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Geotechnical
Environmental
Water Resources
Ecological

VIA EMAIL: cheryl.chase@ct.gov

Cheryl A. Chase
Director
Inland Water Resources Division
Bureau of Water Protection and Land Reuse
79 Elm Street, Hartford, CT 06106-5127

**Re: Comments to the August 29, 2014 CMD Smith Report
“Evaluation of Risk-Based Decision Making”**

Dear Ms. Chase:

It is understood that CDM Smith was contracted by the Connecticut Department of Energy and Environmental Protection (CTDEEP) to prepare a report in accordance with Section 28 of Public Act 13-308, passed on July 12, 2013, charging CTDEEP, in consultation with the Department of Public Health (DPH), to evaluate the risk-based decision making processes related to the remediation of contaminated sites in Connecticut. The final report, entitled “Evaluation of Risk-Based Decision Making” (the CDM Report) was made available for public review August 29, 2014

Per the CTDEEP’s request for public input, GEI Consultants, Inc. submits the following comments and information to support the CTDEEP in preparing recommendations for statutory and regulatory changes to the risk-based decision making process.

Comment 1:

First and foremost, GEI commends CTDEEP for working with the CDM Smith project team to create a comprehensive and wide reaching document that evaluates the risk-based decision making process in Connecticut consistent with national and international science and practice. Based on our experience performing site-specific risk characterization under numerous state and international regulations, a collaborative risk characterization process that readily allows for site-specific evaluation will almost always result in contaminated site cleanup that is focused, feasible, and health-protective.

Comment 2:

GEI supports the first recommendation from the CDM Smith Report, that Connecticut law be amended so that CTDEEP is solely responsible for the oversight and implementation of HHRA, HHRM, ERA, and ERM within the context of the Remediation Standard Regulations (RSRs). Successful risk-based decisions making requires a fully integrated and collaborative effort. The currently split responsibility of DPH and CTDEEP has restricted the practical applicability/feasibility of implementing site-specific risk assessment in Connecticut. The current system is simply inefficient and time consuming.

Comment 3:

The second recommendation made by CDM Smith's team includes the statement:

“Such solutions could also include improvements to already protected habitats and conservation areas elsewhere in the State, in lieu of costly but likely less effective restoration at the developed sites per se.”

This approach must consider the ecological and societal values and services provided by open space and “green corridors” in urbanized settings. In lieu improvements and restoration may provide higher habitat restoration value in specific circumstances; however other site-specific improvements should be considered. For example, vegetative restoration for the purposes of stormwater treatment as a component of contaminated site remediation and restoration in urbanized conditions may also provide alternative nonstandard solutions. Site specific improvements made in urban communities can go a long way to address environmental justice concerns.

Comment 4:

The third major recommendation within the CDM Smith Report includes the statement:

“(ii) DEEP consider updating these criteria, per British Columbia's criteria, to account for risks to soil invertebrates and to plants as well as for risks to public health;”

As GEI noted during the September 10, 2014 public meeting, we recommend that the CTDEEP consider the use of guidance-based ecological screening values, in the context of performing site-specific ecological assessments where ecological resources are identified at a site. Instituting RSR regulatory criteria, proposed to evaluate the potential for adverse effects to ecological receptors, may have the unintended result of conservative remedial decisions based on ecological screening values that cause increased environmental harm (habitat destruction), rather than the intended level of protection.

Ecological screening criteria have been developed as conservative benchmarks for use in early stages of ecological risk assessments, to screen out sites or chemicals for which adverse effects in ecological receptors are not expected. To provide conservative levels of protection, these screening-level guidelines are often based on no observed effects level (NOECs) within an individual organism. These NOEC-based risk thresholds are usually considered too conservative unless threatened or endangered species are present, particularly, because unlike remedial criteria in human health risk assessment which are based on endpoints including cancer and non-cancer risks to individuals, ecological risk assessment endpoints are most often the protection and maintenance of ecological populations. Community-based evaluations should be considered to assess the potential for chemicals of concern to impact and ecological population.

