NEW MEXICO AIR QUALITY BUREAU

NSR & TV: MONITORING PROTOCOL

**VOC/HAPS LDAR FUGITIVE MONITORING AT NEW MEXICO SOURCES**

**Version: April 19, 2017**

[NOTE: Each permit writer shall review and adjust the requirements below according to the specific facility circumstances. Frequently for VOC emissions, hourly limits are likely to not be appropriate. If this is the case, permit writers should indicate this in the emission limit table and clarify with a footnote such as “ \* indicates hourly emission limits are not appropriate for this operating situation.”

A facility may have multiple sections of a facility that are subject to different requirements depending on when the components were constructed or reconstructed. For example, one facility may have sections subject to no NSPS or MACT, a section subject to NSPS KKK, and a section subject to NSPS OOOO. For these cases, multiple fugitive conditions may be required.

The unit numbers need to be clearly identified in each condition, especially if the facility is subject to multiple conditions for different areas of the facility.

## Units NOT subject to Federal LDAR regulations

**[NOTE – The condition below corresponds to the scenario addressed in column B in the decision tree.]**

1. Chemical Analysis/Equipment Count and Leak Monitoring for Fugitive VOC Equipment not Subject to a federal NSPS or MACT leak detection regulation (Unit(s) FUGX, FUGY, etc.) [25 & < 100 TPY Facility Wide Fugitives, units not subject to federal LDAR regulations]

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| **Requirement:** The permittee shall demonstrate compliance with the allowable VOC emission limit in Section A106 as follows:   1. The permittee shall conduct an annual chemical analysis for VOC content of all equipment in the unit; 2. conduct an annual count of all equipment in the unit; and 3. if the results of the chemical analysis or the equipment count have changed from the information submitted in the permit application, re-calculate the ton per year VOC emissions using the appropriate emissions factors to ensure the allowable emission limits are met. 4. The permittee shall conduct an annual inspection of equipment in VOC service by using EPA Reference Method 21 (40 CFR 60, Appendix B) to determine the presence of leaking sources. Alternatively, the permittee may determine the presence of leaking sources by using optical gas imaging with infrared cameras.    * + 1. For leaks determined using EPA Reference Method 21 (RM 21): 5. The instrument shall be calibrated before each day of its use by the procedures specified in RM 21. 6. The instrument shall be calibrated with zero air (less than 10 ppm of hydrocarbon in air); and a mixture of methane or n-hexane and air at a concentration of about, but less than, 10,000 ppm methane or n-hexane. 7. If an instrument reading of 10,000 ppm or greater of methane or n-hexane is measured, a leak is detected.    * + 1. For leaks determined using optical gas imaging with infrared cameras: 8. The instrument must comply with the specifications, the daily instrument checks, and the leak survey requirements at 40 CFR §60.18(i)(1) – (3). 9. If any emissions are imaged by the optical gas instrument, a leak is detected. 10. Any leaks detected shall be repaired within 30 days of discovery.   For the purpose of this condition, *equipment* means each pump, pressure relief device, open-ended valve or line, valve, and flange or other connector.  For the purpose of this condition, *in VOC service* means equipment in contact with a gas or a liquid that has a VOC content greater than 10% by weight. |
| **Monitoring:** Once per calendar year [or a custom annual monitoring period], the permittee shall complete the following monitoring:   1. a chemical analysis for VOC content of all equipment in the unit. 2. a count of all equipment in the unit. 3. an inspection of equipment in VOC service to detect leaks. 4. If a leak is detected, the permittee shall place a visible tag on the leaking component until the component has been repaired. 5. If any leaks are detected, the equipment must be re-monitored no later than 30 days after discovery of the leak to demonstrate that it has been repaired. 6. If the leak cannot be repaired within 30 days without a process unit shutdown, it may be designated “Repair delayed,” and must be repaired before the end of the next process unit shutdown. 7. An inspection of equipment in VOC service shall also be conducted within 15 days of any maintenance or repair that affects the equipment. |
| **Recordkeeping:** The permittee shall maintain the following records:   1. equipment identification or description and location; 2. weight percent VOC for each piece of equipment, and 3. emission factor for each piece of equipment; 4. total VOC emissions for each unit, tons per year; 5. For any leaks detected the permittee shall record the: 6. date a leak is detected; 7. dates of attempts to repair; 8. designation of "Repair delayed"; and 9. reason for delay if the leak is not repaired within 30 days of leak discovery, and 10. signature of authorized representative whose decision it was that repair could not be effected without a process shutdown; and 11. The date of successful leak repair shall be recorded. 12. For leaks determined using optical gas imaging with infrared cameras, the permittee shall keep the records of the specifications, the daily instrument checks and the leak survey requirements specified at 40 CFR §60.18(i)(1) – (3). |
| **Reporting:** The permittee shall report the following in accordance with Section B110:   1. The number of leaking components discovered, 2. The number of leaking components not repaired within 30 days, 3. The duration of the leaks that exceeded 30 days, 4. Dates of process unit shutdowns; and 5. VOC emissions for each unit in tons per year |

