ATTACHMENT H – 40 CFR PART 264, SUBPART CC

SECTION O. – 40 CFR PART 264, SUBPART CC AIR EMISSION STANDARDS

Heritage Environmental Services, LLC ("Heritage") is not permitted to treat or store hazardous waste in tanks or surface impoundments. Therefore, these units are not discussed in this document. Heritage does manage containers subject to Subpart CC air emission standards. Subpart CC standards are applicable to containers in which hazardous wastes are managed with the following exceptions:

1. Containers in which only hazardous waste with an average volatile organic concentration of less than 500 ppmw is managed;

2. Containers in which only hazardous waste that meets applicable organic hazardous constituent treatment standards under the land disposal restrictions is managed; and

3. Containers with a design capacity of less than or equal to 0.1 m^3 (approximately 26 gallons).

See the attached document: Subpart CC Air Emission Standards for Tanks, Surface Impoundments, and Containers – Inspection and Monitoring Plan for additional details.

SUBPART CC AIR EMISSION STANDARDS FOR TANKS, SURFACE IMPOUNDMENTS, AND CONTAINERS - INSPECTION AND MONITORING PLAN

Heritage Environmental Services, LLC
284 East Storey Road
Coolidge, Arizona 85128
AZD081705402

TABLE OF CONTENTS

LIST OF APPENDICES

1.0 INTRODUCTION/APPLICABILITY

This document specifies the procedures Heritage Environmental Services, LLC ("Heritage") will integrate with overall facility operations to maintain compliance with the Air Emission Standards for Tanks, Surface Impoundments, and Containers (40 CFR 264, Subpart CC, hereinafter referred to as "Subpart CC"). As a facility operations manual, this document summarizes the requirements for inspection and monitoring, equipment repairs, recordkeeping, and reporting under Subpart CC.

USEPA requires routine inspection and monitoring of containers subject to Subpart CC, and 40 CFR 264.1088(b) of Subpart CC requires that an owner/operator develop and implement a written plan and schedule to perform the inspection and monitoring requirements of Subpart CC. This document outlines the procedures Heritage will implement to comply with these inspection and monitoring requirements. These procedures are included as part of the facility's inspection plan required under 40 CFR 264.15.

Only the containers that are specifically subject to Subpart CC will be subject to the procedures outlined in this document. Heritage does not own or operate any surface impoundments or hazardous waste tanks at this facility. Therefore, these units are not discussed in this document.

This document addresses containers managed by Heritage that are subject to the Subpart CC air emission standards. Subpart CC standards are applicable to containers in which hazardous wastes are managed with the following exceptions:

1. Containers in which only hazardous waste with an average volatile organic concentration of less than 500 ppmw is managed;

2. Containers in which only hazardous waste that meets applicable organic hazardous constituent treatment standards under the land disposal restrictions is managed; and

3. Containers with a design capacity of less than or equal to 0.1 m^3 (approximately 26 gallons).

For additional unit exemptions, consult 40 CFR 264.1080, 264.1082, and 264.1086.

The provisions of this document do not apply to units managing products or virgin materials not regulated as hazardous waste, including but not limited to materials managed under RCRA exclusions or exemptions, non-hazardous wastes, or used oils managed in accordance with the Used Oil Management Standards at 40 CFR Part 279.

2.0 DEFINITIONS

The following definitions as specified in Subpart CC apply to this document:

Average volatile organic concentration or average VO concentration - The mass-weighted average volatile organic concentration of a hazardous waste as determined in accordance with the requirements of 40 CFR 264.1083 of Subpart CC (Waste Determination Procedures).

Closure Device - A cap, hatch, lid, plug, seal, valve, or other type of fitting that blocks an opening in a cover such that when the device is secured in the closed position it prevents or reduces air pollutant emissions to the atmosphere. Closure devices include devices that are detachable from the cover (e.g., a sampling port cap), manually operated (e.g., a hinged access lid or hatch), or automatically operated (e.g., a spring-loaded pressure relief valve).

Container - Any portable device in which a material is stored, transported, disposed of, or otherwise handled.

Cover - A device that provides a continuous barrier over the hazardous waste managed in a unit to prevent or reduce air pollutant emissions to the atmosphere. A cover may have openings (such as access hatches, sampling ports, gauge wells) that are necessary for operation, inspection, maintenance, and repair of the unit on which the cover is used. A cover may be a separate piece of equipment that can be detached and removed from the unit, or a cover may be formed by structural features permanently integrated into the design of the unit. An example of a cover is a lid on a drum.