In addition, generic ecological screening criteria also do not take into account the many chemical and physical factors in the natural sediment environment, such as total organic carbon, that tend to reduce the bioavailability and, hence, toxicity of the chemical of concern.

One important example is the evaluation of the potential for adverse effects in a wetland environment. Remedial decisions based on overly conservative ecologically-based criteria may direct remediation in a high quality system. Criteria-based screening does not account for the ecosystem services provided by the high quality wetland habitat, or the limited bioavailability of

contaminants in an organic rich environment, which could be evaluated in a site-specific ecological risk assessment.

Comment 5

The fourth recommendation made by CDM Smith's team states:

“Fourth, we suggest that DEEP adopt and, as needed, adapt the successful ecological risk assessment and ecological risk management programs already in place in Massachusetts and in British Columbia.”

While GEI agrees with the CDM Smith Report recommendation to adapt ecological risk assessment and ecological risk management programs, we provide some alternative recommendations for developing CTDEEPs programs based on our working knowledge and experience conducting ecological risk assessments at CERCLA site, at sites within various state regulatory programs including Massachusetts, New York, New Jersey, and in Canada.

Section 7 of the CDM Smith Report did not clearly document the current state of practice of Ecological Risk Assessment within the United States. Specifically, the majority of state environmental remediation regulatory agencies refer to the USEPA eight-step process (USEPA 1997) as the primary basis for their Ecological Risk Assessment process and guidance documents. Table 1(Attachment A) provides an overview of many of the state-specific ERA methodologies reviewed in Section 7 of the CDM Smith Report in the context of the USEPA eight-step methodology and which components of the USEPA methodology were addressed. (It should be noted that there were some discrepancies between our review and the CDM Smith summary, such as the break out of the Ecological Evaluation and Ecological Risk Assessment components of the NJDEP Ecological Risk Assessment Process, and the terminology applied to the stages of the Texas Ecological Risk Assessment Process.)

GEI recommends that CTDEEP review the Draft Ecological Risk Assessment guidance documents for the states of New Jersey (*Ecological Evaluation Technical Guidance – August 2012*) and Texas (*Conducting Ecological Risk Assessments at Remediation Sites in Texas – January 2014*) in addition the Massachusetts program. The British Columbia methodology is a beneficial reference, but is not based on the current state of the practice of Ecological Risk Assessment within the United States. On the other hand, Massachusetts and New Jersey have established site remediation professional programs similar to regulatory program in Connecticut.

New Jersey and Texas guidance documents were developed more recently than the Massachusetts guidance and ecological updates. New Jersey's Ecological Evaluation guidance therefore incorporates new and developing concepts such as consideration of evaluation and comparisons to the background conditions, assessment of bioavailability for specific chemicals/contaminants considering environmental conditions, and specifically discusses the role of ecological risk assessment in supporting remedial management decisions with a focus on consideration of the ecosystem services of wetlands. CTDEEP should support the development of solution-focused ecological risk assessments.

All three of these State ecological risk assessment programs have developed tiered approaches, as recommended by the CDM Smith Report, and currently proposed by CTDEEP.

Comment 6

GEI agrees with the fifth recommendation within the CDM Smith Report, that CTDEEP encourage the use of advanced, site-specific risk assessments for sites where application of RSR default criteria may be inappropriate. However, based on our experience, despite site-specific risk characterization being permitted under the RSRs, the application of site-specific risk assessment in practice has been limited. This sentiment echoed amongst Connecticut Licensed Environmental Professional (LEPs) and the regulated community is that CTDEEP and the Department of Public Health (DPH) are not responsive to site-specific risk characterization. In addition, the use of such approaches requires direct regulatory oversight, which is limiting, in the otherwise LEP decision-based regulatory program. While a regulatory change may help promote more site-specific risk characterization, we feel the issue is more systemic. We encourage CTDEEP and DPH to look within and address the resistance to allowing more site-specific risk characterization. Without first addressing this issue internally, regulatory changes may be ineffective.

