**NORTH CAROLINA DIVISION OF AIR QUALITY**

# Application Review

**Issue Date:** XXXXX xx, 2024

**Region:** Asheville Regional Office
**County:** Haywood
**NC Facility ID:** 4400857
**Inspector's Name:** Amro Ali
**Date of Last Inspection:** 09/28/2023
**Compliance Code:** 3 / Compliance - inspection

## Facility Data

**Applicant (Facility's Name):** White Oak Landfill

**Facility Address:**
White Oak Landfill
3898 Fines Creek Road
Waynesville, NC 28785

**SIC:** 4953 / Refuse Systems
**NAICS:** 562212 / Solid Waste Landfill

**Facility Classification: Before:** Title V **After:** Title V
**Fee Classification: Before:** Title V **After:** Title V

## Permit Applicability (this application only)

**SIP:** 15A NCAC 02D .0524, .1110, 02D .1806, and 02Q .0523
**NSPS:** Subpart XXX
**NESHAP:** 40 CFR 61, Subpart M
**PSD:** N/A
**PSD Avoidance:** N/A
**NC Toxics:** Yes, but exempted by 15A NCAC 02Q .0702(27)(A) because of NESHAP 61, Subpart M.
**112(r):** N/A
**Other:** 15A NCAC 02D .1806

## Contact Data

| Facility Contact | Authorized Contact | Technical Contact |
|---|---|---|
| John Preston<br>Landfill Manager<br>650 25th Street NW, Suite 100<br>Cleveland, TN 37311<br><br>(423) 650-3095<br><br>JPreston4@republicservices.com | Shane Walker<br>Area President<br>2440 Whitehall Park Drive, Suite 800<br>Charlotte, NC 28273<br><br>(980) 430-8511<br><br>SWalker@republicservices.com | Mark Stanley<br>Area Manager, Engineering/Enviro<br>2440 Whitehall Park Drive, Suite 800<br>Charlotte, NC 28273<br>(980) 430-8522 |

## Application Data

**Application Number:** 4400857.22A and .22B
**Date Received:** 05/25/2022 and 03/18/2022
**Application Type:** Renewal and 502(b)(10)
**Application Schedule:** TV-Renewal

### Existing Permit Data

**Existing Permit Number:** 10535/T01
**Existing Permit Issue Date:** 03/12/2018
**Existing Permit Expiration Date:** 02/28/2023

**Total Actual emissions in TONS/YEAR:**

| CY | $SO_2$ | $NO_X$ | VOC | CO | $PM_{10}$ | Total HAP | Largest HAP |
|---|---|---|---|---|---|---|---|
| 2021 | **0.0100** | **0.2200** | **8.06** | **0.0500** | **0.0200** | **4.62** | **1.65 [Toluene]** |
| 2020 | **0.0100** | **0.2200** | **7.42** | **0.0500** | **0.0200** | **4.25** | **1.52 [Toluene]** |
| 2019 | **0.0100** | **0.2200** | **6.78** | **0.0500** | **0.0200** | **3.88** | **1.39 [Toluene]** |
| 2018 | **---** | **---** | **6.13** | **---** | **---** | **3.52** | **1.26 [Toluene]** |

**Review Engineer:** Booker Pullen/Massoud M. Eslambolchi

**Review Engineer's Signature:** **Date:** XXXXxx, 2024

**Comments / Recommendations:**

**Issue:** 10535T01
**Permit Issue Date:** XXXXXX xx, 2024
**Permit Expiration Date:** XXXXX, xx, 2029

Note: The design plan for this facility was approved in January 2024. The permit to install and operate the GCCS (10535T01) was approved in April 2024.

## 1.0 Facility Description

White Oak Landfill (WOL) is a currently permitted municipal solid waste landfill (Permit No. 10535T00) that is owned by Haywood County and is operated by Republic Services. The facility began operation in 1993 and is located at 3898 Fines Creek Road in Waynesville, Haywood County, North Carolina 28785. The landfill accepts municipal solid waste as well as Construction & Demolition waste, along with small amounts of asbestos containing material. This landfill may only receive waste from the eighteen westernmost counties in North Carolina (Avery, Buncombe, Burke, Cherokee, Clay, Graham, Haywood, Henderson, Jackson, McDowell, Macon, Madison, Mitchell, Polk, Rutherford, Swain, Transylvania and Yancey).

The landfill received its initial Title V permit in March 2018. The existing permit for this facility includes the requirements for 40 CFR Subpart XXX because the landfill was modified after July 2014. This landfill is subject to Title V because the landfill has a design capacity of greater than 2.5 million Megagrams and 2.5 million cubic meters of waste in accordance with 40 CFR 60.762(b). This facility does not currently have a gas collection and control system installed at the facility but has submitted a gas collection design plan to the DAQ which was received on January 18, 2023.

The landfill performed Tier 2 testing and the results were submitted to the DAQ. The results of the testing were approved by the DAQ on March 1, 2019. The estimated NMOC emissions using the Tier 2 results indicated a value below 34 Megagrams per year through the end of 2020.

The only other emission sources at this landfill site are insignificant activities: one tub grinder (ID No. I-2), seven temporary solar vent flares (ID Nos. (ID Nos. I-3.1, I-3.2, I-3.3, I-3.4, I-3.5, I-3.6, and I-3.7) and one insignificant leachate lagoon (ID No. I-1, 500,000 gallons maximum capacity).

The design plan for this facility was received by the Division of Air Quality on January 18, 2023 in the Asheville Regional Office. The plan was approved by the Raleigh Central Office (Booker Pullen) in January 2024.

The facility received approval for TV Significant modification (Step-1) on April 23, 2024, for installation and operation of a gas collection and control system (GCCS1) and a utility flare (CD-1).

## 2.0 Purpose of Application

Application No. 4400857.22A was submitted to the North Carolina Department of Environmental Quality, Division of Air Quality (DAQ) for the renewal of the existing Title V operating permit for the White Oak Landfill. The renewal application was initially received in the Asheville Regional Office on May 25, 2022 and was considered complete on that date. The application was transferred to the Raleigh Central Office on May 27, 2022. The current permit expires on February 28, 2023. The renewal application was received at least six months prior to the expiration date per Section 3, General Conditions K of the existing permit, therefore this permit shall not expire until the renewal permit has been issued or denied. All terms and conditions of the permit shall remain in effect.

Application No. 4400857.22B was submitted as a 501(b)(10) modification on March 18, 2022 to install six temporary solar vent flares (ID Nos. I-3.1, I-3.2, I-3.3, I-3.4, I-3.5, I-3.6). After the most recent inspection by the Asheville Regional Office, it was stated by the inspector that there is a plan to install a seventh solar vent flare (I-3.7) at the facility. All of these flares are considered insignificant activities in accordance with 15A NCAC 02Q .0503(8). This application will be combined with renewal application 4400857.22A and processed during the renewal of the current Title V permit.

The renewed permit will include the requirements of 40 CFR 61, Subpart M (asbestos) and is required to go through both a 30-day public notice and a 45-day EPA review period prior to issuance.

The facility contact for this application is John Preston, Landfill Manager (phone number 423.650.3095, email: JPreston4@republicservices.com). The consulting firm SCS Engineers, PC was used to prepare this application. The contact for SCS Engineers is David Walker (704.504.3107, email: dwalker@scsengineers.com).

