Protecting
Our
Water and
Environmental
Resources

POWER Action Group
Clean Up CTS Superfund Site…*Now!*

Spring 2014

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Concerned Citizens of Asheville Fighting for Cleanup

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Superfund Efforts Finally Get Underway

EPA Briefs POWER on Results of First Phase of Work

CTS Contractor AMEC sampled soil, ground water, and residual waste material at the former plant site over the winter to confirm how much contamination, including the industrial solvent trichloroethylene (TCE), remains in the soil. CTS has other contaminants, but TCE is the biggest problem. EPA briefed POWER on the results of the new work on May 12, shortly after EPA received a draft report about it from AMEC.

Extremely high levels of TCE had been reported previously, indicating that it was likely present both as non-aqueous phase liquid (NAPL), and dissolved in ground water. Dense NAPL (DNAPL)TCE is thought to have sunk through the soil and infiltrated the underlying fractured bedrock. The new data show that a large amount of TCE is also dissolved in a mass of *light* petroleum NAPL (LNAPL), which is floating on the water table about ten to 15 feet underground. EPA reported the LNAPL contains up to 30 percent TCE.

EPA says it's not safe to drink water that contains more than 5 parts per billion (ppb) of TCE. In 2009, AMEC found up to 42,000 ppb TCE in ground water at the site, and up to 34,000 ppb in off-site springs! EPA has found 88 ppb of TCE in a well 2/3 mile away.

The residual NAPL mass at CTS is the source of TCE and other chemicals that have been found off-site in springs, streams, and wells as far back as the 1990s. While the extent of TCE in bedrock still must be defined before a site-wide remedy can be developed, ***nothing should stand in the way now of CTS cleaning up the LNAPL petroleum and TCE that is causing significant off-site exposures.*** LNAPL can be recovered more easily than DNAPL, with proven techniques that have been widely used to clean up petroleum spills.

Technologies Exist to Clean Up TCE and Control the Site

A hazardous waste site with NAPL, such as CTS, can be brought under control. The NAPL mass must be removed or destroyed; releases to off-site properties must be stopped; and unacceptable risks to humans and environmental receptors must be eliminated.

