



Screening of Polychlorinated Biphenyls (PCBs) in Soil

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REVISION HISTORY

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ER-SOP-20238, R0	6/2/15	New/Major Revision	Updated to new template. Major edits. Renumbered because of reorganization. Updated references

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1.0 PURPOSE AND SCOPE

The purpose of this procedure is to describe the process for using field test kits to screen for polychlorinated biphenyls (PCBs) in soil to guide field activities at Los Alamos National Laboratory Associate Directorate Environmental Programs, Environmental Remediation (ADEP-ER).

2.0 BACKGROUND AND PRECAUTIONS

2.0 Background

This procedure is used in conjunction with an approved Integrated Work Document (IWD). Also, consult the IWD for information on and use of all personal protective equipment (PPE).

Poly-Chlorinated bi-Phenols (PCBs) have been used extensively for more than half a century. Their properties make them ideal for use as plasticizers, adhesives, and dielectric fluids in capacitors and transformers. PCBs are extremely lipophilic compounds. This characteristic permits rapid penetration of cell membranes and uptake by tissues. Joint consideration of cancer studies and environmental processes leads to a conclusion that environmental PCB mixtures are highly likely to pose a risk of cancer to humans (EPA, IRIS, <http://www.epa.gov/iris/subst/0294.htm>).

PCB field-screening kits may be used in conjunction with fixed-laboratory analytical data to help guide a PCB investigation or remediation in real time. Waste management, investigations of nature and extent, and confirmation samples should not be made with PCB field-screening data alone. The data used to support regulatory decisions or for risk assessments must be based, at least in part, on EPA-approved methods per New Mexico Environment Department (NMED) requirements. Generally the intended use of PCB field-screening data and the field approach should be included in work plans subject to regulatory approval.

2.1 Precautions

PCB field-screening kits provide simple, economical, and quick (~1 hr.) results in the field. The kits are generally PCB-specific; however, Pentachlorophenol, 2, 2', 5, 5'-Tetrabromobiphenyl, Tetradifon, Holowax, and other related chlorinated compounds may cause analytical interference. Therefore, these kits are most effective when related chlorinated compounds are not present in the sample media. Therefore, the PCB field-screening kit and its detection limit should be selected with project objectives in mind.

Hazards associated with using a PCB field-screening kit include potential exposure to the chemical compounds associated with the test kit. These field-kit chemical compounds are typically contained in (hermetically) sealed glass ampules. All aspects of potential hazards associated with use of a PCB field-screening kit should be addressed in the project IWD.

The field-screening kits also contain chemicals that must be considered when preparing the waste characterization strategy form for the field work activities. Therefore, a complete list of the chemical components of the field kits shall be available and understood. The waste characterization process may classify certain chemicals in these field kits as hazardous. Therefore, additional consideration shall be given to how these chemicals are stored, handled, and disposed. Such processing of the chemicals shall ensure compliance with specific procedures for waste management EP-DIR-SOP-10021, *Characterization and Management of Environmental Program Waste*.

3.0 EQUIPMENT AND TOOLS

- PCB screening kit, i.e., may include balance, differential photometer, etc.
- The manufacturer's instruction manuals for all field instrumentation
- The Materials Safety Data Sheets (MSDS), i.e. Safety Data Sheet (SDS).
- PPE as described in the IWD.

4.0 REFERENCES

- EP-DIR-SOP-10021, *Characterization and Management of Environmental Program Waste*
- EP-ERSS-SOP-5061, *Field Decontamination of Equipment*
- WES-EDA-QP-219, *Sample Control and Field Documentation*

5.0 DEFINITIONS AND ACRONYMS

5.0 Acronyms

ER	Environmental Remediation
IWD	Integrated Word Document
PCBs	polychlorinated biphenyls
PPE	personal protective equipment
RPF	Records Processing Facility

6.0 Step-by-Step Process Description

6.1 Pre-Operation Activities

<p>NOTE: Because many types of PCB field-screening kits are available, the instructions provided by the manufacturer of the kit must be followed.</p>		
Operator	1.	Establish the data quality objective (DQO) for use of the PCB field-screening kit. The DQO should address factors such as detection limit and sample-analysis time. The DQO should guide selection of the specific kit to be used.
	2.	Obtain a copy of the manufacturer’s instruction manual for using the kit. Submit the manual to the ER Project’s Records Processing Facility (RPF).
	3.	Gather all necessary materials as specified in the PCB field-screening kit’s instruction manual.
	4.	Ensure that all personnel using the screening kit are properly trained in the conduct of the analysis.
	5.	<p><i>NOTE: This analysis determines if the specific PCB field-screening kit that was chosen is appropriate for the site-specific conditions. It also helps determine if the media being analyzed, or other contaminants that are present, could cause interference and detection problems with the particular kit being used.</i></p> <p>To ensure applicability of the PCB field-screening kit to the project objectives, collect 5 samples from the project site. Homogenize the samples and create split aliquots. Analyze each split aliquot using the field kit and an offsite laboratory using EPA-approved method. The EPA method should be determined based on the DQO for detection limit (e.g., aroclor vs congener method).</p>
	6.	Use data from the field-screening kit and an offsite laboratory to evaluate whether a sufficient correlation can be made such that a field-screening kit may be used to guide field operations. If a sufficient correlation can be made, proceed with steps necessary to obtain regulatory approval for use of the field-test kit.

6.2 Screening Operation

Operator	1.	Follow the manufacturer's instructions for conducting the screening analysis.
	2.	<i>Record any information pertaining to the type of kit, the lot, and the serial number in the Screening Data Sheet (see Attachment 1), as appropriate.</i>
	3.	Conduct analysis using the field-screening kit in accordance with an NMED approved work plan. Record analytical results on the Screening Data Sheet (Attachment 1) by recording the date, sample ID, and the results of the field-kit screening analysis.

6.3 Post-Operation Activities

Operator	1.	Decontaminate equipment in accordance with manufacturer's instruction.
	2.	Manage spent materials and all other generated waste in accordance with procedure EP-DIR-SOP-10021, <i>Characterization and Management of Environmental Program Waste</i>

6.4 Records

Field Team Leader	1.	Submit the following records generated by this procedure to the Records Processing Facility (RPF): <ul style="list-style-type: none">• any sample collection logs, if appropriate;• any screening data sheets;• any daily activity logs or field notebooks, if appropriate; and• manufacturer's instruction manual for a specific PCB field-screening kit.
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7.0 **PROCESS FLOW CHART**

Flow chart is to be included at a later date.

8.0 **ATTACHMENTS**

Attachment 1 Screening Data Sheet