**3.0 History/Background**

| | |
|---|---|
| 03/12/2018 | 1st Time Title V Permit issued (10535T00). |
| 09/21/2018 | Inspection report (facility appeared to be operating in compliance with permit 10535T00). |
| 11/05/2018 | Inspection report (facility appeared to be operating in compliance with permit 10535T00). |
| 05/14/2019 | Inspection report (facility in compliance with permit 10535T00). This was the during COVID-19 year and no onsite inspections were performed. The inspection was done via phone, email, etc. |
| 09/09/2020 | Inspection report (facility appeared to be operating in compliance with permit 10535T00). |
| 08/10/2021 | Inspection report (facility appeared to be operating in compliance with permit 10535T00). |
| 03/18/2022 | 502(b)(10) application (4400857.22B) was received for the addition of six insignificant activity sources temporary solar vent flares. After the most recent inspection by the Asheville Regional Office, it was stated by the inspector that there is a plan to install seven solar vent flares at the facility. |
| 05/05/2022 | Inspection report (facility appeared to be operating in compliance with permit 10535T00). |
| 01/18/2023 | Gas collection and control system design plan received in the Asheville Regional Office. |
| 04/23/2024 | Significant modification to TV was issued for installation and operation of gas collection control system (GCCS1) and landfill-gas fired utility flare (CD-1), under application 4400857.24. |

Application Chronology

| | |
|---|---|
| 05/25/2022 | Renewal application (4400857.22A) was submitted to the Division of Air Quality and considered complete on this date. |
| 06/06/2022 | Sent acknowledgment letter indicating that the application (4400857.22A) for the renewal permit was complete on May 25, 2022. |
| 12/05/2023 | Draft permit and review was forwarded to Supervisor (Rahul Thaker). Comments received and incorporated into the permit on 12/15/2023. |
| 01/23/2024 | Draft permit and review forwarded to the Stationary Compliance Branch and ARO for comments. No comments were received. |
| 01/23/2024 | Draft permit forwarded to the applicant for comments. No comments were received. |
| XX, xx, 2023 | Draft permit and permit review forwarded to the 30-day public notice and the 45-day EPA review. |
| XX, xx, 2023 | Public comment period ends. ….comments received. |
| XX xx, 2023 | EPA comment period ends. „./…. comments received. |

## 4.0 Table of Permitted Sources

The facility's permitted emission sources (following 502(b)(10) modification[1]) are as follows:

| Emission Source ID No. | Emission Source Description | Control Device ID No. | Control Device Description |
|---|---|---|---|
| ES-1<br>**NSPS XXX**<br>**NESHAP M** | Municipal solid waste landfill | CD-GCCS*<br><br>CD-1* | One landfill gas collection and control system<br><br>One landfill gas-fired candlestick type flare (1,860 scfm maximum gas flow rate) |

* Construction and operation of the proposed landfill gas collection and control system (GCCS-1 and CD-1) is considered voluntary based on estimated NMOC annual generation rate of below the applicable threshold pursuant to 40 CFR 60 Subpart XXX provisions

1 No additional equipment is being added during this renewal application, however temporary solar vent flares (ID Nos. I-3.1, I-3.2, I-3.3, I-3.4, I-3.5, I-3.6, I-3.7) were added as insignificant activities during a 502(b)(10) application.

Insignificant Activities in accordance with 15A NCAC 02Q .0503(8)

| Emission Source ID No. | Emission Source Description |
|---|---|
| I-1 | Leachate lagoon (500,000 gallons maximum capacity) |
| I-2 | Tub grinder |
| I-3.1<br>I-3.2<br>I-3.3<br>I-3.4<br>I-3.5<br>I-3.6<br>I-3.7 | Seven solar vent flares (estimated 140 standard cubic feet per minute flow rate each) |

## 5.0 Changes to the Existing Permit

The following table describes the modifications to the current permit as part of this renewal process.

| Pages | Section | Description of Changes |
|---|---|---|
| -- | Cover page and throughout permit | Updated all dates and permit revision numbers. |
| pg 34of cover letter | Cover page | Added "Notice Regarding The Right To Contest A Division Of Air Quality Permit Decision" page. |
| pg 3 of cover letter | Summary of Changes to Permit Page | Added summary of changes made to the permit according to the most recent requirements of the renewed Title V permit. |
| pg 1 of Permit | Cover page of permit | • Updated all dates, application numbers and permit revision numbers. |
| pg 2 of Permit | Table of Contents | • Added Section 2.2 "Permit Shield for Non-applicable Requirements.<br>• Added Section 3.0 as "Insignificant Activities List".<br>• Added Section 4.0 as "General Permit Conditions". |
| pg. 3 of Permit | Body of Permit | • Added "List of Acronyms". |
| pages 4-13 | Section 2.1 A.1 | • Updated the NSPS XXX regulatory requirements |
| pg 18 of Permit | Section 3 | Added Insignificant Activities table as Section 3, added seven temporary landfill gas solar vent flares |

| Pages | Section | Description of Changes |
|---|---|---|
| pg 19 of Permit | Section 4 | Added most current General Condition (version 8.0, 7/10/2024) as Section 4. |

**6. Regulations Listed in the Current Permit:**

The facility is subject to the following air quality regulations in addition to the General Conditions:

- 15A NCAC 02D .0524 "New Source Performance Standards", Subpart XXX
- 15A NCAC 02D .0711 "Emission Rates Requiring a Permit" (not listed in the permit because the facility is subject to MACT Subpart 61)
- 15A NCAC 02D .1100 "Control of Toxic Air Pollutants" (not listed in the permit because the facility is subject to MACT Subpart 61)
- 15A NCAC 02D .1110 "National Emissions Standards for Hazardous Air Pollutants", 40 CFR 61, Subpart M
- 15A NCAC 02D .1806 "Control and Prohibition of Odorous Emissions"
- 15A NCAC 02Q .0503(8) "Definitions, Insignificant Activities due to size"

**7.0 Regulatory Review**

The White Oak Landfill is subject to the following regulations. The facility's equipment and operations have not changed since the last renewal in 2018. The permit was updated to reflect the most current stipulations for all applicable regulations, where necessary.

15A NCAC 02D .0524 "New Source Performance Standards"

The White Oak Landfill is subject to NSPS Subpart XXX "Standards of Performance for Municipal Solid Waste Landfills That Commenced Construction, Reconstruction, or Modification After July 17, 2014". Sources subject to new source performance standards promulgated in 40 CFR Part 60 shall comply with emission standards, monitoring and reporting requirements, maintenance requirements, notification and record keeping requirements, performance test requirements, test method and procedural provisions, and any other provisions, as required therein. Continued compliance is anticipated. See Section 8.0 below for further evaluation.

15A NCAC 02D .1110 "Emission Standards for Hazardous Air Pollutants"

The White Oak Landfill is subject to NESHAP 61, Subpart M "National Emission Standards for Asbestos". Sources subject to national emission standards for hazardous air pollutants for source categories promulgated in 40 CFR Part 61 shall comply with emission standards, monitoring and reporting requirements, maintenance requirements, notification and record keeping requirements, performance test requirements, test method and procedural provisions, and other provisions, as required therein. Compliance is anticipated. See Section 8 below for further evaluation.

