Risk-Based Site Closure:
Not Just for Toxicologists and Risk Assessors

By Kaitlyn Rhonehouse

Following passage of Session Law 2015-286 in 2015, the North Carolina Department of Environmental Quality (NCDEQ) published a risk calculator to support consultants in evaluating cumulative human health risks. An updated version of the Risk Calculator was made available in October 2017. At the same time, DEQ also promulgated guidance and tools to assist environmental consultants, attorneys, and their clients to efficiently and safely close out sites. Over the past several months, practitioners in North Carolina have begun using the program with more frequency and success, and it is likely to become even more popular with time.

Traditionally, environmental site assessments and remediation have relied upon the use of human health-based soil screening levels and groundwater cleanup standards to obtain site closure. In North Carolina, the DEQ follows the EPA Regional Screening Levels (RSLs) in establishing preliminary soil remediation goals (PSRGs). The NCDEQ PSRGs are generally five times more conservative than the EPA RSLs. The North Carolina groundwater quality standards were developed and promulgated in Title 15A of the North Carolina Administrative Code, Subchapter 2L (commonly referred to as “2L Standards”). The 2L groundwater standards are similarly established following conservative human health-based risk assumptions and represent an inflexible end goal irrespective of groundwater use, land use, or actual site exposure risk factors. In the past, remediating contaminated sites to these conservative criteria meant expensive remedial actions and/or decades of groundwater monitoring. In 2015, the State Legislature paved the way for a risk-based evaluation approach to groundwater remediation with the passage of Session Law 2015-286 (Session Law). The Session Law empowered NCDEQ to promulgate procedures to implement site specific objectives based upon acceptable risk. This risk-based approach obviates the need for extensive and expensive monitoring and active remediation at numerous low-risk sites state-wide.

The risk-based approach facilitates “No Further Action” determinations at many sites by implementing engineering controls and/or land use restrictions in lieu of remediating the site to the soil and groundwater criterion. For example, practitioners often encounter scenarios where the chemicals in site soils exceed the “residential use” screening levels for a site intended for residential redevelopment. Historically, this has required practitioners to remediate the soils until chemical concentrations were below the “residential use” guidance values. The Session Law recognizes the conservative nature of the PSRGs and provides an avenue for environmental professionals to more appropriately consider the human health risks prior to enacting intrusive remedial actions. Specifically, this risk-based alternative is referred to as a human health risk evaluation, which is often performed by toxicologists and professional risk assessors.

The Session Law offers a platform for non-toxicologists to estimate the human health risks and facilitate site closure in a more time and cost-efficient manner. The risk-based approach to site assessment also allows for a three-tiered screening of site risk, including i) a screening level comparison; ii) a cumulative risk evaluation; and iii) a target-organ specific risk evaluation. The screening level comparison and initial cumulative risk evaluation can now be performed by non-toxicological professionals, while target-organ specific evaluations should still be conducted under the oversight of a professional risk assessor.

To support Session Law and the associated risk-based remedial option, the NCDEQ published a risk calculator to support consultants in evaluating cumulative human health risks. The risk calculator is a Microsoft Excel-based program that quantifies cumulative chemical exposure risks based upon the assumed receptor (e.g., residential or commercial occupancy, recreational use, or a construction worker scenario) and environmental media (e.g., soil, groundwater, surface water) using default exposure assumptions (e.g., exposure duration, frequency, body weight). The calculator is simple to operate, at a minimum only requiring practitioners to input the site-specific data, such as the maximum detected soil concentrations. The calculator then quantifies the estimated carcinogenic and non-carcinogenic risks and provides insight as to whether acceptable cumulative risk levels have been exceeded. The most recent NCDEQ risk calculator was released in October 2017 and is posted to the Risk Evaluation Resources page on the NCDEQ Risk-Based Remediation website, along with a technical user guidance document.

There are many case studies of sites with numerous exceedances of both the residential and commercial PSRGs, but the risk calculator revealed the cumulative human health risks are within acceptable levels. This is due to the conservative nature of the preliminary soil screening levels in relation to the risk assumptions implicit in the NCDEQ risk calculator. The risk calculator uses factors corresponding to the EPA RSLs, which are less conservative than the PSRGs and thus quantify a more accurate risk estimate. In this scenario, where the risk calculator suggests cumulative risks are within acceptable levels, site closure may be obtained with minimal, if any, land use restrictions. Prior to the enactment of Session Law 2015-286, the sites that exceeded the PSRGs would often require a costly intrusive investigation, and/or unnecessary land use restrictions. In some cases, back-calculation of site-specific cleanup goals can be conducted to design a targeted excavation or remedial action that would result in acceptable risk, while leaving some soil exceedance areas onsite.

