NORTH CAROLINA DIVISION OF AIR QUALITY

Application Review

Issue Date: xx/xx/2020

Region: Fayetteville Regional Office
County: Montgomery
NC Facility ID: 6200052
Inspector's Name: Jeffrey D. Cole
Date of Last Inspection: 11/05/2019
Compliance Code: 3 / Compliance - inspection

Facility Data

Applicant (Facility's Name): Uwharrie Environmental Landfill

Facility Address:
Uwharrie Environmental Landfill
500 Landfill Road
Mount Gilead, NC 27306

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 .0516, .0521, .0524, .1111, .1806, 02Q .0317
NSPS: Subparts WWW and IIII
NESHAP: MACT AAAA, GACT ZZZZ and CCCCCC, 40 CFR 61 Subpart M
PSD: N/A
PSD Avoidance: Avoidance condition for CO
NC Toxics: N/A
112(r): N/A
Other: N/A

Contact Data

Facility Contact	Authorized Contact	Technical Contact
Mike Gurley Environmental Manager (704) 781-2004 5105 Morehead Road Concord, NC 28027	William Maness General Manager (910) 576-3851 1137 Albemarle Road Troy, NC 27371	Mike Gurley Environmental Manager (704) 781-2004 5105 Morehead Road Concord, NC 28027

Application Data

Application Number: 6200052.19B
Date Received: 06/24/2019
Application Type: Renewal
Application Schedule: TV-Renewal

Existing Permit Data
Existing Permit Number: 08826/T11
Existing Permit Issue Date: 07/28/2015
Existing Permit Expiration Date: 04/30/2020

Total Actual emissions in TONS/YEAR:

CY	SO2	NOX	VOC	CO	PM10	Total HAP	Largest HAP
2018	0.3600	3.44	16.49	18.44	0.8300	5.40	1.85 [Toluene]
2017	0.3900	3.71	16.36	19.98	0.9000	5.39	1.83 [Toluene]
2016	0.6600	5.76	16.24	30.70	1.40	5.58	1.82 [Toluene]
2015	0.5300	5.09	15.26	27.19	1.24	5.21	1.71 [Toluene]
2014	1.72	16.67	14.85	90.15	4.07	6.38	1.88 [Hydrogen chloride (hydrochlori]

Review Engineer: Joshua L. Harris

Review Engineer's Signature: **Date:**

Comments / Recommendations:
Issue 08826/T12
Permit Issue Date: xx/xx/2020
Permit Expiration Date: xx/xx/2025

1. Purpose of Application

The Uwharrie Environmental Landfill is an active municipal solid waste (MSW) landfill located in Mount Gilead, Montgomery County. Application 6200052.19B was timely received on June 24, 2019 and was made for renewal of the landfill's existing Title V air permit with no modifications. The application will go through the 30-day public notice and 45-day EPA review periods prior to issuance.

The facility name and legal entity were updated in DAQ's database to reflect previously issued permits and applications. The previous name and legal entity were both listed as "Uwharrie Regional Landfill." This has been updated to reflect the legal owner as "Republic Services of South Carolina, LLC," which is listed in the application, and is an active entity registered with the North Carolina Secretary of State's Office, Corporations Division. The site name has been updated to "Uwharrie Environmental Landfill," which is consistent with the permit application and with previously issued permits.

The facility contact for this application is Mike Gurley, Environmental Manager, (phone: 704-781-2004). A consultant, SCS Engineers P.C. (SCS), was used to prepare the application. The contact at SCS is David Greene, Project Manager, (phone: 828-285-8951).

2. Facility Description

The Uwharrie Environmental Landfill is an active MSW landfill that is owned and operated by Republic Services of South Carolina, LLC, and operates under Solid Waste Permit No. 6204. The landfill has a design capacity of municipal solid waste in excess of 2.5 million Mg and 2.5 million m^3, and has an NMOC emission rate greater than 50 Mg/yr. Two distinct refuse areas exist on the site: an unlined (pre-Subtitle D) landfill area and a lined landfill area. The unlined area is known as the Montgomery County Landfill and was closed in December 1995. The lined landfill opened in January 1996 and currently serves as the active landfill. Both the lined and the unlined landfills have a gas collection and control system installed and operating. Gas can be routed to two open flares (ID Nos. CD-01 and CD-02) for incineration, each with a flow capacity of 3,000 scfm. The landfill also sends gas to an adjacent landfill gas to energy (LFGTE) facility, Uwharrie Mountain Renewable Energy, LLC (Facility ID 6200087, Permit No. 10226), for electricity generation.

3. Application Chronology

06/24/19 The Division of Air Quality (DAQ), Fayetteville Regional Office (FRO), received Application No. 6200052.19B, submitted for renewal, and forwarded a copy to the Raleigh Central Office (RCO). The application contained the required forms, and there was no request for confidentiality; no application fees were required. The application appeared to be complete for processing.

06/28/19 RCO sent the facility a letter acknowledging receipt of the complete application.

10/30/19 Joshua Harris sent David Greene an email with questions regarding the gasoline tank (ID No. IES-09) throughput, and the site name for the facility.