15A NCAC 02D .1806 "Control and Prohibition of Odorous Emissions"

This regulation is State-enforceable only and is applicable facility-wide. DAQ inspectors did not note any objectionable odors beyond the facility's property boundary during the most recent inspection, and neither DAQ nor the facility have received any odor complaints from nearby residents. Continued compliance is expected.

15A NCAC 02Q .0523 "Changes Not Requiring Permit Revisions"

Application No. 4400857.22B requested the addition of six temporary solar vent flares to be located at the facility. After the most recent inspection by the Asheville Regional Office, it was stated by the inspector that there is a plan to install a total of seven solar vent flares at the facility. Solar vent flares are widely used for odor and emission control at passive outlets, such as cap vents, leachate stations, or from gas outbreaks at the surface of active or closed landfill cells. All of these solar vent flares will be included in the Title V permit as insignificant activities in accordance with 15A NCAC 02Q .0503(8).

**Data:**

- Seven solar vent flares at 140 standard cubic feet per minute flow rate (max flow for seven = 1120 scfm)
- Methane heat content = 1,012 Btu per standard cubic foot (AP-42)
- Landfill gas heat content = 506 Btu per standard cubic foot
- NOx emission factor = 39 lbs NOx/million cubic feet of methane (AP-42, revision 2008)
- CO emission factor = 46 lbs CO/million cubic feet of methane (AP-42, revision 2008)
- PM emission factor = 15 lbs PM/million cubic feet of methane (AP-42, revision 2008)
- $SO_2$ emission factor = Calculated using equations 3, 4, and 7 of AP-42, Section 2.4, revision 2008
- HCL emission factor = Calculated using equations 3, 4, and 10 of AP-42, Section 2.4, revision 2008

See Attachment "A" of this review for an email from the US EPA inferring that the 2008 draft AP-42 emission factors can be used for Title V air permit applications and renewals because the emission factors for carbon monoxide, nitrogen dioxide, and particulate matter all receive an "A" rating when ranked by EPA based on dataset size and other factors.

Sample calculation of annual NOx emissions from each of the seven solar vent flares burning landfill gas at 8760 hours per year and 50% methane:

$$\frac{39\ lbs\ NOx}{10^6\ ft^3\ CH_4} \times \frac{50\ (CH_{4\ content})}{100\ lfg} \times \frac{140\ \text{ft}^3\ \text{lfg}}{\text{minute}} \times \frac{60\ \text{minutes}}{1\ \text{hr(s)}} \times \frac{8760\ \text{hrs}}{\text{yr}} \times \frac{1\ \text{ton NOx}}{2000\ \text{lbs NOx}} = \frac{0.72\ tons\ NOx}{yr}\ each$$

A total emission rate of 0.72 tons per year of NOx was calculated for each flare. The annual emissions of CO and PM were calculated in a similar fashion to be:

NOx = 0.72 tpy each solar vent flare
CO = 0.85 tpy each solar vent flare
PM = 0.28 tpy each solar vent flare
VOC = 0.01 tpy year each solar flare (using the AP-42, Section 2.4.4 states that the fraction of NMOC (as hexane) in the landfill gas contains VOCs. Each flare can obtain 98% control efficiency for VOCs.

Sample calculation of annual $SO_2$ emissions from each of the seven solar flares burning landfill gas at 8760 hours per year:

Calculation of sulfur emissions:

$$Q_{sulfur} = A \times Q_{CH_4} x \left(\frac{C_p}{1\times 10^6}\right)$$ Equation 3, Section 2.4.4.1, revision 2008

**Where:**
$Q_p$ = Emission rate of pollutants, $m^3$/yr
$Q_{CH4}$ = Methane generation rate, $m^3$/yr
$C_p$ = concentration of reduced sulfur compounds (if not known) from AP-42 Section 2.4, 2008 draft (47.0 ppmv)
A = multiplication factor (2.0) for 50% methane ($CH_4$) and that 50 percent is $CO_2$, $N_2$, and other constituents) – This factor used for the calculation of pounds of $SO_2$ per million Btu
A = multiplication factor (1.82) for 55% methane ($CH_4$) and that 45 percent is $CO_2$, $N_2$, and other constituents)
A = multiplication factor (1.43) for 70% methane ($CH_4$) and that 45 percent is $CO_2$, $N_2$, and other constituents) – This is the factor used for toxic pollutant and HAP calculations.

Calculation of the uncontrolled $SO_2$ emission rate for the combustion of landfill gas @ 50% methane content and 140 standard cubic feet per minute of flow for 8760 hours.

$$= \frac{140\ ft^3\ lfg}{minute} \times \frac{50\ ft^3\ CH_4}{100\ ft^3\ lfg} \times \frac{60\ minutes}{hour} \times \frac{8760\ hours}{year} \times \frac{1\ m^3}{35.31466\ ft^3\ CH_4} = \frac{1{,}041{,}834\ m^3 CH_4}{year}$$

$$Q_{sulfur} = A \times Q_{CH_4} x \left(\frac{C_p}{1\times 10^6}\right)$$ Equation 3, Section 2.4.4.1

$$Q_{sulfur} = 2.0 \times \frac{1{,}041{,}834\ m^3 CH_4}{yr} \times \left(\frac{47\ parts}{1\times 10^6}\right) = \frac{97.9\ m^3}{year}$$

The potential emissions of sulfur that would come from the landfill gas at 47.0 ppmv equates to 97.9 $m^3$ per year.

$$UM_{sulfur} = \frac{97.9\ m^3\ sulfur}{yr} \quad x \left[ \frac{MW\ (g/gmole) \times (1\ atmosphere)}{(\frac{8.205 \times 10^{-5}\ m^3 - atmospere}{gmol - {}^0K}) \times \frac{1000\ g}{kg} \times (273 + 25\ {}^0C)\ {}^0K} \right] = \frac{kg\ Sulfur}{year}$$

**Where:**
$UM_{sulfur}$ = Uncontrolled mass emissions of pollutants, kg sulfur/yr
$MW_p$ = Molecular weight of pollutant, 32.065 grams sulfur/gmol
$Q_p$ = Emission rate of pollutant, $m^3$/yr
$T^0$ = $25^0$ C (77 $^0$F), recommended by AP-42 for landfill gas temperature if temperature is unknown

$$UM_{sulfur} = \frac{97.9\ m^3}{yr}\ x \left[ \frac{32.065\ grams\ sulfur/gmole \times (1\ atmosphere)}{(\frac{8.205 \times 10^{-5}\ m^3 - atmospere}{gmol - {}^0K}) \times \frac{1000\ g}{kg} \times (273 + 25\ {}^0C)\ {}^0K} \right] = \frac{128\ kg\ sulfur}{year}$$

The calculated emissions of $SO_2$ are twice the emissions of Sulfur (MW ratio).

