Private Well Testing in North Carolina

Numerous scientific studies indicate that our ash basins are not influencing neighbors' water supply wells, and we've been proactive in addressing potential issues.

Even so, we support bringing peace of mind to neighbors by providing permanent water solutions for those living in the immediate vicinity of coal ash basins.

Background

The Coal Ash Management Act of 2014 required the state to test plant neighbors' wells in close proximity to ash basins. The N.C. Department of Environmental Quality (DEQ) coordinated the testing and selected wells within 1,500 feet of ash basins. Duke Energy paid for the analyses, which were performed by various independent laboratories. Test results were then sent to the N.C. Department of Health and Human Services (DHHS) to determine if the well water was safe.

The vast majority of well owners' water met federal drinking water standards, but many did not meet new DHHS health screening levels for hexavalent chromium (0.07 parts per billion (ppb)) and vanadium (0.3 ppb). The agency sent letters advising that hundreds of residents who participated in testing not drink or cook with their well water. Duke Energy offered to provide temporary bottled water to those well owners for their peace of mind as we completed thorough groundwater studies. Independent experts completed those studies in fall 2015.

After further review, DHHS lifted the "do not drink" guidance for well owners in March 2016 related to levels of hexavalent chromium and vanadium. Updates to the new state coal ash law in June 2016 require permanent water supplies to well owners within a half-mile of ash basins in North Carolina, regardless of whether a well has been impacted by coal ash or not.

Groundwater studies on Duke Energy plant properties and other publicly available information – many from scientific sources outside the company – help shed some light on this complex issue for plant neighbors.

These substances occur naturally

- Data demonstrate the substances in neighbors' wells that generated "do not drink" guidance occur in North Carolina rocks and soil in the same general ranges.
- A Duke University study released in October 2016 tested more than 370 wells across North Carolina, both close to and far from ash basins. The study determined that hexavalent chromium is not from ash basins but from volcanic rock in the Southeast. This validates ash basins are not the source of the substance that triggered the majority of the state's "do not drink" letters and the community concern that followed.
- DEQ well data show these same substances occur naturally at varying levels across the state even in locations far away from ash basins. In August 2015, DEQ posted its results for background well testing it conducted near three coal plants. The state selected these well locations because they were far enough away from the coal plants (generally 2 to 5 miles) to ensure plant operations had no potential to impact the wells but were still close enough to share the same geology. Twenty out of 24 background wells sampled also received "do not

drink" advisories, primarily for vanadium and hexavalent chromium. See the state's Aug. 28, 2015, blog post, its spreadsheet of results and DHHS's Oct. 15, 2015, letter to well owners. In the 24 background samples, the state observed a range of <0.6 ppb to 4.5 ppb for hexavalent chromium and a range of <1 ppb to 23.7 ppb for vanadium. Most plant neighbors' results fall within these ranges.

- Background well data at other locations across North Carolina show these substances occur many miles from ash basins. Well testing in Chatham, Jackson and Lee counties with no presence of coal ash shows similar results.
- Background well data in the state-required groundwater assessment reports performed by independent experts show the presence of hexavalent chromium and vanadium on plant properties in locations that are not influenced by basin flow (upgradient).
- The concentrations of hexavalent chromium in ash basin water are low and not consistent with the higher levels observed in neighbors' wells. Similarly, ash basins are relatively shallow, and the concentrations of hexavalent chromium are typically higher the deeper you sample into bedrock. This suggests the source is natural geology.
- Duke Energy sampled nearly 200 employees' wells in 2015 to enhance background data available across the state. These private wells were located at least 2 miles away from ash basins – far enough not be influenced by them. This testing also detected hexavalent chromium and vanadium in many samples in the same general range the state observed in its background well testing.
- U.S. Geological Survey data demonstrate vanadium is common in North Carolina soils, and it's also common in North Carolina groundwater (slide 14) at levels that exceed the state's Interim Maximum Allowable Concentration of 0.3 ppb and that triggered "do not drink" advisories.
- The state's Frequently Asked Questions illustrates that many municipal water supplies in North Carolina and across the United States also contain low levels of vanadium and hexavalent chromium for the same reasons. The same quality of municipal water that meets U.S. Environmental Protection Agency standards and safely serves hundreds of millions of people across the nation would have triggered North Carolina "do not drink" advisories if it were coming from a private well.
- DEQ noted in a Jan. 13, 2016, update to legislators that more than 70 percent of public water systems in the United States that have sampled for hexavalent chromium and vanadium would exceed N.C. DHHS screening levels.

There is no evidence of ash basin influence

- Most importantly, DEQ private well data show no elevated levels of boron in neighbors' wells. Boron is one of the key indicators the U.S. Environmental Protection Agency and the industry use to identify potential impact from coal ash.
- Some of the most experienced environmental engineering firms in the nation have performed a series of groundwater studies around North Carolina ash basins. This work has been the most comprehensive look at groundwater ever performed at our facilities. More than 750 groundwater monitoring wells were installed across the 14 plant sites in 2015 to explore the flow direction of groundwater and the vertical and horizontal extent of groundwater impact.
- The monitoring data demonstrate groundwater near ash basins is moving away from neighbors' wells, which are generally upgradient. Groundwater near the Sutton Plant ash

basins in Wilmington, N.C., is an exception, and the company has already taken steps to address this.

- State regulators requested that additional groundwater monitoring wells be installed to further validate the extent of groundwater impact, flow direction and what the natural “background” levels are of various substances. The company installed nearly 200 additional wells in 2016 to gather additional information. Data coming from those wells is consistent in showing the same flow directions and extent of impact. The company expects to be able to better identify background levels following additional sampling events. Computer modeling also validates that flow directions are expected to continue moving away from neighbors’ wells in the future.