11/14/19 David Greene responded with a purchase log showing that the landfill purchases less than 10,000 gallons of gasoline per month. Mr. Greene also verified that the correct name for the site is "Uwharrie Environmental Landfill."

11/15/19 Joshua Harris sent electronic copies of the draft permit and review documents to Booker Pullen, Samir Parekh, Heather Carter, Greg Reeves, and Jeff Cole for comments.

11/20/19 Booker Pullen and Samir Parekh responded with no comments.

11/22/19 Joshua Harris spoke with Jeff Cole and Greg Reeves who had questions regarding 40 CFR 61, Subpart M. Mr. Harris sent an email to David Greene with questions regarding whether the landfill actively accepts asbestos-containing waste.

11/25/19 Joshua Harris received a phone call from David Greene who confirmed that the landfills does actively accept asbestos-containing wastes.

12/03/19 Jeff Cole provided minor editorial comments from the FRO on the permit review.

12/03/19 Joshua Harris sent electronic copies of the draft permit and review documents to William Maness, Mike Gurley, and David Greene for comments.

01/08/20 David Greene responded with no comments from the facility.

Xx/xx/20 30-day public notice and 45-day EPA review periods begin.

Xx/xx/20 Public notice period ends; [comments received].

Xx/xx/20 EPA review period ends; [comments received].

Xx/xx/20 Air Quality Permit Revision No. 08826T12 issued.

4. Table of Changes to Existing Permit No. 08826T11

Existing Page(s)	New Page(s)	Section	Description of Changes
Cover and Throughout	Cover and Throughout	--	• Updated letterhead. • Updated the address of the Responsible Official. • Updated all dates and permit revision numbers. • Reorganized permit conditions to be in order of regulatory citation.
Attachment to Cover	Attachment to Cover	--	• Added label to IES-09 for applicability of 40 CFR 63, Subpart CCCCCC. • Changed "MACT" labels to "GACT" for IES-11 and IES-14 and removed the word "Subpart" from each. • Updated URL for DAQ MACT/GACT guide.
3	3	1 (Table)	Specified applicable NSPS and MACT Subparts.
3	3	2.1 A. (Table)	• Reorganized table in order of regulation number. • Included all control options for NMOC emissions. • Added row for asbestos.
7-13	4-11	2.1 A.3.	• Moved the NSPS WWW permit requirements to this Section. • Referenced to the requirements in the permit instead of referring to the federal codes throughout this condition.
--	4-5	2.1 A.3.b-e.	Inserted the "Standards for Air Emissions from Municipal Solid Waste Landfills" section.
--	6	2.1 A.3.g.i.	Inserted actual equation required to calculate NMOC emissions.
8	--	--	Removed the conditions specific to expansion of the GCCS within the first 180 days system startup.
--	7	2.1 A.3.g.v.	Added a reporting condition to apply when the facility requests to establish a higher operation value at specific wells.
7	8	2.1 A.3.l.	• Moved the testing conditions to be after the compliance provisions. • Added noncompliance language.
12	--	--	Removed well closure section since it is covered under section 2.1 A.3.f.ii.(C).
13	--	--	Removed the initial annual report and the initial performance test conditions.
12	9	2.1. A.3.o.	Moved site-specific requirements.
--	11	2.1 A.3.x.	Added the landfill closure reporting requirement.
--	11	2.1 A.3.y.	Added the reporting requirement prior to removing of control equipment.
--	11-13	2.1 A.4.	Inserted conditions for 40 CFR 61, Subpart M
5	13-14	2.1 A.5.	Moved MACT AAAA permit requirements to this Section.
--	13	2.1 A.5.b and c	Added the operation/emission standards and the SSM provision.
5	13	2.1.A.5.d.	Added the noncompliance language.
--	13	2.1.A.5.e.	Added section to include language for deviations, consistent with 40 CFR 63.1965.
--	14	2.1.A.5.f.	Added section to include language for the startup, shutdown and malfunction plan, consistent with 40 CFR 63.6(e)(iii).
5	14	2.1.A.5.h. through j.	Updated the recordkeeping and reporting language to be consistent with 40 CFR 63.6(c)(iii), 63.6(c)(iv) and 63.6(c)(v).
6-7	15	2.1 A.6.	Moved PSD Avoidance conditions to this section.
4	15	2.1 A.7.	Moved odor rule condition to this section.
14-25	16-25	3	Updated the General Conditions to latest version (Version 5.3).

5. Changes in Equipment

There are no changes to the facility's permitted emission sources.