**[NOTE – The condition below corresponds to the scenario addressed in column C in the decision tree.]**

1. Leak Detection and Repair Program for fugitive equipment in VOC service not subject to a Federal NSPS or MACT leak detection regulation (Unit(s) FUGX, FUGY, etc.) [> 100 TPY Facility Wide Fugitives]

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| **Requirement:** The permittee shall demonstrate compliance with the allowable VOC emission limit in Section A106 by meeting the following requirements:   1. The permittee shall conduct an annual chemical analysis for VOC content of all equipment in the unit, and 2. shall conduct an annual count of all equipment in the unit; 3. If the results of the chemical analysis or the equipment count have changed from the information submitted in the permit application, the permittee shall re-calculate the ton per year VOC emissions using the appropriate emissions factors to ensure the allowable emission limits are met. 4. The permittee shall conduct quarterly inspections of equipment in VOC service by using EPA Reference Method 21 (40 CFR 60, Appendix B) to determine the presence of leaking sources. Alternatively, the permittee may determine the presence of leaking sources by using optical gas imaging with infrared cameras. 5. For leaks determined using EPA Reference Method 21 (RM 21): 6. The instrument shall be calibrated before each day of its use by the procedures specified in RM 21. 7. The instrument shall be calibrated with zero air (less than 10 ppm of hydrocarbon in air); and a mixture of methane or n-hexane and air at a concentration of about, but less than, 10,000 ppm methane or n-hexane 8. If an instrument reading of 10,000 ppm or greater methane or n-hexane is measured, a leak is detected 9. For leaks determined using optical gas imaging with infrared cameras: 10. The instrument shall comply with the specifications, the daily instrument checks and the leak survey requirements at 40 CFR §60.18(i)(1) – (3). 11. If any emissions are imaged by the optical gas instrument, a leak is detected. 12. Any leaks detected shall be repaired within 30 days of discovery.   For the purpose of this condition *equipment* means each pump, pressure relief device, open-ended valve or line, valve, and flange or other connector.  For the purpose of this condition *in VOC service* means equipment in contact with a gas or a liquid that has a VOC content greater than 10% by weight. |
| **Monitoring:** Once per calendar quarter [or a custom quarterly monitoring period] the permittee shall complete the following monitoring:   1. A chemical analysis for VOC content of all equipment in the unit. 2. A count of all equipment in the unit. 3. an inspection of equipment in VOC service to detect leaks. 4. If a leak is detected, the permittee shall place a visible tag on the leaking component until the component has been repaired. 5. If any leaks are detected, the equipment shall be re-monitored no later than 30 days after discovery of the leak to demonstrate that it has been repaired. 6. If the leak cannot be repaired within 30 days without a process unit shutdown, it may be designated “Repair delayed,” and shall be repaired before the end of the next process unit shutdown. 7. An inspection of equipment in VOC service shall also be conducted within 15 days of any maintenance or repair that affects the equipment. |
| **Recordkeeping:** The permittee shall maintain the following records:   1. equipment identification or description and location; 2. weight percent VOC for each piece of equipment. 3. emission factor for each piece of equipment. 4. total VOC emissions for each unit, tons per year 5. For any leaks detected the permittee shall record the: 6. date a leak is detected; 7. dates of attempts to repair; 8. designation of "Repair delayed"; 9. reason for delay if the leak is not repaired within 30 days of leak discovery, and 10. signature of authorized representative whose decision it was that repair could not be effected without a process shutdown; and 11. The date of successful leak repair shall also be recorded. 12. For leaks determined using optical gas imaging with infrared cameras, the permittee shall keep the records of the specifications, the daily instrument checks and the leak survey requirements specified at 40 CFR §60.18(i)(1) – (3). |
| **Reporting:** The permittee shall report the following in accordance with Section B110:   1. The number of leaking components discovered, 2. The number of leaking components not repaired within 30 days, 3. The duration of the leaks that exceeded 30 days, 4. Dates of process unit shutdowns; and 5. VOC emissions for each unit, tons per year |