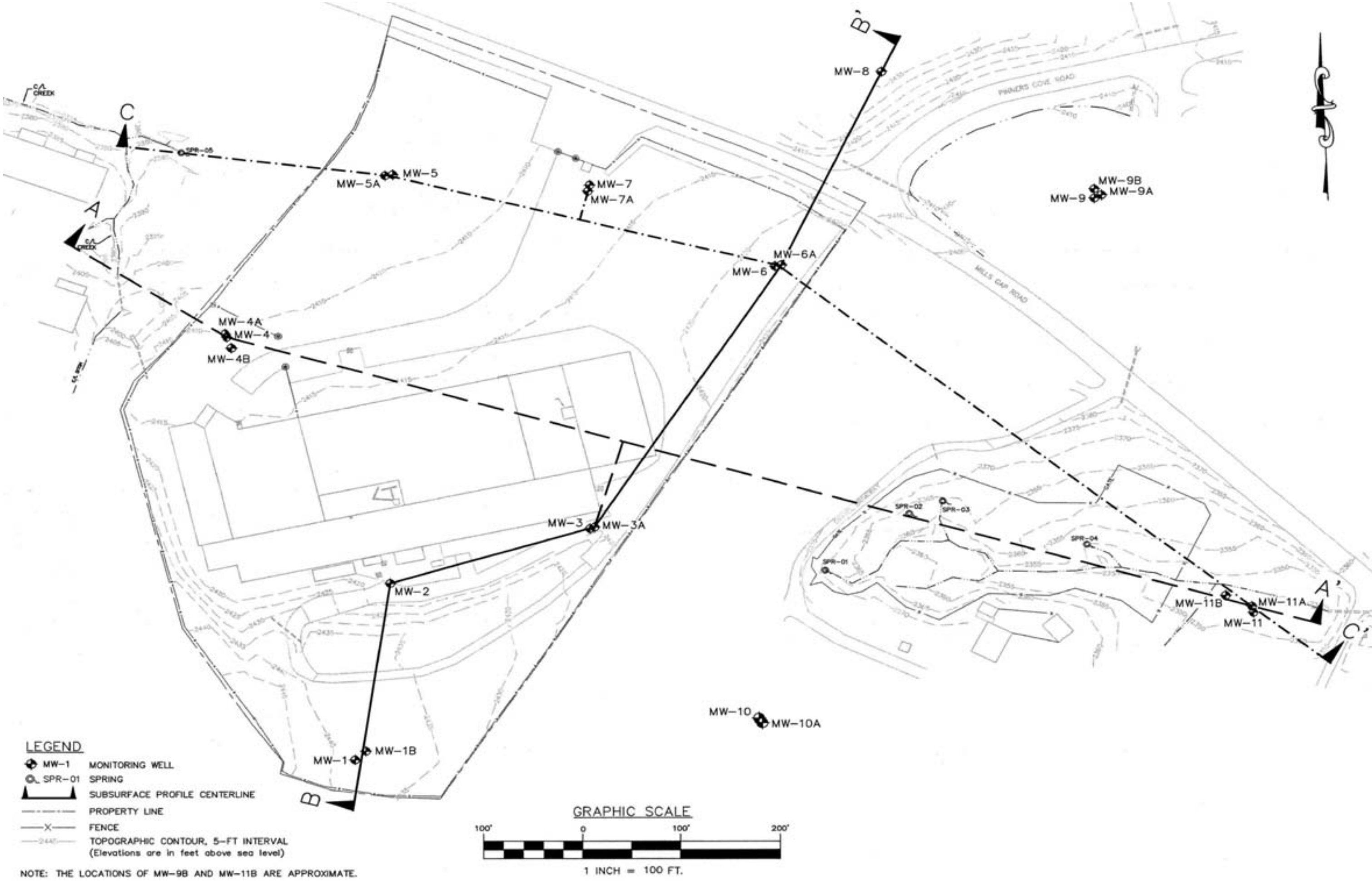
LNAPL can be skimmed from wells or collected in trenches. Dual-phase Extraction can recover liquid– and vapor-phase contamination. Soil Vapor Extraction and Chemical Oxidation or Reduction can remove and destroy TCE. Air Sparging and Permeable Reactor Barriers can remove dissolved TCE from ground water as it flows from the site. Ground water pumping can hydraulically contain contaminated ground water, keeping it from leaving the site and contaminating the environment further. Learn more about cleanup technologies by reading Citizen Guides at EPA's http://cluin.org/products/citguide/.

The most recent data shows that a large area of uncontrolled contamination still remains under the CTS site. The concentrated source area, which basically sits at the top of the hill, is leaching TCE into ground water that flows onto the surrounding land, ground and surface water. ***POWER pressed EPA to insist that CTS immediately take action to get the newly-defined LNAPL contamination source under control and removed as soon as possible***. EPA told us that it has discussed with CTS the need for taking such Interim Remedial Measures (IRMs), but EPA would not commit to ordering CTS to do so.

CTS Report in 2009: 42,000 ppb of TCE in On-site Ground Water; 35,000 ppb on Private Property 500 feet Away

Before EPA made the former CTS plant a National Priority List (NPL) Superfund Site, CTS contractor MACTEC (now AMEC) studied the site for NC Department of Environment and Natural Resources. In 2009, MACTEC reported that extremely high levels of TCE remained. Two of MACTEC's maps are all you need to look at to understand just how bad the situation is. ***These maps are reproduced on the next two pages to illustrate that TCE remains beneath the site and surely continues to spill from it***.

