

DRAFT

Report to Florida Contaminated Soils Forum

Submitted by: Methodology Focus Group

The methodology focus group has reviewed and discussed issues relating to the methodology used to derive the Soil Cleanup Target Levels (SCTLs) for the Florida Department of Environmental Protection (FDEP) and other technical aspects of implementing risk-based approaches to managing contaminated soils.

The methodology focus group held a meeting on September 21, 1998 to initiate our discussions of these issues and have presentations from the scientists of the University of Florida, Center for Environmental and Human Toxicology (CEHT) who have derived the SCTLs on behalf of FDEP and maintain the database used for inputs. The meeting was attended by the following members of the focus group:

Bob DeMott, ATRA Inc. - focus group leader Prasad Kuchibhotla, Alachua County Doug Covert, HSWMR, Inc. Christopher Teaf, HSWMR, Inc. Jim Frauen, Seminole Electric Steve Roberts, UF CEHT Keith Tolson, UF CEHT Tim Bahr, FDEP Zoe Kulakowski, FDEP Jim Chastain, Chastain-Skillman, Inc. Mark Mechling, Ellis & Assoc. Pat Byers, SWA, Inc. Richard Lewis, HSA Environmental Florence Ndikum-Moffor, UF CEHT Chris Saranko, UF CEHT Christine Halmes, UF CEHT Ed Zillioux, Florida Power & Light Corp.

The agenda for the meeting included approximately 2 hours of presentations by CEHT staff explaining the specific methods for calculating SCTLs and the sources and order of priority for obtaining the necessary toxicological and chemical/physical information. Discussions during these presentations led to the identification of around a half-dozen points which the group wished to consider in detail and consider offering input to the CEHT staff and the Contaminated Soils Forum. The remaining 3 hrs. of the meeting were spent in such discussions and resulted in several specific technical recommendations to the Forum and CEHT staff and the identification of several issues which the focus group feels warrant additional attention and possibly action or recommendations. These issues are also being reported to the Forum.

Focus Group Recommendations

1. That a memo or guidance manual be prepared and peer reviewed presenting the mechanics of applying the SCTLs to evaluation of specific sites.

Rationale:

There was consensus on the focus group that there is not clear direction from the FDEP included in any of the existing rules on exactly how sites should be evaluated against the default SCTLs. Examples of confusing issues include whether concentrations must be below SCTLs at all locations on a site or how certain areas should be defined as hotspots and handled. Also, will FDEP suggest a maximum allowable level in any individual sample - a "not-to-exceed" concentration that would be applied in conjunction with some type of site averaging of all detected concentrations. Related questions on how many and what type of sampling must be done for both site assessment and evaluating background were also raised. Focus group members experienced with assessments in Florida and from FDEP provided anecdotal accounts of their experiences and typical practices, but the entire group recommended that such specifics be committed to writing.

2. That SCTLs be revised and updated on an annual basis to account for newly incorporated science, new compounds, or other changes and that this update be released in such a manner as to facilitate public comment and input. Further, that the first such update should particularly focus on revising SCTL tables

presented in the rules (Brownfields, Petroleum, possibly Dry Cleaning by that time) to ensure consistency across programs.

Rationale:

It is recognized that input values, especially toxicity-related values such as slope factors and reference doses, needed for calculation of SCTLs change over time. Providing a scheduled change will maximize the attention given to such changes and the opportunity for comment. Also, since the SCTLs are now incorporated into promulgated rules, there may be administrative constraints to incorporating individual changes as they occur.

3. That rule-making be initiated to transfer the SCTLs listed in tables in different rules (62-780 and 62-785, possibly Dry Cleaning rule) into a single administrative document, applicable to contaminated sites in general.

Rationale:

A stated initial goal of the Contaminated Soils Forum was to reduce the confusion, administrative difficulties, and occasional logical inconsistencies associated with having different soil target concentrations in different rules or programs. Also, with regard to recommendation 2, above, the focus group felt that updates could be handled in a more efficient and consistent manner if the tables existed in one documentary location. The focus group recognizes the difficulties in defining the universe of "contaminated sites" that such a rule would apply to, but also believes that it is already clear that Petroleum, Brownfield, and Dry Cleaning Program sites could be addressed by a single set of tables.

