

# Field Soil Coring

## 1 INTRODUCTION

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This method describes the coring techniques used to plan, obtain, label, document, and store cores for further analyses. This procedure is used when assisting the DPT and hollow stem auger drilling operator.

## 2 SCOPE AND APPLICATION

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Coring sites are selected based off of a number of criteria. Two cores are to be taken every 5 feet. Two 2.5 foot plastic coring tubes are placed inside a 5 foot core barrel each time the drilling operator drills to a new depth. Once the sample is obtained, the core barrel is opened and the cores are removed. Each core is capped, labeled, and recorded in a field notebook before being stored in a labeled Styrofoam container. Cores are stored in a freezer to preserve field conditions (e.g., moisture content, Nitrogen, and VOC's).

### 2.1 SAMPLE PRESERVATION

Collected cores should be capped on both ends and preserved in a freezer while in the field and transferred to a freezer once returned from the field.

## 3 REQUIRED TRAINING

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Field workers should be trained on how to keep a field notebook.

## 4 EQUIPMENT AND MATERIALS

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### 4.1 APPARATUS AND MATERIALS

- i. Computer with google earth or GIS
- ii. 2.5 foot plastic tubes
- iii. Rubber tube caps
- iv. Styrofoam coolers
- v. Water resistant field notebook
- vi. Work gloves
- vii. Thick sharpies

viii. Tools and supplies provided by drilling operator:

1. Drill Rig
2. Hollow-stem augers
3. Core barrels
4. Water level indicator
5. Egg shell stoppers
6. Core holding rack
7. Pipe vice
8. Pipe wrenches
9. Sediment separator
10. Brushes
11. Water bucket
12. Bentonite bore-hole plug
13. GPS unit

## 4.2 REAGENTS

None

## 4.3 CHEMICALS

None

# 5 SAFETY PRECAUTIONS

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Use work gloves, hard hat, steel toed boots, and keep a safe distance from the drilling rig.

# 6 PROTOCOL

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## 6.1 SUBSECTION 1

### 6.1.1 Site Selection

- i. Sites will vary based on project goals and land-owner consent.  
Examples include:
  1. Areas of high contaminant concentration vs. low concentration
  2. Varied land use
  3. Previously sampled vs. newly sampled
- ii. Select sites that are:
  1. Accessible
    - a. Agricultural land
    - b. Lawns and parks
  2. In low-lying areas with greater leaching potential
  3. Are within the depth constraints of the drilling equipment
  4. Sampled past the rooting zone into the vadose zone, ideally reaching the water table

### 6.1.2 Field Book Record Keeping

- iii. Start a new entry for every site and record the following:
  - 1. Name
  - 2. Site location
    - a. Record latitude/longitude or legal description
  - 3. Date & time
  - 4. Weather
  - 5. GPS coordinates
  - 6. At what depth visible changes between any sediment horizons occur
  - 7. Groundwater depth
  - 8. Depth of any missing core intervals

### 6.1.3 Coring Preparation

- iv. Ensure that the two 2.5 foot plastic tubes are aligned with the top and bottom of the open steel core encasement once placed inside.
- v. Place top shell of the steel core encasement on top of the loaded bottom shell. To avoid cross threading, ensure the two shells are properly aligned with each other before using the monkey wrenches to assist in screwing on the rear steel cap.
- vi. Screw on the core barrel head assembly and then the shoe after securing the core barrel in place with the pipe vice.
  - 1. **Note:** An egg shell can be placed inside the front steel cap to prevent sample loss when drilling in sandy sediment.

### 6.1.4 Core Collection and Labeling

- vii. The core barrel will be placed on the core holding rack and secured by the pipe vice.
- viii. Unscrew the head assembly and the shoe. Clean the thread of any debris with a wet brush.
- ix. Lift and gently drop one end of the steel core encasement on the holding rack to open it.
  - 1. **Note:** if both tubes aren't fully filled with sediment, inform the drilling operator so adjustments can be made.
- x. Insert sediment separator tool in-between the two cores to divide them.
- xi. Carefully remove the cores and place a rubber tube cap on each side.
- xii. Label every core with their respective site location found in the coring locations pdf file. If a site has more than one drilling location, add a "-#" to the end to denote the location (i.e., HC1-1, HC1-2, and HC1-3).
- xiii. Label the top cap and highest part of the tube with the depth the sample was taken at. Do the same with the bottom cap and the lowest part of the tube.
- xiv. Place the labeled core into a Styrofoam cooler labeled with the site location, date, and range of depths.
- xv. Revert back to coring preparation.

### 6.1.5 Sample Preservation

- xvi. Styrofoam coolers should be stored in a freezer as soon as possible to preserve field conditions.

## 7 QUALITY ASSURANCE

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- 1 Use clean liners and caps to prevent cross contamination.
- 2 Perched water tables can interfere with perceived aquifer depths. If unusually shallow saturated sediments are recovered in the core barrel, drill 5 more feet and attempt to push through the perched table. If sediments are still unsaturated, reassess the situation.
- 3 If refusal occurs, mark the depth of refusal and discontinue drilling operations.

## 8 ADDITIONAL INFORMATION

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### 8.1 DEFINITIONS

- **Core Barrel** – Encases core liners and prevents sample loss down the bore-hole
- **DPT** – Direct Push Technology (e.g., GeoProbe)
- **GIS** – Geographical Information Systems used for planning and site selection
- **Head Assembly**—Head of the core barrel that screws onto the hex rods for sample retrieval
- **Refusal**—When the drill is unable to penetrate deeper into the sediment
- **Shoe** –End of the core barrel where the sample enters the core barrel
- **VOC's** – Volatile Organic Compounds

## 9 PREVIOUS ISSUES AND CHANGES

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Document File Name	Issue	Issue Effective Dates	Author

### 9.1 ISSUE CHANGES

#### 9.1.1 Issue 001:

- Change 1: NA
- Change 2: NA
- Change 3: NA

## 10 DIAGRAMS, FIGURES, AND PHOTOGRAPHS

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NA