Sampling Map: In 2009, CTS Contractor MACTEC Sampled Ground Water at These Locations:



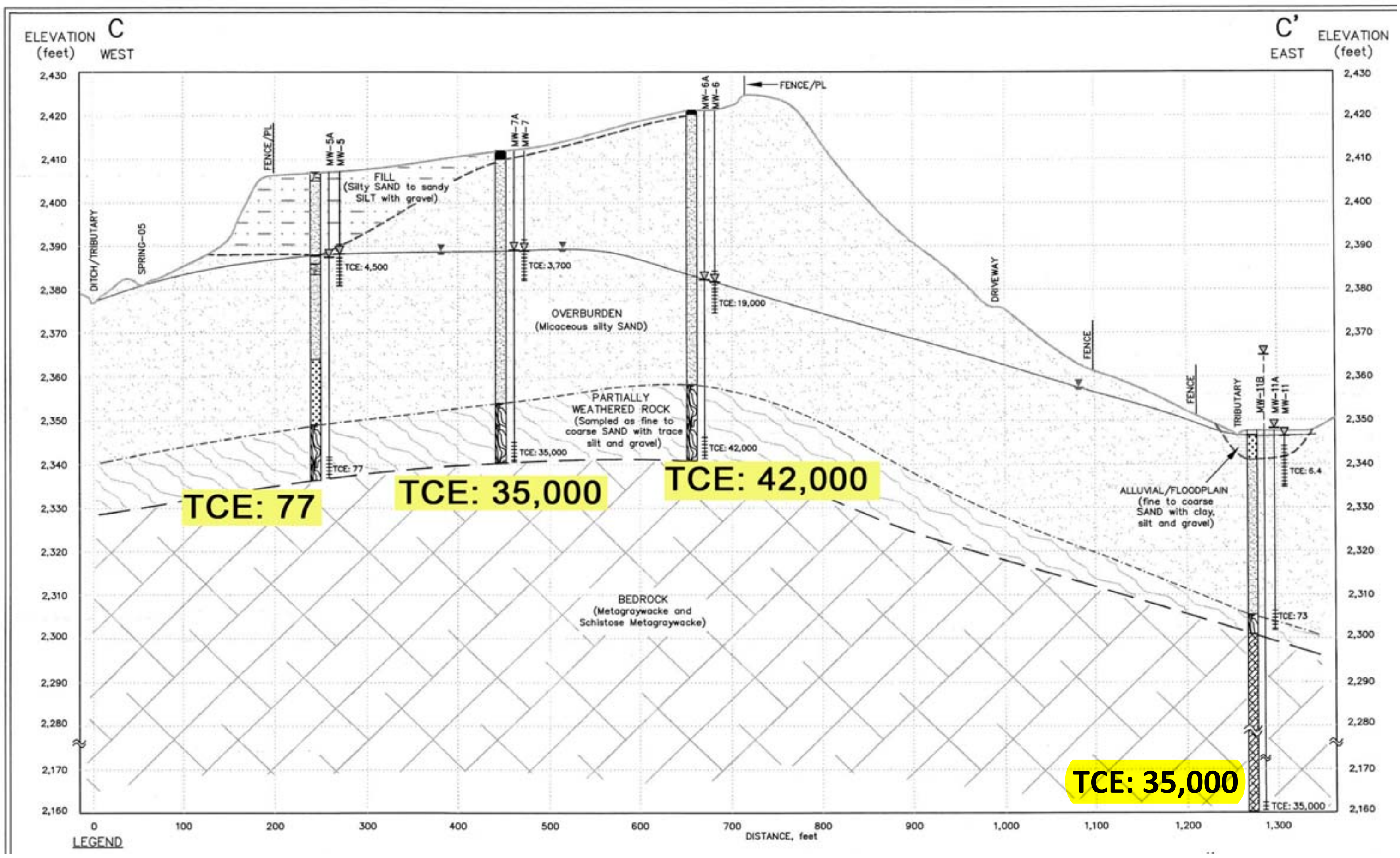
This map shows the CTS site boundaries and former plant building footprint, and some features (entrance on Mills Gap Rd. is top center). Monitoring locations are wells where ground water was collected (labelled "MW-3" etc.). Some water samples were taken in shallow soil, some in deeper soil near the top of bedrock, and some from down deeper, within the bedrock. Wells with an "A" or "B" indicate different depths (B is deeper than A).

The map on the next page is a "Cross-Section," what you would see if you sliced down through the earth along the line CC' shown on the map above. It would be like looking at exposed rock at a road-cut through the mountains. Labels like "TCE: 42,000" show how much TCE was in the water samples (in this case, 42,000 parts per billion (ppb) at MW-6A, about 80 feet deep at the top of the bedrock).

