

Friends of Buckingham Baseline Water Testing

Results, Recommendations, Resources

August 2019

Friends of Buckingham did baseline (preconstruction) water testing at 30 sites in 2018 along the 26-mile length of the proposed Atlantic Coast Pipeline in Buckingham County. Below is a summary of the water testing results of concern with recommendations. The results were entered into a spreadsheet with the sites coded by number to protect privacy, and ready to go in the event the ACP is built, to enter post construction testing data results. Participants have been informed as to which site number is theirs. An information meeting was held Thursday, June 27, 2019 to share this information. Follow up letters were sent to all participants. The Department of Health and DEQ have expressed interest in the detailed results, and we have consulted with a lawyer who did not think sharing that data would hurt any later legal case should the pipeline contaminate the water, and so I am planning to share the detailed results.

Results of Concern Affecting Multiple Residents:

- **Coliforms: PRESENT**

Sites 1, 3, 5, 7, 9, 12, 13, 14, 16, 18, 21, 23, 24, 26, 27, 28, 29, 30

- Coliforms are a group of bacteria. They should not be in well water. The presence of coliform bacteria indicates that fecal waste may be contaminating the water.
- While most are harmless, some can cause illness, especially in children or the elderly. Even if the coliform bacteria are not causing illness, if coliform bacteria can get into your well, it is likely that other bacteria, some of which may cause disease, can get in too.
- Coliform bacteria are more likely to be found after it has been raining, and more likely in wells less than 100 feet deep.
- Inspect your well or have a well driller or other professional inspect it, to see how surface water and bacteria may be entering the well. Some defects are easily viewed and others aren't. For example, is the cap or seal on tightly? Is the top of the well sufficiently above the soil (e.g., a foot or more, to prevent water from getting into the well)? Is the soil sloped away from the well casing? Is the well cap and casing intact (not corroded, no holes or other defects)? (Note: you may need a professional to check the casing). Is the well free from nests or other indications that insects, rodents or other animals are living there? Is your septic system working properly and a sufficient distance from your well?
- Test for coliform bacteria periodically (e.g., once a year) using a certified laboratory.
- For more information: https://www.wellwater.bse.vt.edu/files/BACT442-662_PDF.pdf and <https://www.healthvermont.gov/health-environment/drinking-water/common-drinking-water-contaminants>

- **E. coli: PRESENT**

Sites 1, 3, 12, 14, 18, 23, 26, 29

- E. coli is a disease-causing bacteria present in human and animal fecal waste.

- The presence of E. coli in drinking water usually indicates recent fecal contamination.
 - Do not drink water contaminated with E. coli bacteria unless it has been vigorously boiled for at least one minute (preferably 3 minutes) or treated to remove it.
 - Inspect your well or have a well driller or other professional do so (see above) to prevent E. coli from contaminating your water
 - Re-test your water using a certified laboratory, and periodically re-test (see above).
 - For more information: https://www.wellwater.bse.vt.edu/files/BACT442-662_PDF.pdf
- **Field pH:** < 6.5 (acidic water, corrosive) (6.5-8.5 OK)
 Sites 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21, 22, 24, 26, 27, 28, 29, 30
- Low pH can cause a bitter metallic taste and is corrosive.
 - Since the water was sampled at the outside spigot, levels measured at the inside water tap could have higher levels of metals such as lead or copper (from the acidic water interacting with the plumbing). Run water for several minutes before using it for drinking (especially if the plumbing includes copper pipes, lead pipes, or lead solder), and consider testing from the faucet where you drink, and/or getting a neutralizer.
 - For more information: https://www.wellwater.bse.vt.edu/files/CORR442-665_PDF.pdf and <https://articles.extension.org/pages/32302/drinking-water-treatment-ph-adjustment>.
- **Alkalinity:** <150 or > 200
 All sites (all low except one high)
- A measure of water's ability to neutralize acids. The lower the alkalinity, the more likely water is to be corrosive. Water with high alkalinity (>150) may contribute to scale buildup in plumbing. See above under pH.

Results of Concern Affecting a Few Residents

- **Nitrate > 10 mg/L (and > 3 mg/L for infants)**
 Sites 23, 24
- High nitrate levels can cause methemoglobinemia (blue baby syndrome) in infants (birth-6 months). Virginia Cooperative Extension advises not using water with levels approaching 3-5 mg/L for mixing baby formula or for drinking water for infants < 6 months
 - Pregnant women should not drink water with high levels of nitrates (e.g., possible association between nitrate in drinking water and spontaneous abortions, birth defects, childhood onset of diabetes mellitus and other conditions
 - Nitrates in drinking water pose a possible cancer risk.
 - Consider steps to prevent future nitrate contamination (it may take years for the nitrate to return to safe levels), carrying or buying water especially for infants and pregnant women, and treatment options
 - For more information: https://www.pubs.ext.vt.edu/content/dam/pubs_ext_vt_edu/442/442-659/442-659.pdf

Results of Potential Concern Affecting Some Residents:

- **Turbidity: >5 NTU** (< 1 is ideal)
Sites 4, 12, 18; also 1,3,6, 15, 25, 26 more than ideal
 - o Turbidity is a measure of how cloudy the water is.
 - o Turbidity can provide food and shelter for pathogens and promote regrowth of pathogens.
 - o Consider a new well screen and a sediment filter
- **Sodium: > 20 mg/L** (for those on a restricted sodium diet (500 mg/day). 30-60 mg/L is taste threshold), 4 mg/L says Massachusetts
Sites 12, possibly 1, 4, 6, 8, 10, 19, 20, 22, 23, 24, 25, 28, 29
 - o For more information: https://www.wellwater.bse.vt.edu/files/SodiumChloride442-661_pdf.PDF
- **Aluminum: > 0.5- 0.2 mg/L** (colored water)
Sites 12, 18, and to a lesser extent 1, 3
 - o EPA considers this a non-health issue. There are some studies linking Alzheimer disease with aluminum in drinking water but they suffer from shortcomings. The World Health Organization recommend that levels not exceed 0.2 mg/L, but they say 0.9 ug/L is a health-based value. Some states recommend not drinking water exceeding 0.2 mg/L.

