

Memorandum

Florida Department of Environmental Protection

TO: District Directors, Waste Program Administrators, Local Program Managers,
Interested Parties.

FROM: Jorge Caspary, P.G., Director
Division of Waste Management

DATE: December 18, 2014

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., and the application of SCTLs under Chapter 376, Florida Statutes (F.S.), to determine when site rehabilitation is deemed complete. This memo explains how to apply DE 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 at various depths in subsurface soils. It also provides an explanation of the engineering and/or institutional controls, if any, that are applicable for site closure when one or more contaminants remain in soils at concentrations that exceed applicable cleanup target levels (i.e., "contaminated" soil remains as defined by Rule 62-780.200(9), F.A.C.). The strategies described in this memorandum are also depicted in flow charts of Risk-Based Corrective Action options that are referenced in Rule 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 soil¹. 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 wall collapse. *Consequently, Direct Exposure residential SCTLs should not apply to soils deeper than two feet when institutional controls (e.g., a restrictive covenant, a development order within the meaning of s. 163.3164, F.S., etc.), or other methods are used to prevent human exposure.* Exposure to soil below two 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/or not re-used as surface soil. From a practical perspective, the risk of exposure to contaminants in soil decreases with increasing depth. Therefore, it is both consistent with the statute and appropriate to adjust the closure criteria for deeper soils at a site to reflect the reduced risk and potential frequency of exposure.

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 found at the following link (<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, remediation or an engineering control (e.g., an engineered cap) and/or institutional control is required when soil at depths within two feet of the land surface exceeds any of the applicable direct exposure SCTLs, due to the higher likelihood of contact with soil at those shallow depths. If contaminated soil exceeding DE SCTLs remains at depths greater than two feet below land surface, a restrictive covenant *is not* required for a conditional closure as long as another institutional control or other method is used to prevent direct human exposure. For soil with contamination remaining at depths below two feet but less than 12 feet of land surface,

¹ See ss. 376.30701(2), 376.3071(5), 376.3078(4), and 376.81, F.S.; which establish that: 1.) SCTLs for human exposure (i.e., direct exposure) are to be applied for each contaminant found in soils from the land surface to depths of 2 feet below land surface; and 2.) Unless remediated, institutional controls or other methods shall be used to prevent direct human exposure to contaminated soils more than 2 feet below the land surface.

either an institutional control such as a development order or other method such as a deed notice, should be included in the SRCOC with conditions (SRCOC), and the SRCOC should document the site conditions that remain at closure. Where contaminated soil remains at depths only below 12 feet of the land surface², a deed notice should not be required but documentation of the extent to which contaminated soil remains at depth should be included in the SRCOC. In all cases where contaminated soil is left in place, the SRCOC should require that any disturbed contaminated soil be returned at depth or properly disposed as needed. Similarly, in all cases where contaminated soil is left in place, the site shall also be listed in the Department's Institutional Controls Registry found at the link below:
<http://www.dep.state.fl.us/waste/categories/brownfields/pages/ICR.htm>.

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

1. If the concentrations of COCs that remain in the top two feet exceed the DE Residential SCTLs but do not exceed the DE Commercial/Industrial SCTLs, an SRCOC would be appropriate where the property is limited to commercial/industrial use and an institutional control such as a restrictive covenant or development order is implemented to ensure that the property will remain in commercial/industrial use. Even if the property is in an area zoned commercial or 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 two feet). If soil below two feet but above 12 feet exceeds the commercial/industrial DE SCTLs further controls or action may be necessary.
2. If the concentrations of COCs that remain in the top two feet exceed DE Commercial/Industrial SCTLs, an SRCOC 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, or a concrete pad). In this case, an SRCOC 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. For example, if maintenance construction is performed that necessitates partial or total removal and replacement of the cap, construction workers will be notified that soil contamination exists, so they may be informed of the need to appropriately limit worker

² The lower depth of 12 feet below land surface is provided as guidance for a depth below the land surface where exposure would practically be limited to construction projects using backhoes with digging depths which are commonly limited to 14-15 feet below land the surface, deeper excavators, or more extensive earthwork projects. In such cases, the Department's Order (the SRCOC) for the site, and listing the site in the Department's Institutional Controls Registry, may be relied upon as the methods used to prevent direct human exposure to contaminated soils at those deeper depths.

exposure to that soil, 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 only remain at depths below two feet and above 12 feet, an SRCOC would be appropriate if an institutional control such as a development order, or other suitable method (e.g., a deed notice) is used to prevent human exposure to contaminated soil more than two feet below the land surface. For example, a deed notice would be an effective means to provide information cautioning that soil below two feet is contaminated, and if ever excavated, will need to be properly managed (e.g., returned to depths below two feet or properly disposed). In this case, the other method will also include listing the site in the Department's Institutional Controls Registry and the Site Rehabilitation Completion Order will include a precautionary statement.

When performing site assessment of soil that exceeds DE SCTLs at depths greater than two feet below land surface, once it is established that the levels of contaminants in soil greater than two 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 two 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?

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. However, 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.

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, relevant hydrologic information should be used to evaluate the expected seasonal fluctuations in the water table elevations and whether additional soil sample collection may be needed to verify that SCTLs have been met above a representative elevation for the unsaturated zone at the site.

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, Rule 62-780, F.A.C., requires 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 a 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 in the unsaturated zone. However, leachability-based SCTLs may be exceeded, and NAM may be applied, 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. Note that this exception does not require that the soil is not

leaching, *rather it requires that it is not leaching at a rate that will present a risk to any receptor.* In such cases, NAM may still be the best option for cleanup and it would be consistent with the rule. In addition, if the PRSR intends to address DE SCTLs as described in this memo or by using an engineering control or land-use restriction as part of their site closure strategy, then such soil contamination may also 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.