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Appendix

Water Sampling Plan (Approved 1991)
1. Distribution System Overview

The City of Petersburg’s water distribution system serves approximately 35,000 customers through pipes ranging in size from 1-inch to 20-inches. The City’s current water distribution system map is shown following page 1.

The City’s water is supplied through two Pressure Reducing Valves (PRV’s) from the Appomattox River Water Authority (ARWA) water treatment plant. Currently, ARWA maintains operational control of water delivered to Petersburg. The ARWA water treatment plant obtains water from the Appomattox River and provides conventional treatment consisting of rapid mix, coagulation, flocculation, sedimentation, filtration and disinfection. Primary disinfection at the plant is provided with chlorination. Secondary disinfection is provided with chloramines (a mixture of free chlorine and ammonia.) The drinking water provided by ARWA meets or exceeds all treatment requirements by the Virginia Department of Health (VDH) and the United States Environmental Protection Agency (USEPA) Surface Water Treatment Rule (SWTR).

The City of Petersburg’s water distribution system is divided into low and high-pressure service areas. The City operates two pump stations, both serving the high-pressure service area (the Locks and Mt. Vernon Pump Stations). Two of the City’s water storage tanks are located in the low-pressure service area (the Mercury Street Tank and Mt. Vernon Tank). The Jamestown, Walnut Hill, Industrial Park, and Halifax storage tanks are located in the high-pressure service area. The City’s storage tanks are summarized in the following table.

<table>
<thead>
<tr>
<th>Storage Tank Name</th>
<th>Pressure Zone</th>
<th>Diameter (ft)</th>
<th>Max. HGL (ft)</th>
<th>Min. HGL (ft)</th>
<th>Max. Level (ft)</th>
<th>Volume (gal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mercury Street Tank</td>
<td>Low</td>
<td>80</td>
<td>180</td>
<td>136</td>
<td>50</td>
<td>1,900,000</td>
</tr>
<tr>
<td>Mt. Vernon Tank</td>
<td>Low</td>
<td>165</td>
<td>180</td>
<td>145</td>
<td>35</td>
<td>5,600,000</td>
</tr>
<tr>
<td>Halifax Tank</td>
<td>High</td>
<td>50</td>
<td>265</td>
<td>176</td>
<td>89</td>
<td>1,300,000</td>
</tr>
<tr>
<td>Industrial Park Tank</td>
<td>High</td>
<td>80</td>
<td>265</td>
<td>225</td>
<td>40</td>
<td>1,000,000</td>
</tr>
<tr>
<td>Walnut Hill Tank</td>
<td>High</td>
<td>55</td>
<td>265</td>
<td>240</td>
<td>25</td>
<td>500,000</td>
</tr>
<tr>
<td>Jamestown Tank</td>
<td>High</td>
<td>72</td>
<td>265</td>
<td>230</td>
<td>35</td>
<td>1,000,000</td>
</tr>
</tbody>
</table>

The City’s distribution system is comprised of varied materials of varied age. Ductile iron, cast iron (both lined and unlined), concrete, PVC and steel pipes are found throughout the system. Many sections of the Petersburg water distribution system are over 50-years old.
The City of Petersburg follows a written flushing plan. Each area of the City is flushed annually in late spring or early summer. The current program divides the City into four areas. The program requires flushing concentrically away from the storage tank(s) in that area.

The City has a Virginia Department of Health (VDH) approved sampling plan. 45 different locations are sampled monthly. The sampling plan was approved in 1991. The sampling plan and addresses for each location are included in the Appendix.

2. Demand

For the year 2000, water demand for the City of Petersburg was as follows:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ARWA Readings</td>
<td>1,729 Mgal</td>
</tr>
<tr>
<td>City of Petersburg Meter Readings</td>
<td>1,587 Mgal</td>
</tr>
</tbody>
</table>

The difference of 142 Mgal per year represents unaccounted for water of only 8%. This difference is caused by many reasons including leaks in the system, main breaks, manual draining of storage tanks, fire demand, flushing, and water meter inaccuracies.

Although there is an 8% loss, this is considered an average loss value for most water distribution systems, and is not of immediate concern.

For this report, the ARWA readings were used to represent the amount of water actually in the system while modeling. The 1995 demand data used existing in the previous model is 2% less than the demand data used by the 2000 model.

3. Operational Controls

The City of Petersburg Public Utilities Department currently uses the following operational controls for the pump settings:

<table>
<thead>
<tr>
<th>Pump Station</th>
<th>On Below (HGL)</th>
<th>Off Above (HGL)</th>
<th>Control Tank</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOCKS PUMP STATION</td>
<td>Locks Pump 1</td>
<td>259</td>
<td>263</td>
</tr>
<tr>
<td></td>
<td>Locks Pump 2</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Industrial Park Tank</td>
</tr>
<tr>
<td>MT VERNON PUMP STATION</td>
<td>Mt. Vernon Pump 1</td>
<td>257</td>
<td>264</td>
</tr>
<tr>
<td></td>
<td>Mt. Vernon Pump 2</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Jamestown Tank</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>NONE</td>
</tr>
</tbody>
</table>
4. **Reason For Study**

The purpose of this study is to determine the most likely source of recent water quality problems experienced by the City of Petersburg and recommend measures to eliminate those water quality problems.