Fixed roof - A cover that is mounted on a unit in a stationary position and does not move with fluctuations in the level of the material managed in the unit.

Hard-piping - Pipe or tubing that is manufactured and properly installed in accordance with relevant standards and good engineering practices.

In light material service - The container is used to manage a material for which <u>both</u> of the following conditions apply: The vapor pressure of one or more of the organic constituents in the material is greater than 0.3 kilopascals (kPa) (approximately 4.35 x 10^{-2} psi) at 20°C; and the total concentration of the pure organic constituents having a vapor pressure greater than 0.3 kPa (approximately 4.35 x 10^{-2} psi) at 20°C is equal to or greater than 20 percent by weight.

No detectable organic emissions - No escape of organics to the atmosphere as determined using the procedure specified in 40 CFR 264.1083(d) of Subpart CC (i.e., by an instrument reading less than 500 parts per million by volume (ppmv) above the

background level when measured in accordance with the requirements of Method 21 (see Appendix C), and by no visible openings or defects in the device or system such as rips, tears, gaps, etc.

Point of waste origination - When the facility owner/operator is the generator of the hazardous waste, the point of waste origination means the point where a solid waste produced by a system, process, or waste management unit is determined to be a hazardous waste as defined in 40 CFR Part 261. When the facility owner/operator is not the generator of the hazardous waste, the point of waste origination means the point where the facility accepts delivery or takes possession of the hazardous waste.

Volatile organic concentration, or VO concentration - The fraction by weight of the volatile organic compounds contained in a hazardous waste expressed in terms of parts per million (ppmw) as determined by direct measurement or by knowledge of the waste in accordance with the requirements of 40 CFR 264.1083 of Subpart CC (Waste Determination Procedures). For the purpose of determining the VO concentration of a hazardous waste, organic compounds with a Henry's law constant value of at least 0.1 mole-fraction-in-the-gas-phase/mole-fraction-in-the-liquid-phase (0.1 Y/X) (which can also be expressed as 1.8×10^{-6} atmospheres/gram-mole/m^3) at 25° Celsius must be included. Chemical reference books are available to determine Henry's Law Constants.

3.0 CONTAINERS

40 CFR 264.1086 specifies three levels of air emission controls for containers depending on the size of the container, the types of wastes managed, and how the wastes are managed. These control levels and Heritage's container management procedures are specified in this section.

3.1 Container Level 1 Standards (40 CFR 264.1086(c))

Heritage will manage the following types of containers in accordance with Container Level 1 standards:

1. **Containers with a design capacity greater than 0.1 m^3 (approximately 26 gallons) and less than or equal to 0.46 m^3 (approximately 119 gallons)** - Such containers may include, but are not limited to, 30-, 55-, and 80-gallon drums. Most containers managed by Heritage fall into this category.

2. **Containers with a design capacity greater than 0.46 m^3 (approximately 119 gallons) that are not "in light material service" (see Section 2.0 - Definitions)** - Containers of this size are called "bulk containers" by USDOT and include, but are not limited to, intermediate bulk containers (tote tanks), tank trucks, railcars, and rolloff boxes. Containers of this size for which a determination regarding "in light material service" status has not been made will be managed in accordance with Container Level 2 standards (see Section 3.2).

Where applicable, Heritage will comply with Container Level 1 standards using one of the following control methods specified by 40 CFR 264.1086(c)(1):

1. The container will meet applicable USDOT hazardous material packaging regulations (this will be Heritage's primary method of complying with Container Level 1 standards); or

2. The container will be equipped with a cover and closure devices that form a continuous barrier over the container openings such that when the cover and closure devices are secured in the closed position there are no visible holes, gaps, or other open spaces (e.g., a lid on a drum, a suitably secured tarp on a roll-off box, or a bulk cargo container equipped with a screw-type cap).

3.2 Container Level 2 Standards (40 CFR 264.1086(d))

Heritage will manage the following types of containers in accordance with Container Level 2 standards:

1. **Containers with a design capacity greater than 0.46 m^3 (approximately 119 gallons) that are "in light material service" -** Containers of this size are called "bulk containers" by USDOT and include, but are not limited to, intermediate bulk containers (tote tanks), tank trucks, railcars, and rolloff boxes.