The far-right sampling location labeled "MW-11B" is located about 500 feet off-site from CTS. ***Water sampled there, at 185 feet deep in the bedrock, had 35,000 ppb of TCE in it. Remember, EPA set 5 ppb as the maximum safe level of TCE in drinking* water.** Finding this much TCE in deep ground water, especially 500 feet off-site, means this a very big problem.

TCE, in the form of a dense NAPL (DNAPL), likely sank through the soil and spread out underground. DNAPL is not dissolved in water – think of it as blobs of syrup, filling void spaces underground. Rain and snowmelt soak into the ground on the CTS site, and flush TCE to discharge points at the surface in springs and streams, or into deep ground water (and drinking water wells). ***This residual mass of DNAPL TCE has been there since before 1989. It will contaminate water moving through the earth for decades more to come unless it is removed, destroyed or isolated.*** You can access the complete 2009 report, and many other documents about the CTS contamination, on the web at http://portal.ncdenr.org/web/wm/sf/ctsmillsgap.

Extremely High Levels of TCE were Found:



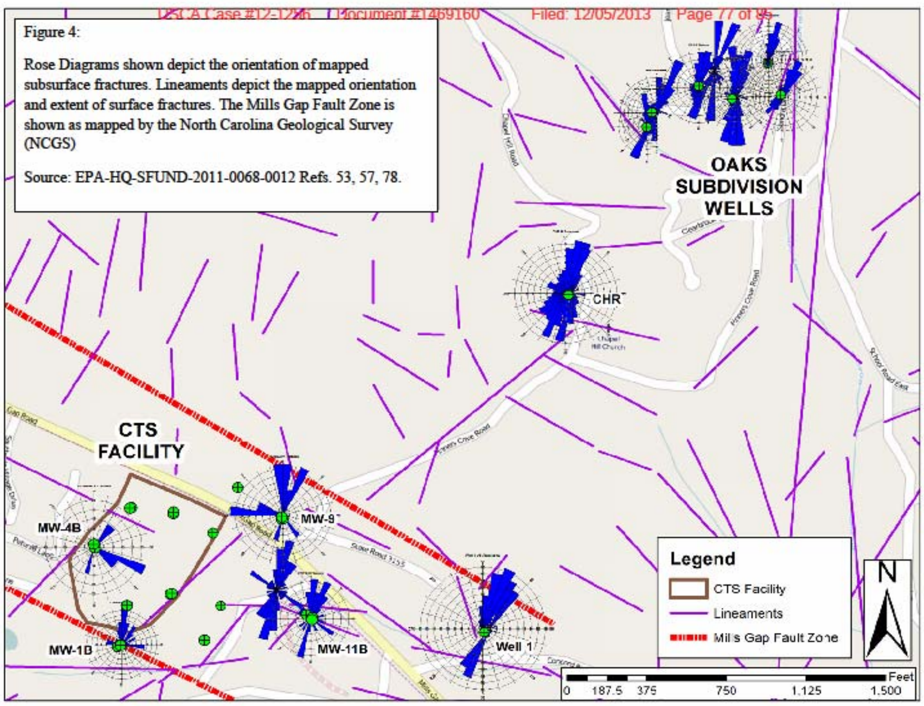
The highest TCE on-site (42,000 ppb) was found at the bottom of the soil profile, where it transitions to weathered rock and then into what geologists call “competent” bedrock (the hard stuff). The lower levels of TCE in shallower soil is evidence that DNAPL TCE could have flowed downward with little resistance, then built up where it hit the less-permeable bedrock. ***The highest TCE off-site was relatively the same (35,000 ppb) as on-site, but it was found much deeper. DNAPL in bedrock would be cause long-term impacts to ground water.***

The sample from 187 feet deep at MW-11B was collected from a deep bedrock well. This much TCE in that location means DNAPL could have flowed laterally “downhill”, along the top of the bedrock from beneath the site, and then downward through fractures in the bedrock to that depth. Or, it could have sunk into the bedrock on-site through fractures, and then spread laterally through fractures in the bedrock. ***We don’t know how much TCE is down there on-site, because only two bedrock wells were drilled on the site.*** And they are along the eastern side, away from the plant building, not where most discharges would have occurred. Furthermore, those wells (MW-1 and MW-4) did not penetrate as deep into the bedrock as off-site well MW-11B.