In the summer of 2000, the City of Petersburg water sampling program results contained six test results in which the presence of coliforms tested. These positive results occurred in samples taken from July 24th to the end of September.

VDH requires all municipalities to monitor their distribution system on a monthly basis for the presence of indicator organisms known as coliform bacteria. Total coliform bacteria do not pose a health risk to humans, however, their presence may indicate that other (possibly pathogenic) organisms may be present. This monitoring rule is referred to as the Total Coliform Rule (TCR). TCR also mandates that re-sampling be conducted (including one upstream and one downstream sample) if any sample tests positive for total coliform. The TCR requires that second samples be tested for fecal coliform or E. Coli. Bacteria as well.

5. **Causes of Contamination**

There are several different typical causes of coliform positive samples in the water distribution system. Discussed below are some of the most common causes.

- **False positives because of sampler error** – The sampler employed by the City is one of the key components to ensuring that all the samples taken are indicators of the water quality in the distribution system. Often times, new or inexperienced samplers can unknowingly contaminate samples while collecting the sample or opening the bottles incorrectly. The same person took all but one of the positive samples.

- **The sampling procedure itself** – During the actual sampling procedure, there are several different ways contamination can occur. The water should be run long enough before taking the sample that the water is clear and cold (a temperature consistent with the distribution system) so that the sample accurately represents water from the system, not water that has been sitting in the pipes in the building. Samples should not be taken after a backflow preventor. Although the samplers for the City are most likely aware of proper sample collection procedures, a re-training or discussion of proper sampling procedures may be helpful.
• **Sampling locations** – Some sample locations can increase chances for positive coliform results. For example, places which are generally good breeding places for bacteria are bathrooms and locations behind backflow preventors, such as outside spigots of residences. Schools are not good locations because they do not use a constant amount of water throughout the year, and they have large diameter service pipes. During times when school is not in session, the water is not flushed through their system and contamination may occur. Another sampling location to be avoided is a dead end in the system, especially dead ends with low demand. These areas are not necessarily reflective of the water in the system. Sample locations should be a good representation of the water distribution system. After reviewing Petersburg’s VDH approved sampling plan, it is evident that several sampling locations could be a contributing factor to the positive coliform samples.

• **Temperature of the water in the system or outside air is high** – Higher temperature water will increase the likelihood of bacterial growth. All of the positive coliform tests occurring in the summer. It is evident that this could be one of the major contributing factors. No water temperature readings were taken while collecting the water samples. The importance of the temperature reading should be stressed to the sampler because it may help the City determine when tanks or pipelines in the system need to be flushed based on temperature. Temperature can also be an indicator of the quality of the sample. For good sampling, water should be run for an adequate amount of time before the sample is taken as representative of the distribution system. A higher temperature may be an indication that the water was not run long enough before the sample was taken.

• **Through the handling or testing of the sample** – There is a possibility that samples could be contaminated while handling after collection. The ARWA water testing laboratory tests all of the water samples collected for Petersburg. The personnel are very experienced and have quality lab equipment to perform proper testing. The lab did not experience a higher volume of coliform positive samples from other areas during this time. Therefore it is unlikely that improper handling during the lab testing was the cause of positive coliform results.

• **Low daily turnover rates in the water storage tanks** – This is a likely cause of contamination in the system. Of the City’s six water storage tanks, two have little or no turnover, and therefore create potential for bacterial regrowth. The Mercury Street and Halifax storage tanks serve areas with low demand. Both will continue to pose a contamination risk if the water in the tanks is not circulated more frequently or the tanks are not taken out of service.

• **Activities in sample areas (hydrant flushing, large fires, water line breaks, cross connections, construction)** – When water is being flushed or moved at high velocity (such as during a large fire or main break) through a pipe that does not normally experience high velocities, there is a risk that some bacteria or build-up along the side walls of the pipe will slough off and
contaminate the distribution system water. Cross connections and construction can also be culprits because dirt and bacteria can enter the water system in these areas. During this period, there was no pipe flushing or construction affecting water lines reported.

6. **Analysis**

- Trace analysis from the model reveals that with current operational controls for the system, the Mercury Street and Halifax storage tanks do not serve the surrounding area. Both tanks remain full with no incoming or outgoing water.

- Age analysis reveals that many areas, especially on the outskirts of the southern and eastern portion of the town may require additional flushing. The age analysis map is shown following page 5.

- Using the model, it is evident that taking the Mercury Street tank out of service does not affect pressures in the area or fire flow. A similar study of the Halifax tank reveals that while this tank does not serve the surrounding area, it does aid minimally with fireflow capacity. The model also shows that this tank could be taken out of commission without a large effect on the system. (i.e., both tanks may be taken out of service at the same time.)