**[NOTE – There are no standard conditions proposed at this time that correspond to the scenario addressed in column D in the decision tree.]**

**Units Subject to One or More Federal LDAR Regulations**

**[NOTE – The conditions below correspond to the scenario addressed in column E in the decision tree.]**

1. 40 CFR 60, Subpart VV (Unit(s) X, Y, and Z) [Equipment at Synthetic Organic Chemicals Manufacturing Industry Plants subject to NSPS VV]

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| **Requirement:** Equipment in VOC service (as defined in 40 CFR §60.481) within process unit(s) [X, Y, and Z] is subject to Standards of Performance for Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry, 40 CFR 60, Subpart VV. The permittee shall comply with all applicable requirements in Subparts A and VV. |
| **Monitoring:** The permittee shall implement a leak detection and repair program and shall comply with the standards as specified at 40 CFR §§60.482-1 through 60.482-10, 60.483, 60.484 and 60.485. |
| **Recordkeeping:** The permittee shall comply with the recordkeeping requirements specified at 40 CFR §60.486. |
| **Reporting:** The permittee shall comply with the reporting requirements specified at 40 CFR §60.487. |

1. 40 CFR 60, Subpart VVa (Unit(s) X, Y, and Z) [Equipment at Synthetic Organic Chemicals Manufacturing Industry Plants subject to NSPS VVa]

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| **Requirement:** Equipment in VOC service (as defined in 40 CFR §60.481a) within process unit(s) [X, Y, and Z]is subject to Standards of Performance for Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry, 40 CFR 60, Subpart VVa. The permittee shall comply with all applicable requirements in Subparts A and VVa. |
| **Monitoring:** The permittee shall implement a leak detection and repair program and shall comply with the standards as specified at 40 CFR §60.482-1a through 60.482-11a, 60.483a, 60.484a and 60.485a. |
| **Recordkeeping:** The permittee shall comply with the recordkeeping requirements specified at 40 CFR §60.486a. |
| **Reporting:** The permittee shall comply with the reporting requirements specified at 40 CFR §60.487a. |

1. 40 CFR 60, Subpart GGG (Unit(s) X, Y, and Z) [Equipment at Petroleum Refineries subject to NSPS GGG]

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| **Requirement:** Equipment in VOC service (as defined in 40 CFR §60.591) within process unit(s) [X, Y, and Z]is subject to Standards of Performance for Equipment Leaks of VOC in Petroleum Refineries, 40 CFR 60, Subpart GGG. The permittee shall comply with all applicable requirements in Subparts A and GGG. |
| **Monitoring:** The permittee shall implement a leak detection and repair program and shall comply with the standards as specified at 40 CFR §60.592 except as provided in §60.593. |
| **Recordkeeping:** The permittee shall comply with the recordkeeping requirements specified at 40 CFR §§60.592(e) and 60.486. |
| **Reporting:** The permittee shall comply with the reporting requirements specified at 40 CFR §§60.592(e) 60.487. |

1. 40 CFR 60, Subpart GGGa (Unit(s) X, Y, and Z) [Equipment at Petroleum Refineries subject to NSPS GGGa]

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| **Requirement:** Equipment in VOC service (as defined in 40 CFR §60.591a) within process unit(s) [X, Y, and Z]is subject to Standards of Performance for Equipment Leaks of VOC in Petroleum Refineries, 40 CFR 60, Subpart GGGa. The permittee shall comply with all applicable requirements in Subparts A and GGGa. |
| **Monitoring:** The permittee shall implement a leak detection and repair program and shall comply with the standards as specified at 40 CFR §60.592a except as provided in §60.593a. |
| **Recordkeeping:** The permittee shall comply with the recordkeeping requirements specified at 40 CFR §§60.592a(e) and 60.486a. |
| **Reporting:** The permittee shall comply with the reporting requirements specified at 40 CFR §§60.592a(e) and 60.487a. |

