PROTOCOL FOR COLLECTING DATA USING A MSA PASSPORT II ORGANIC VAPOR MONITOR

Maine Department of Environmental Protection
Division of Oil and Hazardous Waste Facilities
Regulation

Standard Operating Procedure: **PID**
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PURPOSE

This document provides guidance to the Division of Oil and Hazardous Waste Facility Regulation Staff for the use and care of the MSA Passport II Organic Vapor Monitor (Passport) to analyze samples for volatile organic compounds at work sites. This guidance will apply to all work sites that Division personnel visit, or work on.

INTRODUCTION

Division Staff are responsible for the investigation of oil and hazardous waste sites throughout Maine. This standard operating procedure (SOP) is designed to be a guideline for data collection with a Passport. This is a field screening method, which may be used for:

Field Screening – The Passport may be used for: profiling an area, locating sources of contamination, determining the horizontal or vertical extent of contamination, monitoring the effectiveness of mitigation measures, or collecting preliminary data that will be used to design a sampling plan.

Sampling soil headspace – See the SOP for Field Screening Of Soil Samples Utilizing the Jar Headspace Technique DR # 11 written by Brian Beneski

Zip locking bags or glass jars with lids and tin foil are needed to conduct soil headspace analysis. After an appropriate soil sample has been obtained, put about 250 grams of sample into a jar or ziplock bag. Seal the container and shake for about 30 sec. Allow between 15 minutes and 2 hours to warm the samples to 15° to 20° C and allow the VOCs to reach equilibrium with the headspace. Shake the container again for 30 sec. Then, insert the Passport probe and record the highest reading in the appropriate field data sheet or field notebook.

Site Safety – It should be noted that PIDs in general are <u>total</u> organic vapor analyzers, and not all compounds can be ionized by a PID. PIDs are sensitive to all compounds in the sample matrix that can be ionized by the ultraviolet (UV) lamp in the PID. The Passport has no way of discriminating between different compounds, so it is important to know, by other means, what the contaminants are at a given site before using the PID for breathing zone monitoring and/or for site safety. A PID shall not be relied upon as the sole instrument used for site safety unless the user knows: the contaminant(s), the ionization potential for the contaminant(s), the correction factors or set points for the contaminant(s), and the applicable safe work levels (such as permissible exposure limit, time weighted average, short-term exposure limit etc), and after other measures have been implemented to eliminate the hazards, and protect staff. This should be addressed in the Site Safety Plan prepared prior to visiting the project site.

Unprotected Division Staff may not enter any space where they have any expectation that unsafe contaminant levels may be present, without a Site Safety Plan designed to address the specific site issues. This instrument must not be used in confined spaces without proper training, monitoring, and permits required in the Department's Confined Space Policy.

Unsafe contaminant levels wouldn't normally be expected where Division Staff are conducting routine inspections of actively operating businesses and in areas where staff of the business are normally expected to work. Division Staff will use caution and limit their exposure to any contaminants.

RESPONSIBILITIES

Division Staff must follow this procedure when using the Passport. All supervisors are responsible for ensuring that their staff is familiar with and adhere to this procedure prior to using the PID. The User Group Monitoring Equipment Coordinator (UGMEC) is responsible for determining who will be eligible to use the Passport and providing the training. For the Division of Oil and Hazardous Waste Facility Regulation Staff, the UGMEC for the Passport is the OHMS II in Augusta, with regional assistance from the ES III in Bangor and the OHMS II in Portland. There is one Passport for each office.

4. BACKGROUND

The Passport is a portable organic vapor meter, which detects and quantifies most organic vapors with a highly sensitive photoionization detector. The Passport has an operating range of 0.1 to 10,000 parts per million (ppm) with a minimum detection of 0.1 ppm. The Passport operates on an internal battery that can hold a charge for about 8 hours of continuous operation at 25 degrees centigrade. The battery is rechargeable with the charger provided with the instrument.