$CM_{SO2}$ = Controlled mass emissions of $SO_2$ (kg/yr)
UM = Uncontrolled mass emissions of reduced sulfur compounds as sulfur (kg/yr) (from AP-42 Section 2.4.4.1 equations 3 and 4)
Ŋ = Efficiency of the landfill gas collection system (percent)
2.0 = Ratio of the molecular weight of $SO_2$ to the molecular weight of S
170.02 = Flare heat input rate

$$CM_{SO2} = UM_S \times \frac{\eta_{col}}{100} \times 2.0 \quad \text{Equation 7, Section 2.4.4.1}$$

$$= \frac{128.0\ kg\ S}{year} \times \frac{100}{100} \times \frac{2.0}{1} \times \frac{2.205\ lbs\ SO2}{kg\ S} \times \frac{1\ ton\ SO_2}{2000\ lbs\ SO_2} = \frac{0.28\ tons\ SO2}{yr}$$

In accordance with 15A NCAC 02Q.0503(8), each flare emits less than 5 tons per year of each a criteria pollutant.

Sample calculation for HAP emissions

Calculation of annual HAP (toluene) emissions from each solar flare burning landfill gas at 8760 hours per year and 50% methane. Based on the calculations, the largest individual HAP constituent of the landfill gas is toluene. Therefore, if the annual toluene emissions are less than 1,000 pounds, then all the other individual HAP emissions will be less than 1,000 pounds.

$$Annual\ flare\ flow\ rate = \frac{140\ ft^3\ lfg}{minute} \times \frac{50\ ft^3\ CH_4}{100\ ft^3\ lfg} \times \frac{60\ minutes}{hour} \times \frac{8760\ hours}{year} \times \frac{1\ m^3}{35.31466\ ft^3\ CH_4} = \frac{1{,}041{,}834\ m^3 CH_4}{year}$$

$$Q_{toluene} = A \times Q_{CH_4} x \left(\frac{C_p}{1 \times 10^6}\right) \quad \text{Equation 3, Section 2.4.4.1}$$

**Where:**
$Q_{toluene}$ = Emission rate of pollutants, $m^3$/yr
$Q_{CH4}$ = Methane generation rate, $m^3$/yr
$C_p$ = concentration of toluene from AP-42 Section 2.4, 2008 draft (29.5 ppmv)
A = multiplication factor (2.0) for 50% methane ($CH_4$) and that 50 percent is $CO_2$, $N_2$, and other constituents) – This factor used for the calculation of pounds of toluene
A = multiplication factor (1.82) for 55% methane ($CH_4$) and that 45 percent is $CO_2$, $N_2$, and other constituents)
A = multiplication factor (1.43) for 70% methane ($CH_4$) and that 45 percent is $CO_2$, $N_2$, and other constituents) – This is the factor used for toxic pollutant and HAP calculations.

$$Q_{toluene} = A \times Q_{CH_4} x \left(\frac{C_p}{1\times 10^6}\right)$$ Equation 3, Section 2.4.4

$$Q_{toluene} = 2.0 \times \frac{1{,}041{,}834\ m^3 CH_4}{yr} \times \left(\frac{29.5\ parts}{1\times 10^6}\right) = \frac{61.5\ m^3\ toluene}{year}$$

$$UM_{toluene} = \frac{61.5\ m^3\ toluene}{yr} \quad x \left[\frac{MW\ (g/gmole)\times (1\ atmosphere)}{(\frac{8.205\times 10^{-5}\ m^3-atmospere}{gmol-{}^0K})\times \frac{1000\ g}{kg} \times (273+ 25{}^0C)\ {}^0K}\right] = \frac{kg\ toluene}{year}$$

**Where:**
$UM_{toluene}$ = Uncontrolled mass emissions of pollutants, kg toluene/yr
$MW_p$ = Molecular weight of pollutant, 92.14 grams sulfur/gmol
$Q_p$ = Emission rate of pollutant, $m^3$/yr
$T^0$ = $25^0$ C (77 $^0$F), recommended by AP-42 for landfill gas temperature if temperature is unknown

$$UM_{toluene} = \frac{61.5\ m^3}{yr}\ x \left[\frac{92.14\ grams\ toluene/gmole\times (1\ atmosphere)}{(\frac{8.205\times 10^{-5}\ m^3-atmospere}{gmol-{}^0K})\times \frac{1000\ g}{kg} \times (273+ 25{}^0C)\ {}^0K}\right] = \frac{231.75\ kg\ toluene}{year}$$

$$CM_{toluene} = UM_{toluene} \times \frac{\eta_{col}}{100}$$ Equation 7, Section 2.4.4.1

$$= \frac{231.75\ kg\ toluene}{year} \times \frac{100}{100} \times \frac{2.205\ lbs\ SO2}{kg\ S} \times (1-0.98)\ control\ efficiency = \frac{10.2\ pounds\ toluene}{yr}$$

In accordance with 15A NCAC 02Q.0503(8) each flare emits less than 1000 lbs of any one HAP.

The flares will be placed into the renewal permit as insignificant activities (140 scfm each, I-3.1, I-3.2, I-3.3, I-3.4, I-3.5, I-3.6 and I-3.7)

**8. NSPS, NESHAPS/MACT, PSD, 112(r), CAM, PFAS**

**NSPS**
This facility is subject to 40 CFR 60, Subpart XXX because it was modified after July 17, 2014. A Tier 2 testing protocol was submitted to the Asheville Regional Office on September 21, 2018. The subsequent Tier 2 test was performed and a report was submitted to the DAQ. A memorandum approving the test (dated March 1, 2019) was issued by the Stationary Source Compliance Branch of DAQ. See the results of the test in the table below.

| Emissions Year Modeled | Estimated Annual Waste Acceptance Rate (Mg/Yr) | As of January 1, Current Solid Waste-In-Place (Mg) | NMOC Emissions Limits (Mg/Yr) | Modeled Tier 2 NMOC Emissions (Mg/Yr) | Compliance |
|---|---|---|---|---|---|
| 2018 | 145,833** | 1,305,047 | < 34 | 27.8 | Indicated |
| 2019 | 145,833** | 1,450,930 | < 34 | 30.9** | Indicated |
| 2020 | 145,833** | 1,596,813 | < 34 | 33.9** | Indicated |
| 2021 | 145,833** | 1,742,695 | < 34 | 36.7** | Not indicated |
| 2022 | 145,833** | 1,888,578 | < 34 | 39.4** | Not indicated |
| 2023 | 145,833** | 2,034,461 | < 34 | 42.0** | Not indicated |

** Assuming future waste receipts in years 2018 through 2023

The NMOC emission rate shall be calculated using the procedures specified in 40 CFR 60.764(a)(1) until such time as the calculated NMOC emission rate is equal to or greater than 34 megagrams per year.

If the calculated NMOC annual emission rate is equal to or greater than 34 megagrams per year, the owner or operator must either: (a) submit a gas collection and control system design plan within one year of the first annual report showing a total greater than 34 Mg; or (b) calculate the NMOC emissions using the next higher tier in 40 CFR 60.764; or (c) conduct a surface emission monitoring demonstration using the procedures specified in 40 CFR 60.764(a)(6).

A gas collection and control system design plan was submitted by this facility to the Asheville Regional Office on January 18, 2023. The design plan was forwarded to the Raleigh Central Office on January 19, 2023 via email and was placed into the DAQ database as Applicability Determination #3925.

