Buncombe County Schools Property, Asheville, North Carolina

by Lenny Siegel
January, 2013

Located less than ten miles from the CTS Superfund site on Mills Gap Road[1] in Asheville, North Carolina, another hilltop electronics factory, Square D, also released trichloroethylene (TCE) (and tetrachloroethylyne [PCE]) into local groundwater. In 1989, the year before the State of North Carolina required a site investigation, Square D sold the northern portion of its property to the Buncombe County Board of Education. Today the old Plant 2 building houses district offices as well as English language classes, and the district's newer maintenance center and warehouse is attached.

In January 2012, as the Board of Education considered adding a $4 million magnet STEM (Science, Technology, Engineering, and Mathematics) High School to the existing structure, Board Member Lisa Baldwin discovered that the school property was on the edge of the Square D hazardous waste site. She questioned putting more students on the property, but at first other board members and District management did not take her seriously. Eventually they agreed to an independent study, and meanwhile the North Carolina Department of Environment and Natural Resources (DENR) asked Square D to conduct additional testing on the site to determine the potential for vapor intrusion.

Looking uphill at the Square D site
from the front of the Buncombe County Schools Building

[1] See my reports at http://www.cpeo.org/pubs/CTSAsheville.pdf and http://cpeo.org/pubs/CTSCritique.pdf.

Thus far, groundwater and soil gas sampling have not demonstrated a risk to building occupants, but much more testing is necessary to ensure that vapor intrusion is not and will not be a problem. Unfortunately, because Square D sold the Schools property before initiating its investigation, relatively little characterization has been done on site. Even on the southern portion (Plant 1) of the original Square D site, some of which is still owned and operated by the company, there has been no clear identification of the sources of contamination.

The property was first developed by Gorham Silver in 1952. Square D purchased the site in 1960 and began operations in 1961. In 1990 the company reported a leaking above-ground oil tank, but its reported contents did not include TCE and PCE. Site documents list two suspected source areas for those compounds, a former drum storage area at the northeastern corner of Plant 1 and a subgrade storm sewer slightly further south, just west of the building. Since there appear to be no private wells in the immediate area, the pathway of concern is vapor intrusion, the possible migration of TCE and PCE fumes into buildings from groundwater contamination in the saprolite, or upper aquifer.

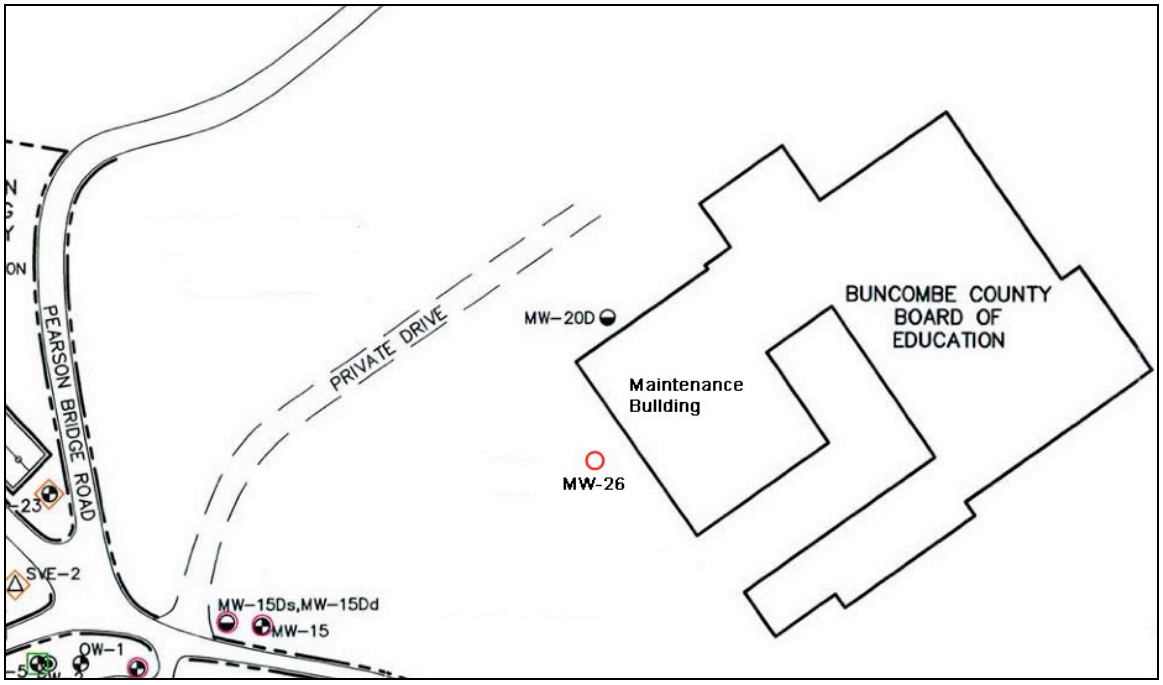
Consultants for Champion Products, another polluter to the northwest of Square D, do the best job of describing the pollution. They identify plumes of "PCE and TCE in the saprolite aquifer originating from the northeast corner [of the] … Square D property," as well as a "PCE in the bedrock aquifer originating on the western portion of the Square-D property." The former is the potential source of vapor intrusion. Active remediation, primarily groundwater pump and treat, began in 1994.

