COMMONWEALTH of VIRGINIA

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April 15, 2025

The Honorable Glenn Youngkin
Governor of Virginia
Post Office Box 1475
Richmond, Virginia 23218

The Honorable Danny Avula
Mayor of the City of Richmond
900 East Broad Street, Suite 201
Richmond, Virginia 23219

Dear Governor Youngkin and Mayor Avula:

After the system-wide failure in the City of Richmond's waterworks on January 6, 2025 and following the issuance of a Notice of Alleged Violation (NOAV) on January 23, 2025, the Governor requested the Virginia Department of Health's (VDH) Office of Drinking Water (ODW) to conduct a comprehensive examination of root and direct causes. This analysis was conducted in partnership with Short Elliott Hendrickson, Inc. (SEH).

As you know, the City of Richmond ("City") waterworks lost system-wide water pressure on January 6, 2025, resulting in a boil water advisory until January 11, 2025 (hereinafter described as the "water crisis"). ODW also completed a detailed sanitary survey of the City of Richmond waterworks, a review of the federal Environmental Protection Agency's ("EPA") 2022 inspection that outlined multiple areas of concern, and a report of the City's independent investigation. The City released its final investigatory report on April 3, 2025.

Please find enclosed SEH's report, ODW's sanitary survey report, and ODW's review and status update report identifying actions the City has taken in response to the EPA's areas of concern from 2022. Based on the information outlined herein, ODW will issue a second NOAV that builds upon the one previously issued. ODW will require a corrective action plan ("CAP") and monitor the City's adherence to that CAP.

The ODW investigation found significant and comprehensive root causes in addition to what the City of Richmond's report revealed. Specifically, the failure at the Richmond plant was not the result of a "day of" disaster, but rather, the result of years' long neglect.

KEY FINDINGS, CONCLUSIONS, AND OBSERVATIONS:

In contrast to the City of Richmond's report, the ODW investigation found that the water crisis was completely avoidable and should not have happened.

The ODW investigation found that the City's Department of Public Utilities ("DPU") management and leadership made three critical errors in their operational decisions that caused the water crisis.

- First, DPU operated the water treatment plant (WTP) in "Winter mode," meaning that the WTP only used the overhead main power feed during the winter months *as a cost saving measure*. This unnecessarily created a single point of failure without adequate redundancy. Additionally, winter, when the threat of a power outage from a snow/ice event is greatest, was the exact wrong season to take the underground main power feed offline. The water crisis would never have happened if DPU had operated the plant in "Summer mode," such that both the overhead and underground power feeds were supplying power to the WTP. DPU has since stopped operating in this mode.

- Second, DPU has known for decades that flooding was a risk; yet the Department did not take appropriate actions to properly maintain critical back-up systems to prevent or respond to flooding events. The Uninterrupted Power Supply ("UPS") battery back-up systems were not properly maintained and were past their design life. Operators reported that they knew the UPSs did not work; yet DPU did not address it. Had DPU properly tested, maintained, and replaced the UPS battery back-ups (every 3–5 years), then the water crisis would not have happened. DPU has since replaced critical UPS systems.

- Finally, DPU allowed the plant to be overly reliant on manual operation. The WTP should have more automatic operation. The back-up diesel generators were useless in response to the power failure because they required manual start and were tied to the single point of failure from "Winter mode" operation. DPU used manually operated pumps that were difficult to start in the cold weather to pump during flooding events. Given the WTP's need for significant manual operation, DPU did not have enough trained staff, specifically an electrician, at the WTP during a known weather event, where both the Governor and Mayor had issued emergency declarations. Had the back-up diesel generators been automatically available with both power feeds activated in "Summer mode," then the water crisis would not have happened.

ODW's investigation identified significant cultural, operational, procedural, and engineering failures. Faulty components *and* a faulty culture at the plant contributed significantly to this failure.

ODW found that systemic institutional and organizational factors led to the water crisis. Problematic and unaddressed systemic issues over decades, including a complacent and reactive organizational culture, caused the water crisis. SEH points to several cascading failures, including primary and redundant power, UPS battery back-up failures, and improper operational practices. Ultimately, ODW and SEH determined one of the root causes of the water crisis was a lack of proper maintenance of the UPS battery back-up, which was a symptom of institutional complacency and a reactive work environment.