Results Affecting a Few Residents (not a health concern)

- **Iron > 0.3 mg/L** (rusty color; sediment; metallic taste; reddish/orange staining)
Sites 3, 4, 9, 12, 15, 18
 - o Consider corrosion control and particle filter
 - o For more information:
https://www.pubs.ext.vt.edu/content/dam/pubs_ext_vt_edu/442/442-656/442-656_pdf.pdf
- **Fluoride: > 2 mg/L** (tooth discoloration)
Site 2
 - o Children 8 years and younger should be provided with alternative sources of drinking water
 - o For more information:
https://www.pubs.ext.vt.edu/content/dam/pubs_ext_vt_edu/442/442-660/BSE-254.pdf
- **Manganese > 0.05 mg/L** (black to brown color; black staining; bitter metallic taste)
Site 4, 9, 15
For more information: https://www.pubs.ext.vt.edu/content/dam/pubs_ext_vt_edu/442/442-656/442-656_pdf.pdf

Other Results of Note:

- **Methane**
Sites 18, 20, 29, although below levels of concern

- According to Penn State Extension, methane may occur in a water well due to natural conditions or from human activities such as pipeline leaks, landfills, etc. It has no color, odor, or taste, although a chemical odorant called mercaptan is added by a gas company before distribution to help detect leaks. Methane is combustible. It isn't toxic and doesn't cause health problems in drinking water but at high levels can cause an explosive hazard. Houses, camps, or wells can explode due to escaping gas seeping into a confined area where it may reach dangerous concentrations. Below 10 mg/L is considered a low level; all samples tested were below 10 mg/L. Levels above 28 mg/L require immediate action to reduce the concentration, according to the U.S. Department of the Interior, Office of Surface Mining. Penn State Extension says **any well water with a detectable concentration of methane should be routinely tested to ensure that the methane concentration is not increasing to a dangerous level.** Basement wells are especially problematic because the methane escapes directly into the home. **Adding a vent tube to the water well cap can promote the release of methane. Vented caps cost less than \$100 and can be obtained from most well drillers.**
- **Tetrachloroethene (also called tetrachloroethylene)**
Site 12
 - the goal is zero since this is a probable human carcinogen, but the one result was below the federal drinking water standard of 5 ug/L, although above a public health goal of 0.06 ug/L set by California. This is a solvent commonly used as a degreaser and in dry cleaning. It is also found in household products like wood finishes and paint strippers. Tetrachloroethylene releases into the air during showering or washing and can be inhaled. It can be removed from water using granular activated carbon filtration. Always make sure water treatment devices are certified by an independent organization to remove the contaminant of concern.
- **Chloroform:** the goal is zero since this is a possible human carcinogen, but the one result was below EPA's goal in drinking water of 70 ug/L although above a 0.4 ug/L health guideline proposed by California
Site 26
- **TPH (Total Petroleum Hydrocarbon) – Diesel Range: C10 – C28)**
Site 26
 - The one result was just above the minimum detection limit and below the practical quantitation limit. It was estimated to be 0.13 mg/L. This is below EPA's "provisional peer reviewed toxicity" value and the level used by Massachusetts and Minnesota, of 0.2 mg/L. TPH is a mixture of chemicals; fortunately, this sample had no VOCs present, some of which can be present in petroleum fuels.

Additional Resources

U.S. EPA National Primary Drinking Water Regulations (lists Maximum Contaminant Levels (MCLs) and Maximum Contaminant Level Goals (MCLGs): <https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations>

U.S. EPA Secondary Drinking Water Standards: Guidance for Nuisance Chemicals. <https://www.epa.gov/dwstandardsregulations/secondary-drinking-water-standards-guidance- nuisance-chemicals>

Virginia Cooperative Extension Publication 442-670: Virginia Household Water Quality Program: Household Water Treatment.

https://www.wellwater.bse.vt.edu/files/WaterTreatment442-670_pdf.pdf

Virginia Cooperative Extension. Ten tips for Managing your private well water supply.

https://www.wellwater.bse.vt.edu/files/ten-tips-0813-v4_press.pdf

Virginia Cooperative Extension, Virginia Household Water Quality Program. TESTING IN BUCKINGHAM SEPTEMBER 4. Contact Jen Ligon, jligon@vt.edu, 434-969-4261, see

<https://www.wellwater.bse.vt.edu/clinics.php>

This is the fine and exacting work of Lisa Lefferts, to whom we owe much gratitude for the more than generous offering of her time and professional expertise to the common good for all our communities. Her bio:

Lisa Lefferts lives in Nelson County, on the side of a mountain, downslope from the proposed ACP route. She is a public health scientist with over 30 years of experience in evaluating risks from chemicals and other food safety issues. Currently she works as a senior scientist at the Center for Science in the Public Interest (CSPI), a non-profit, independent, consumer advocacy organization based in Washington DC. She received her B.A. from Oberlin College in Biology and Environmental Studies, and a Masters of Science in Public Health from the University of North Carolina at Chapel Hill, in the Department of Environmental Science and Engineering, with a focus on toxicology. At CSPI her focus is food additives and other chemicals added to food. Prior to CSPI, she worked as a consultant to and directly for non-profit organizations, and also a little for state and federal government agencies. She has co-authored a book and dozens of reports and articles.

Please call me with any of your questions:

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