



## **SITE ASSESSMENT GUIDANCE FOR FORMER AGRICULTURAL SITES IN MIAMI- DADE COUNTY**

### **A. Background**

Pesticides and herbicides are designed to be toxic to plants and animal pests. Because of their intrinsic toxicity, they can also be harmful to human health and/or the environment and can pose a risk to exposed populations through direct or indirect contact. The historical usage of these agrichemicals can result in the accumulation of residual amounts of these toxic chemicals in the environment.

The conversion of former agricultural lands into nonagricultural uses (e.g., residential land uses, schools, etc.), results in different exposed populations (e.g., expectant mothers, children, construction workers, etc.), different exposure scenarios (e.g., increased exposure frequency and duration, etc.), and different exposure pathways. Under these new scenarios, the residual agrichemical concentrations in the environment may pose an unacceptable health risk to exposed populations and have the potential to cause a nuisance or cause ground pollution or water pollution as defined in Section 24-5 of the Miami-Dade County Code (the Code). Therefore, as authorized by the Code, including but not limited to, Section 24-7(26) of the Code, as well as other provisions of the Code, as applicable, the Department requires testing/proper assessment and, if necessary, risk mitigation to ensure the protection of public health, safety, and welfare.

This guidance was developed in response to requests to provide environmental professionals and practitioners with clear guidance for evaluating potential environmental concerns at sites transitioning from a former bona fide agriculture land use (e.g., crops and orchards) to a non-agricultural land use, such as a residential use. One of the goals of providing this guidance is to help environmental practitioners to submit an approvable document the first time or at least minimize the number of resubmittals, thereby potentially reducing costs and time to the client/responsible party and facilitating a more streamlined and expedited Departmental review and approval process.

The guidance addresses areas historically utilized for growing agricultural crops and provides minimum requirements to characterize the site's environmental conditions resulting from historical agricultural activities at the site. It is important to note that based on changes in types of crops grown, agrichemicals used, and irrigation and pest management strategies, homogenous application of agrichemicals and distribution of agrichemical residues in soils and groundwater cannot be assumed. Ancillary use areas (e.g., agrichemical storage, mix-load areas, fuel storage areas, etc.) may require more targeted assessment and may include additional contaminants of concern (COCs). Furthermore, additional assessment may be necessary on a case-by-case basis for properties at which a non-agricultural land use predated the bona-fide agricultural use (e.g., landfill, military installation, etc.) or where the land use history indicates a period during which

bona-fide agricultural use was interrupted by a non-agricultural use. Golf courses are not a bona-fide agriculture use and as such, conversions from golf courses to other uses would generally not be covered by this guidance. The patterns of agrichemical application, the types of agrichemicals used, irrigation patterns, and management practices, including stormwater, are significantly different at golf courses than at agricultural operations.

While this document provides generalized assessment guidelines, an environmental professional may still submit an alternate assessment plan, provided that supporting data and analysis (e.g., statistical evaluation, ASTM Phase I/Phase II results, etc.) is included, as may be appropriate based on site-specific conditions. Any alternative proposal shall be subject to the Department's review and approval prior to implementation.

Notwithstanding the general guidance provided herein, please note that nothing herein would preclude DERM from requesting additional assessment based, for example, on the results of the initial soil and groundwater sampling, site-specific concerns, and closure option.

## **B. Soil Assessment**

### **1. Sampling Methodology**

Soil sampling should be adequate to provide representative assessment of the entire property or portion of the property subject to the proposed land use change (the property). The Department acknowledges that the sampling frequency (approximately 1 sample every 20-50 feet) and methodologies (discrete sampling) typically employed for assessment at small (less than 1 acre) sites are not practical and would be cost prohibitive for the large acreages typical of agricultural land uses. The Department recognizes that the selected closure option and ultimate proposed land use for the property will impact the potential for exposure to agrichemical residuals in soil and hence the resulting potential risk. As an example, if a No Further Action with Conditions (NFAC) with Engineering Controls (EC) is selected as the site closure option early in the process, assessment activities may be more targeted to the property boundary or areas that will not be subjected to an EC or to facilitate contaminated soil management/soil reuse/safety plans. The Department will evaluate, for approval, any proposal for alternate sampling strategies based on site-specific information, including closure options, available historic land use and land practices information (e.g., ASTM Phase I and or Phase II information, historic agrichemical use, historical crops, phased approach, etc.,) provided adequate supporting data and justification is provided.