The ODW investigation observed the lack of proper maintenance as a root cause of the event, including a lack of a proper number of trained and skilled staff at the WTP during the known significant weather event when the power failed. As noted in the City's report and the attached SEH report, a power blip and power failure should be something that the City of Richmond waterworks should be able to handle as a matter of routine practice.

DPU allowed situations to exist that increased the risk of a water crisis. DPU has known of the flooding concern and the risk from flooding for decades; yet requested approval in the late 1980s to study, through an engineering consultant, and to seek and receive approval for high flow filter rates (from 2 gallons per minute, or GPM, up to 4 GPM), which increased the risk of flooding. Despite knowing the increased risk from higher flow rates, DPU did not properly maintain the UPS battery back-ups and made decisions to eliminate critical main power redundancy. DPU had undersized pumping capacity to address the frequent flooding events.

ODW staff observed during their inspections that equipment would break and not be repaired or replaced for unnecessarily long periods of time. Obsolete or outdated instruments and equipment remained in place, making it more difficult for newer DPU staff to understand what instruments and equipment were available and could be relied upon. DPU lacked standard operating procedures and sufficient training for emergency response. Numerous areas of the WTP had readily identifiable safety hazards and a lack of cleanliness.

DPU management and leadership allowed a complacent and reactive culture to persist. Known problems and flooding risks were not addressed or were allowed to exist for extended periods of time. DPU management did not adequately prepare for a power outage, did not train staff on emergency response, and did not have adequate operating procedures. DPU enhanced risk by proposing increased filter rates and not timely maintaining, automating, or replacing critical equipment. DPU staff did not elevate concerns and DPU management did not create an environment of pride, care, and ownership of problems. This complacent cultural mindset increased the risk of a water crisis event.

As stated above, an additional Notice of Alleged Violation (NOAV) is forthcoming. ODW identified 12 significant deficiencies from its sanitary survey and inspections that will require DPU to address through a CAP.

ODW revisited EPA's 2022 inspection, which found many areas of concern. ODW observed that DPU had made insufficient progress on several of EPA's areas of concern from 2022. The SEH report recommends a combination of short- and long-term measures, including system upgrades (e.g., UPS maintenance), operational practice changes, and reducing vulnerabilities such as flooding in the clearwell.

While legally permitted, the City of Richmond started diverting funding away from their Water Treatment Plant into the City's general fund to be used for other purposes since at least 2006. ODW's investigation identified about $64 million of infrastructure upgrades that are needed over the coming years.

Several upgrades identified by SEH are already included in the City's capital improvement plan, such that an additional $64 million of capital improvement funding is not necessary. The City implements a Payment In Lieu of Taxes (PILOT) program, and pursuant to its authority, about $6.6 million is placed into the City's general fund from water utility fees paid by customers. ODW believes this PILOT funding could be leveraged to generate at least $80 million for recommended infrastructure upgrades. ODW is aware of only a few cities in Virginia that might use PILOT as a routine practice for utility billing. While ODW does not regulate billing, a best practice would be to keep the water utility billing income within the water utility's enterprise funding.

The City has started addressing findings and recommendations. The City has changed its key management and leadership positions.

The City staff reports that about $5 million in critical infrastructure upgrades have already happened. There is a new DPU Director and Deputy Department Director, both coming from the Virginia Department of Environmental Quality. The City hired a former ODW manager to help lead water and wastewater operation. ODW has observed significant improvement on attention to emergency preparedness and infrastructure improvements since the water crisis. The new DPU management team is changing the organizational structure to improve communication among its staff, especially maintenance and operations. The new DPU management team is aware and understands that DPU needs more training, written standard operating procedures, and regular proficiency exercises to respond to power outages and other possible emergency events. Culture and organizational complacency are being replaced with active management and an emergency preparedness mentality.

Thank you again for your leadership on this issue both during and after the water crisis in January. The Virginia Department of Health and I look forward to continuing to work with you to ensure that the water infrastructure and systems in the City are safe and reliable.

Sincerely,

Karen Shelton, MD

CC: The Honorable John Littel, Chief of Staff to the Governor
The Honorable Janet V. Kelly, Secretary of Health and Human Resources