2. **Containers with a design capacity greater than 0.46 m^3 (approximately 119 gallons) for which a determination has not been made regarding their status as "in light material service."**

Where applicable, Heritage will comply with Container Level 2 standards using one of the following control methods specified by 40 CFR 264.1086(d)(1):

1. Containers subject to Container Level 2 standards at Heritage will meet applicable USDOT hazardous material packaging regulations, as allowed by 40 CFR 264.1087(d)(1)(i). This will be Heritage's primary method of complying with Container Level 2 standards.

2. Alternatively, Heritage may choose to use a non-DOT specification packaging and perform organic vapor monitoring in accordance with Method 21 of 40 CFR Part 60, Appendix A, or use a container that has been demonstrated within the preceding 12 months to be vapor-tight by using Method 27 of 40 CFR Part 60, Appendix A. This method of compliance with Container Level 2 standards will only be used in very limited cases when the container is not to be shipped off-site.

3.3 Container Level 3 Standards (40 CFR 264.1086(e))

Containers with a design capacity greater than 0.1 m^3 (approximately 26 gallons) used for stabilization of hazardous waste are subject to Container Level 3 standards. Heritage does not currently perform stabilization of Subpart CC-regulated hazardous wastes in containers at the facility. Therefore, Container Level 3 standards are not specified in this document. Should Heritage elect to undertake such activities in the future, this document will be amended to include Container Level 3 standards.

3.4 Container Management Procedures

Whenever hazardous waste subject to Subpart CC is in a container, all covers and closure devices for that container will be installed, secured, and maintained in the closed position except in the following situations:

1. A container that is RCRA-empty (40 CFR 261.7(b)) is not subject to Subpart CC and may be open at any time.

2. A closure device or cover may be opened to add waste or other material to the container. If the container is filled in one continuous operation, the closure devices must be secured in the closed position and the cover installed promptly upon conclusion of the filling operation. If the container is filled in discrete quantities or batches, the closure devices must be promptly secured in the closed position and the covers installed upon either: the container being filled to its final fill level; the completion of a batch loading after which no additional material will be added within 15 minutes; the person performing the loading operation leaving the immediate vicinity of the container; or the shutdown of the process generating the material added to the container, whichever occurs first.

3. A closure device or cover may be opened to remove waste from the container. If the waste is removed in discrete quantities or batches, but the container is not RCRA-empty, the closure devices must be secured in the closed position and cover installed promptly upon completion of a batch removal after which no additional material will be removed within 15 minutes, or the person performing the unloading leaves the immediate vicinity of the container, whichever comes first.

4. A closure device or cover may be opened when access inside a container is needed to perform routine activities other than transfer of waste. Following completion of the activity, the closure device must be promptly secured in the closed position and the cover reinstalled.

5. Opening of a spring-loaded pressure-vacuum relief valve, conservation vent, or similar type of pressure relief device which vents to atmosphere during normal operations for the purpose of maintaining the container's internal pressure in accordance with the container's design specifications, such as during loading or diurnal temperature fluctuations (see 264.1086(c)(3)(iv) for details). The device must be designed to operate with no detectable organic emissions when closed.

6. Opening of a safety device to avoid unsafe conditions.

Transfers of hazardous wastes subject to Subpart CC into or out of containers subject to Container Level 2 standards will minimize exposure of the waste to the atmosphere, to the extent practical, considering the physical properties of the waste and good engineering and safety practices applicable to the hazards of the material.

Examples of such transfers include:

- A submerged fill pipe or other submerged fill method to load liquids into the container.
- A vapor balancing system or a vapor recovery system to collect and control the vapors from the container filling operation.
- A fitted opening in the top of a container through which the hazardous waste is filled and subsequently purging the transfer line before removing from the container opening.

4.0 INSPECTION AND MONITORING SCHEDULE

Containers shipped to Coolidge are inspected to determine if they meet USDOT specifications. In the event that a container does not meet DOT packaging requirements, wastestream data are reviewed to determine if the container is subject to Subpart CC regulations (e.g., the hazardous waste contains over 500 ppm VOC). If subject to Subpart CC, the container is inspected to determine if it meets Subpart CC Level 1 or Level 2 standards, as applicable.

Personnel performing the inspections have theoretical and practical training in the implementation of Subpart CC standards, including inspections, recordkeeping, and repair of containers. Subpart CC training is included in the review of the Clean Air Act in the Introduction to RCRA training session and during the training session on Container Management and Storage.

An Inspection/Monitoring Log for containers that are subject to Subpart CC that do not meet DOT packaging requirements is maintained at the facility. The log includes container volume, waste type, and type of control. A sample Inspection/Monitoring Log is provided as Appendix A.

