source water, transmission, treatment, storage, and distribution system facilities and the operation thereof. The owner shall identify and evaluate factors with the potential for impairing the quality of the water delivered to the consumers. Preventative control measures identified in Part II of [the Waterworks Regulations] shall be promptly implemented to protect public health.”
11. RSA failed to identify and evaluate factors with the potential for impairing the quality of the water delivered to customers by not sufficiently overseeing the work of its contractors when the electrical contractor installed the undersized, temporary wiring and when the general contractor had cause to remove the failed pumps. Additionally, following RSA’s receipt of customer reports of the odor on August 21, 2024, RSA failed to further investigate the nature and extent of the failure of the pump that occurred on August 20, 2024. An odor of unknown origin has the potential to impair the quality of water delivered to customers. Furthermore, RSA’s monitoring systems and early warning mechanisms were either insufficient or not utilized effectively such that RSA did not identify the odor at the Wilderness WTP waterworks until RSA began receiving complaints from customers.

Requested Corrective Actions:

VDH wishes to address all aspects of the observations made through its exhaustive investigation with DEQ, including actions needed to ensure compliance with state law and regulations. VDH is very concerned about the events that occurred. If RSA cannot provide reliable drinking water free of objectionable odor and health hazards, then increased risk to public health could result. VDH is also concerned about receiving timely, accurate, and informative notice about significant equipment failures. VDH emphasizes that RSA must also provide proper and adequate notification to consumers whenever there is or may be an imminent threat to public health caused by the actual or potential for contamination. To reduce future risks to the reliability of the waterworks, VDH asks that RSA take these specific actions:

1. Within 60 days of RSA’s receipt of this notice, submit to ODW’s Culpeper Field Office, by electronic mail, a detailed and comprehensive plan to address the concerns outlined herein and detailed in the enclosed Investigative Summary Report, and including the following elements:
 - a. A listing of causal and contributing factors that resulted in the objectionable odor event from RSA’s post analysis of the event, including how RSA will effectively respond to those observations and the lessons learned to prevent a similar event from occurring.
 - b. Operational changes at RSA to actively and routinely monitor raw water quality and odor, which should include updating daily bench sheets completed by RSA’s licensed operators.
 - c. Changes in RSA’s policy and procedures to ensure infrastructure improvements at the

Wilderness WTP waterworks are closely monitored and overseen with a proactive construction inspection program before equipment is placed into operation.

- d. An appropriate and ongoing communication strategy with consumers to address public concerns about water quality.
 - e. Ensuring a responsive capital improvement plan to reduce disinfection by-products and improve RSA's ability to respond to taste and odor concerns.
 - f. Ensuring an effective emergency response plan and asset management plan.
 - g. Other items that RSA would feel important to share based on the Investigative Summary Report dated September 25, 2024, and this notice.
2. Schedule at least monthly meetings with ODW's Culpeper Field Office to review progress on RSA's plan, including its asset management, emergency response, and capital improvement plans.

VDH recognizes that many of the above recommended actions will take longer than 60 days to complete. VDH encourages RSA to consider a formal plan of action and understanding by entering into a Consent Order with VDH as a next step. Appropriate, timely action undertaken in response to this notice and investigative summary would ensure a cooperative understanding and positive outcome.

Pursuant to Code of Virginia § 2.2-4019 and [12VAC5-590-115](#) of the Waterworks Regulations, RSA may request an informal fact-finding proceeding (IFFP) if it disagrees with the allegations in this notice or wishes to obtain a determination as to whether a violation has occurred. Please advise VDH in writing within 15 business days of RSA's receipt of this notice if RSA wishes to request an IFFP. To request an IFFP, please contact Grant Kronenberg, ODW Director of the Division of Compliance, Enforcement, and Policy, at grant.kronenberg@vdh.virginia.gov. If RSA fails to attend a scheduled IFFP absent good cause, VDH may issue an adverse case decision against RSA pursuant to Code of Virginia § 2.2-4020.2.

If you have questions, you may reach me directly at (540) 829-7340, (540) 424-4854, or Jeremy.Hull@vdh.virginia.gov. You can also contact Dwayne Roadcap, Office Director, at (804) 338-0371 or Dwayne.Roadcap@vdh.virginia.gov.

Sincerely,

Jeremy
Hull

Digitally signed by
Jeremy Hull
Date: 2024.09.24
21:45:53 -04'00'

Jeremy Hull, PE
Field Director

Enclosures

cc: Dr. James "Jay" Carr, Health Director, Rappahannock Rapidan Health District
Mr. Theodore Voorhees, County Administrator
Mr. Dwayne Roadcap, Director, Office of Drinking Water

EXHIBIT "D"

4258 Germanna Hwy, Ste. A
Locust Grove, VA 22508
(540)972-2133



www.rapidan.org

2445 S. Seminole Trl.
Madison, VA 22727
(434)985-7811

SENT ELECTRONICALLY ONLY

November 14, 2024

Mr. Jeremy Hull, P.E., Field Director
Virginia Department of Health
Office of Drinking Water
400 S. Main Street, 2nd Floor
Culpeper, Virginia 22701

RE: Wilderness WTP Waterworks (PWSID VA6137999)
Notice of Alleged Violation

Dear Mr. Hull:

Rapidan Service Authority is in receipt of the above referenced NOAV that came about after the objectionable odor event in August 2024.

I will address each of VDHODW's requested corrective actions in numerical order.

