

Cover Sheet
Standard Operating Procedure

Operation Title: Protocol for the Use of Portable Air Monitors

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1.0 Applicability

This Standard Operating Procedure (SOP) applies to all programs in the Maine Department of Environmental Protection's (MEDEP) Division of Remediation (DR). It may be utilized by other Divisions within MEDEP, as determined by the respective Division Directors or their designees.

This SOP is not a rule and is not intended to have the force of law, nor does it create or affect any legal rights of any individual, all of which are determined by applicable statutes and law. This SOP does not supersede statutes or rules.

2.0 Purpose

The purpose of this document is to describe the MEDEP/DR procedure for the use of portable organic and inorganic Air monitors (PAMs), including Photoionization (PID) and multi-gas detectors.

3.0 Key Definitions

Portable Organic and Inorganic Air Monitors (PAMs): Handheld devices that sample air in the device user's immediate vicinity. They can provide real-time results for particulates, carbon monoxide, sulfur dioxide, and other contaminants.

Photoionization Detector: A portable or fixed instrument that uses ultraviolet (UV) light to ionize gas molecules, detecting low concentrations (parts per billion to 10,000 parts per million) of volatile organic compounds (VOCs) and hazardous vapors.

Multi-Gas Meter: A portable or fixed safety device that simultaneously measures multiple hazardous gases, commonly: oxygen carbon dioxide, hydrogen sulfide and carbon monoxide; these readings inform workers from hazards related to suffocation, poisoning, or explosions in confined spaces and industrial environments. These devices provide real-time, audible, and visual alarms for instantaneous hazards.

4.0 Responsibilities

All MEDEP/DR Staff must follow this procedure when performing this task. All Managers and Supervisors are responsible for ensuring that their staff are familiar with and adhere to this SOP. MEDEP/DR staff reviewing data by outside parties

should ensure that this SOP (or an equivalent) was followed, depending on the specific Data Quality Objectives (DQOs) of the task.

Other MEDEP SOPs may also apply when performing this task, including, but not limited to MEDEP/DR SOP *RWM-DR-014 - Development of a Sampling and Analysis Plan* (SAP). The SAP should consider quality assurance and quality control (QA/QC) samples and measures, the specifics of which will depend on the DQOs for the task. Types of QA/QC samples are discussed in more detail in the DR Quality Assurance Plan (QAP). SAP development includes provisions for creating a Health and Safety Plan (HASP) associated with the activity, including compliance with [Dig Safe](#) notifications when disturbing soil with powered equipment or tools (i.e., not hand tools). Dig Safe notification does not include public utility clearance requests which must be completed separately (e.g., sewer and water lines). These utility marking requests typically do not extend onto marking private property (i.e., they may only mark lines in the public right of way), so hiring a private utility marking company may be necessary, depending on site specifics. Fieldwork and data collection tasks must be properly documented in accordance with applicable MEDEP SOPs and policies.

5.0 Guidelines and Procedures

5.1 Equipment Overview

The two general uses of a PAM in the investigation and remediation of sites are: 1) for monitoring the potential presence, levels of, or absence of, hazardous contaminants and environmental conditions that could affect the health and safety of workers; and 2) utilizing the “headspace” technique, in which soils or other media are “screened” for the possible presence of contamination. For more information about using a PID for jar or bag headspace technique, see MEDEP/DR SOP# RWM-DR-011 – Field Screening of Soil Samples Utilizing Photoionization and Flame-Ionization Detectors.

The MEDEP/DR and MEDEP/TS owns several types of PAMs that may be used for site monitoring, including various models of PIDs and multi-gas detectors. For full specifications, including detection capabilities and limitations of these instruments, please refer to equipment-specific manuals, which are kept with the instrument. Data quality objectives must be considered when selecting an appropriate instrument.

A Health and Safety Plan should address planned use of any PAM and is especially important if the PAM is being used to determine if site conditions are safe for workers.

5.2 Photoionization Detector

PIDs may have different ranges which should be determined when assessing data quality objectives for the PID. Some PIDs read in a part per million by (ppm) volume scale, while others use a part per billion (ppb) by volume scale. It should be noted that all chemicals of potential concern (COPCs) have different ionization energies and correction factors on the PIDs. Before determining that a PID is an appropriate device for sampling or monitoring, users should consult the manufacturer's instructions to determine if the COPC is detectable with the 10.6 eV lamp that these instruments often use, and what the appropriate correction factor for that COPC is when the instrument is calibrated to an isobutylene standard, and in scenarios where correction factors are necessary. All users of PIDs must review the manual and understand the instrument completely before use.

5.3 Multi-gas Meter

Multi-gas meters are portable instruments designed to measure multiple parameters with one instrument (e.g., lower explosive limit, methane, oxygen, hydrogen sulfide, carbon monoxide, carbon dioxide, etc.). Such units may measure gases in different units. For example, combustible gas is measured in percent of lower explosive limit (LEL) while oxygen is measured in percent. The meters typically have audible alarms to provide a warning of a change in conditions at preset action levels.

As with all field monitoring equipment, these types of instruments have limitations. For example, they may not indicate the combustible gas content in an inert gas background, atmospheres containing less than 10% oxygen, or a reducing atmosphere. The limitations and other general warnings and cautions can be found in the instruction manual. **All users of the Eagles must review the manuals and understand the instruments completely before use.**

6.0 Training

6.1 Training Requirements

In order to use any portable air monitoring equipment outlined in this SOP, each user must undergo the following training:

- SARA 40-hour hazardous materials site training
- Annual SARA 8-hour refresher training
- Participation in MEDEP's BRWM medical monitoring program may also be required for certain job positions, as determined by supervisors
- Introductory training specific to the instrument being used. and an additional annual proficiency training in:
 - Turning on the PAM
 - Preparing the PAM for use
 - Calibrating the PAM
 - General instrument use and limitations discussion

7.0 Calibration

The PAMs shall be calibrated, as described in the associated instrument instruction manual. This calibration shall be documented in the maintenance log for the meter which should be kept in the instrument case, as should any repairs to the PAM. Additionally, the PAM's response should be periodically "bump" tested by applying calibration gas. If the instrument does not read within 15% of the calibration gas concentration, it should be recalibrated. **If the instrument does not appear to be working properly, it must not be used for health monitoring purposes until the issue is corrected.** Report maintenance issues to the person(s) designated by MEDEP/TS responsible for maintaining filed equipment.

8.0 References

None