4. That intermediate values calculated during the overall derivation of SCTLs not be subject to any type of rounding.

Rationale:

Based on the presentations made by CEHT and the experiences of several groups attempting to duplicate the derivation of SCTLs, it is apparent to the focus group that differences in rounding conventions following intermediate calculations can lead to substantial differences in the final SCTL. The focus group determined that using no rounding convention would be the most straight-forward approach to solve this and make the calculation of SCTLs more transparent and easier to duplicate. If intermediate calculations are not rounded, i.e., the value is used out to the precision given by a calculator or typical software, it was agreed that differences between programs or calculators used by different people would be too minor to effect their ultimate derivation of an SCTL.

5. That extrapolated values for toxicity values given by USEPA Region III not be used in the derivation of SCTLs.

Rationale:

This source of input information was also agreed to lead to considerable confusion in the duplication of SCTL derivation due to differences in rounding conventions adopted by different analysts. In the cases where Region III has presented an extrapolated value, the original values and equation they used in such extrapolation are available and apparent. Consequently, it was agreed that such original values should be used instead of the extrapolated estimate and that the subsequent calculation of an extrapolated toxicity value as part of deriving a Florida SCTL would then be subject to recommendation 4, above. If all analysts use the original information specified from this source and then adhere to maintaining the full precision provided by standard software in calculating the extrapolation, any differences in the calculated value will be too minor to effect the final derivation of an SCTL.

6. That the following order of priority be established for sources of chemical/physical inputs other than diffusivity for the derivation of SCTLs:

1. Superfund Chemical Data Matrix (SCDM) 2. Hazardous Substances Database (HSDB) 3. Reference texts (e.g., Howard, 1991; CRC Manual, etc.)

(Note to Focus Group Members: see email memo from C. Halmes, K. Tolson re: dropping the subscription service EHRAV from this list. We discussed this at the meeting and appeared to have consensus, but did not discuss it again when we decided upon the recommendation. I think this amounts to an oversight and have included the suggestion of dropping this source in the draft report. Please comment- rpd.)

Rationale:

Specifying the order of priority of sources will make the derivation of SCTLs more transparent and easier to duplicate. If all analysts understand that they should first look for a value in source 1 and use this if available, progressing, in order, to additional sources only when values are not available, then the likelihood that the same value will be used by different analysts is improved. All of these sources are used in regulatory applications, most of them are maintained by governmental agencies and they are all readily available. CEHT staff recommended dropping one source, EHRAV, that they have previously used because it is a private, subscription database with unknown review processes and another source, the SSG guidance from EPA, because it represents essentially a subset of SCDM with potentially confusing rounding conventions.

7. That the following order of priority be established for sources of the value used to represent the diffusivity of compounds in deriving SCTLs:

1. Values listed in the CHEM8 database
2. Values calculated using the specified equations of the WATER8 model associated with CHEM8 with assumptions currently used by CEHT
3. Additional models described and subject to review and comment

Rationale:

Scientists experienced in attempting to calculate the diffusivity of chemicals agreed that there can be considerable uncertainty in this estimation and difficulty in specifying one consistent modeling equation. Consequently, where listed values have been provided in the agency maintained database, they should be considered the primary source. While the model underlying this database was agreed to be inadequate for some chemicals, consensus was that for the time being this should be the next source since the equation is readily available and the output can be readily duplicated. The focus group felt that additional, improved models may be available and that future meetings should deal with this issue.