7. **Conclusions and Recommendations**

The following conclusions and recommendations are based on the modeling analysis and other information provided by the City concerning the operation of the water distribution system:

- **Heterotrophic Plate Count (HPC)** – HPC testing estimates the number of live heterotrophic bacteria in water. These tests provide the concentrations of the general bacterial population, and can alert the City of possible coliform presence in the water. By using these inexpensive tests, the City can flush areas of potential contamination before getting a positive coliform sample.

- **More aggressive flushing program in dead end and potential problem areas of the City** – To help minimize water detention times in dead end or low demand areas, additional flushing beyond the annual flushing will help. By looking at the Age Analysis Map following page 5, a plan should be developed to flush the areas with older water on a regular basis, especially during warmer temperature months.

- **Keep water turn-over in tanks daily at a good level** – One of the keys to insuring good water quality is turning over the water in storage tanks. The water in each one of the tanks should turn over by 30% on a daily basis. The following table shows the storage tanks and the desired minimum level to reach a 30% turnover:
TABLE 3
MINIMUM LEVELS TO REACH 30% TURNOVER

<table>
<thead>
<tr>
<th>STORAGE TANK</th>
<th>PRESSURE ZONE</th>
<th>MAX LEVEL</th>
<th>MIN LEVEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Halifax</td>
<td>High</td>
<td>89</td>
<td>62</td>
</tr>
<tr>
<td>Industrial Park</td>
<td>High</td>
<td>40</td>
<td>28</td>
</tr>
<tr>
<td>Walnut Hill</td>
<td>High</td>
<td>25</td>
<td>18</td>
</tr>
<tr>
<td>Jamestown</td>
<td>High</td>
<td>35</td>
<td>25</td>
</tr>
<tr>
<td>Mt. Vernon</td>
<td>Low</td>
<td>35</td>
<td>25</td>
</tr>
<tr>
<td>Mercury Street</td>
<td>Low</td>
<td>50</td>
<td>35</td>
</tr>
</tbody>
</table>

Given the storage volume available to the City, it will be a difficult turn over every tank 30% each day. An alternative to turning water over in the tanks is to take the Mercury Street or Halifax tank, or both, out of service. This will reduce the volume of dead storage in the water system. The modeling analysis results show minimal negative impacts to the City’s fireflow and service capabilities. The following table depicts the amount of storage in Petersburg and the amount that is required by VDH to meet storage standards:

TABLE 4
STORAGE REQUIREMENTS

<table>
<thead>
<tr>
<th></th>
<th>MGal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage available</td>
<td>11.3</td>
</tr>
<tr>
<td>Average Day Demand</td>
<td>4.74</td>
</tr>
<tr>
<td>Maximum Day Demand</td>
<td>6.87</td>
</tr>
<tr>
<td>Storage required by VDH</td>
<td>2.37</td>
</tr>
<tr>
<td>Storage in excess of requirement</td>
<td>8.93</td>
</tr>
</tbody>
</table>

The City’s Public Utilities Department goal is to keep all the storage tanks in service. Based on model analysis, the following alternatives will help cycle the existing tanks, therefore increasing water quality.

- Turn off ARWA from 10 p.m. to 4 a.m. daily to cycle the tanks in the low pressure system.
- Add a 15 hp pump to the Halifax tank discharge. This will pump water out of the tank and force turnover to occur. The pump should run for two to three hours a day to reach a 25-30% turnover. The cost for this pump station is approximately $10,500.

On the following pages are graphs of the storage tank operation created from the modeling results. Each 24-hour graph shows:
• Current average day operation
• ARWA off from 10 p.m. to 4 a.m.
• The 15 hp pump at the Halifax Tank running from 9 to 11 A.M.
• ARWA off for 6 hours and the Halifax Tank pump run for two hours simultaneously

The modeling results show that with ARWA off for 6 hours and the Halifax pump running for two hours, all six of the City's tanks will cycle near the goal level.

• Move some of the Sampling Locations – The best solution for changing sampling locations, is to install sampling stations, at least for several of the primary points. For commercial locations, sampling in kitchens rather than bathrooms will reduce the number of positive coliform tests. Locations with general cleanliness and short service lines are preferred. Do not sample at locations with swivel faucets as they can be breeding places for bacteria. Sampling at schools should be done at schools that can show no appreciable decrease in usage over the summer.

• Ensure that the sampling forms are completely filled out – This will monitor changes in the water quality during hot weather periods specifically.

• System flushing – Continue flushing the system annually using the developed flushing plan, and running water from fresh to dirty, outward concentrically from the storage tanks, and from larger diameter to smaller diameter pipe. Run the hydrants five to ten minutes or until the water is clear.

• Systematic flushing of the area with free chlorine – It may be helpful to have ARWA, with the cooperation of other localities, do a systematic flushing with free chlorine to rid the system of organisms resistant to chloramines periodically during the warmer months of the year.

• Ensure adequate disinfectant residual - This can be maintained by booster disinfection at strategic points in the water distribution system.
CITY OF PETERSBURG

WATER DISTRIBUTION SYSTEM
OPERATION EVALUATION

APPENDIX

WATER SAMPLING PLAN
(APPROVED 1991)

JUNE 2001
BACTERIOLOGICAL MONITORING PLAN

WATERWORKS NAME: City of Petersburg

PWSID NUMBER: 3730750

I. Purpose

It is the purpose of this document to establish a bacteriological monitoring program which will identify specific sampling locations which will provide samples representative of the water quality throughout the distribution system for this waterworks.