As it relates to groundwater, the rules previously required remediation to the 2L standards. This was costly and time-consuming, often resulting in years of routine monitoring prior to receiving eligibility for site closure. The new regulations allow closure for sites with groundwater impacts above the 2L standards assuming certain criteria are met, such as demonstrating that the groundwater plume is stable or shrinking; instituting land-use restrictions prohibiting groundwater use; and obtaining acknowledgement and acceptance from affected property owner(s). Long-term monitoring of low-level
The Carolinas Chapter of the Association of Environmental & Engineering Geologists (AEG) held its second vapor intrusion (VI) conference at the Hilton Charlotte University Place on Oct. 5 and 6, 2017. During our 2014 conference in Raleigh, which we held after the U.S. EPA had released their draft guidance for VI, we had 225 registrants, speakers, exhibitors, sponsors, and planners, and numerous registrants requested a follow-up conference. The 2017 conference drew a total registration of 241, including many members of the NCBA Environmental, Energy and Natural Resources Law Section. Grady Shields of Wyrick Robbins was one of the eight conference planners.

We had 23 speakers from across the United States. Our keynote speakers were Henry Schuver of the U.S. EPA in Washington, D.C., Dr. Blayne Harman of Hartman Environmental Geoscience in Solana Beach, California, and Rod Thompson of August Mack Environmental in Indianapolis. On Thursday afternoon, we had a special session on trichloroethene, with four speakers of varying backgrounds who presented the latest on this topic. At the end of their four presentations, they convened a panel and took questions from the audience. Representatives from the North Carolina Department of Environmental Quality (NCDEQ) presented the new Vapor Intrusion Calculator, and discussed the impact of vapor intrusion on risk-based closure in North Carolina. Several speakers also addressed the role of VI in redevelopment (and particularly in the Brownfields context). Finally, some of the other panels included speakers in the consulting and legal fields who addressed recent legal cases related to VI and vapor intrusion considerations in business and real estate transactions. The presentation slides for all of our speakers at the conference are in a public Dropbox at: https://www.dropbox.com/sh/no0f3qkzaix6iji/AADMmuAjl6jcDK9qwXPbSmzUa?dl=0

Since the Session Law was passed in 2015, NCDEQ promulgated guidance and tools to assist environmental consultants, attorneys, and their clients to efficiently and safely close out sites in almost every environmental cleanup program (e.g., the UST program has already established risk-based guidance). Risk-based remedial goals focus remediation efforts and resources where they are truly needed, reduce overall costs to our clients, and lower the burden on the regulatory community while retaining protection of human health and the environment.

Since the Session Law enactment, practitioners colloquially may refer to this new risk-based guidance as a tool to “risk a site away” or “risk a site to closure,” rather than “remediating the site to closure.” This tends to have the negative connotation, suggesting that the regulations now allow for unprotective levels of contaminants to remain in the environment. However, it is important to recognize that the risk-based remedial approach principally addresses sites where the existing contaminant levels do not pose an unacceptable risk to the environment. This change in policy will refocus remedial actions and resources to sites where an unacceptable cumulative risk level exists, and intrusive remedial alternatives are more appropriate to retain protection of human health and the environment.

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AEG’s Vapor Intrusion: The Conference II a Big Success

By Rick Kolb

We offered a 50% discount of the registration fee for employees in the public sector and as a result, we had over 55 employees from local, state, and federal governments, due in large part to the support Jim Bateson, chief of the Superfund Section of the NCDEQ, and Michael Scott, Director of the Division of Waste Management of NCDEQ.

Our conference attracted 18 exhibitors and three sponsors, whose fees helped keep the registration cost down, much like the sponsors do for the annual meeting of the Environment, Energy and Natural Resources Section of the NCBA. While many of the exhibitors and sponsors were already yearly sponsors of the Carolinas Chapter of AEG, others came from other Mid-Atlantic and Eastern states.

We offered 12 continuing education units for licensed geologists and professional engineers, and with Grady’s help, continuing legal education units for attorneys in five states. The 12 hours of continuing education credit fulfilled the recently implemented annual requirement for licensed geologists in North Carolina.

The conference was a huge success. The Carolinas Chapter of AEG will host AEG’s 3-day annual meeting in Asheville in September 2019. A one-day symposium on emerging contaminants is among the topics planned for this meeting.

Rick Kolb is a Senior Geologist at Duncklee & Dunham and has been a consulting geologist for 27 years in the Triangle. He currently manages environmental projects and serves as peer reviewer for all the reports the company prepares. He has been a member of the Environment, Energy and Natural Resources Section since the mid-1990’s, is past chair of the section’s Consultants and Membership committees, and is now a co-chair of the Cleanup & Waste Programs Committee.