Comment 7:

The primary goal is to work with legislature to allow for a framework by which site-specific risk characterization can be conducted in Connecticut. We recommend highlighting that the risk management criteria for Connecticut (10^{-6} per chemical, 10^{-5} site wide) are consistent with regional, neighboring regulatory agencies (i.e. Massachusetts) where site-specific risk characterization is embraced and effective at facilitating contaminated site closure, as opposed to relying on more distant agencies (i.e. British Columbia, California, Michigan, Texas) to support less stringent risk management criteria. In light of the public and political pressures that must be overcome to reach that goal, it seems that using more tangible, local, and familiar examples of how Connecticut's current risk management criteria can be effective is a more palatable position for all parties. This approach will likely have more influence on the legislature than proposing less stringent criteria based on regulatory agencies that have little to no affiliation or familiarity to Connecticut.

Per CDM Smith Report sixth recommendation:

“Finally, sixth, for potentially carcinogenic site contaminants, we suggest that DEEP adopt risk management goals for the reasonably maximally exposed individual (RMEI) of up to 1 in 100,000 per chemical, and up to 1 in 10,000 per site”

We advise caution in proposing less stringent target risk management criteria based on consideration of currently exposed populations. While we acknowledge the concept of varying risk management criteria for maximally exposed individuals (typically less stringent) versus exposed populations (typically more stringent), the CDM Smith Report imparts a tone of overlooking potential foreseeable site uses. For example, relying on current site use to set risk management criteria for an abandoned brownfield where only transient trespassers are present will likely not be protective for all potential future site redevelopment (ie, recreational or residential use). To allow for a less stringent risk management criteria, it is common to place land use restrictions on properties that do not achieve a level of cleanup for some unintended, yet potential future use. We recommend that any proposal to the legislature for setting less stringent risk management criteria based on current site use must also identify how potential future site use will be addressed.

Comment 8:

The review approach taken by the CDM Smith team was internally focused, with the majority of interviews conducted with CTDEEP representatives. This approach is beneficial in understanding

the interests and direction CTDEEP has in implementing risk-based decision making approaches within Connecticut, however, it is limits the understanding of how similar regulatory changes have been successfully implemented in other state regulatory programs, which could inform and provide strategies for CTDEEP. As noted above, understanding the approaches taken in similar regional regulatory programs is essential to CTDEEP's success. Consulting with representatives involved with develop risk-based decision making approaches within the Massachusetts LSP program and NJDEP LSRP programs can support CTDEEP's efforts. The approaches taken in other states, if used in conjunction with some of the unique strengths of the CTDEEP program, e.g. the current groundwater classification system, will produce an effective risk-based remediation program in Connecticut.

Comment 9:

Although the Remediation Standard Regulations Evaluation of Soil and Sediment report to the CTDEEP on The Draft Proposed Program Outline for a Transformed Cleanup Program (Hogan L., Trombly, G. et al. 2012) was mentioned several times in the CDM Smith Report, risk-based evaluation of sediments was not explicitly discussed. The Hogan & Trombly report recommends a tiered risk-based evaluation approach for sediment assessment, with references including the NJDEP methodology.

Sediment assessment lends itself to risk-based decision making. Human exposures to impacted sediments are often limited; therefore, potential for adverse effects to ecological receptors are a primary objective; specifically benthic organisms inhabiting sediments are frequently selected as the assessment endpoint most critical to identification of risk-based clean-up criteria. Risk-based assessment of sediments can provide a significantly higher level of site-specificity, incorporate COPC bioavailability, and greatly reduce uncertainties in the accuracy or level of protection afforded by instituted sediment quality guidelines. Advanced methods of assessment include sediment toxicity testing, analysis of benthic community structure, and weight of evidence approaches combining multiple lines of evidence. These site-specific approaches are almost always less conservative than generic sediment quality guidelines, but provide a much more accurate determination of ecological risk that is specifically linked to the desired levels of protection needed.