**NESHAP**

15A NCAC 02D .1110, 40 CFR 61, Subpart M "Nation Emission Standards for Hazardous Air Pollutants"
The landfill is an active disposal site for asbestos-containing wastes; therefore, it is subject to the requirements of this regulation. To comply, the facility must adhere to a general set of work practices which may include ensuring there are no visible emissions at the disposal site, covering waste daily with at least six inches of compacted non-asbestos material or use another dust suppression agent; the landfill may propose alternative methods for DAQ approval. The facility will be required to post signage and barriers if the method of compliance does not include covering the asbestos-containing waste. Closed portions of the landfill which have previously received asbestos-containing waste are also subject and are required to comply with the requirements of 40 CFR 61.151 for inactive waste disposal sites. The landfill provided a copy of their asbestos waste management plan as part of the Solid Waste Permit applications, and the plan appears to meet the requirements of this Subpart.

In accordance with 15A NCAC 02Q .0702 (27)(A) "Exemptions", a permit to emit toxic air pollutants shall not be required pursuant to this Section for an air emission source that is subject to an applicable requirement pursuant to 40 CFR Part 61, as amended. Therefore, toxic air pollutant emissions from the landfill and the insignificant activity sources will not be listed in the Title V air permit.

Compliance is expected.

**MACT**

15A NCAC 02D .1111, 40 CFR 63, Subpart AAAA "National Emission Standards for Hazardous Air Pollutants for Municipal Solid Waste Landfills"

The White Oak Landfill is not subject to this Subpart because:
- The landfill is not a major source as defined in 40 CFR 63.2 of Subpart A.
- The landfill is not collocated with a major source as defined in 40 CFR 63.2 of Subpart A.
- The landfill does not have an NMOC emissions rate equal to or greater than 50 megagrams per year (Mg/yr) NMOC as calculated according to 40 CFR 63.1959.

**PSD**

This facility is not subject to PSD because the potential emissions of each criteria pollutant is below the 250 ton per year threshold. This landfill is considered a minor source under the PSD program as indicated on the cover page of the proposed Title V permit.

Haywood County has triggered increment tracking under PSD for NOx. However, this permit renewal does not consume or expand increments for any pollutants.

**112(r)**

The facility is not subject to Section 112(r) of the Clean Air Act requirements because it does not store any of the regulated substances in quantities above the 112(r) thresholds. No change with respect to 112(r) is anticipated under this permit renewal.

**CAM**

The CAM rule (15A NCAC 02D .0614) applies to each pollutant specific emissions unit (PSEU) at Title V facilities that meets all three following criteria:

- the unit is subject to any (non-exempt: e.g. pre November 15, 1990, Section 111 or Section 112 standard) emission limitation or standard for the applicable regulated pollutant.
- the unit uses any control device to achieve compliance with any such emission limitation or standard.
- The unit has potential pre-control device emissions of the applicable regulated air pollutant that are equal to or greater than 100 percent of the amount, in tons per year, required for a source to be classified as a major source (i.e., 100 tons per year for criteria pollutants or 10/25 tons per year for HAPs).

This facility does not currently use any control devices and the landfill is subject to a post November 1990 NSPS standard that regulates the pollutants that would be subject to CAM for this facility. CAM does not apply.

**9. Facility Wide Air Toxics**

Toxic air pollutants (TAPs) from the White Oak Landfill are subject to NESHAP Subpart M. In accordance with North Carolina's general statute 143-215.107(a) and regulation 15A NCAC 02Q .0702(a)(27), toxic emissions from sources subject to MACT or NESHAP standards exempts them from having to receive a permit to emit air toxic pollutants. As such, the State is required to evaluate the toxic air emissions for this facility to determine if these sources present an unacceptable risk to human health. As part of the previous permit renewal, the DAQ conducted a TAP evaluation.

A dispersion modeling analysis for the White Oak Landfill in Waynesville, Haywood County, North Carolina was received by the Division of Air Quality Analysis group on July 18, 2017. At the time of the modeling exercise, there were no combustion sources included in the analysis. Therefore, the toxic air pollutants were evaluated at the maximum fugitive emissions from the landfill (area source) without controls. The purpose for the modeling was to determine if TAP emissions from the landfill presented an unacceptable risk to human health. This was accomplished by demonstrating compliance with guidelines specified in 15A NCAC 2D .1104 for Toxic Air Pollutants (t APs) emitted in excess of the Toxic Permitting Emission Rates (TPERs) listed in t SA NCAC 2Q .0711.

The modeling adequately demonstrated that there was no unacceptable risk to human health (values below the Ambient Air Limits) for the five toxics modeled (acrylonitrile, benzene, hydrogen sulfide, methyl mercaptan, and vinyl chloride). AERSCREEN (vl6216), using the EPA default meteorological settings, was used to evaluate impacts from the area source in the area surrounding the facility. The landfill was modeled as a 610.4 by 531.3 area source with an average elevation of 15 meters. A 0.1 adjustment was made to the modeled maximum 1-hour average air concentration to estimate the annual average air concentration because AERSCREEN does not make this adjustment for area sources.

Table 1: modeled air pollutants

| Pollutant | Emission Rate (lbs/hour) | Averaging Period | Maximum Concentration ($\mu g/m^3$) | AAL ($\mu g/m^3$) | % of AAL |
|---|---|---|---|---|---|
| Acrylonitrile | 0.0389 | 1-hour | 0.78 | 80 | 1 % |
| Benzene | 0.0173 | Annual | 0.035 | 0.12 | 29% |
| Hydrogen sulfide | 0.3942 | 24-hour | 7.9 | 120 | 7% |
| Methyl mercaptan | 0.0139 | 1-hour | 0.28 | 50 | 0.6% |
| Vinyl chloride | 0.0531 | Annual | 0.09 | 0.38 | 28% |

Hydrogen Chloride is a North Carolina toxic air pollutant and is created from the combustion of landfill gas (which contains chlorine ions) in the solar vent flares. The landfill had no combustion of landfill gas prior to the solar vent flares being added. The design plan for the White Oak landfill was received on January 18, 2023 and was approved in January 2024. The emissions of toxic air pollutants that were previously modeled from the landfill will be better collected and controlled at a level greater than currently at the landfill. The only emissions that will increase will be the emissions of HCL which are created during the combustion process. The HCL emissions should be re-evaluated when the gas collection and control system is installed and in operation at the Landfill. This can be done during the next modification or renewal.

Calculation for Hydrogen Chloride emission from the combustion process in the 7 solar vent flares:
The calculation method used is from AP-42, Section 2.4.4.2 – Controlled Emissions. Hydrochloric acid (HCl) is formed when chlorinated compounds in landfill gas are combusted in control equipment. The best methods to estimate emissions are mass balance methods using site-specific data on total chloride [expressed in ppmv as the chloride ion ($Cl^-$)].