1. 40 CFR 60, Subpart KKK (Unit(s) X, Y, and Z) [Equipment and compressors at Onshore Natural Gas Processing Plants subject to NSPS KKK]

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| **Requirement:** Equipment and compressors in VOC or in wet gas service (as defined in 40 CFR §60.631) within process unit(s) [X, Y, and Z]is subject to Standards of Performance for Equipment Leaks of VOC from Onshore Natural Gas Processing Plants, 40 CFR 60, Subpart KKK. The permittee shall comply with all applicable requirements in Subparts A and KKK. |
| **Monitoring:** The permittee shall implement a leak detection and repair program and shall comply with the standards as specified at 40 CFR §60.632 except as provided in §60.633. |
| **Recordkeeping:** The permittee shall comply with the recordkeeping requirements specified at 40 CFR §60.486 except as provided in §§60.633 and 60.635. |
| **Reporting:** The permittee shall comply with the reporting requirements specified at 40 CFR §60.487 except as provided in §§60.633 and 60.636. |

1. 40 CFR 60, Subpart OOOO (Unit(s) X, Y, and Z) [Equipment at Onshore Natural Gas Processing Plants subject to NSPS OOOO]

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| **Requirement:** Equipment in VOC or in wet gas service (as defined in 40 CFR §60.5430) within process unit(s) [X, Y, and Z]is subject to the equipment leak standards at 40 CFR §60.5400 of 40 CFR 60, Subpart OOOO. The permittee shall comply with all applicable requirements in Subparts A and OOOO. |
| **Monitoring:** The permittee shall implement a leak detection and repair program and shall comply with the standards as specified at 40 CFR §60.5400 except as provided in §60.5401. |
| **Recordkeeping:** The permittee shall comply with the recordkeeping requirements specified at 40 CFR §§60.5400(e) and 60.486 except as provided in §§60.5401 and 60.5421. |
| **Reporting:** The permittee shall comply with the reporting requirements specified at 40 CFR §§60.5400(e) and 60.487 except as provided in §§60.5401 and 60.5422. |

1. 40 CFR 60, Subpart OOOOa (Unit(s) X, Y, and Z) [Equipment at Onshore Natural Gas Processing Plants subject to NSPS OOOOa]

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| **Requirement:** Equipment in VOC or in wet gas service (as defined in 40 CFR §60.5430a) within process unit(s) [X, Y, and Z]is subject to the GHG and VOC equipment leak standards at 40 CFR §60.5400a of 40 CFR 60, Subpart OOOOa. The permittee shall comply with all applicable requirements in Subparts A and OOOOa. |
| **Monitoring:** The permittee shall implement a leak detection and repair program and shall comply with the standards as specified at 40 CFR §60.5400a except as provided in §60.5401a. |
| **Recordkeeping:** The permittee shall comply with the recordkeeping requirements specified at 40 CFR §§60.5400a(e) and 60.486a except as provided in §§60.5401a and 60.5421a. |
| **Reporting:** The permittee shall comply with the reporting requirements specified at 40 CFR §§60.5400a(e) and 60.487a except as provided in §§60.5401a and 60.5422a. |

1. 40 CFR 60, Subpart OOOOa (Unit(s) X, Y, and Z) [Collection of fugitive emissions components at well sites and compressor stations specified at §60.5365a(i) and (j) subject to NSPS OOOOa]

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| **Requirement:** The collection of fugitive emissions components(as defined in 40 CFR §60.5430a) at this facility are subject to the fugitive emissions GHG and VOC leak standards at 40 CFR §60.5497a of 40 CFR 60, Subpart OOOOa. The permittee shall comply with all applicable requirements in Subparts A and OOOOa. |
| **Monitoring:** The permittee shall implement a leak detection and repair program and shall comply with the standards as specified at 40 CFR §60.5397a. Alternative means of emissions limitations at §60.5398a can only be approved by the US EPA. |
| **Recordkeeping:** The permittee shall comply with the applicable recordkeeping requirements specified at 40 CFR §60.5420a(c), including §60.5420a(c)(15) |
| **Reporting:** The permittee shall comply with the applicable reporting requirements specified at 40 CFR §60.5420a(b), including §60.5420a(b)(7). |

1. 40 CFR 63, Subpart CC (Unit(s) X, Y, and Z) [Equipment in organic HAP service at Petroleum Refineries subject to MACT CC]