- **Discrete sampling**

While discrete sampling is an option for soil assessment, this type of sampling may not be practical for large areas (i.e., more than 1 acre). If discrete sampling is utilized, the number of samples should be adequate to account for potential spatial variability in soil characteristics and heterogeneity in contaminant concentration distribution. As provided in the FDEP Guidance Technical Report: Development of Cleanup Target Levels (CTLs) for Chapter 62-777, F.A.C. (February 2005), if the 95% approach is utilized, the exposure unit (default 0.25 acres for residential lots), or areas which the receptors will have equivalent

and random contact, must be accounted for. The number and placement of discrete soil samples should be based on an appropriately designed Conceptual Site Model (CSM) and established Data Quality Objectives (DQOs). The United States Environmental Protection Agency (USEPA) publication EPA/240/R-02/005 (December 2002) available at: <https://www.epa.gov/sites/production/files/2015-06/documents/g5s-final.pdf> is one of several available resources for guidance on sampling design for environmental data collection.

- Composite Sampling

Composite sampling should consist of a minimum of one composite sample per acre and should account for and include areas that represent the highest potential for contaminant accumulation (e.g., topographic lows, crop variations, etc.). Each composite sample should, at minimum, consist of eight (8) subsamples evenly distributed within each composite sampling area. The above referenced USEPA publication along with EPA publication EPA-230-R-95-005 (August 1995) available at <https://www.epa.gov/sites/production/files/2016-03/documents/comp-samp.pdf> provides guidance on composite sampling techniques.

It is recommended that a representative number of individual subsamples be retained/archived to allow for analysis of individual subsamples if the results of the composite sample exceed any applicable Soil Cleanup Target Level (SCTL) and more targeted assessment is deemed necessary (e.g., for COCs with Acute Toxicity Considerations-See Section 5).

- ISM

The size, layout, and number of increments of the Decision Units (and/or Sampling Units) for any ISM sampling plan should be based on the CSM. ISM sampling shall be conducted in accordance with the Interstate Technology & Regulatory Council's (ITRC's) Incremental Sampling Methodology (ISM) guidance document (February 2012 updated October 2020), [https://ism-2.itrcweb.org/?\\_ga=2.225860249.2090615185.1625585772-207317260.1603892520](https://ism-2.itrcweb.org/?_ga=2.225860249.2090615185.1625585772-207317260.1603892520)

Since ISM sampling does not allow for subsequent analysis of individual subsamples, it is crucial that the sampling plan considers the use of supplemental sampling techniques (e.g., discrete sampling), especially in areas of potential contaminant accumulation/discharge (e.g., mixing tank/mix-load areas, agrichemical storage, low lying areas, etc.).

## 2. Sampling Intervals

Samples should be collected at 0-6 inch and 6-24 inches below land surface (bls) and each subsequent two (2) foot interval to the water table or to the competent limestone bedrock, whichever is shallower. Adequate documentation of the depth of the limestone bedrock is required (e.g., geotechnical survey, test pits, soil boring logs from samples that extend into the limestone, rock core or drill cutting photographs, drill blow counts, etc.).

### 3. Contaminants of Concern

#### Group A

- i. Total Arsenic, Chromium, and Copper
- ii. Organochlorine Pesticides (EPA method 8081 or equivalent)
- iii. Synthetic precipitation leaching procedure (SPLP), if applicable (Section 4 below).

If the concentration of any COC in a composite or ISM sample exceeds any applicable SCTL, further analysis such as targeted discrete sampling for ISM samples or release of subsamples for composite samples may be necessary (e.g., if copper is a COC at the site, acute toxicity considerations will apply, as discussed in Section 5 below).

#### Group B

A subset (15%) of the collected soil samples from each interval shall also be analyzed for:

##### Lead and Manganese

Sampling locations for the subset of samples shall account for site-specific conditions that may favor contaminant accumulation (e.g., historical land use, topography, lithology, contaminant distribution, etc.).

If the concentration of any COCs analyzed in the subset of samples exceed their applicable SCTL, then the remaining samples (i.e., 85%) for that COC which exceeded applicable SCTL shall be analyzed.