Containers at Heritage that are subject to Subpart CC standards will be inspected and monitored in accordance with the requirements of 40 CFR 264.1088, and the following schedule.

Containers managed under the Container Level 1 standards, or under the Container Level 2 standards meeting applicable USDOT packaging requirements - Perform a visual inspection of these hazardous waste containers, including covers and closure devices. Check for visible cracks, holes, gaps, or other open spaces into the interior of the container when the cover and closure devices are secured in the closed position. Confirm that the applicable control is effective in preventing emissions. ORGANIC VAPOR MONITORING IS NOT REQUIRED FOR CONTAINERS MEETING APPLICABLE USDOT PACKAGING REQUIREMENTS. Perform these visual inspections in accordance with the following schedule:

1. **Initial visual inspection** - at the time the containers are first accepted (i.e., prior to signing the manifest); and for containers generated on-site at the time hazardous waste subject to Subpart CC is added to the container.

2. **Annual visual inspection (at least once every 12 months)** - <u>only</u> for containers that remain at the facility for one year or more.

Containers managed under the Container Level 2 standards that <u>do not</u> meet applicable USDOT packaging requirements. In the event a non-DOT specification

packaging with a design capacity greater than 0.46 m^3 (approximately 119 gallons) is used to store hazardous waste subject to Subpart CC, either:

1. Perform organic vapor monitoring in accordance with Method 21 (see Appendix C), as specified by 40 CFR 264.1083(d) and 264.1086(g), when the container is accepted or waste is first placed in it; or

2. Use a container that has been demonstrated within the preceding 12 months to be vapor-tight by using Method 27 of 40 CFR Part 60, Appendix A.

In addition, for Container Level 2 containers not meeting USDOT packaging requirements perform visual inspections in accordance with the following schedule:

1. **Initial visual inspection** - at the time the containers are first accepted (i.e., prior to signing the manifest); and for containers generated on-site at the time hazardous waste subject to Subpart CC is added to the container.

2. **Annual visual inspection (at least once every 12 months)** - <u>only</u> for containers that remain at the facility for one year or more.

5.0 INSPECTION AND MONITORING PROCEDURES

5.1 Inspection Procedures

Heritage will visually inspect containers subject to Subpart CC and their covers and closure devices as follows:

1. View the entire container, its cover, and closure devices (e.g., bungs, valves, caps, etc.) for evidence of any defect that could result in air pollutant emissions.

2. Defects include, but are not limited to, visible cracks, holes, gaps, or other open spaces into the interior of the container when the cover and closure devices are secured in the closed position. In addition, visible vapor or liquid leakage may indicate a leak is present.

3. Note any visible evidence of any defect and the inspection date on the Inspection/Monitoring Log (see Appendix A).

4. Immediately report such observations to the Facility Maintenance Department for repair in accordance with Section 6. Note the dates when repair begins and the date when repair is completed on the Inspection/Monitoring Log (see Appendix A).

5.2 Monitoring Procedures

In addition to the inspection procedures specified in Section 5.1, for any non-DOT specification packaging with a design capacity greater than 0.46 m^3 (approximately 119 gallons) used to store hazardous waste subject to Subpart CC, Heritage will monitor the container covers and closure devices. Heritage will maintain an organic vapor analyzer (OVA) on site. The OVA will be stored in the office of the Environmental Compliance Manager or other suitable location. The OVA will be inspected and calibrated by the Environmental Compliance Manager or designee before each use. An OVA Inspection/Calibration Log will be maintained at the facility (see sample OVA Inspection/Calibration Log in Appendix B). The container covers and closure devices will be monitored as follows:

1. Perform monitoring in accordance with the procedures specified in Method 21 (see Appendix C) and 40 CFR 264.1083(d). Use an instrument that meets applicable Method 21 criteria and calibrate the instrument before each day of use using the calibration gases specified by 40 CFR

264.1083(d)(5). (See Appendix B for Organic Vapor Analyzer Inspection/Calibration Log.)

2. Determine the background level according to the procedures in Method 21.

3. Ensure the container cover and closure devices are secured in the closed position prior to monitoring.

4. Traverse the instrument probe around the potential leak interface as close to the interface as possible, as required by Method 21. Check each potential leak interface (i.e., a location where organic vapor leakage could occur) on the container, its cover, and associated closure devices, including but not limited to: the interface of the cover rim and container wall; the periphery of any opening on the container or container cover and its associated closure device; and the sealing seat interface on a spring-loaded pressure-relief valve.