II. Responsible Charge

The following person will normally be responsible for collecting samples under this program (name, title and address):

Robert L. West - Service Technician II

424 St. Andrew Street

Petersburg, Virginia 23803

Phone: 804-733-2407

III. Program Elements

1. The Petersburg waterworks is currently collecting 45 water samples for coliform analysis. Three different sampling locations are identified for every required routine sample for a total of 207 locations.

2. Attachment No. 1 consists of a system piping map, with each sample site location identified.

3. Routine Samples

a. Routine samples shall be collected from the designated locations listed in Attachment 2.

b. Routine bacteriological samples will be collected from each of the above routine locations on a rotating basis. Attachment 3 discusses how sample collection is to be rotated between the sample locations.

c. When more than one (1) routine sample per month is required, the samples will be collected at evenly spaced timed intervals throughout the month. Allowances will be made for holidays, vacations, etc., to make sure that all of the required samples will be analyzed each month. Normally, routine samples will be collected so that no more than 15 are collected in any one week.
d. These routine sample locations are chosen to allow for the collection of required upstream and downstream repeat samples when necessary.

e. No routine samples shall be collected at the water source(s) or at entry point(s) to the system.

f. For the month following any month in which there is a positive sample, five routine samples will be collected. These routine samples will be collected from the designated locations, and will be distributed evenly throughout the system and the month.

4. Repeat Sampling

a. At least one repeat sample will be collected at the same tap as the original sample. At least one repeat sample will be collected from within 5 service connections downstream of the original sample. At least one repeat sample will be collected from within 5 service connections upstream of the original sample. Additional repeat samples may be collected from anywhere in the system.

b. Repeat samples shall be collected from the designated locations listed in Attachment 4.

IV. Attachments

A. No. 1 - System Piping Map
B. No. 2 - Routine Sample Locations
C. No. 3 - Discussion of Sample Rotation
D. No. 4 - Repeat Sample Locations

V. This bacteriological monitoring plan is established this date:

Albert E. Andrews, III
Name

Superintendent - Utility Lines Div.
Title

Signature

September 19, 1991
Date
WATER SAMPLING SCHEDULE
(Bacteriological)

SAMPLE LOCATION (Take samples according to their numerical listing)

1. 010 Locks
   010 Ramsey's Iron & Metal Inc. - 30 Mill Rd.
   010 Stackhouse - 33 Rawlings La.

2. 020 Pepsi Cola Plant - 1501 W. Washington St.
   020 Wyatt Sign Co. - 1311 Hinton St.
   020 Southern State - 1609 W. Washington St.

3. 030 Seven Eleven (460 E.) - 2210 County Dr.
   030 California Inn (bathroom - office) - 2214 County Dr.
   030 Jamestown Tank (in pit)

4. 040 Modern Radiator - 1001 E. Bank St.
   040 Darksdale Oil Co. (bathroom - office) - 1041 E. Bank St.
   040 B.P. Short & So. (office) - 1006 E. Bank St.

5. 050 Virginia State College (boiler house)
   050 Simm Hall
   050 Jones Dining Hall

6. 060 Wastewater Treatment Plant (kitchen office) - 900 Magazine Rd.
   060 Wastewater Treatment Plant (shop) - 900 Magazine Rd.
   060 Wastewater Treatment Plant (new lab building) - 900 Magazine Rd.

7. 070 Wastewater Treatment Plant (mens bathroom - control room) - Magazine Rd.
   070 Wastewater Treatment Plant (new lab building) - Magazine Rd.
   070 Wastewater Treatment Plant (shop) - 900 Magazine Rd.

