

Resource International, Ltd., (Resource) has reviewed the Private Well Test Results and associated Virginia Department of Health correspondence for the following residences:

Samuel Harrison – 18210 Possum Point Road  
Artemus & Deanna Brown – 18214 Possum Point Road  
Dan Morrow – 18303 Possum Point Road  
William and Joanne Alvey – 18306 Possum Point Road  
Samuel Jackson, Clear Sky Properties – 18316 Possum Point Road  
Brian West – 18411 Possum Point Road

Based on this review, Resource offers the following comments

#### SUMMARY OF TEST RESULTS AND DISCUSSION

- VDH has provided a detailed evaluation of the test results for each residence which we are sure will be of value to the homeowners and Prince William County.
- Resource finds no information in VDH's summation which is, in our opinion, open to question.
- Resource finds no record of well depth/construction at the residences. For purposes of this evaluation, it is assumed that the wells withdraw from the unconfined or "water table" aquifer and not from a lower, confined, aquifer or bedrock.
- It is our understanding that a question has been raised by a homeowner regarding the sample collection methodology used by VDH. Specifically, VDH collected the samples by first purging water from the system (typically 20-45 gallons per residence), then sampling from an available spigot or tap (indoor or outdoor) prior to well water entering a treatment system, if present. The homeowner question pertains to advice from a third party that (a) the sample should be an immediate draw with no flushing, and (b)

samples should be collected from an interior faucet. The purpose of purging is to obtain a sample that is as representative as possible of the water in the aquifer from which the well draws, mitigating potential introduction of contaminants from the well system (piping, solder, etc.). Given that the purpose of the testing was to explore the potential of an effect on groundwater quality at the residences from the vicinity coal ash storage system at Possum Point Power Station, purging was necessary. An immediate draw sample would in fact be considered of challengeable value for drawing conclusions regarding groundwater quality in the aquifer at the withdrawal point. With respect to a possible distinction between interior and exterior sampling locations, there is none. As noted by VDH, the critical requirement was to collect from a cold water source prior to movement of well water through any treatment system (e.g., filter, water softener).

- It is Resource's understanding that some additional samples may have been collected and tested by other labs. Not having access to such data, we are unable to comment. However, we note that the laboratory used by VDH is accredited under the Virginia Environmental Laboratory Accreditation Program (VELAP).
- Based on Resource's experience with unconfined groundwater throughout the Commonwealth of Virginia, we note that the constituents and constituent concentrations detected in the samples collected at 18210, 18214, 18303, 18306, 18316 and 18411 Possum Point Road appear consistent with waters collected from shallow wells in the Coastal Plain and Piedmont geographic areas.
- Irrespective of concentration (all of which are below applicable SDWA MCL), VDH does not address the potential source of constituents identified in the water samples (with the notable exception of the households' own plumbing systems as a potential source of lead and a special note in connection with 18411 Possum Point Road [see below]). Potential sources include:
  - Natural occurrence
  - An effect in connection with household piping
  - An effect in connection with wellhead conditions
  - An effect in connection with the Dominion Ash Pond System
  - An effect in connection with another anthropogenic source

- At 18411 Possum Point Road, VDH comments on the unique risk connected with the location of the well in the home's basement. Specifically, VDH notes that private wells are by regulation to be located at least 50 feet from termite treated foundations, or 10 feet when borate based treatments are applied directly to wood. VDH does not state that the 18411 Possum Point well has been compromised by past termite treatments; rather, it cautions the homeowner regarding future actions.
- The preceding comment is not intended as criticism of VDH, because source determination is beyond the scope of evaluation of a single private well water sample in absence of other information.
- Prince William County has informed Resource that citizen concern has been expressed regarding a potential connection between lead identified in the private well samples and the nearby Ash Pond complex at Dominion Virginia Power's Possum Point Power Station. Four of the six residential wells tested were found to have quantifiable lead concentrations. While the VDH correspondence notes that the lead results *do not* exceed MCL, it also comments that current medical judgement suggests "no known safe level of lead in a child's blood," and that the MCL *goal* for lead in drinking water is zero. VDH advises the residents that a potential source of lead in private well water is corrosion of the water system components and provides commentary on various treatment systems that might be considered by the residents.
- As noted above, VDH provides no other commentary in connection to potential source of lead (or other detected parameters) in the private well system samples. Resource's review of the 2014 and 2015 Annual Groundwater Reports for the Possum Point Power Station VPDES Permit did not indicate the presence of lead in any of the wells monitored (1 µg/L detection limit), with the exception of a detected but not quantified value (2 µg/L) in well ES-3A in June 2015. This leads to the conclusion that data presented in the station's 2014 and 2015 Annual Groundwater Reports do not support a hypothesis that the Ash Ponds have been a source of introduction of lead into groundwater.