**Since the TPER limit for HCL is in lbs/hour, the units in the equation will be in lbs/hour.**

$\frac{140\ ft^3\ lfg}{minute} \times \frac{60\ minutes}{hour} \times \frac{50\ ft^3\ CH_4}{100\ ft^3 lfg} = \frac{4200\ ft^3\ CH_4}{hour}\ each$ (29,400 $ft^3$/hr $CH_4$ for seven or 833 $m^3$/hour $CH_4$ for seven solar vent flares)

$Q_{cl^-} = Q_{CH_4}\left(\frac{C_{cl}}{C_{CH4}\ (1\times 10^6)}\right)$ (Equation 3, AP-42 2008 draft, Section 2.4.4.)
$Q_{cl^-}$ = Emission rate of chloride ions, $m^3$/hr
$Q_{CH4}$ = 833 $m^3$ (seven solar vent flares at 140 scfm landfill gas at 50% methane)
$C_{cl^-}$ = concentration of chloride ions (42.0 ppmv, AP-42 default value when concentration not known)
$C_{CH4}$ = Concentration of methane (50% landfill gas is methane expressed as 0.5)

$Q_{cl^-} = \frac{833\ m^3\ CH_4}{hour} \times \frac{42\ parts\ Cl^-}{0.5 \times (1\ x\ 10^6)} = \frac{0.07\ m^3\ Cl^-}{hour}$ (Equation 3, AP-42 2008 draft, Section 2.4.4.)

The uncontrolled mass emissions of chloride ions present in the methane were found in the following manner using Equation 4, AP-42, Section 2.4.4.2.

**Where:**
$UM_{cl^-}$ = Uncontrolled mass emissions of chloride ions, kg/hr
$MW_{cl^-}$ = Molecular weight of chloride ions (35.45 g/mol)
$Q_{cl^-}$ = Emission rate of chloride ions, (0.06 $m^3$/hr)
$T^0$ = 25$^0$ C (77 $^0$F), recommended by AP-42 for landfill gas temperature if temperature is unknown

$$UM_{cl^-} = \frac{0.07\ m^3}{\text{hour}} \times \left[\frac{35.45\ \text{g/gmole} \times 1\ \text{atmosphere}}{\left(\frac{8.205 \times 10^{-5}\ m^3\text{–atmospere}}{\text{gmol–}^0\text{K}}\right) \times \frac{1000\ g}{kg} \times (273 + 25\ ^0\text{C})\ ^0\text{K}}\right] = \frac{0.10\ kg\ (Cl^-)}{\text{hour}}$$

The mass emissions of hydrochloric acid (HCl) created by the flare combustion of chloride ions is found by using Equation 10, AP-42, Section 2.4.4.2.:

Where:
$CM_{HCl}$ = Controlled mass emissions of hydrogen chloride, kg/hr
$UM_{cl^-}$ = Uncontrolled mass emission of chloride ions (0.10 kg/hr)
$\eta_{col}$ = Solar vent flare capture efficiency 100%
1.03 = Ratio of molecular weight of HCL to $CL^-$
$\eta_{col}$ = Control efficiency of the solar vent flare for chlorinated hydrocarbons (98% conversion)

$$CM_{HCL} = UM_{cl^-} \times \left(\frac{\eta_{col}}{100}\right) \times 1.03 \times \left(\frac{\eta_{cnt}}{100}\right) \times \frac{2.205 \text{ lbs}}{1 \text{ kg}}$$

$$CM_{HCL} = \frac{0.10 \text{ kg}}{\text{hour}} \times \left(\frac{100}{100}\right) \times 1.03 \times (0.98) \times \frac{2.205 \text{ lbs}}{\text{kg}} = \frac{0.22 \text{ lbs}}{\text{hour}}$$

The total hydrogen chloride emissions from the seven solar vent flares, using a collection efficiency of 100%, a 98% conversion rate and a flow rate of 140 scfm per flare is equal to 0.22 lbs/hour. The TPER limit for HCL emissions from an unobstructed flare is 0.74 lbs/hour. Therefore, the total emissions of HCL from the seven solar vent flares emits less than the hourly TPER rate for HCL. No modeling is required. The unobstructed table in 02Q .0711(b) was used because all the emission release points are unobstructed and vertically oriented and the HCL emissions are not a common emission from the landfill.

The addition of the seven temporary solar vent flares would not add to the emissions of the five toxic air pollutants that were modeled in 2017, because the landfill was modeled at 100% fugitive emissions. The gas that is being combusted in the solar vent flares will be controlled at a 98% efficiency rate and therefore help to decrease the emissions from the landfill. However, Hydrogen Chloride is being created during the combustion process in the solar vent flares. As noted in the current permit, the landfill did not contain any combustion sources of landfill gas. As stated above, the total HCL emissions from the seven solar vent flares are below the Toxic Air Pollutant Emissions requiring permitting.

The current permit renewal and the 502(b)(10) application (to add the insignificant activities) do not change the facility's status with respect to NC Air Toxics, and therefore the sources at the White Oak Landfill are not expected to present an unacceptable risk to human health because the 2017 air toxic modeling evaluation indicated compliance with the Ambient Air Quality levels.

**10. Facility Emissions Review**

The facility-wide potential emissions do not change under this TV permit renewal. Actual emissions for criteria pollutants and HAPs for the years 2018 through 2021 are provided in the header of this permit review.

**11. Compliance Status**

DAQ has reviewed the compliance status of the White Oak Landfill facility. During the most recent inspection, conducted on September 28, 2023 by Amro Ali of the Asheville Regional Office, the facility appeared to be in compliance with all applicable requirements. Further, the facility has had no air quality violations within the last five years.

**12. Public Notice/EPA and Affected State(s) Review**

A notice of the DRAFT Title V Permit shall be made pursuant to 15A NCAC 02Q .0521. The notice will provide for a 30-day comment period, with an opportunity for a public hearing. Consistent with 15A NCAC 02Q .0525, the EPA will have a concurrent 45-day review period. Copies of the public notice shall be sent to persons on the Title V mailing list and EPA. Pursuant to 15A NCAC 02Q .0522, a copy of each permit application, each proposed permit and each final permit shall be provided to EPA. Also pursuant to 02Q .0522, a notice of the DRAFT Title V Permit shall be provided to each affected State at or before the time notice provided to the public under 02Q .0521 above. No affected states or local agencies are within 50 miles of this facility.

- Draft permit and permit review sent to public notice: XXXXX xx, 2024 through XXXXXX 2024. …..Comments were received……

- Draft permit and permit review sent to the US EPA for their 45 review: XXXXX xx, 2024 through XXXXX xx, 2024 …..Comments were received……

**13. Other Regulatory Considerations**

**a. Miscellaneous:**

- A P.E. seal is NOT required for this renewal or the 502(b)(10) modification to add the seven solar vent flares.
- A zoning consistency determination is NOT required for this renewal or the 502(b)(10) application.
- A permit fee is NOT required for this renewal or for the 502(b)(10) application.

**b. <u>Emergency Affirmative Defense:</u>**

EPA has promulgated a rule (88 FR 47029, July 21, 2023), with an effective date of August 21, 2023, removing the emergency affirmative defense provisions in operating permits programs, codified in both 40 CFR 70.6(g) and 71.6(g). EPA has concluded that these provisions are inconsistent with the EPA's current interpretation of the enforcement structure of the CAA, in light of prior court decisions[1]. Moreover, per EPA, the removal of these provisions is also consistent with other recent EPA actions involving affirmative defenses[2] and will harmonize the EPA's treatment of affirmative defenses across different CAA programs.

As a consequence of this EPA action to remove these provisions from 40 CFR 70.6(g), it will be necessary for states and local agencies that have adopted similar affirmative defense provisions in their Part 70 operating permit programs to revise their Part 70 programs (regulations) to remove these provisions. In addition, individual operating permits that contain Title V affirmative defenses based on 40 CFR 70.6(g) or similar state regulations will need to be revised.