8. 080 Seven Eleven (South Crater Rd.) - 3029 S. Crater Rd.
   080 Beuckey's Florist & Gift Shop (bathroom) - 3047 A S. Crater Rd.
   080 J.L. Thacker (bathroom) - 3071 S. Crater Rd.
<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>9. 090</td>
<td>Chang's Food Mart (bathroom) - 2328 E. Washington St.</td>
<td></td>
</tr>
<tr>
<td>9D</td>
<td>Young's Foreign Car Repair (bathroom) - 2327 E. Washington St.</td>
<td></td>
</tr>
<tr>
<td>9U</td>
<td>Food Lion (bathroom) - 2400 E. Washington St.</td>
<td></td>
</tr>
<tr>
<td>10. 100</td>
<td>Petersburg High School - 3101 Johnson Rd.</td>
<td></td>
</tr>
<tr>
<td>10D</td>
<td>Johnson Rd. Fire Station (bathroom) - Johnson Rd.</td>
<td></td>
</tr>
<tr>
<td>10U</td>
<td>Anderson Education Center (Room #110) - 3101 Homestead Dr.</td>
<td></td>
</tr>
<tr>
<td>11. 110</td>
<td>School Board Maintenance Office - W. Wythe St.</td>
<td></td>
</tr>
<tr>
<td>11D</td>
<td>Recreation Office (kitchen sink) - W. Wythe St.</td>
<td></td>
</tr>
<tr>
<td>11U</td>
<td>School Board Maintenance Shop (bathroom) - W. Wythe St.</td>
<td></td>
</tr>
<tr>
<td>12. 120</td>
<td>Market Street Fire Station (bathroom) - S. Market St.</td>
<td></td>
</tr>
<tr>
<td>12D</td>
<td>Merit Bakery Discount Store (bathroom) - 42 S. Market St.</td>
<td></td>
</tr>
<tr>
<td>12U</td>
<td>Market Street Fire Station (maintenance shop) - S. Market St.</td>
<td></td>
</tr>
<tr>
<td>13. 130</td>
<td>Health Center (men's bathroom 1st floor) - 301 Halifax St.</td>
<td></td>
</tr>
<tr>
<td>13D</td>
<td>Crockett's Food Center (kitchen sink) - 400 Halifax St.</td>
<td></td>
</tr>
<tr>
<td>13U</td>
<td>Petersburg Dept. of Social Services (men's bathroom 1st floor) - Farmer St.</td>
<td></td>
</tr>
<tr>
<td>14. 140</td>
<td>City Garage Office (bathroom) - 800 Arlington St.</td>
<td></td>
</tr>
<tr>
<td>14D</td>
<td>Traffic Maintenance Shop (sink) - 800 Arlington St.</td>
<td></td>
</tr>
<tr>
<td>14U</td>
<td>City Garage (brake room sink) - 800 Arlington St.</td>
<td></td>
</tr>
<tr>
<td>15. 150</td>
<td>Pecan Acres (Housekeeping Area Office) - 433 Pecan St.</td>
<td></td>
</tr>
<tr>
<td>15D</td>
<td>Pecan Acres Child Care Center (bathroom) - 432 Pecan St.</td>
<td></td>
</tr>
<tr>
<td>15U</td>
<td>Petersburg Area Transit Office (utility room) - 309 Fairgrounds Rd.</td>
<td></td>
</tr>
<tr>
<td>16. 160</td>
<td>Utility Lines Division Office (bathroom) - 424 St. Andrew St.</td>
<td></td>
</tr>
<tr>
<td>16D</td>
<td>Utility Lines Division Yard (bathroom) - 424 St. Andrew St.</td>
<td></td>
</tr>
<tr>
<td>16U</td>
<td>Utility Lines Division Shop (sink) - 424 St. Andrew St.</td>
<td></td>
</tr>
<tr>
<td>17. 170</td>
<td>CECO Inc. (bathroom) - 2929 N. Normandy Dr.</td>
<td></td>
</tr>
<tr>
<td>17D</td>
<td>Virginia Abrasives (outside faucet) - 2051 Service Rd.</td>
<td></td>
</tr>
<tr>
<td>17U</td>
<td>Bronco Bearing Inc. (office sink) - Petersburg Industrial Park</td>
<td></td>
</tr>
<tr>
<td>18. 180</td>
<td>Seven Eleven (bathroom) - 900 S. Sycamore St.</td>
<td></td>
</tr>
<tr>
<td>18D</td>
<td>Canton Restaurant (bathroom) - 950 S. Sycamore St.</td>
<td></td>
</tr>
<tr>
<td>18U</td>
<td>Gene's Transmission (bathroom sink) - 812 S. Sycamore St.</td>
<td></td>
</tr>
<tr>
<td>19. 190</td>
<td>Mount Vernon Water Pumping Station - Mount Vernon St.</td>
<td></td>
</tr>
<tr>
<td>19D</td>
<td>Mount Vernon Tank (pit) - Mount Vernon St.</td>
<td></td>
</tr>
<tr>
<td>19U</td>
<td>Resident R.I.E. Emory (outside faucet) - 1503 Mount Vernon St.</td>
<td></td>
</tr>
</tbody>
</table>
20. 200  Halifax St. Tank - Halifax St.  
20D  Cesco Roofing (bathroom) - 1600 Halifax St.  
20U  Try Me Supermarket - 1614 Halifax St.  

21. 210  Seven Eleven (bathroom) - 225 S. Boulevard  
21D  McDonald's (bathroom) - 2128 S. Crater Rd.  
21U  Hardee's (bathroom) - 1065 S. Crater Rd.  

22. 220  Mercury St. Tank - Mercury St.  
22D  Webster St. Apartment Building I Apt. A (kitchen sink) - Webster St.  
22U  George Coleman's Residence (outside faucet) - 336 Glenwood Ct.  

23. 230  Zip Mart (kitchen) - 2744 S. Crater Rd.  
23D  Triangle Dodge (showroom - men's bathroom) - 2033 S. Crater Rd.  
23U  Burger King - 2910 S. Crater Rd.  

24. 240  4th Street Fire Station - 4th Street  
24D  Decorating Outlet (bathroom) - 327 Dollingbrook St.  
24U  Midas Muffler Shop (bathroom) - 214 Dollingbrook St.  