Comment 10

GEI recommends that the implementation of a workgroup to support the development of draft Ecological Risk Assessment guidance documents for Connecticut. The approach should be similar to those work groups developed for the Transformed Cleanup program roundtables. This approach was implemented in both Massachusetts and New Jersey for the development of ERA guidance documents. Not only will this reduce the demands in CTDEEP personnel, but the applied knowledge and perspectives of practicing ecological risk assessors, and LEPs in conjunction with the DEEP regulatory perspective will support the development of a well-rounded state-of-the-practice working guidance document.

GEI is interested and willing to participate in this work group if it is established.

We appreciate the opportunity to provide recommendations to CTDEEP as they move forward in this effort. If you have any questions or would like addition support, please feel free to contact us at 860-368-5300.

Sincerely,

GEI CONSULTANTS, INC.



Kimberly B Bradley
Senior Professional/Ecologist



Joseph Roman
Project Manager / Senior Scientist

Enclosures.

Table 1. Summary of State-level Ecological Risk Assessment Methodologies in the context of the USEPA 8-step Ecological Risk Assessment Process (USEPA 1997).

Federal ERA CERCLA Process		Connecticut	Massachusetts	New York	New Jersey	California	Montana	Texas
Step 1 - SLERA problem formulation & toxicity evaluation	Screening Level Ecological Risk Assessment (SLERA)	Scoping-Level Risk Assessment	Method 3 Environmental Risk Characterization (ERC) Stage I Environmental Risk Screening	Fish and Wildlife Resource Impact Assessment (FWRIA) Requirement	Ecological Evaluation (EE; Formerly BEE)	Scoping Assessment	Level 1/2/3/4 Ecological Risk Analysis (ERA)	Teir I : Exclusion Criteria Checklist
Step 2 - SLERA exposure estimate and risk calculation		Screening Level Risk Assessment		FWRIA Part 1 - Resource Characterization				
Step 3 - BERA problem formulation	Baseline Ecological Risk Assessment (BERA)	Site-specific Ecological Risk Assessment	Method 3 ERC Stage II Environmental Risk Characterization	FWRIA Part 2 - Ecological Impact Assessment	Ecological Risk Assessment (ERA)	Phase III Predictive Assessment	Level 4 ERA	Teir III: Site-Specific Ecological Risk Assessment (SSERA)
Step 4 - Study design and data quality objective process								
Step 5 - Field sampling plan verification								
Step 6 - Site investigation and data analysis								
Step 7 - Risk characterization								
Step 8 - Risk management	Record of Decision	Remedial Action Plan	Apply to RAO Selection	Ecological Effects of Remedial Alternatives	Remedial Measures	Ecologically-based Remediation/ Ecological Monitoring	Remedial Decision	Ecological Risk Management

References:

CTDEEP Ecological Risk Assessment Guidance : http://www.ct.gov/deep/cwp/view.asp?a=2715&q=325016&deepNav_GID=1626

MA DEP (1995). Guidance for Disposal Site Risk Characterization in Support of the Massachusetts Contingency Plan. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup and Office of Research and Standards. Boston, MA. July 1995. Available at <http://www.mass.gov>

NYS DEC (1994). Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites (FWIA). October 1, 1994. Available at http://www.dec.ny.gov/docs/wildlife_pdf/fwia.pdf.

NJ DEP (2012). Ecological Evaluation Technical Guidance. Version 1.2. August 29, 2012. Available at http://www.nj.gov/dep/srp/guidance/srra/ecological_evaluation.pdf.

Cal EPA (2013). Preliminary Endangerment Assessment Guidance Manual. State of California Environmental Protection Agency; Department of Toxic Substances Control. Interim Final – Revised October 2013 . Available at <http://www.dtsc.ca.gov/SiteCleanup/Brownfields/upload/Preliminary-Endangerment-Assessment-Guidance-Manual.pdf>

MT DEQ (2014). State Superfund Process Flowchart. Available at <http://www.deq.mt.gov/StateSuperfund/PDFs/statesuperfundchart.pdf>.

TCEQ (2014). Conducting Ecological Risk Assessments at Remediation Sites in Texas. Texas Commission on Environmental Quality. January 2014. Available at <http://www.tceq.texas.gov/assets/public/remediation/trrp/rg263-draft.pdf>.