### 4. SPLP

SPLP analysis is required if the total concentration of a COC exceeds the default leachability SCTL. For inorganics without a default leachability SCTL, SPLP analysis is required if the total concentration exceeds the applicable Miami-Dade County background concentration. If the site soil quality is approved by the Department to be consistent with background (see Section 7 below,) the potential impacts to groundwater shall be evaluated based on the groundwater assessment as per Groundwater Assessment section (Section C) below.

### 5. Acute Toxicity Considerations

COCs with direct exposure SCTLs, calculated based on acute toxicity (e.g., copper), may require modified sampling design (e.g., increased sampling frequency, discrete vs composite sampling, etc.) to ensure that the exposure units (e.g., residential lot, etc.) are appropriately and adequately evaluated. Refer to [http://publicfiles.dep.state.fl.us/DWM/FTP/DBS/Acute\\_Toxicity\\_Whitepaper\\_Apr20.pdf](http://publicfiles.dep.state.fl.us/DWM/FTP/DBS/Acute_Toxicity_Whitepaper_Apr20.pdf) for additional information on COCs with acute toxicity modes of action.

For COCs with acute toxicity concerns, where ISM or composite sampling is utilized, the Department may request release of discrete samples/sub-samples for further analysis at a

concentration below the applicable health-based concentration. The environmental professional may propose a maximum ISM/composite concentration below which the individual discrete samples that comprise the composite/ISM sample will not be reasonably expected to be a concern. The proposal should include appropriate and adequate supporting information and requires Department approval.

The Department recommends that the responsible party request that the analytical laboratory retain the samples for at least 30 days to facilitate conducting (as applicable based on initial sample results) leachability testing via SPLP and/or analysis for the additional COCs (as applicable) on the original samples. Based on the short holding time of some parameter groups, resampling may be required if leachability testing or additional analysis is deemed necessary.

While not required, submittal of a sampling plan to the Department for review and comment prior to implementation is highly recommended.

#### 6. Assessment of Bioavailability from Soil

A risk-based soil cleanup target level includes an assumption regarding the relative oral bioavailability (RBA) of the chemical from soil. The RBA for a chemical from soil can vary from site-to-site depending upon a variety of factors including soil characteristics and the form of the chemical released to the environment. The default RBA for most chemicals is 1.0 (100%), although arsenic has a much lower default of 0.33 in Florida. The default RBA values must be used when deriving risk-based soil cleanup goals unless the responsible party develops site-specific RBA data using a method approved by the Department. Currently, EPA Method 1340 is available for estimating RBA for arsenic and lead based upon an in vitro extraction (see SW-846 Test Method 1340: <https://www.epa.gov/hw-sw846/sw-846-test-method-1340-vitro-bioaccessibility-assay-lead-soil> and Validation Assessment of In Vitro Arsenic Bio accessibility Assay for Predicting Relative Bioavailability of Arsenic in Soils and Soil-like Materials at Superfund Sites, U.S. EPA, OLEM 9355.4-29, April 20, 2017). The number of soil samples required to derive a site-specific RBA for arsenic and/or lead will depend upon the size of the site and variability in terms of soil characteristics and chemical releases. Guidance on sampling for this purpose is available from U.S. EPA (Guidance for Sample Collection for In Vitro bio accessibility Assay for Arsenic and Lead in Soil and Applications of Relative Bioavailability Data in Human Health Risk Assessments, January 4, 2021. <https://semspub.epa.gov/work/HQ/100002711.pdf>).

#### 7. Special Note on Background Concentrations

*“Background concentrations” means concentrations of contaminants that are naturally occurring or resulting from anthropogenic impacts unrelated to the discharge of pollutants or hazardous substances at a contaminated site undergoing site rehabilitation...”, (62-780.200(3), Florida Administrative Code (FAC).*

DERM, like the FDEP, allows for an evaluation of background concentrations at sites undergoing site rehabilitation:

*“However, the Department shall not require site rehabilitation to achieve a CTL for an individual contaminant that is more stringent than the site-specific background concentration for that*

*contaminant or the best achievable detection limit for that contaminant.” (62-780.650, FAC)*