25. 250  Willie Pope's Residence (outside faucet) - 1342 Steele St.  
25D  Colonel A. Pelliford's Residence (outside faucet) - 1314 Beazley St.  
25U  Deborah Westbrook's Residence (outside faucet) - 1346 Steele St.  

26. 260  Walnut Hill Tank (in pit)  
26D  Moore's Building Supplies (bathroom) - 2520 S. Crater Rd.  
26U  Firestone Mastercare Service (bathroom) - 2140 S. Crater Rd.  

27. 270  Walnut Hill Fire Station (bathroom) - 1907 S. Sycamore St.  
27D  Palmore Decorating Center (bathroom) - 1927 S. Sycamore St.  
27U  Parham's Texaco (bathroom) - 1901 S. Sycamore St.  

28. 280  Fire Administration Building (bathroom) - 400 E. Washington St.  
28D  Aunt Sarah's (bathroom) - 403 E. Washington St.  
28U  Regency Inn Motel (bathroom) - 380 E. Washington St.  

29. 290  City Hall Annex (bathroom 1st floor) - 103 W. Tabb St.  
29D  City Hall (bathroom downstairs) - 22 W. Tabb St.  
29U  City Registrar Office (bathroom) - 142 N. Union St.  

30. 300  A.P. Hill Community Center (bathroom 1st floor) - 1237 Halifax St.  
30D  Roper Still's Residence (kitchen sink) - 1232 Halifax St.  
30U  Grace Archer's Residence (kitchen sink) - 1310 Halifax St.  

31. 310  Petersburg Public Library (outside faucet) - 1865 S. Sycamore St.  
31D  James Wright's Residence (outside faucet) - 1875 S. Sycamore St.  
31U  Robert Buckley's Residence (outside faucet) - 1850 S. Sycamore St.
32. 320 School Board Office (bathroom) - 141 E. Wythe St.
     32D Alrod Inc. (bathroom) - 142 E. Wythe St.
     32U Southern Autotronics (bathroom) - 101 E. Wythe St.

33. 330 Buildings & Grounds Office (bathroom) - 1808 Midway St.
     33D Pennington Seed (bathroom) - 1711 Midway St.
     33U Buildings & Grounds Shop (bathroom) - 1901 Midway St.

34. 340 Jerry's Electric (bathroom) - 2803 A County Dr.
     34D Stop Shop Brake Shop (bathroom) - 2791 County Dr.
     34U ABE's Auto (bathroom) - 2817 County Dr.

35. 350 Fire Department (bathroom) - 1320 Farmer St.
     35D Shirley Eance's Residence (outside faucet) - 1327 Farmer St.
     35U Gladys Stith's Residence (outside faucet) - 1309 Farmer St.

36. 360 Walnut Hill School (kitchen) - 300 S. Boulevard
     36D Walnut Hill Laundrette - 1923 Wakefield Ave.
     36U Dr. Richard Dunn's Office - 1808 S. Sycamore St.

37. 370 Robert E. Lee School (kitchen) - 51 Gibbons Ave.
     37D Alice Wood's Residence (outside faucet) - 60 Gibbons Ave.
     37U Willie Collins' Residence (outside faucet) - 44 Gibbons Ave.

38. 380 Stuart School (kitchen) - 100 Pleasant La.
     38D Kenneth White's Residence (outside faucet) - 411 Pleasant La.
     38U David Edmonds (outside faucet) - 320 Pleasant St.

39. 390 Westview School (kitchen) - 1100 Patterson St.
     39D Carl Wyatt's Residence (outside faucet) - 1105 Patterson St.
     39U Alvin Graves' Residence (outside faucet) - 1039 Patterson St.

40. 400 A.P. Hill School (kitchen) - 1450 Talley Ave.
     40D Charles Lewis' Residence (outside faucet) - 1449 Talley Ave.
     40U Lathurs Mann's Residence (outside faucet) - 1635 Talley Ave.

41. 410 Hardee's (men's bathroom) - 2135 County Dr.
     41D Jim Whelan's Service Center (men's bathroom) - 2156 County Dr.
     41U Sloan's Texaco (men's bathroom) - 2129 County Dr.