Regarding NCDAQ, it has not adopted these discretionary affirmative defense provisions in its Title V regulations (15A NCAC 02Q .0500). Instead, DAQ has chosen to include them directly in individual Title V permits as General Condition J.

Per EPA, DAQ is required to promptly remove such impermissible provisions, as stated above, from individual Title V permits, after August 21, 2023, through normal course of permit issuance.

**c. <u>PFAS:</u>**

The NC DEQ has determined that per- and polyfluoroalkyl substances, also known as PFAS, have been and are being deposited in landfills. PFAS has become a significant concern since 2017. PFAS compounds are commonly used in industrial processes and found in waste streams where they can be emitted into the air, deposited into surface water or soil, and eventually reach groundwater. PFAS are also found in many commercial products that eventually find their way to landfills. In response to the growing concern about PFAS, NC DAQ has developed a list of screening questions that are sent to identified industries to help to identify potential air emission sources of emerging contaminants. These questions will be sent to Landfills that are currently collecting landfill gas and burning the gas onsite in a flare or other combustion device and to facilities that receive landfill gas for renewable natural gas facilities.

The White Oak Landfill currently does not have a gas collection and control system, therefore the PFAS testing requirement will not be placed in the Title V permit. However, the following PFAS Disclosure statement will be placed into the Title V permit.

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[1] NRDC v. EPA, 749 F.3d 1055 (D.C. Cir. 2014).

[2] In newly issued and revised New Source Performance Standards (NSPS), emission guidelines for existing sources, and NESHAP regulations, the EPA has either omitted new affirmative defense provisions or removed existing affirmative defense provisions. See, e.g., National Emission Standards for Hazardous Air Pollutants for the Portland Cement Manufacturing Industry and Standards of Performance for Portland Cement Plants; Final Rule, 80 FR 44771 (July 27, 2015); National Emission Standards for Hazardous Air Pollutants for Major Sources:
Industrial, Commercial, and Institutional Boilers and Process Heaters; Final Rule, 80 FR 72789 (November 20, 2015); Standards of Performance for New Stationary Sources and Emission Guidelines for Existing Sources: Commercial and Industrial Solid Waste Incineration Units; Final Rule, 81 FR 40956 (June 23, 2016).

**State-enforceable only**
**Disclosure of Information Relating to Emissions of Fluorinated Chemicals** [15A NCAC 02Q .0508(f)]
The Permittee shall have an ongoing duty to disclose the known presence of materials containing fluorinated chemicals at the Facility that have the potential to result in the emission of fluorinated chemicals to the environment. Such disclosures shall be in writing and submitted to the Regional Office Supervisor within thirty days of the Permittee becoming aware of such information, unless such information has already been disclosed to DAQ by the Permittee.

The disclosure shall describe the identity, quantity, and use of such material to the extent known. DAQ may require the permittee to conduct analysis or testing of fluorinated chemical emissions as necessary to properly evaluate emissions sources at the Facility.

As used in this condition, the term "fluorinated chemicals" includes but is not limited to per- and polyfluoroalkyl substances (PFAS).

**14. Recommendations**

The permit renewal application for White Oak Landfill, located in Waynesville, Haywood County, North Carolina has been reviewed by DAQ to determine compliance with all procedures and requirements. DAQ has determined this facility is complying or will achieve compliance, as specified in the permit, with all requirements that are applicable to the affected sources. DAQ recommends the issuance of Air Permit No. 10535T01.

# Attachment A

**From:** Matt Lamb
**To:** Suparna Chakladar; Bryan Wuester; Eric Hopkins; Gordon McLennan
**Cc:** John Fearrington; Mac Jones
**Subject:** Re: Flare emission factors
**Date:** Friday, September 8, 2023 12:38:47 PM
**Attachments:** image001.png



On Wed, Aug 9, 2023, 4:10 PM Matt Lamb <matt@smithgardnerinc.com> wrote:
Our email from EPA. Hopefully this will justify our flare emission factors.
**Matthew S. Lamb**
Senior Scientist
**SMITH GARDNER, INC.**
14 N. Boylan Avenue
Raleigh, NC 27603
P (919) **828.0577 x121**
C (919) **801.3548** **www.smithgardnerinc.com**

On Wed, Aug 9, 2023 at 1:13 PM
Thorneloe, Susan <Thorneloe.Susan@epa.gov> wrote:

Matt – I agree with your use of the AP42 2008 emission factors as we discussed this morning. The industrial emission factors were not evaluated for landfill gas application whereas the 1998 and 2008 (I was involved in both updates).

The issues that industry raised with the 2008 report had to do with requesting that EPA provide more information on oxidation research that they had funded. My judgement was that the path of least resistance dominates where oxidation is likely. At the time as I recall, the contention for some in the industry (including researchers funded by industry) was that landfills are a sink for carbon and not a source. The Nature 2019 publication put that claim to rest (IMO).

The 2008 report includes the results from work that I led (and EREF funded) to conduct measurements of combustion technology at five landfills - two of which were enclosed flares. The objective was to get more up-to-date data on landfill gas combustion (and byproduct emissions based on differences in technology used) in the AP42 emission factors. We did succeed and I believe that is what most people are now using. Was not aware that some are suggesting the industrial flare factors that are not representative of landfill gas. Regardless, it is the State and Region that have the ultimate oversight on what is ultimately used in calculating emissions factors. As I explained, I agree with your recommendation-

Kind regards- Susan T
**Susan Thorneloe**
**U.S. Environmental Protection Agency**
Office of Research and Development (ORD)
Center for Environmental Solutions and Emergency Response
Homeland Security and Materials Management Division
Materials Management and Oil Spills Branch
Research Triangle Park, NC 27711
Office: 919-541-2709 | Mobile: 919-452-8061

# Attachment A – Continued

Email: thorneloe.susan@epa.gov
Member of the International Waste Working Group
https://www.tuhh.de/iue/iwwg/welcome.html

**From:** Matt Lamb <matt@smithgardnerinc.com>
**Sent:** Wednesday, August 9, 2023 12:58 PM
**To:** Thorneloe, Susan <Thorneloe.Susan@epa.gov>; John Fearrington <johnf@smithgardnerinc.com>; Mac Jones <mac@smithgardnerinc.com>
**Subject:** Flare emission factors

Susan:

Thank you for taking the time to meet and talk about landfill gas emission factors today. As we discussed, our client is working with a landfill gas to energy developer to permit a renewable natural gas (RNG) project to collect and treat landfill gas to levels that would allow it to be injected into a natural gas pipeline. After the permit is issued, and while the project is being constructed, as well as during the brief periods when the project is shut down to perform maintenance, landfill gas will be sent to one of two existing open candlestick flares for destruction. EPA has provided emission factors for use in estimating emissions from candlestick flares, including the following:

- AP-42 Chapter 2.4, Municipal Solid Waste Landfills, finalized 1998;
- AP-42 Chapter 13.5, Industrial flares (refinery and other chemical manufacture), finalized 2018; and AP-42 Chapter 2.4, Municipal Solid Waste Landfills, draft 2008.

