

# 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 ever 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 criterion 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 as-

essment 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

groundwater impacts is no longer required to obtain site closure.

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.

Kaitlyn Rhonehouse is a senior engineer for Geosyntec Consultants in Raleigh with more than 12 years working as an environmental consultant. Kaitlyn’s practice focuses on the assessment and remediation of contaminated properties, property transaction environmental due diligence, compliance and permitting evaluations, valuation of environmental liability, brownfields negotiations and redevelopment, and vapor intrusion assessment and mitigation.