5. Perform monitoring when the container is filled with a material having a volatile organic concentration representative of the range of volatile organic concentrations for the hazardous wastes expected to be managed in this type of container.

6. If the arithmetic difference between the maximum organic concentration indicated by the instrument and the background level is less than 500 ppmv, then the container is considered to have no detectable organic emissions (i.e., it "passes").

7. If the arithmetic difference between the maximum organic concentration indicated by the instrument and the background level is equal to or greater than 500 ppmv, note this condition on the Inspection/Monitoring Log.

8. Immediately report such observations to the Facility Maintenance Department for repair in accordance with Section 6. Note the dates when repair begins and the date when repair is completed on the Inspection/Monitoring Log (see Appendix A).

REPAIRS

When a defect is detected by either a visual inspection, as described in Section 5.1, or by leak detection monitoring, as described in Section 5.2, Heritage will repair the container in the following manner:

1. The first attempt at repairing a container will be no later than 24 hours after the defect is detected.

2. Repair the container as soon as possible, but no later than 5 calendar days after detection of the defect.

3. If repair of the defect cannot be completed within 5 calendar days, then remove the hazardous waste from the container and do not use the container to manage hazardous waste until the defect is repaired. Note details on the Inspection/Monitoring Log (see Appendix A).

6.0 RECORDKEEPING

Heritage will record and maintain the information described in this section in accordance with 40 CFR 264.1089. Heritage will maintain records specified in this section in the facility operating record filed on site in Coolidge or available electronically for a minimum of 3 years.

As specified by 40 CFR 264.1086(c)(5), for containers with a capacity of 0.46 m^3 (approximately 119 gallons) or greater that also do not meet applicable DOT packaging requirements, Heritage will maintain a copy of the procedure used to determine that they are not "in light material service" when such a determination is performed. However, in general, Heritage will manage all such containers under the requirements for containers "in light material service," rather than performing the determination.

For containers exempted from Subpart CC because they manage only wastes with an average volatile organic concentration of less than 500 ppmw, or for which volatile organics have been destroyed or removed, Heritage will maintain the following records:

1. For wastes with an average volatile organic concentration of less than 500 ppmw, information used for each waste determination, including wastestream profile data from the generator, in the facility operating record filed onsite in Coolidge and/or available electronically. If analytical results are used, the date, time, and location of each sample will be recorded.

2. For wastes treated to remove volatile organics, the identification number of the incinerator, boiler, or industrial furnace in which the waste was treated.

3. For wastes that are exempt because they meet applicable organic treatment standards under the land disposal restrictions (LDR) (40 CFR 264.1082(c)(4)), Heritage already maintains LDR notifications as required by 40 CFR 268.7. These records are not required by Subpart CC, but can be used to document these determinations.

7.0 REPORTING

A written report will be submitted to the Arizona Department of Environmental Quality (ADEQ) within 15 calendar days of the time Heritage becomes aware of each occurrence when hazardous waste subject to Subpart CC emission control requirements is placed in a container not in compliance with Subpart CC emission control standards.

Each report will include the facility EPA identification number, facility name and address, a description of the noncompliance event and cause, the dates of noncompliance, and the actions taken to correct the noncompliance and prevent recurrence. The report will be signed and dated by an authorized representative of Heritage.

APPENDIX A

SUBPART CC INSPECTION/MONITORING LOG

Table H-1
Subpart CC Inspection/Monitoring Log[1]
Heritage Environmental Services, LLC
Coolidge, AZ

Container ID#	Container Volume	Waste Type	Type of Control	Control Adequate? (note any defects)[2]	OVA reading (if applicable)	Date of Inspection	Date Begin Repair (if applicable)	Date Complete Repair (if applicable)	Comments (include follow-up actions, if applicable)	Inspector (print name)

Notes:
[1] For containers that are subject to Subpart CC that do not meet DOT packaging requirements.
[2] Immediately notify Maintenance Department if defects observed.

APPENDIX B

ORGANIC VAPOR ANALYZER INSPECTION/CALIBRATION LOG

Table H-2

Organic Vapor Analyzer (OVA) Inspection/Calibration Log
Heritage Environmental Services, LLC
Coolidge, AZ

Date	Inspector/Calibrator (print name)	Any visible defects?	Zero Gas Reading	1	2	3	Calibration Gas Reading	1	2	3	Difference	1	2	3	Calibration Precision	Response Time	1	2	3	Comments

APPENDIX C

METHOD 21 - DETERMINATION OF VOLATILE ORGANIC COMPOUNDS LEAKS

Method 21 -- Determination of Volatile Organic Compound Leaks

1 Applicability and Principle

1.1 Applicability. This method is applicable for the determination of VOC leaks from process equipment. These sources include, but are not limited to, valves, flanges and other connections, pumps and compressors, pressure relief devices, process drains, open-ended valves, pump and compressor seal system degassing vents, accumulator vessel vents, agitator seals, and access door seals.