The Passport uses an UV lamp of a specific energy and an ionization chamber. Compounds passing through the chamber are excited by the photons of the UV lamp and are ionized. These ions are attracted to a collecting electrode, producing a current proportional to the concentration of the compound. Whether or not a compound can be detected by the PID depends upon the energy needed to remove an electron from the compound. This is referred to as the compound's ionization potential. If the lamp energy is greater than the compounds ionization potential, the Passport will detect it. Conversely, if the ionization potential of the compound is greater than the lamp, the Passport will not detect it. The Passport has a 10.6ev lamp as standard equipment. Lamps of different voltages may be substituted to expand the range of detectable compounds. The Passport users manual has a list of ionization potentials for over 400 chemicals in Appendix E.
A copy of the operation manual for the Passport must be included in the case with each instrument. The operator should be familiar with this manual, as it is the MDEP

policy that operation of instruments should follow the manufacture's recommendations.

5. EQUIPMENT

The Passport has a display screen for messages and measurement readings, and three buttons on the front. The left button is called the 'page button', the center button is the 'on/off button', and the right button is the 'reset button'. All three buttons may have multiple uses. The lamp cover and earphone jack are on the right side of the instrument. The outlet port is on top, and the inlet port and data port are on the back over part of the installed battery pack. The data port and earphone jack are not used at this time by the Division of Oil and Hazardous Waste Facility Regulation Staff.

Also included with the Passport in the carrying case are:
Battery chargers for vehicle (P/N 71043) and wall receptacle (P/N 494716)
Alternate battery case for three alkaline "C" batteries
Sample probe tip with water/dirt filter
Isobutylene calibration gas with regulator and tubing
Copy of instruction manual

Alarms Alarms include; horn sounds, alarm light, and status messages to indicate which alarm threshold was violated. The sound can be temporarily inactivated by pressing the reset button.

Concentration Alarms The Passport has a number of internal alarms, which may be set by the user prior to use. If these are in alarm mode, the displayed concentration will flash. Users may set levels for; a warning level, alarm level, time weighed average, and short-term exposure level. Refer to the instrument manual for additional information and instructions to set these alarms.

System alarms These alert the user to problems such as low battery, obstructed pump or lamp out. When the alarm sounds the display informs the user of the specific cause of the alarm. The user should correct the problem if able, and then reset the alarm by pressing the reset button, or notify the UGMEC, and take the instrument out of service. Refer to the instrument manual for additional information.

6. PROCEDURES FOR PASSPORT USE

The user manual contains instructions that are more detailed

Preparation

It is the responsibility of the user to check the equipment prior to use to make sure the Passport is operating correctly and all of the listed equipment items are included in the instrument carrying case. If the Passport appears to be malfunctioning or equipment is missing, the OHMS II or ES III charged with care of the instrument

should be notified immediately. The instrument should then be tagged out of service until the instrument is fixed or the equipment replaced.

The daily check should include; calibration check, user selections check, and battery status check.

Calibration Check
Attach the calibration tubing and calibration gas and allow the instrument to stabilize. The concentration on the bottle should be within 5% of the displayed concentration. If the reading difference is greater than 5%, refer to the calibration section below for full calibration prior to use. The supplied isobutylene calibration gas is 100 ppm isobutylene so the reading must be between 95 ppm and 105 ppm or the Passport must be re-calibrated.

User Selections
The user has several options upon start up. These are accessed by pressing the page button. The user may elect to set: date and time, peak reading, short term exposure limit, time weighted average, one of 69 sample gas response factors, label, and warning level. The Division of Oil and Hazardous Waste Facilities Regulation will use isobutylene, unless the contaminant is known and that contaminant is included in the 69 sample gasses listed. Refer to the instrument manual for additional information. The Augusta office of The Response Services Division has the ability to program in additional response factors.

Operation.

Start up The instrument is turned on by pressing the on/off button. The Passport will do a self-test and internal check. The user will then be given the option of doing a fresh air setup to zero the instrument. If you are in an area away from contamination, fresh air setup may be selected. If you are starting the instrument at a site where there are noticeable VOC vapors in the ambient air the fresh air set up should be skipped until the user is in an area expected to be free of vapors, or a canister of "Zero Air" should be used for the fresh air set up. The Passport is not supplied with zero air as standard equipment.

After the air check, the instrument will begin to display readings. The user should check the pump by plugging the inlet or the free end of the sampling probe. The alarm will sound, the pump shut off and then restart if the line is unplugged. The reset button will stop the alarm.

Attach the probe tip with the water/dirt filter to the inlet port.

Readings may now be taken following the site sample plan for the site.

Shut down To turn the Passport off. Hold the on/off button down for 6 seconds.