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| **Requirement:** Equipment in organic HAP service (as defined in 40 CFR §63.641) is subject to the equipment leak standards at 40 CFR §63.648 of 40 CFR 63, Subpart CC. The permittee shall comply with all applicable requirements in Subparts A and CC. |
| **Monitoring:** The permittee shall implement a leak detection and repair program and shall comply with the standards as specified at 40 CFR §63.648. |
| **Recordkeeping:** The permittee shall comply with the recordkeeping requirements specified at 40 CFR §63.655. |
| **Reporting:** The permittee shall comply with the reporting requirements specified at 40 CFR §63.655. |

1. 40 CFR 63, Subpart HH (Unit(s) X, Y, and Z) [Ancillary equipment and Compressors at Natural Gas Processing Plants subject to MACT HH]

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| **Requirement:** Ancillary equipment and compressors in VHAP service (as defined in 40 CFR §63.761) are subject to the equipment leak standards at 40 CFR §63.769 of 40 CFR 63, Subpart HH. The permittee shall comply with all applicable requirements in Subparts A and HH. |
| **Monitoring:** The permittee shall implement a leak detection and repair program and shall comply with the standards as specified at 40 CFR §63.769. |
| **Recordkeeping:** The permittee shall comply with the recordkeeping requirements specified at 40 CFR §63.774. |
| **Reporting:** The permittee shall comply with the reporting requirements specified at 40 CFR §63.775. |

**Background:**

How emissions were determined is key to establishing monitoring. Usually, fugitive leaks are calculated based on an emission factor for each component, the number of components, and the concentration of the pollutant inside the component.

A possible approach for monitoring is leak detection monitoring. The intent of leak detection monitoring is to ensure that fugitive emission leaks do not go undetected, and that detected leaks with a concentration > 10,000 ppm methane or n-hexane are repaired within a specified time frame.

See PowerPoint file at: [XXXX] for Protocol Flow Diagram

NOTES:

1. All Fugitive VOC and HAP emissions, to the extent practicable, should be reported in the permit application. (N/C)
2. Fugitive VOC and HAP emissions should be included in the VOC and HAP totals in the public notice. (N/C)
3. **Table 102.A in permit:** Fugitive VOC emissions should be included with a footnote identifying how many tons are fugitive.
4. **Table 104 in permit:** Fugitive VOC’s should be listed in Table 104.A as a Regulated Source since that section states that all regulated sources at the facility are listed. If there is an emission limit in the permit, then conditions demonstrating compliance must be included. If no emission limit is required, for example, since VOC emissions are less than 25 tpy, then no conditions should be added.

**Examples of EQUIPMENT SUBJECT TO 40 CFR 60, SUBPART KKK**

***Inlet compression Turbine(s) X and associated valves and piping***

***Cryogenic Liquids Extraction Plant***

***Tank farm***

***Truck loading rack***

***Amine Treater***

***Sulfur Recovery Unit***

***Dehydrator***

**EQUIPMENT SUBJECT TO 40 CFR 60, SUBPART KKK**

(1) Pumps in LLS – Light Liquid Service 60.482-2

(2) PRDs – Pressure Relief Devices 60.482-4

(3) G/VS – Gas/Vapor Service 60.482-4

(4) OEVs – Open Ended Valves 60.482-6

(5) OELs – Open Ended Lines 60.482-6

(6) Pumps and valves in heavy liquid service, pressure relief devices in light liquid or heavy liquid service, and flanges and other connectors. §60.482-8

(7) CVSCDs – Closed Vent Systems & Control Devices §60.482-10

(8) Valves in G/VS & LLS 60.482-7

(10) Compressors 60.482.3

MONITORING REQUIREMENTS FOR EQUIPMENT SUBJECT TO 40 CFR 60, SUBPART KKK

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| **Process Unit** | **§60.482-2**  **Pumps in LLS(1)** | **§60.482-4**  **PRDs(2) in G/VS(3)** | **§60.482-7 Valves in G/VS(3) & LLS(1)** | **§60.482-8**  **(6)** | **§60.482-10**  **CVSCDs (7)** |
|  | 60.482-2(a)(1)&(2) | 60.633 (b)(1) & (b)(4)(i) & (ii) | 60.482-7(a)&(c)(1)&(2) | 60.482-8 (a) | 60.482-10(e) & (f)(1) & (2) |
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