Knowing how much DNAPL TCE is in the subsurface, and where it resides, will be essential to cleaning CTS up. ***The DNAPL must be removed, destroyed, or isolated to stop the TCE from spreading into ground water.***

Up to 34,000 ppb of TCE was also found in springs and stream samples taken east of CTS, near MW-11. This is a discharge area for shallow ground water that flows through the soil from higher land to the west. Some deeper ground water might also discharge there. ***These springs and streams may cause uncontrolled off-site exposures***.

EPA Connects the Dots: Hi-Tech Methods Prove CTS is Source of TCE in Distant Private Wells



"Numerous joints and fractures form a pathway of interconnected features for contaminated ground water in bedrock fractures near the CTS plant to flow toward [the distant wells]…Packer testing, borehole geophysical logging, and mapping have revealed that a fracture, joint, and faulting system exists that allows the hydraulic connection of distant drinking water wells and distant (0.673 mile) contaminant transport from the CTS facility."

EPA used sophisticated testing and analyses to determine that hazards posed by the CTS site were serious enough for it to be a Superfund Site on the National Priority List (NPL) for action. EPA and the U.S. Geological Survey (USGS) performed multiple tests to find out if CTS was the source of TCE in deep wells more than two-thirds of a mile away. This map of the CTS site shows geological features that control bedrock ground-water flow.

North Carolina's Geological Survey had mapped the Mills Gap Fault Zone that runs under CTS and along Mills Gap Road in a NW/SE direction. USGS found a network of bedrock fractures in deep wells that were mostly oriented in a NE/SW direction. The bedrock fault/fracture system forms a network of interconnected pathways through which the regional ground water flows. This explains why deep ground water can flow in various directions in the area.

EPA found 1,000 ppb of TCE in Well 1, located in the fault zone about 1,200 feet southeast from CTS. EPA also found 1,400 ppb of TCE in deep well CHR, located about 1,500 feet northeast from Well 1, and up to 88 ppb of TCE in four deep wells located two-thirds of a mile northeast from CTS (Oaks subdivision wells). EPA found TCE in water flowing into the wells from individual, deep fractures. EPA also determined the hydraulic connection between these wells when pumping specific fracture-zones in one well caused a decline in water level in other wells. The TCE at the distant wells, therefore, is coming out of the regional bedrock ground water system, and can be traced to originate at the CTS site. Sources: EPA 01/26/11 Technical Memorandum and 12/5/13 Court Brief

CTS by the Numbers

5 ppb: EPA maximum safe level for TCE in drinking water

88 ppb: TCE in private well two-thirds mile away

1,400 ppb: TCE in private well 1500 ft. from CTS

4,670 ppb: TCE in off-site stream east of CTS

34,000 ppb: TCE in private spring 300 ft. off-site

35,000 ppb: TCE in ground water on private property 500 ft. from CTS

42,000 ppb: TCE in ground water at CTS site

CTS Still Trying to Get Off the Hook, Wants off Superfund NPL

CTS challenged EPA in court last August, saying EPA incorrectly ranked the site hazards and the site did not belong in Superfund. EPA responded in December, countering CTS with detailed technical data and analyses that showed how site hazards were evaluated, and why it should be on the list of the country's worst uncontrolled hazardous waste sites. POWER's Technical Advisor said EPA presented "a compelling case, based on sound scientific analyses of high-quality technical information." CTS, on the other hand, "did not present any valid technical data or rationale to support its claim." Oral arguments were made in court in April 2014. EPA reported to POWER that CTS didn't offer any significant additional technical challenge in court. EPA reports that the court is expected to make a decision by early summer. Listen to the court testimony at http://www.cadc.uscourts.gov/recordings/recordings.nsf/DocsByMondayOpenView&StartKey=20140420140407&Count=13&scode=2.