42. 420 Hardee's (men's bathroom) - 100 W. Washington St.
     42D Market Place - 110 W. Washington St.
     42U Heilig-Meyers Furniture (bathroom) - 22 W. Washington St.
<table>
<thead>
<tr>
<th>No.</th>
<th>Street</th>
<th>Householders</th>
</tr>
</thead>
<tbody>
<tr>
<td>43</td>
<td>Albert Andrews' Residence (outside faucet)</td>
<td>1753 Pender Ave.</td>
</tr>
<tr>
<td>43D</td>
<td>James Barkdale's Residence (outside faucet)</td>
<td>1745 Pender Ave.</td>
</tr>
<tr>
<td>43U</td>
<td>N.H. Andrews' Residence (outside faucet)</td>
<td>1820 Pender Ave.</td>
</tr>
<tr>
<td>44</td>
<td>Harding St. Recreation Center (bathroom)</td>
<td>453 Harding St.</td>
</tr>
<tr>
<td>44D</td>
<td>Danzella Stith's Residence (outside faucet)</td>
<td>445 Harding St.</td>
</tr>
<tr>
<td>44U</td>
<td>Robert Hunt's Residence (outside faucet)</td>
<td>450 Harding St.</td>
</tr>
<tr>
<td>45</td>
<td>Elmore Buffkin's Residence (outside faucet)</td>
<td>421 Moke Dr.</td>
</tr>
<tr>
<td>45D</td>
<td>George Mason's Residence (outside faucet)</td>
<td>403 Moke Dr.</td>
</tr>
<tr>
<td>45U</td>
<td>John Pope's Residence (outside faucet)</td>
<td>427 Moke Dr.</td>
</tr>
<tr>
<td>46</td>
<td>Fred Tucker's Residence (outside faucet)</td>
<td>1004 Randolph Ave.</td>
</tr>
<tr>
<td>46D</td>
<td>Bernice Spady's Residence (outside faucet)</td>
<td>1007 Randolph Ave.</td>
</tr>
<tr>
<td>46U</td>
<td>Stanley Tipton's Residence (outside faucet)</td>
<td>1800 Randolph Ave.</td>
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<tr>
<td>47</td>
<td>George Pegram's Residence (outside faucet)</td>
<td>3372 Francis St.</td>
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<tr>
<td>47D</td>
<td>Willie Young's Residence (outside faucet)</td>
<td>3364 Francis St.</td>
</tr>
<tr>
<td>47U</td>
<td>Oscar Green's Residence (outside faucet)</td>
<td>3427 Francis St.</td>
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<tr>
<td>48</td>
<td>Leonard Brent's Residence (outside faucet)</td>
<td>3376 Oakwood Circle</td>
</tr>
<tr>
<td>48D</td>
<td>Howard Barnett's Residence (outside faucet)</td>
<td>3302 Oakwood Circle</td>
</tr>
<tr>
<td>48U</td>
<td>Lawrence Robinson's Residence (outside faucet)</td>
<td>3368 Oakwood Circle</td>
</tr>
<tr>
<td>49</td>
<td>Michael Stuart (outside faucet)</td>
<td>3341 E. Princeton Rd.</td>
</tr>
<tr>
<td>49D</td>
<td>Ray Chariton's Residence (outside faucet)</td>
<td>3333 E. Princeton Rd.</td>
</tr>
<tr>
<td>49U</td>
<td>Durrell Angell's Residence (outside faucet)</td>
<td>3324 E. Princeton Rd.</td>
</tr>
<tr>
<td>50</td>
<td>Robert Allen's Residence (outside faucet)</td>
<td>3356 Lancelot Rd.</td>
</tr>
<tr>
<td>50D</td>
<td>Walter Flaunders' Residence (outside faucet)</td>
<td>1765 W. Princeton Rd.</td>
</tr>
<tr>
<td>50U</td>
<td>Carl Keller's Residence (outside faucet)</td>
<td>3348 Lancelot Rd.</td>
</tr>
<tr>
<td>51</td>
<td>Joseph Dyson's Residence (outside faucet)</td>
<td>426 Walnut St.</td>
</tr>
<tr>
<td>51D</td>
<td>Madeline Mason's Residence (outside faucet)</td>
<td>432 Walnut St.</td>
</tr>
<tr>
<td>51U</td>
<td>Carrie Dodson's Residence (outside faucet)</td>
<td>425 Walnut St.</td>
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<tr>
<td>52</td>
<td>Charles Hester's Residence (outside faucet)</td>
<td>1045 Elliott Ave.</td>
</tr>
<tr>
<td>52D</td>
<td>R.H. Pritchett's Residence (outside faucet)</td>
<td>1040 Elliott Ave.</td>
</tr>
<tr>
<td>52U</td>
<td>Laura Baird's Residence (outside faucet)</td>
<td>1040 Elliott Ave.</td>
</tr>
<tr>
<td>53</td>
<td>Preston Emory's Residence (outside faucet)</td>
<td>1820 Stuart Ave.</td>
</tr>
<tr>
<td>53D</td>
<td>Roy Richardson's Residence (outside faucet)</td>
<td>1830 Stuart Ave.</td>
</tr>
<tr>
<td>53U</td>
<td>M.E. Whitmurch's Residence (outside faucet)</td>
<td>1816 Stuart Ave.</td>
</tr>
<tr>
<td>54</td>
<td>Bobby Goodwin's Residence (outside faucet)</td>
<td>1603 Circle Dr.</td>
</tr>
<tr>
<td>54D</td>
<td>Harry Stallings' Residence (outside faucet)</td>
<td>1608 Circle Dr.</td>
</tr>
<tr>
<td>54U</td>
<td>Louise Lewis' Residence (outside faucet)</td>
<td>1600 Circle Dr.</td>
</tr>
</tbody>
</table>
55. Joseph Harris' Residence (outside faucet) - 2923 Drierwood Rd.
55D K. Muramoto's Residence (outside faucet) - 2930 Drierwood Rd.
55U Thomas Pegram's Residence (outside faucet) - 2917 Drierwood Rd.