1.2 Principle. A portable instrument is used to detect VOC leaks from individual sources. The instrument detector type is not specified, but it must meet the specifications and performance criteria contained in Section 3. 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.

2 Definitions

2.1 Leak Definition Concentration means the local VOC concentration at the surface of a leak source that indicates that a VOC emission (leak) is present. The leak definition is an instrument meter reading based on a reference compound.

2.2 Reference Compound means the VOC species selected as the instrument calibration basis for specification of the leak definition concentration. (For example, if a leak definition concentration is 10,000 ppm as methane, then any source emission that results in a local concentration that yields a meter reading of 10,000 on an instrument meter calibrated with methane would be classified as a leak. In this example, the leak definition concentration is 10,000 ppm and the reference compound is methane.)

2.3 Calibration Gas means the VOC compound used to adjust the instrument meter reading to a known value. The calibration gas is usually the reference compound at a known concentration approximately equal to the leak definition concentration.

2.4 No Detectable emission means a local VOC concentration at the surface of a leak source, adjusted for local VOC ambient concentration, that is less than 2.5 percent of the specified leak definition concentration. that indicates that a VOC emission (leak) is not present.

2.5 Response Factor means the ratio of the known concentration of a VOC compound to the observed meter reading when measured using an instrument calibrated with the reference compound specified in the applicable regulation.

2.6 Calibration Precision means the degree of agreement between measurements of the same known value, expressed as the relative percentage of the average difference between the meter readings and the known concentration to the known concentration.

2.7 Response Time means the time interval from a step change in VOC concentration at the input of the sampling system to the time at which 90 percent of the corresponding final value is reached as displayed on the instrument readout meter.

3. Apparatus

3.1 Monitoring Instrument.

3.11 Specifications.

a. The VOC instrument detector shall respond to the compounds being processed. Detector types which may meet this requirement include, but are not limited to, catalytic oxidation, flame ionization, infrared absorption, and photoionization.
b. Both the linear response range and the measurable range of the instrument for each of the VOC to be measured, and for the VOC calibration gas that is used for calibration, shall encompass the leak definition concentration specified in the regulation. A dilution probe assembly may be used to bring the VOC concentration within both ranges; however, the specifications for instrument response time and sample probe diameter shall still be met.
c. The scale of the instrument meter shall be readable to ±2.5 percent of the specified leak definition concentration when performing a no detectable emission survey.
d. The instrument shall be equipped with an electrically driven pump to insure that a sample is provided to the detector at a constant flow rate. The nominal sample flow rate, as measured at the sample probe tip, shall be 0.10 to 3.0 liters per minute when the probe is fitted with a glass wool plug or filter that may be used to prevent plugging of the instrument.
e. The instrument shall be intrinsically safe as defined by the applicable U.S.A. standards (e.g., National Electric Code by the National Fire Prevention Association) for operation in any explosive atmospheres that may be encountered in its use. The instrument shall, at a minimum, be intrinsically safe for Class 1, Division 1 conditions, and Class 2, Division 1 conditions, as defined by the example Code. The instrument shall not be operated with any safety device, such as an exhaust flame arrestor, removed.
f. The instrument shall be equipped with a probe or probe extension for sampling not to exceed 1/4 in. in outside diameter, with a single end opening for admission of sample.

3.1.2 Performance Criteria.

(a) The instrument response factors for each of the VOC to be measured shall be less than 10. When no instrument is available that meets this specification when calibrated with the reference VOC specified in the applicable regulation, the available instrument may be calibrated with one of the VOC to be measured, or any other VOC, so long as the instrument then has a response factor of less than 10 for each of the VOC to be measured.
(b) The instrument response time shall be equal to or less than 30 seconds. The instrument pump, dilution probe (if any), sample probe, and probe filter, that will be used during testing, shall all be in place during the response time determination.
(c) The calibration precision must be equal to or less than 10 percent of the calibration gas value.
(d) The evaluation procedure for each parameter is given in Section 4.4.

