

U.S. Environmental Protection Agency's Environmental Sampling & Analytical Methods Program

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Introduction

The Environmental Protection Agency (EPA) developed a comprehensive Environmental Sampling & Analytical Methods (ESAM) program to facilitate a coordinated response to a chemical, radiochemical, biotoxin, or pathogen contamination incident. The program supports EPA's Environmental Response Laboratory Network (ERLN), including the Water Laboratory Alliance (WLA), and the response community. ESAM is composed of field and laboratory ready documents and web based tools focusing on sample collection, processing and analysis to facilitate site characterization, remediation, and release. The Sample Collection Information Document (SCID), within ESAM, provides general information for use by EPA, and its contractors, when collecting samples during contamination incidents and environmental remediation efforts. Sampling procedures will be used to guide collection of post incident environmental and urban matrices samples specifically intended for analysis using the selected methods. Sampling strategies provide a framework to assist decision-makers in developing and implementing an approach for post incident sample collection. Working with EPA and other federal, state, and local experts, the Selected Analytical Methods (SAM) document, a compendium of analytical methods to be used when responding to contamination incidents within ESAM, was developed. Multiple laboratories may be used to conduct sample analysis during an incident. Ensuring that all laboratories use the same analytical method provides comparable data and eliminates the need to convert or extrapolate data generated from different methods; thus, allowing stakeholders to assess the situation and make decisions in a timely manner. SAM methods and information in the SCID are available as an online document and via a searchable database to provide quick access during an incident.



- Sampling: Readily available sampling procedures and strategies for use in the field by sample collectors
- SCID: Online resource to facilitate field sample collection and laboratory requirements for large numbers of samples
- SAM: Readily available analytical methods for laboratory use
- Query Tool: Online resource identifying best available analytical method to be used by multiple laboratories during a large homeland security incident



Step 1. Select an Analyte Ahrin and Abrine (Jakrin marker) Aflatoxine (BJ, B2, G1, G2) Anatoxine Boulinum neuroboxin (Serotypes A - G Brevetoxine (A an B Forms) Cylindrospermopsin Divaetoxyscipenei (DAS) Domoic Add (DA) Microcystres (IA, JF, IR, IV, RR, YR) Picrotoxin Add

Add All Analytes

ep 2. Select Parameters Displ



https://www.epa.gov/homeland-security-research/environmental-sampling-analytical-methods-esam-program-home

Sample Collection Information Document (SCID) **SCID:** Developed to facilitate transfer of field samples to the analytical laboratory by indicating specific requirements for: • Sample size collected Sample container Holding time • Sample preservation Packaging Shipping labels Office of Research and Development Homeland Security Research Program

Figure 2 Covers of SCID Documents

ESAM Website

SCID Webpage: The SCID webpage provides access to the two SCID documents and has a query tool to perform searches based on analyte, sample type, and parameters to be displayed in the results. The SCID webpage can be accessed via the ESAM website at www.epa.gov/sample-collection-information-documents-scids

Query Analyte Query Methods

Figure 3 SCID Search Tool Parameters

Aerosol (filter/cassette, liquid impinger Particulate (swabs, wipes, dust socks)

SAM Webpage: In addition to providing access to the SAM 2017 document, the SAM web page hosts a SAM 2017 query tool that permits searches for methods based on analyte of concern, sample matrix type, or the capabilities of laboratories. The site also has full documentation of publicly available laboratory methods, links to the companion documents and sample collection procedures, and links to technical contacts and key collaborators. The SAM webpage can be accessed via the ESAM website at <u>https://www.epa.gov/homeland-</u> security-research/sam

Analyte	Contains Y	Select an analyte	Select an analyte		
CAS RN	Exact Match Y	Select a CAS RN	Select a CAS RN		
Method	Contains Y	Select a Method	Select a Method 🗸		
Method Publisher/Author	Select a Method Publisher / Author				
Method Types **	Include Sample Preparation	Determinative Techniques			
Determinative Techniques	Select All		Unselect All		
	GC - Gas Chromatography		LC - Liquid Chromatography		
	Visible Spectrophotometry		ICP - Inductively Coupled Plasma		
	CVAA - Cold Vapor Atomic Absorption		Cold Vapor Atomic Fluorescence Spectrometry		
	IC-Conductivity - Ion Chromatography-Conductivity Detection		GFAA - Graphite Furnace Atomic Absorption		
	TEM - Transmission Electron Microscopy		ISE - Ion Specific Electrode		
	Visible Spectrophotometry/Titrimetry/Cyanide-Selective Electrode				
	Select All Unselect All				
Applicable Sample Types **	Solid Samples				
	Drinking Water Samples				
	🗹 Air Samples				
	Wipe Samples				



CY2017 Statistics				
Page Views	121,182			
Downloaded Files (.pdf)	32,924			
Active Country Sessions	67,522			
Webpage Access Outside U.S.	127			

Table 1. SAM 2012 Web Statistics







Figure 5. SAM 2012 World Access

SAM: EPA's Selected Analytical Methods for Environmental Remediation and Recovery (SAM) 2017 document represents a balance between providing existing, documented techniques and providing consistent and valid analytical results, and serves the critical need for fast and accurate laboratory analyses during environmental remediation and recovery following an incident.

SAM is unique in that it identifies a single selected method for each analyte/sample type pairing (e.g. soil, water, air). Using the same set of

- Permits sharing of sample load between laboratories
- Increases the speed of analysis

• Simplifies potential outsourcing for analytical support

Chemicals	Radiochemicals	Pathogens	Biotoxins
 45 analytes sample types: Solids Non-drinking water Drinking water Air Wipes 	 36 analytes 10 sample types Drinking water Aqueous & liquid phase Soil & sediment Surface wipes Air filters Vegetation Brick Concrete Asphalt matrices Asphalt shingles 	 33 analytes 5 sample types Aerosol Particulate Soil Drinking water Post decontaminati on waste water 	 17 analytes 5 sample types: Aerosol Solid Particulate Non-drinking water Drinking water

Table 2. SAM 2017 Overview

Selected Analytical Methods (SAM 2017) Updates:

• Added outdoor building and infrastructure material sample types for radiochemistry analytes • Added soil sample type for pathogens

Assigned applicability tiers to pathogen and biotoxin methods

• Added analytes to chemistry, radiochemistry, pathogen and biotoxin sections

• Added considerations regarding the potential impacts of decontamination agents on the analytical performance of selected radiochemical methods

• Changed the names of "aqueous liquid" (chemistry methods sample type) and "liquid water" (biotoxin methods sample type) to "non-drinking water" to clarify that the sample type applied to all non-drinking water aqueous sample matrices.

SAM Workgroup Leads

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