56. Joe East's Residence (outside faucet) - 1905 Dogese Dr.
56D Sylvester Williams' Residence (outside faucet) - 1910 Dogese Dr.
56U Willie Dalthrop's Residence (outside faucet) - 1862 Dogese Dr.

57. Peabody Jr. High School (kitchen) - 725 Wesley St.
57D Charles Fitzgerald's Residence (outside faucet) - 726 Wesley St.
57U Oscar Crump's Residence (outside faucet) - 722 Wesley St.

58. Southside Regional Hospital (men's bathroom 1st floor) - 137 Appolo St.
58D Cancer Center (bathroom) - Adams St.
58U Purchasing Office (bathroom) - Appolo St.

59. Citgo (bathroom) - 701 S. Crater Rd.
59D Auto World (bathroom) - 660 S. Crater Rd.
59U Flagstop Inn (bathroom) - 815 S. Crater Rd.

60. Golden Skillet (bathroom) - 1228 W. Washington St.
60D Central Cleaner's (bathroom) - 1234 W. Washington St.
60U Tri-City Lumber (bathroom) - 1202 W. Washington St.

61. L. Henshaw (outside faucet) - 615 Confederate Ave.
61D L. Epps (Outside faucet) - 622 Confederate Ave.
61U R. Warren (outside faucet) - 614 Confederate Ave.

62. S. Gustinis (outside faucet) - 14 Seaboard St.
62D R. Price (outside faucet) - 17 Seaboard St.
62U K. Mayes (outside faucet) - 10 Seaboard St.

63. Mary Parsons (outside faucet) - 1655 Berkeley Ave.
63D M. Gill (outside faucet) - 1658 Berkeley Ave.
63U J. Tyler (outside faucet) - 1654 Berkeley Ave.

64. R. Hartman (outside faucet) - 2037 Woodland Rd.
64D J. Williamson (outside faucet) - 2042 Woodland Rd.
64U L. Turner (outside faucet) - 2031 Woodland Rd.

65. C. Leonard (outside faucet) - 1980 Coggin St.
65D I. Lynch (outside faucet) - 1987 Coggin St.
65U E. Felts (outside faucet) - 1977 Coggin St.

66. J. Mann (outside faucet) - 2204 Walton St.
66D M. Young (outside faucet) - 2205 Walton St.
66U J. Clarke (outside faucet) - 2147 Walton St.

67. P. Taylor (outside faucet) - 2551 Pinehurst Ave.
67D L. Chambliss (outside faucet) - 2554 Pinehurst Ave.
67U G. Mayes (outside faucet) - 2548 Pinehurst Ave.
68. 680  R. Brooks (outside faucet) - 2711 Rollingwood Rd.
      68D  E. Ruffin (outside faucet) - 2716 Rollingwood Rd.
      68U  G. Hill (outside faucet) - 2706 Rollingwood Rd.

69. 690  D. Hollister (outside faucet) - 218 Seyler Dr.
      69D  J. Morgan (outside faucet) - 223 Seyler Dr.
      69U  S. Wells (outside faucet) - 211 Seyler Dr.
WATER SAMPLES TAKEN IN THE FOLLOWING ORDER

FIRST WEEK OF EACH MONTH

= Utility Lines Division
= Mount Vernon Tank
= Petersburg Library 1865 South Sycamore Street
= Walnut Hill Water Tank
= Petersburg High School - Johnson Road
= Seven Eleven - south Crater Road
= Seven Eleven Rt. 460 East - County Drive
= Modern Radiator - East Bank Street
= Fire Administration Building - 400 East Washington Street
= Fourth Street Fire Station 4th Street
= Virginia State University
= School Board Maintenance Office - West Wythe Street
= Health Center - 301 Halifax Street
= Locks Water Pumping Station

SECOND WEEK OF EACH MONTH

= Seven Eleven 900 South Sycamore Street
= Walnut Hill Fire Station - South Sycamore Street
= Zip Mart South Crater Road
= Ceco Inc. North Normandy Drive
= Hardee's - County Drive
= Chang's Food Mart - East Washington Street
= Wastewater Treatment Plant (Kitchen Office)
= Hardee's West Washington Street
= City Garage
= A.P. Hill Community Center - Halifax Street
= Pope House - 1343 Steele Street
= Halifax Street Tank
= Stuart School - Pleasants Lane
= Pecan Acres - Pecan Street
= Pepsi Cola Company - West Washington Street
Third WEEK OF EACH MONTH

- Mercury Street Tank
- Walnut Hill School - South Boulevard
- Buffkin's Residence - 421 Hoke Drive
- Seven Eleven - South Boulevard
- Jerry's Electric - County Drive
- Andy Andrew's Residence - 1753 Pender Avenue
- Robert E Lee School - Gibbons Avenue
- School Board Office - 141 East Wythe Street
- Wastewater Treatment Plant (Bathroom)
- City Hall Annex - First Floor (Bathroom)
- Market Street Fire Station - South Market Street
- Harding Street recreation Center - Harding Street
- A.P.Hill School - Tally Avenue
- Westview School - Patterson Avenue
- City of Petersburg Building and Grounds