3.1.3 Performance Evaluation Requirements.

a. A response factor must be determined for each compound that is to be measured, either by testing or from reference sources. The response factor tests are required before placing the analyzer into service, but do not have to be repeated at subsequent intervals.
b. The calibration precision test must be completed prior to placing the analyzer into service, and at subsequent 3 month intervals or at the next use whichever is later.
c. The response time test is required prior to placing the instrument into service. If a modification to the sample pumping system or flow configuration is made that would change the response time, a new test is required prior to further use.

3.2 Calibration Gases. The monitoring instrument is calibrated in terms of parts per million by volume (ppmv) of the reference compound specified in the applicable regulation. The

calibration gases required for monitoring and instrument performance evaluation are a zero gas (air, less than 10 ppmv VOC) and a calibration gas in air mixture approximately equal to the leak definition specified in the regulation. If cylinder calibration gas mixtures are used, they must be analyzed and certified by the manufacturer to be within ±2 percent accuracy, and a shelf life must be specified. Cylinder standards must be either reanalyzed or replaced at the end of the specified shelf life. Alternately, calibration gases may be prepared by the user according to any accepted gaseous standards preparation procedure that will yield a mixture accurate to within ±2 percent. Prepared standards must be replaced each day of use unless it can be demonstrated that degradation does not occur during storage.

Calibrations may be performed using a compound other than the reference compound if a conversion factor is determined for that alternative compound so that the resulting meter readings during source surveys can be converted to reference compound results.

4. Procedures

4.1 Pretest Preparations. Perform the instrument evaluation procedures given in Section 4.4 if the evaluation requirements of Section 3.1.3 have not been met.

4.2 Calibration Procedures. Assemble and start up the VOC analyzer according to the manufacturer's instructions. After the appropriate warmup period and zero internal calibration procedure, introduce the calibration gas into the instrument sample probe. Adjust the instrument meter readout to correspond to the calibration gas value. NOTE: If the meter readout cannot be adjusted to the proper value, a malfunction of the analyzer is indicated and corrective actions are necessary before use.

4.3 Individual Source Surveys.

4.3.1 Type I-- Leak Definition Based on Concentration. Place the probe inlet at the surface of the component interface where leakage could occur. Move the probe along the interface periphery while observing the instrument readout. If an increased meter reading is observed, slowly sample the interface where leakage is indicated until the maximum meter reading is obtained. Leave the probe inlet at this maximum reading location for approximately two times the instrument response time. If the maximum observed meter reading is greater than the leak definition in the applicable regulation, record and report the results as specified in the regulation reporting requirements. Examples of the application of this general technique to specific equipment types are:

a. Valves. The most common source of leaks from valves is the seal between the stem and housing. Place the probe at the interface where the stem exits the packing gland and sample the stem circumference. Also, place the probe at the interface of the packing gland take-up flange seat and sample the periphery. In addition, survey valve housings of multipart assembly at the surface of all interfaces where a leak could occur.
b. Flanges and Other Connections--For welded flanges, place the probe at the outer edge of the flange gasket interface and sample the circumference of the flange. Sample other types of nonpermanent joints (such as threaded connections) with a similar traverse.
c. Pumps and Compressors--Conduct a circumferential traverse at the outer surface of the pump or compressor shaft and seal interface. If the source is a rotating shaft, position the probe inlet within 1 cm of the shaft-seal

interface for the survey. If the housing configuration prevents a complete traverse of the schft periphery, sample all accessible portions. Sample all other joints on the pump or compressor housing where leakage could occur.

d. Pressure Relief Devices--The configuration of most pressure relief devices prevents sampling at the sealing seat interface. For those devices equipped with an enclosed extension, or horn, place the probe inlet at approximately the center of the exhaust area to the atmosphere.
e. Process Drains--For open drains, place the probe inlet at approximately the center of the area open to the atmosphere. For covered drains, place the probe at the surface of the cover interface and conduct a peripheral traverse.
f. Open-Ended Lines or Valves--Place the probe inlet at approximately the center of the opening to the atmosphere.
g. Seal System Degassing Vents and Accumulator Vents--Place the probe inlet at approximately the center of the opening to the atmosphere.
h. Access Door Seals--Place the probe inlet at the surface of the door seal interface and conduct a peripheral traverse.

4.3.2 Type II--"No Detectable Emission".

Determine the local ambient concentration around the source by moving the probe inlet randomly upwind and downwind at a distance of one to two meters from the source. If an interference exists with this determination due to a nearby emission or leak, the local ambient concentration may be determined at distances closer to the source, but in no case shall the distance be less than 25 centimeters. Then move the probe inlet to the surface of the source and determine the concentration described in 4.3.1. The difference between these concentrations determines whether there are no detectable emissions. Record and report the results as specified by the regulation.