## GENERAL HYDROGEOLOGIC CONSIDERATIONS

Prince William County has a concern regarding potential effect to citizens' private residential drinking water supply wells in connection with the Dominion Ash Pond System. With respect to this consideration, Resource offers the following comments:

- An unnamed tributary separates the Dominion ash ponds from residential properties on Possum Point Road, including the six properties herein addressed. This tributary enters a surface water body known locally as the "Beaver Pond," which in turn enters Quantico Creek. This tributary and the pond represent a surface water divide between the Ash Ponds and the residences. Unconfined groundwater will interface with the surface water at which point it will become diluted. Natural water movement is controlled by gravity, and water at a groundwater/surface water interfaces does not flow "uphill" on the opposite side of a drainage divide. Because of this, shallow groundwater entering the Beaver Pond from the Possum Point Power Station side of the divide cannot then enter groundwater west of the pond and tributary and then flow naturally towards the residences. Groundwater underlying the residences is instead moving naturally towards Quantico Creek and, depending on the home location, in part towards the Beaver Creek.
- Pumping of groundwater from wells will impart localized variation to natural flow. The rate of pumping from residential wells (typically lower than 5 gallons/minute on a sporadic basis), even in concert with other residential wells, could not create a sufficient area of influence to realistically pull groundwater from that underlying the Ash Pond area past a surface water divide the scale of the Beaver Pond.
- Saltwatertides.com notes that a tidal influence exists in Quantico Creek (typically a variation of 15-18 inches between high tide and low tide). Tidal action results in localized small flow alterations along the groundwater/surface water interface demarcated by the shores of Quantico Creek. There are no records of tidal influence on the Beaver Pond; however, it can be assumed that a tidal influence occurs there also. It is Resource's opinion that such a mechanism would be of unmeasurable significance with respect to potential movement of groundwater across the drainage divide.

- As noted in the previous section, the groundwater monitoring program at the Possum Point Power Station has not identified lead in groundwater. Even if lead had been identified in groundwater at the Power Station, the possibility of hydraulic communication across the drainage divide sufficient to conclude an effect on the residential wells from the Ash Ponds is considered unfeasible for the reasons discussed above. This observation applies to other constituents in addition to lead.

## CONCLUSION

In summary, the test results for the sample collected from the wells at 18210, 18214, 18303, 18306, 18316 and 18411 Possum Point Road appear typical of shallow wells in the Virginia Coastal Plain and Piedmont regions. Natural hydrogeologic processes do not allow for movement of shallow groundwater from the Possum Point Power Station towards the residences on Possum Point Road. 2014-2015 Groundwater Monitoring reports for the Possum Point Power Station do not indicate release of lead into groundwater. Based on the foregoing, it is reasonable to conclude that the Dominion Ash Ponds do not represent a potential source in connection with lead or other constituents identified in the private well samples.

Prepared by: Anthony W. Creech, P.G.  
Section Manager, Groundwater and Geology

Reviewed by: Michael E. Fiore, P.E.  
President

## **Limitations**

The conclusions presented in this document are based solely on the information included herein. Additional information that was not available to Resource at the time of this document was prepared could modify the conclusions stated herein. This document has been prepared in accordance with generally accepted engineering and environmental practices; no other warranty, expressed or implied, is made as to the professional opinions herein.