Calibration

The Passport does not need to be calibrated before use every day if the calibration check is within 5% of the concentration of the span gas used. As the instrument can drift during use, it may be necessary to calibrate more then once a day during use. A source of "zero air" and "span gas" are needed to calibrate the Passport. For the Passport, 100 ppm Isobutylene gas is used for the span gas. Zero air is usually the ambient air. However, if you are attempting to calibrate the instrument at a site where there are noticeable VOC vapors in the ambient air, a canister of "Zero Air" should be used.

When the Passport display is not within 5% of the calibration gas, turn the instrument off. Start the calibration sequence by holding the page and reset buttons simultaneously. While continuing to hold these two buttons, press the on/off button and the instrument displays "calibrate now?" Follow the display prompts to apply background air (zero air), span gas, and adjust the display reading to match the calibration gas. When the display reading matches calibration gas, level select OK (on/off button). At this point calibration is complete and the instrument will shut off.

Refer to the manufacture's operation manual for calibration details and instructions.

7. DOCUMENTATION

All sampling activity should be documented according to the site specific sampling Plan. The following should be noted:

- Project name
- Date and time of recording
- Background air results
- Verification of calibration
- Name of person(s) performing the analysis
- Results
- Any special considerations or sampling conditions

8. CLEANING AND ROUTINE MAINTENANCE

Section 6.4 of the user manual has a troubleshooting Guide. Users should only attempt the corrective actions suggested in the table in 6.4. If the Passport appears to be malfunctioning or equipment is missing, the OHMS II or ES III charged with care of the instrument should be notified immediately. The instrument should then be tagged out of service until the instrument is fixed and the equipment replaced.

The instrument should be wiped down with a damp cloth to remove any soil or grime prior to placing back in the carry case. Do not submerse the instrument in water or

any other solution, as this will severely damage the instrument.

The OHMS II s or ES III may perform other Maintenance described in section 6.5 of the user manual if they feel they are able to perform the action.

The Passport should be charged every evening after operation. The charge is regulated so that it cannot overcharge the battery and damage the instrument.

Daily
At the end of a sample event, the user will record the use, battery charge, calibration and any maintenance in the instrument log kept with the instrument.

Monthly
Once a month, the instruments are checked by the appropriate office coordinator. This involves a battery and calibration check to indicate that the instrument is operating properly. This information is then recorded the instrument log. The log also records when repairs have been made, what they were, date of purchase etc. If any instrument is found to be not operating correctly, the UGMEC should be informed immediately, the instrument is to be tagged out immediately and taken out of service until repairs have been made and the instrument is operating correctly.

Every 40 hours of use

The lamp should by cleaned after 40 hours of use following the instructions in the user manual.

9. TRAINING

Prior to use, personnel must demonstrate an ability to operate the Passport and understand what the readings mean. In addition, operators will need to demonstrate on a yearly basis their proficiency in using the Passport. This will be accomplished as part of a yearly refresher or individual lesson with the UGMEC, regional assistant, or designee. A list of approved users will be kept with the UGMEC.

10. RECORD KEEPING

The Enforcement user group shall maintain a logbook recording the user group's history of instrument use. This logbook (including all instruments) shall contain:

Section I - A list of qualified users in the group indicating which monitoring equipment they are qualified to use and the date their proficiency was checked. (Proficiency must be checked at least annually.)

Section II - A list of site monitoring equipment maintained by the unit both in and out of service.

Section III – An equipment log for each unit of monitoring equipment shall be kept with the instrument, and a copy of this record will be submitted to the UGMEC at least once per year. This equipment log includes:

- When the unit of monitoring equipment instrument was first put into service;
- Periodic (monthly preferred) performance, battery and calibration checks of the unit of monitoring equipment;
- When the instrument was used, by whom, and under what conditions;
- Decontamination the monitoring equipment has undergone
- Repair history of the monitoring equipment.

Section IV - A record of the quality control checks made by the User Group's Coordinator of site monitoring equipment maintained by the group (annually preferred).

Section V - Copies user manuals and written user group procedures (SOPs) for each type of monitoring equipment available for use by the unit.

11. DEVIATIONS FROM SOPS

All deviations from the procedures outlined in this or in any other, SOPs followed for using the Passport must be documented in field notes.

12. REFERENCES

MSA Passport II Organic Vapor Monitor User's Manual

Bureau of Remediation and Waste Management's Department of Environmental Protection, *Site Monitoring SOP*