Responsible parties have the option of conducting a site-specific background study to demonstrate that the contaminants documented at the site are related to background conditions. However, to assist the public the Department has conducted and published the results of several countywide background studies; these studies are available for download at <https://www.miamidade.gov/environment/research-reports.asp#4>. The background study with most relevance to this Guidance is downloadable at <https://www.miamidade.gov/environment/library/reports/2014-anthropogenic-background-study.pdf>. The background concentrations are utilized to guide decisions regarding cleanup (e.g., delineation of impacted areas) at sites in Miami-Dade County, including former agricultural sites undergoing land use changes to non-agricultural uses. In utilizing the Miami-Dade County background information, the environmental professional shall evaluate the data with reference to site-specific data (e.g., population distribution consistency) to determine the need for a supplemental sub-regional background study. The site-specific background or supplemental sub-regional study shall be submitted for review and approval to the Department.

### **C. Groundwater Assessment**

A representative number of shallow, properly constructed groundwater monitoring wells (refer to <https://www.miamidade.gov/environment/library/instructions/risk-based-corrective-action.pdf> - DERM's monitoring well construction guidance) shall be installed to evaluate groundwater conditions at the site.

#### 1. Sampling Frequency

Generally, one well per acre is the minimum acceptable frequency. However, if an NFAC closure is pre-determined as the closure option early in the site rehabilitation process, groundwater assessment may be tailored to target property boundaries, with targeted assessment in areas proposed for drainage.

To help inform the locations of the required monitoring wells, DERM recommends that groundwater assessment be deferred pending the results of the soil assessment. Additionally, the monitoring well locations should be optimized to allow assessment in areas of proposed drainage (if known) (please see Attachment C of the Class II, III & VI Applications Guidance Drainage for Contaminated Sites at <https://www.miamidade.gov/permits/library/class-2-3-6.pdf>).

The Department shall evaluate for approval any proposal for alternate sampling strategies, based on site-specific information, including closure options, available historic land use and land practices information (e.g., ASTM Phase I and or Phase II information, historic agrichemical use, historical crops, phased approach, etc.) provided adequate supporting data and justification is provided.

#### 2. Contaminants of Concern

Group A

All samples shall be analyzed for:

- i. Total Arsenic, Iron, and Manganese
- ii. Nitrate and Nitrate-Nitrite

#### Group B

A subset (15%) of monitoring wells shall also be sampled for:

- i. Chromium
- ii. Organochlorine Pesticides
- iii. Nitrites

Sampling locations for the subset of samples shall consider site-specific conditions that may favor contaminant accumulation (e.g., historical land use, topography, lithology, contaminant distribution, etc.).

If the concentration of any of the additional COCs analyzed in the subset of samples exceed the groundwater cleanup target level (GCTL), then the remaining monitoring wells (i.e., the other 85%) shall be sampled for the contaminant(s) that exceed the GCTL. The Department recommends that monitoring wells not be abandoned until such time DERM has given written approval that the wells are no longer required as part of site assessment/remediation activities.

### **D. General Guidance**

#### 1. Technical Reports

Technical reports submitted to the Department shall include, without limitation:

- i. An excel file which includes a compilation of all available summary of the laboratory analytical data, and for each sampled interval and parameter,
- ii. The coordinates of all the soil borings and monitoring well locations, the geographic coordinate system utilized, and any pertinent geo-referencing data shall be included with technical reports along with a scaled site map,
- iii. Laboratory analytical reports, and
- iv. A copy of all statistical analysis performed in support of derived conclusions.

#### 2. Notification

DERM shall be notified in writing a minimum of three (3) working days prior to the implementation of any sampling or field activities. Email notifications shall be directed to [DERMPCD@miamidade.gov](mailto:DERMPCD@miamidade.gov). DERM has the option to split any samples deemed necessary with the consultant or laboratory at the subject site.

The consultant collecting the samples shall perform field sampling work in accordance with the Standard Operating Procedures provided in Chapter 62-160, FAC, as amended. The laboratory analyzing the samples shall perform laboratory analyses pursuant to the National Environmental Laboratory Accreditation Program (NELAP) certification requirements. If the data submitted exhibits a substantial variance from DERM split sample analysis, a complete resampling using two independent certified laboratories will be required.