Florida Department of
Environmental Protection

Memorandum

TO: Clifford D. Wilson III, P.E., Deputy Secretary
Regulatory Programs

FROM: Jorge Caspary, P.G., Director
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DATE: <Date>

SUBJECT: Chapter 62-780, F.A.C., Supplemental Guidance for Application of Direct Exposure Soil Cleanup Target Levels for Subsurface Soils

The following discussion relates to the application of Direct Exposure (DE) Soil Cleanup Target Levels (SCTLs) referenced in Table II of Chapter 62-777, Florida Administrative Code (F.A.C.), as they apply to Chapter 62-780, F.A.C. This memo explains how to apply SCTLs to site rehabilitation and final closure decisions and includes several options to qualify for a Site Rehabilitation Completion Order (SRCO) when the default SCTLs are not met. It also provides an explanation of the engineering and/or institutional controls that are applicable for site closure when contaminated soil remains. The strategies described in this memorandum are also depicted in flow charts of Risk-Based Corrective Action options (referenced in Subsection 62-780.100(3)), F.A.C).

Table II of Chapter 62-777, F.A.C., lists two types of SCTLs: those based on Direct Exposure (human health) and those based on Leachability (protection of groundwater). There are two sets of Direct Exposure SCTLs (columns 1 and 2) for residential and commercial/industrial scenarios. There are four sets of SCTLs based on Leachability (columns 3 through 6), which are derived (back calculated) from the groundwater cleanup target levels (GCTLs) and surface water cleanup target levels (SWCTLs) referenced in Table I of Chapter 62-777, F.A.C. This relationship between the SCTL Table and the Groundwater and Surface Water CTLs means that soil with concentrations at or below the concentrations specified in columns 3 through 6 of the SCTL Table is not expected to leach at concentrations exceeding the Groundwater and Surface Water CTLs. To qualify for an SRCO without conditions, the Contaminants of Concern (COCs) detected in soil samples from the unsaturated (vadose) zone must meet both the Direct Exposure SCTLs for a residential scenario and the Leachability-based SCTLs based on the applicable GCTLs and/or SWCTLs. This memo provides guidance on the applicability of Direct Exposure SCTLs.

Depth to Which Direct Exposure SCTLs Apply

In establishing the Department's authority to develop rules for risk-based corrective action in Florida, the Legislature based its statutory direction on the expectation that most potential

exposures during routine activities for a resident are limited to the top two feet of contaminated soil[1]. Excavation deeper than two feet below the surface is usually performed to install or repair utilities or for construction; thus exposure to contaminated soil at a particular location would be of limited duration and can be eliminated by routine implementation of health and safety plans and adequate notification. Given Florida's surficial lithology, deeper excavation often requires specialized equipment not readily available to a resident, including the need for shoring, shielding, or sloping due to the threat of collapse. Consequently, Direct Exposure residential SCTLs should not apply to soils deeper than X[2] feet. Exposure to soil below X feet is typically restricted to a construction worker scenario with short-term exposure provided all such soil is returned to the excavation at depth and not re-used as surface soil.

Please note that the terms "residential" and "commercial/industrial" combine many possible land uses into two general categories and the category of "residential" applies to several types of land uses other than residential dwellings, such as schools, day care facilities and parks. The "Land-Use Restrictions" section under paragraph G. 2. of "Attachment 3: Form A" of the Department's Institutional Controls Procedures Guidance (ftp://ftp.dep.state.fl.us/pub/reports/wc/icpg.docx) should be consulted for an explanation of the different land uses that are classified as "residential" for the purposes of applying the DE SCTLs to closure decisions.

In general, engineering and/or institutional control requirements apply when the top two feet of soil exceeds direct exposure SCTLs due to the higher likelihood of contact with soil at that shallow depth. If the only contaminated soil exceeding DE SCTLs is greater than X feet below land surface, a restrictive covenant is not required for a conditional closure if another method is used. In such cases, listing the site in the Department's Institutional Controls Registry (http://www.dep.state.fl.us/waste/categories/brownfields/pages/ICR.htm) and including a precautionary statement on the Conditional SRCO can serve as another method. In addition, deed notices may be used to help ensure prospective property owners are aware of the contaminated soil at depth.

The following are examples of several common scenarios of Direct Exposure SCTL exceedances along with a description of the conditional closure options.

1. If the concentrations of COCs in the top X feet exceed the DE Residential SCTLs but do not exceed the DE Commercial/Industrial SCTLs, a conditional SRCO would be appropriate if the property is currently in commercial/industrial use and an institutional control such as a restrictive covenant is implemented to ensure that the property will remain commercial/industrial. Even if the property is in an area zoned commercial or

[1] See ss. 376.30701(2), 376.3071(5), 376.3078(4), and 376.81, F.S.
[2] The specific depth for the applicability of DE SCTLs is a proposed subject for discussion. Internal discussion has suggested the depth for applicability to be within the range of 2 to 15 feet, inclusive.

industrial, an institutional control may be necessary to ensure the property remains commercial/industrial and that any excavated soil will be properly managed. This example assumes that soil concentrations do not increase with depth (i.e. commercial/industrial DE SCTLs are not exceeded below X feet). If soil below X feet exceeds the commercial/industrial DE SCTLs further controls or action may be necessary.