8. That the following order of priority be established for sources of the toxicity values used in the derivation of SCTLs:

1. Values currently listed in Integrated Risk Information System (IRIS)
2. Values currently listed in the Health Effects Assessment Summary Tables (HEAST)
3. Values derived by USEPA NCEA.
4. Various alternative sources with peer review and comment

Rationale:

The toxicity values used in deriving the SCTLs play a major determining role in the final value. Also, unlike most chemical/physical values, there can be considerable scientific disagreement about the establishment of these values since they are extrapolated on the basis of experimental results rather than directly measured. The focus group agreed that the first three sources should be used, in order, where available as default values for the SCTLs. Despite any scientific disagreement, these are widely used sources maintained by the USEPA. However, recognizing that professional judgement might vary widely when additional sources must be used, or toxicity values actually estimated, the focus group recommends that no order of priority be given to particular additional sources and that the selection of such alternatives come under peer review and be subject to comment. Some examples of sources that would fall into this

category include: withdrawn IRIS and HEAST values, values from surrogate chemicals, values specified or derived from the scientific literature.

9. That a memo or guidance directive be prepared specifying the FDEP approach for determining and manner of considering background levels of chemicals.

Rationale:

The issue of dealing with background has been brought before the entire forum and several different focus groups may address various aspects. This focus group agreed that the scientific information needed to generate a specified default approach is available and that the release of such directives would be useful for sites and analysts in general. The focus group recognizes that sometimes background issues are site-specific considerations. However, this is a frequent set of issues and specific guidelines on how background concentrations can be documented and used will promote site-to-site consistency in approach and preclude the use of various statistical methods/justifications at different sites.

10. That the body weight factors used in the derivation of SCTLs be reconsidered and recalculated on the basis of currently available information on body weight at a given age.

Rationale:

CEHT staff presented the methodology used in specifying the body weight assumptions used in SCTL derivation. The focus group agreed that the method used represented the best approach. It was noted in discussion, however, that newly expanded information on body weight distributions at particular ages collected by USEPA has not yet been incorporated. CEHT scientists agreed that this new information represented an improved database and that the time was right for recalculating body weight assumptions.

11. That the issue of bioavailability be specifically investigated and reviewed, with opportunity for comment, regarding the relatively few chemicals where SCTLs have been derived on the basis of acute reference doses derived for FDEP. And, that FDEP should determine whether additional chemicals included in the SCTL tables are subject to potential acute toxicity concerns at levels below the typically-derived (i.e., chronic) SCTL. And, that FDEP refine and expand its consideration of potential concerns on acute toxicity of contaminated soils to address when and how acutely-based SCTLs should be used.

Rationale:

CEHT scientists presented the approach and manner of identifying chemicals for which acutely-based reference doses and corresponding SCTLs were derived. These toxicity values are not available from an existing regulatory source and, consequently, fall into the "alternative values" category subject to comment/review as presented in recommendation 8, above. An obvious confounding factor in using toxicity values derived in this manner is the potential for substantial differences in chemical form and bioavailability between the substances encountered in the underlying studies and chemicals in soil. Since there are currently very few chemicals for which acute reference doses have been derived, the focus group felt that it was reasonable to evaluate this issue for each subject chemical. Also, it was noted that while the chemicals evaluated for potential acute toxicity concerns had been selected on the basis of some reasonable scientific leads and assumptions, a comprehensive consideration of all the SCTL chemicals has not been completed. The focus group felt that having acknowledged the potential for concerns about acute toxicity, FDEP should move forward with determining how many of the SCTLs might need to be refined for acute concerns and specifying when such values should be applied.

Issues for Further Consideration, Reports, or Recommendations

In addition to the issues relating to the above recommendations, the focus group discussed several other topics. The focus group did not feel that specific recommendations were appropriate at this time, but

wishes to report the topics to the Forum and indicate our intent to further evaluate these issues and possibly present recommendations at a later date.

One topic of discussion was the manner of dealing with possible multiple chemical additivity and synergy. It was pointed out that the presentation of different target organs/effects in the SCTL tables is not readily conducive to determining which chemicals need to be grouped for reducing the SCTLs to account for multiple chemicals. Various options such as standardized terminology or developing designated groupings of chemicals were discussed. Since this particular issue pertains to the current approach of treating chemicals always directly additive in their effects and the focus group felt that this approach might need to be discussed in terms of more sophisticated accounting for multiple-chemical effects, the group decided to hold this discussion over for future meetings.