

Region 4
U.S. Environmental Protection Agency
Science and Ecosystem Support Division
Athens, Georgia

GUIDANCE

Title: Leak Detection and Repair

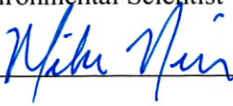
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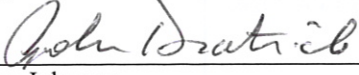
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Revision History

The top row of this table shows the most recent changes to this controlled document. For previous revision history information, archived versions of this document are maintained by the SESD Document Control Coordinator on the SESD local area network (LAN).

History	Effective Date
<p>SESDGUID-102-R2, <i>Leak Detection and Repair</i>, replaces SESDGUID-102-R1.</p> <p>Cover Page: SESD’s reorganization was reflected in the authorization section by making John Deatruck the Chief of the Field Services Branch. The FQM was changed from Liza Montalvo to Hunter Johnson.</p> <p>Revision History: Changes were made to reflect the current practice of only including the most recent changes in the revision history.</p> <p>General: Throughout the document added reference to TVA 2020, where appropriate.</p> <p>Section 3.3: Third sentence, changed “must” to “should.”</p> <p>Section 3.5: First sentence, added “Resource Conservation and Recovery Act (RCRA).” Fourth Bullet, replaced “Subpart BB” with “Subparts AA, BB & CC.”</p>	<p>October 15, 2015</p>
<p>SESDGUID-102-R1, <i>Leak Detection and Repair</i>, replaces SESDGUID-102-R0.</p>	<p>April 20, 2011</p>
<p>SESDGUID-102-R0, <i>Leak Detection and Repair</i>, Original Issue</p>	<p>June 13, 2008</p>

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1 General Information

1.1 Purpose

This procedure describes how SESD conducts direct monitoring for Leak Detection and Repair (LDAR) investigations. The purpose of these investigations is to monitor regulated equipment in volatile organic compound (VOC) service for potential leaks.

1.2 Scope/Application

This procedure covers the calibration and operation of the Thermo Toxic Vapor Analyzer (TVA) 2020 or 1000B instruments by SESD personnel and how LDAR monitoring investigations are conducted. This procedure contains directions developed solely to provide internal guidance to SESD employees. Mention of trade names or commercial products does not constitute endorsement or recommendation for use.

1.3 Documentation/Verification

This procedure was prepared by persons deemed technically competent by SESD management, based on their knowledge, skills and abilities and has been tested in practice and reviewed in print by a subject matter expert. The official copy of this procedure resides on the SESD local area network (LAN). The Document Control Coordinator is responsible for ensuring the most recent version of the procedure is placed on the LAN and for maintaining records of review conducted prior to its issuance.

1.4 References

SESD Operating Procedure for Equipment Inventory and Management, SESDPROC-108, Most Recent Version

SESD Operating Procedure for Logbooks, SESDPROC-010, Most Recent Version

Thermo TVA 1000B Operation Manual

Thermo TVA 2020 Operation Manual

US EPA, Method 21, Determination of Volatile Organic Compound Leaks (40 Code of Federal Regulations, Part 60, Appendix A)

USEPA, Enforcement and Compliance Assurance, *Inspection Manual: Federal Equipment Leak Regulations for the Chemical Manufacturing Industry Volume I*, EPA/305/B-98/011, December, 1998.

USEPA. Safety, Health and Environmental Management Program Procedures and Policy Manual. Region 4 SESD, Athens, GA, Most Recent Version

1.5 General Precautions

1.5.1 Safety

Proper safety precautions must be observed when conducting LDAR inspections. Refer to the SESD Safety, Health and Environmental Management Program Procedures and Policy Manual and any pertinent site-specific Health and Safety Plans (HASPs) for guidelines on safety precautions. These guidelines, however, should only be used to complement the judgment of an experienced professional. Address chemicals that pose specific toxicity or safety concerns and follow any other relevant requirements, as appropriate.

1.5.2 Procedural Precautions

The instrument should be intrinsically safe, as defined by the applicable U.S.A. standards for operation in any explosive atmospheres that may be encountered during its use. The following is a list of some items that should be considered when taking field measurements:

- Allow ample time for instrument warm-up before calibration.
- If instrument is not working properly, red-tag it and remove it from use.
- Observe shelf life of calibration standards.
- Read operational manuals.
- Ensure written documentation is maintained for monitoring data.
- During direct monitoring of equipment, caution must be exercised to prevent liquids, grease, dirt, etc., from being pumped into the instrument's probe.