2. If the concentrations of COCs in the top X feet exceed DE Commercial/Industrial SCTLs, a conditional SRCO may also be appropriate, provided the contaminated soil is under some type of "cap"; i.e., an engineering control (e.g., paved asphalt parking lot, a concrete pad, or covered with two feet of clean fill). In this case, a conditional SRCO would be appropriate if engineering controls (with a restrictive covenant to maintain the engineering control) are implemented to provide assurance that the cap will be properly maintained and not removed; that if construction is ever performed on the property, construction workers will be notified that contamination exists, and that if the contaminated soil is ever excavated it must be handled and disposed of properly.

3. If the concentrations of COCs that exceed the DE Residential SCTLs are only at depths below X feet, a conditional SRCO would be appropriate if an institutional control or other method is implemented to provide assurance that at least two feet of clean soil above the depth at which soil contamination begins will be maintained and not removed in the event of future property development, and that if the contaminated soil below X feet is ever excavated it will be handled and disposed of properly. In this case, the other method may consist of listing the site in the Department's Institutional Controls Registry and the Conditional Site Rehabilitation Completion Order will include a precautionary statement.

When performing site assessment of soil that exceeds DE SCTLs at depths greater than X feet below land surface, once it is established that the levels of contaminants in soil greater than X feet below land surface exceed DE SCTLs, the continued vertical delineation to greater depths is still necessary even if the responsible party intends to accept the institutional controls or other methods associated with contaminated soil greater than X feet below land surface (listing of site on the Department's Institutional Controls Registry), because the full vertical extent of soil contamination above the groundwater table will need to be established. Note that the criteria for leachability must also be met and this may also require further delineation of soil contamination.

All three Risk Management Options (RMOs) include options to perform a calculation of average soil concentrations in an exposure unit to compare with the DE SCTLs. This procedure is applicable to SCTLs which are based on long-term exposure to the soil on the property and so it would generally not be beneficial to perform the calculations for any intervals where the DE SCTL is not being applied. This procedure is based on the assumption that an individual using the property will have equal and random exposure to soil at different locations over a long

period of time, and therefore, the average (mean) concentration of a contaminant in soil per exposure event will be the average concentration of the contaminant in the soil of the exposure unit. This procedure requires a statistical treatment of the results from multiple soil samples from the same depth using the 95% Upper Confidence Limit (UCL) approach. There are several practical limitations which should be considered including that no single soil analytical result can have a concentration greater than 3 times a DE SCTL; a minimum of 10 representative samples must be collected, at least 7 of which must have detections of the target chemical(s); and if more than one contaminant is present which is a carcinogen, or a non-carcinogen with the same target organ, then the SCTLs of the contaminants that are present must be apportioned. Section XV of the Technical Report: Development of Cleanup Target Levels (CTLs) for Chapter 62-777, F.A.C., Final Report, dated February 2005, should be consulted for more information on procedures for performing the 95% UCL approach for comparison of mean concentrations of contaminants in the soil to the DE SCTLs.

Do I need soil samples in the smear zone or below the water table?

There is often a benefit from the collection of soil samples from the smear zone and below the water table to determine contaminant mass at that depth for remedial decision-making, as knowledge of the mass of contaminant below the water table may have a direct bearing on the best means to accomplish groundwater cleanup objectives. However, soil below the groundwater table does not need to be sampled for comparison to the DE or leachability SCTLs because SCTLs do not apply to soil below the groundwater table.

Variability in water table elevation and applicability of SCTLs

When verifying that SCTLs have been met, it is sometimes found that the elevation of the groundwater table is different than when soil samples were previously collected, resulting in either a greater depth of unsaturated zone where soil samples have not previously been collected, or that soil which was previously unsaturated is now submerged. Chapter 62-780, F.A.C., does not specify how to address this issue, therefore, professional judgment will apply to determine the need for additional soil sample collection when there has been a variation in water table elevation.

Verification that SCTLs Have Been Achieved at the Conclusion of Site Rehabilitation

Cleanup progress is commonly based on the analysis of groundwater samples collected during Active Remedial Action, Natural Attenuation Monitoring (NAM), or Post Active Remediation Monitoring (PARM). However, Paragraphs 62-780.680(1)(b), .680(2)(b), and .680(3)(b) F.A.C., require that unsaturated soil must also be sampled to demonstrate that it meets the applicable soil cleanup target levels.

If soil samples collected during the early stages of site rehabilitation indicated that soil in the unsaturated zone exceeded SCTLs at that time, and if confirmation samples have not been collected to indicate SCTLs have been achieved, then additional samples are required to confirm the soil meets applicable SCTLs before an SRCO can be issued.

In the case of NAM, Paragraph 62-780.690(1)(b), F.A.C., requires the Person Responsible for Site Rehabilitation (PRSR) to demonstrate that soil contamination is not present prior to beginning NAM, except that Leachability-based SCTLs may be exceeded if it is demonstrated that the soil does not constitute a continuing source of contamination to the groundwater at concentrations that pose a threat to human health, public safety and the environment. Also, if the PRSR intends to use either an engineering control or land-use restrictions in their final No Further Action Proposal to address soil contamination that exceeds the Direct Exposure SCTLs, then such soil contamination may remain during NAM.

Generally, confirmation soil samples should be collected prior to beginning PARM as well to demonstrate there is no soil remaining which exceeds SCTLs. However, such a decision should be made in accordance with the provisions for NAM above using best professional judgment.