Site of Monitoring Well 15 cluster

Consultants for both Champion and Square D's current owner, Schneider Electric, show that shallow groundwater flows principally to the north, but there is no data to rule out a northeastern flow, following downhill surface contours toward nearby French Broad River, onto Schools property. In fact, recent soil gas sampling found low levels of PCE in the soil gas beneath the Schools maintenance building. I began this report with a reference to the CTS site because there shallow groundwater flows both to the east and west while deeper groundwater flows north. Identifying one flow direction here does not complete the picture.

In fact, none of the documents I have reviewed provide a conceptual site model of the area, laying out the sources of contamination, geologic conditions, pathways, and potential receptors. Without such a model, it's difficult to construct an investigation that could determine whether the school buildings are susceptible to vapor intrusion.

The red flag for Baldwin and others was the monitoring results from Square D's Monitoring Well 15 (MW-15), located in the saprolite aquifer at the uphill edge of the Schools property. Historically (May, 1997), TCE concentrations in that well were as high as 1100 parts per billion (ppb). Most recently, in May 2012, the level was 287 ppb. The PCE concentration in May 2012 was 123 ppb, the highest level listed in a time series provided by DENR. The depth to groundwater at MW-15 is 65 feet, at an elevation about 40 feet above the parking lots adjacent to the school buildings. So if the contamination is migrating in that direction, it could be a source of indoor vapors.



For this reason, in March 2012 DENR asked Square D to install a monitoring well within 100 feet (laterally) of the Schools buildings and to conduct soil gas sampling. In August 2012 Square D reported no detections of the contaminants of concerns at the new Monitoring Well 26. That's slightly re-assuring, but one well is insufficient to delineate a plume for the purpose of ruling out vapor intrusion, particularly since in October PCE

was detected in the soil gas under the maintenance building. Furthermore, in 2012 Champion's consultants concluded, "Square D has not established hydraulic control of the saprolite aquifer PCE/TCE plume originating from the northeast portion of their property using their existing remedial approach."

Though Champion is focused on migration northward onto its former property, its consultants argued that contamination continued to move at a rate slightly below the 11.3-feet-per-year shallow groundwater velocity. At that rate, I figure it could take forty years or less for elevated levels of TCE and PCE to move from MW-15 to the new monitoring well, and less than 50 years to reach the schools buildings—again, if significant levels are migrating in that direction.

It's quite possible the plume has migrated around the new monitoring well, or that low levels of PCE and maybe TCE vapors have migrated through the soil to the maintenance building in advance of the groundwater plume. However, higher groundwater concentrations capable of generating unacceptable vapor intrusion may be on their way. If further characterization shows that more significant levels of TCE and PCE are headed toward the Schools buildings, there is still time to intercept the plumes. But currently there are no plans. In fact, there are no plans for additional groundwater investigation in that area.

Square D's consultants took five soil gas samples in October 2012. Two were in outdoor areas within the buildings' perimeter. Only three were more indicative subslab samples. And one of those, under the maintenance building, found PCE at 6.55 $\mu g/m^3$. The detection limit for PCE was set at 6.0 $\mu g/m^3$, and for TCE it was even lower (4.8 $\mu g/m^3$). That is, both TCE and PCE may be in the soil gas under the buildings, at levels not much lower than the PCE hit, but they were "not detected."

It is extremely unlikely that PCE or TCE at 6.55 $\mu g/m^3$ or a lower concentration would cause unacceptable vapor intrusion, but the presence of PCE does imply that contamination has migrated downgradient from the Square D site and MW-15 toward the

Schools buildings. The recognized variability of soil gas measurements over time and space suggests a need for additional subslab sampling, with lower detection limits. Indeed, noting that vapor migration may be greater in colder months, Square D's consultant recommended that additional sub-slab samples be collected in the maintenance area this winter.

I would go further. *Investigators should install additional saprolite groundwater monitoring wells between the known Square D plume and the Schools buildings. They should re-test the soil gas under both Schools buildings during the winter season.* From provided drawings, I estimate the slab footprint to be about 160,000 square feet. Three subslab samples are insufficient to rule out vapor intrusion.

Also during the winter, either Square D or the Board of Education should conduct indoor air sampling within both the maintenance building and original structure. Direct measurement of air quality is the best way to rule out, or discover, vapor intrusion. If groundwater assessments suggest that higher levels of TCE and PCE are headed down the hill toward the buildings, then indoor sampling should be repeated each winter. If analysis of the buildings' ventilation systems show that there are multiple distinct airspaces, then real-time portable samplers may be more cost-effective than Summa canisters.

Let me be clear. *There is no evidence at this time that vapor intrusion is a health risk at the Buncombe County Schools buildings.* But the limited testing conducted thus far is insufficient to determine whether unacceptable vapor intrusion is occurring now or may occur in the future.

So the Board of Education is left with the question: Is this a suitable place to build a high school? As we have written before, many factors—educational priorities, cost, transportation, etc.—go into school siting. While in some cities—such as New York and parts of Los Angeles—it is difficult to site a new school away from subsurface contamination, in areas like Asheville there is a choice. Environmental conditions, based upon a complete characterization and assessment of risk, should be one of the factors evaluated before a site is selected. Most buildings can be built or modified to protect against vapor intrusion, but the initial and long-term costs and risks should be considered before putting students in areas where the potential for vapor intrusion is real.