2 Quality Control

According to EPA Method 21:

- A calibration precision test must be completed prior to placing the instrument into service and at subsequent 3-month intervals.
- The calibration precision must be equal to or less than 10% of the calibration gas value.

If the 10% precision requirement is not met, the instrument must be recalibrated. If, after recalibration, these values still cannot be met, the instrument will be red-tagged and taken out of service.

Three alternating measurements of the zero gas and the specified calibration gas are taken using the VOC instrument and recorded. The average difference between three different meter readings and the calibration gas value is then calculated. [Note: Only positive numbers can be used, therefore it is necessary to use the absolute difference between the calibration gas and the meter reading] This average difference is divided by the known calibration value and multiplied by 100 to obtain the calibration precision.

3 Methodology

3.1 Summary of Method

A portable calibrated instrument is used to detect volatile organic compound (VOC) leaks from process equipment. Leak sources include, but are not limited to, valves, flanges and other connections, pumps, compressors, pressure relief devices, process drains, open-ended lines, pump and compressor seal system degassing vents, accumulator vessel vents, agitator seals, and access door seals. A leak definition concentration (based on a reference compound) is specified in each applicable regulation. This method is intended to locate and classify leaks only, and is not to be used as a direct measure of mass emission rate from individual sources.

3.2 Apparatus, Materials, Chemicals

- TVA 2020 or 1000B
- Calibration gases [parts per million by volume (ppmv)]:
 - Zero gas (air, less than 10 ppmv VOC)
 - Methane (100, 500, 1,000, and/or 10,000 ppmv) or others if applicable.

3.3 Personnel Responsibilities/Training

Personnel will be trained on the use of VOC instruments and Method 21 (40 CFR Part 60, Appendix A) prior to taking field measurements. The training includes reading Method 21 and the instrument manufacturer's manual. Personnel should demonstrate competency/proficiency by properly calibrating the instrument and by using it to measure unknown samples.

3.4 Maintenance and Calibration

All instruments will be maintained and operated in accordance with the manufacturer's instructions and the SESD Operating Procedure for Equipment Inventory and Management (SESDPROC-108). All instruments placed in service will be calibrated to ensure that they are operational before they are taken to the field. If the instrument is not functioning properly, it will be red tagged and taken out of service. An instrument that has been red tagged will be repaired by personnel qualified to do instrument repair or by authorized company representatives, then calibrated, and returned to service. The instrument will be calibrated daily in the field before use by the procedure prescribed in Method 21. Repair records and a log will be maintained on each instrument by the instrument manager/designee. Each entry will be signed and dated.

3.5 Procedure

The Clean Air Act, Resource Conservation and Recovery Act (RCRA), and/or state statutes require facilities with regulated equipment in volatile organic compound (VOC) service to develop and implement a Leak Detection and Repair (LDAR) program to control fugitive VOC emissions. Federal equipment leak regulations that affect the chemical industry are found in the following Code of Federal Regulations (CFR):

- 40 CFR, Part 60, Subpart VV
- 40 CFR, Part 61, Subparts J & V
- 40 CFR, Part 63, Subparts H & I
- 40 CFR, Parts 264 & 265, Subparts AA, BB & CC

Component monitoring must be conducted periodically, as outlined in the applicable statute. LDAR on-site inspections performed by SESD involve monitoring regulated VOC-service components, performing data evaluation/preparation, and reporting inspection findings.

The monitoring method used is EPA Reference Method 21. The instrument used must be intrinsically safe and must be operated according to the manufacturer's instructions. Proper warm-up must be allowed prior to calibration. The instrument must be calibrated each day according to the manufacturers' recommendations before taking unknown VOC readings. This calibration is recorded. Any deviations from this procedure will be noted in the project logbook. Monitoring results will be recorded in project logbooks. All records should be entered according to the procedures outlined in the SESD Operating Procedure for Logbooks (SESDPROC-010).

3.6 Data Review and Documentation

Data will be reviewed to ensure that the data is complete and meets the enforcement/technical requirements of the particular investigation objectives. The data will be reviewed by the project leader, team members, other technical experts, and SESD quality control staff, as appropriate. This review will be conducted in accordance with SESD Operating Procedure for Report Preparation and Distribution, SESDPROC-003.