1. Within 60 days of RSA's receipt of this notice, submit to ODW's Culpeper Field Office, by electronic mail, a detailed and comprehensive plan to address the concerns outlined herein and detailed in the enclosed Investigative Summary Report, and including the following elements:

While RSA does not agree with everything in VDH's Investigative Summary Report, we do acknowledge, in hindsight, that the timing of the first pump failure and the objectionable odor beginning, should have raised a red flag for RSA. From that, we learned that we need to investigate more thoroughly any routine equipment failures to determine potential causes and water quality impacts before continuing with regular operations. Those procedural changes are detailed below.

A listing of causal and contributing factors that resulted in the objectionable odor event from RSA's post analysis of the event, including how RSA will effectively respond to those observations and the lessons learned to prevent a similar event from occurring.

RSA's investigation into this matter revealed that the temporary river intake pump electrical wiring installed on August 19, 2024, led to the failure of each of the three river intake pumps. RSA's Project Engineer, Mangrum Consulting and Design determined the electrical sub-contractor used temporary wiring that was smaller than the existing permanent wiring for the original pumps and significantly smaller than the required new wiring to be installed as part of the project. This undersized wiring led to a thermal overload condition of the pump(s) resulting in the "catastrophic" failure of the pumps and release of food grade mineral oil into the river intake wetwell. This water was then pumped to the water treatment plant after the plant operator activated a second pump upon failure of the first. While each of the three river intake pumps failed in the same manner, it was only oil from the first pump failure that could have been pumped to the water treatment plant as the two remaining pumps failed several days later in quick succession. From that point on, the river intake wetwell was isolated and a diesel pump was utilized to pump water from the river to the plant. RSA has modified its operating protocol in the event of a pump failure to no longer immediately activate another pump. In the event of a pump failure, the plant operator will immediately investigate to determine the cause of the failure before activating another pump. That investigation will include, at a minimum, a trip to the river intake wetwell and collection of a sample from the wetwell in an effort to discern the presence of any food grade mineral oil in the water before proceeding to activating another pump. If any food grade oil is discerned, either by smell or sight, RSA management will also be immediately notified and the wetwell will be isolated and pumped out and cleaned prior to further use. During this investigation period, an emergency pump will be brought in and the wetwell will be bypassed until it is deemed clean.

- a. Operational changes at RSA to actively and routinely monitor raw water quality and odor, which should include updating daily bench sheets completed by RSA's licensed operators.

RSA's operators have been instructed to collect a sample entering the plant pre-sedimentation basin on four-hour intervals, beginning with plant start up, when the plant is operating. This sample can then be checked for odor or any other abnormalities and noted on the plant daily bench sheet.

- b. Changes in RSA's policy and procedures to ensure infrastructure improvements at the Wilderness WTP waterworks are closely monitored and overseen with a proactive construction inspection program before equipment is placed into operation.

RSA has already implemented increased project inspection for this project. There will be an inspector onsite two to three days per week or when there is any activity going on with the placement/start-up of equipment.

- c. An appropriate and ongoing communication strategy with consumers to address public concerns about water quality.

RSA is investigating its ability to implement a greater social media presence. We currently utilize our text/email alert system for people that have signed up to receive them and will investigate the ability to send out an email blast to all customers. We do not have a public relations officer like many larger utilities but interact with our customers daily when they contact us. RSA is providing a final report of this incident to the Orange County Board of Supervisors at a joint meeting with the Lake of the Woods Association Board on November 20, 2024, to include a Town Hall question and answer period at the conclusion of the report presentation.

- d. Ensuring a responsive capital improvement plan to reduce disinfection by-products and improve RSA's ability to respond to taste and odor concerns.

RSA had already begun, prior to this event, actively pursuing a means to reduce disinfection by-products, possibly using granular activated carbon filtration. We learned through this odor event that the same type of filter would have potentially eliminated the odor before it ever left the water treatment plant. We have already begun the process of having an engineer study this matter further as we evaluate the best path forward for this water treatment plant for both now and in the future. RSA's Board and staff are committed to not only reducing the disinfection by-products but also being better prepared for any future odor event that could occur.

- e. Ensuring an effective emergency response plan and asset management plan.

RSA has an emergency response plan, as required by the EPA. Staff will commence a full review and revision, if needed, in 2025. Additionally, we are actively developing an asset management plan. It should be completed in 2025 following the implementation of new asset management software.

- f. Other items that RSA would feel important to share based on the Investigative Summary Report dated September 25, 2024, and this notice.

RSA has attached to this response letter its final report on the Objectionable Odor Event.

2. Schedule at least monthly meetings with ODW's Culpeper Field Office to review progress on RSA's plan, including its asset management, emergency response, and capital improvement plans.

This first meeting is scheduled for November 15, 2024.

RSA always seeks to provide uninterrupted, high quality water service to our customers. We will take this unfortunate incident as a learning experience and an opportunity to revise any necessary operating protocol. RSA looks forward to continuing to work with VDH on this, as well as any other matters pertaining to water quality and supply. We sincerely hope that these upcoming meetings with VDH staff can be productive in that pursuit.

Sincerely,



Timothy L. Clemons
General Manager
Rapidan Service Authority

cc: Mark Johnson, RSA Chairman
Ted Voorhees, Orange County Administrator
Dwayne Roadcap, Director, VDH Office of Drinking Water
David Jarrell, RSA Operations Director