For those cases where the regulation requires a specific device installation, or that specified vents be ducted or piped to a control device, the existence of these conditions shall be visually confirmed. When the regulation also requires that no detectable emissions exist, visual observations and sampling surveys are required. Examples of this technique are:

(a) Pump or Compressor Seals--If applicable, determine the type of shaft seal. Perform a survey of the local area ambient VOC concentration and determine if detectable emissions exist as described above.

(b) Seal System Degassing Vents, Accumulator Vessel Vents, Pressure Relief Devices--If applicable observed whether or not the applicable ducting or piping exists. Also, determine if any sources exist in the ducting or piping where emissions could occur prior to the control device. If the required ducting or piping exists and there are no device, then it is presumed that no detectable emissions are present. If there are sources in the ducting or piping where emissions could be vented or sources where leaks could occur, the sampling surveys described in this paragraph shall be used to determine if detectable emissions exist.

4.3.3 Alternative Screening Procedure. A screening procedure based on the formation of bubbles in a soap solution that is sprayed on a potential leak source may be used for those sources that do not have

continuously moving parts, that do not have surface temperatures greater than the boiling point less than the freezing point of the soap solution, that do not have open areas to the atmosphere that the soap solution cannot bridge, or that do not exhibit evidence of liquid leakage. Sources that have these conditions present must be surveyed using the instrument techniques of 4.3.1 or 4.3.2.

Spray a soap solution over all potential leak sources. The soap solution may be commercially available leak detection solution or may be prepared using concentrated detergent and water. A pressure sprayer or a squeeze bottle may be used to dispense the solution. Observe the potential leak sites to determine if any bubbles are formed. If no bubbles are observed, the source is presumed to have no detectable emissions or leaks as applicable. If any bubbles are observed, the instrument techniques of 4.3.1 or 4.3.2 shall be used to determine if a leak exists, or if the source has detectable emissions, as applicable.

4.4 Instrument Evaluation Procedures. At the beginning of the instrument performance evaluation test, assemble and start up the instrument according to the manufacturer's instructions for recommended warm-up period and preliminary adjustments.

4.4.1 Response Factor. Calibrate the instrument with the reference compound as specified in the applicable regulation. For each organic species that is to be measured during individual source surveys, obtain or prepare a known standard in air at a concentration of approximately 80 percent of the applicable leak definition unless limited by volatility or explosivity. In these cases, prepare a standard at 90 percent of the saturation concentration, or 70 percent of the lower explosive limit, respectively. Introduce this mixture to the analyzer and record the observed meter reading. Introduce zero air until a stable reading os obtained. Make a total of three measurements by alternating between the known mixture and zero air. Calculate the response factor for each repetition and the average response factor.

Alternatively, if response factors have been published for the compounds of interest for the instrument or detector typek the response factor determination is not required, and existing results may be referenced. Examples of published response factors for flame ionization and catalytic oxidation detectors are included in Bibliography.

4.4.2 Calibration Precision. Make a total of three measurements by alternately using zero gas and the specified calibration gas. Record the meter readings. Calculate the average algebraic difference between the meter readings and the known value. Divide this average difference by the known calibration value and multiply by 100 to express the resulting calibration precision as a percentage.

4.4.3 Response Time Introduce zero gas into the instrument sample probe. When the meter reading has stabilized, switch quickly to the specified calibration gas. Measure the time from switching to when 90 percent of the final stable reading is attained. Perform this test sequence three times and record the results. Calculate the average response time.

5. Bibliography

1. DuBoise, D.A., and G.E. Harris. Response Factors of VOC Analyzers at a Meter Reading of 10,000 ppmv for Selected Organic Compounds. U.S. Environmental Protection Agency, Research Triangle Park, NC Publication NO. EPA 600/2-81-051. September 1981.
2. Brown, G.E., et al. Response Factors of VOC Analyzers Calibrated with Methane for Selected Organic Compounds. U.S. Environmental Protection Agency, Research Triangle Park, NC Publications No. EPA 600/2-81-022. May 1981.
3. DuBoise, D.A., et al Response of Portable VOC Analyzers to Chemical Mixtures. U.S. Environmental Protection Agency, Research Triangle Park, NC Publication No. EPA 600/2-81-110. September 1981.