S+G uses the draft 2008 emission factors to calculate emissions for Title V air permit applications and renewals because the emission factors for carbon monoxide, nitrogen dioxide, and particulate matter all receive an "A" rating when ranked by EPA based on dataset size and other factors. For comparison, the final 1998 factors receive "C" ratings for carbon monoxide and nitrogen dioxide, and a "D" rating for particulate matter. The AP-42 Chapter 13.5 emission factors are similarly not used because these emission factors are based on data collected from flaring of refinery and other chemical manufacture byproducts, not landfill gas. Additionally, EPA rates these factors "Poorly" for representativeness.

S+G recommended that the RNG developer adopt the same draft 2008 flare emission factors to calculate flaring emissions from their project, since the flares are similar in size, capacity, and design. Since you were instrumental in data collection and development of the Background Information Document (BID) for the draft 2008 emission factors, would you be willing to provide your expert opinion on S+G using (and S+G recommending others use) these factors in preference of the other available factors?

I appreciate your feedback, and any comment or clarification you may provide.

Thank you.
**Matthew S. Lamb**
Senior Scientist
**SMITH GARDNER, INC.**
14 N. Boylan Avenue
Raleigh, NC 27603
P (919) **828.0577 x121**
C (919) **801.3548**
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# Attachment B

**PFAS Screening Questionnaire**

**1) Will your facility use any material or products in your operations that contain fluorinated chemicals? If so, please identify such materials or products and the fluorinated chemicals they contain.**

*Response: No*

**2) Will your facility formulate/create products or byproducts (directly or indirectly) that contain fluorinated chemicals (across multiple media)? If so, please identify such products or byproducts and the fluorinated chemicals they contain.**

*Response: No. The site does not formulate or create any products or byproducts, as those terms are used in the manufacturing and commercial contexts. The site does generate landfill gas and leachate which could be considered "byproducts" and are further described in response to Question 3. In some instances, landfill gas can be beneficially reused in renewable energy generation, although that reuse does not occur at this site.*

**3) Will your facility generate solid, liquid, or gaseous related emissions, discharges, or wastes/products containing fluorinated chemicals? If so, please identify such waste streams or materials and the fluorinated chemicals they contain.**

*Response: Waste accumulation, within the limits of constructed cells, may contain unavoidable amounts of fluorinated chemicals because of their common use in common consumer products that make up the incoming waste stream, such as textiles, food packaging, carpeting, and sewage sludge from publicly owned treatment works (POTW). White Oak Landfill recently conducted sampling to determine which, if any, fluorinated chemicals exist in its waste accumulation. At the time it submits this response, however, it has not yet received results from that testing and cannot identify which fluorinated chemicals are present.*
*In its article entitled, "A critical review of perfluoroalkyl and polyfluoroalkyl substances (PFAS) landfill disposal in the United States," the U.S. EPA Office of Research and Development summarized studies in which certain PFAS were detected in landfill gas. U.S. EPA posits that the emission of fluorinated chemicals from landfills via landfill gas might occur primarily through two potential pathways: (1) incomplete combustion through flares; and (2) ambient emissions in areas with intermediate cover and no gas collection. White Oak currently does not have an active gas collection and control system (GCCS) but will be bringing one online in the next two months.*
*Even with the two potential pathways through flares or ambient emissions, air/gas data for fluorinated chemicals is limited and research is in its infancy nationally. Thus, it is unknown if, and to what extent, landfill gas created from the naturally occurring waste degradation processes and a GCCS, contains fluorinated chemicals. Even if it does, the fate of those chemicals is also unknown. Further studies may illuminate the fate of any PFAS in landfill gas that is managed through the on-site GCCS. We do not have any data regarding PFAS in landfill gas at this site because it is not required to be tested and is unquantifiable in any event. There currently is no basis to attribute any emissions of PFAS to the landfill. Additionally, MSW landfills generate leachate, which is a liquid effluent created by the percolation or infiltration of rainwater through waste. PFAS contained in the waste accumulation can partition to the liquid phase and become part of landfill leachate. As a result, leachate generated from the landfill may contain certain PFAS, which is collected by the landfill's leachate collection system and managed for offsite disposal. Moreover, landfill gas condensate that will be generated by the GCCS when it goes*

*online will be routed into the leachate collection system before being discharged to a POTW. These discharges of leachate and landfill gas condensate are managed under a separate permit. Notwithstanding these potential pathways for the emission or discharge of fluorinated chemicals from the site, U.S. EPA described in the above-cited article that the vast majority (84%) of PFAS entering landfills from MSW and biosolids remains in the landfill and, thus, is not emitted or discharged. We continue to monitor regulatory and technical developments.*

**4) Do your facility's processes or operations use equipment, material, or components that contain fluorinated chemicals (e.g., surface coating, clean room applications, solvents, lubricants, fittings, tubing, processing tools, packaging, facility infrastructure, air pollution control units)? Could these processes or operations directly or indirectly (e.g., through leaching, chemical process, heat treatment, pressurization, etc.) result in the release of fluorinated chemicals into the environment?**

*Response: Cleaning products, solvents, lubricants, fittings, and tubing are all used at the facility; however, they are used in housekeeping and in general maintenance practices and we are unaware of the presence of any fluorinated chemicals in these products.*

**5) List the fluorinated chemicals identified (i.e., through testing or desktop review) above in your response under the appropriate methods/approaches? If one is not, are they on any other known US or International target lists? OTM-45 (air emissions), Methods 533 & 537.1 (drinking water), SW-846: Method 8327 (water), Draft Method 1633 (water, solids, tissue), "Total PFAS" Draft Method 1621 for Adsorbable Organic Fluorine (wastewater), Non targeted analytical methods, Qualitative approach through suspect screening.**

*Response: As discussed above, air/gas data for PFAS is unknown and research is in its infancy. Thus, it is unknown if the waste degradation generates fluorinated chemicals, and if so, what types in exist in byproduct landfill gas or landfill gas condensate.*
*White Oak recently conducted sampling for PFAS. Results from that sampling, however, are not yet available and cannot be used to identify what, if any, fluorinated chemicals are present. The results from the PFAS analysis can be provided upon receipt.*

**6) Are there other facilities or operations in the U.S. or internationally engaged in the same or similar activities involving fluorinated chemicals addressed in your response to the above questions? If so, please provide facility identification information? In addition, are there any ISO (International Organization for Standardization) certification requirements?**

*Response: Through various studies conducted throughout the United States, PFAS have been identified in leachate generated from municipal solid waste landfills because of the unavoidable use in fluorinated compounds in consumer products. Waste degradation and the corresponding production of byproducts including landfill gas and leachate will naturally occur at all MSW landfills. However, it is documented that landfills are passive receivers and not users or generators of PFAS, and the continued operation of MSW landfills is critical to human health and the environment. Engineered landfills equipped with liners, leachate collection, and landfill gas collection and control systems, like the landfill, are recognized as effective disposal options for waste containing PFAS.*

**7) Do you plan to store AFFF on site, use it in fire training at the site, use it for fighting fires at the facility, or include it in a fire fighting system at the site?**

*Response: No*

**8) Are other emerging contaminants (e.g., 1,4-dioxane, brome, perchlorate, 1,2,3-Trichloropropane) used in some capacity within your facility or operations?**

*Response: None that we are presently aware of.*

**9) Do you need technical assistance to answer the above questions?**

*Response: No*