The facility's permitted emission sources are as follows:

Emission Source ID No.	Emission Source Description	Control Device ID No.	Control Device Description
ES-01 NSPS WWW MACT AAAA 40 CFR 61 Subpart M	Municipal solid waste landfill [including one Subtitle D (lined) section, one 20-acre section (unlined), and Area A]	CD-GCCS1 CD-GCCS2 CD-01 CD-02	One landfill gas collection and control system One landfill gas collection and control system One landfill gas-fired open flare (3,000 scfm maximum flow rate) One landfill gas-fired open flare (3,000 scfm maximum flow rate)

The facility's insignificant/exempt activities are as follows:

Emission Source ID No.	Emission Source Description
IES-05	Welding operations
IES-06	Diesel fuel storage tank (10,000-gallon capacity)
IES-07	Leachate storage tank (250,000-gallon capacity)
IES-08	Diesel fuel storage tank (1,000-gallon capacity)
IES-09 GACT CCCCCC	Gasoline storage tank (250-gallon capacity)
IES-10	Solar flares (100 scfm each)
IES-11 GACT ZZZZ	Back-up generator (Diesel fuel-fired, 143 kW, 192 Hp)
IES-12	Clean burn oil heater
IES-13	Maintenance shop activities
IES-14 NSPS IIII, GACT ZZZZ	Emergency generator (Diesel fuel-fired, 300 kW, 402 hp)

6. Regulatory Review

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

- 15A NCAC 02D .0516: Sulfur Dioxide Emissions from Combustion Sources
- 15A NCAC 02D .0521: Control of Visible Emissions
- 15A NCAC 02D .0524: New Source Performance Standards, 40 CFR 60, Subpart WWW
- 15A NCAC 02D .1110: National Emission Standards for Hazardous Air Pollutants, 40 CFR 61, Subpart M
- 15A NCAC 02D .1111: Maximum Achievable Control Technology, 40 CFR 63, Subpart AAAA
- 15A NCAC 02D .1806: Control and Prohibition of Odorous Emissions
- 15A NCAC 02Q .0317: Avoidance Condition for 02D .0530, Prevention of Significant Deterioration

Except for the inclusion of conditions for 40 CFR 61, Subpart M, there are no regulatory changes for the landfill's sources since the last time the permit was sent to public notice and EPA review, therefore a full review is not required for the regulations listed above. The permit conditions have been updated to include the latest permitting language. NSPS WWW and MACT AAAA conditions were expanded to include the specific requirements in place of references to the federal regulation. The permit was generally reorganized such that the permit conditions appear in order by regulatory citation.

15A NCAC 02D .1110: National Emission Standards for Hazardous Air Pollutants, 40 CFR 61, Subpart M

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 facility's current Solid Waste permit contains a requirement for the facility to comply with the requirements of 40 CFR 61, Subpart M, and continued compliance is expected.

7. NSPS, NESHAP, PSD, 112(r), CAM & Attainment Status

- **NSPS** –

  - ✓ The MSW landfill (ID No. ES-01) is subject to 40 CFR 60, Subpart WWW "Municipal Solid Waste Landfills" since the facility was modified after May 30, 1991, but before July 17, 2014. The landfill's design capacity is greater than 2.5 million Mg and 2.5 million m^3, and has an annual NMOC emission rate greater than 50 Mg/yr. Therefore, the landfill is subject to the GCCS requirements of NSPS Subpart WWW.

  - ✓ The MSW landfill (ID No. ES-01) is NOT subject to 40 CFR 60, Subpart XXX "Municipal Solid Waste Landfills the Commenced Construction, Reconstruction, or Modification After July 17, 2014" since the landfill has not been modified after July 17, 2014.

- ✓ The diesel-fired emergency generator (ID No. IES-11) is NOT subject to 40 CFR 60, Subpart IIII "Stationary Compression Ignition Internal Combustion Engines," since it was manufactured in 1993 which is before the applicability date for this regulation.

- ✓ The diesel-fired emergency generator (ID No. IES-14) is subject to 40 CFR 60, Subpart IIII "Stationary Compression Ignition Internal Combustion Engines," since it was manufactured after the applicability date.

- **NESHAP** –

  - ✓ The MSW landfill (ID No. ES-01) is subject to 40 CFR 63, Subpart AAAA "Municipal Solid Waste Landfills" since the facility has accepted waste since November 8, 1987, has a design capacity greater than 2.5 million Mg and 2.5 million m^3, and has had an annual NMOC emission rate greater than 50 Mg/yr.

  - ✓ The MSW landfill (ID No. ES-01) is subject to 40 CFR 61, Subpart M "National Emission Standard for Asbestos," since it is an active waste disposal site for asbestos-containing waste.

  - ✓ The gasoline storage tank (ID No. IES-09) is subject to 40 CFR 63, Subpart CCCCCC "Gasoline Dispensing Facilities" since the facility is an area source of HAPs, and the facility meets the definition of a gasoline dispensing facility as any stationary facility which dispenses gasoline into the tank of a motor vehicle, motor vehicle engine, nonroad vehicle, or nonroad engine, including a nonroad vehicle or nonroad engine used solely for competition. Gasoline storage tanks are listed as affected sources under §63.11111(a), and there are no size distinctions. Since IES-09 is an insignificant activity, there is no permit condition, however the facility is still required to comply with Subpart CCCCCC.

    The facility has the general duty to minimize emissions by operating and maintaining affected sources, and their associated air pollution control and monitoring equipment, in a manner consistent with safety and good air pollution practices for minimizing emissions. In addition, since the facility's throughput is expected to be less than 10,000 gallons per month based on purchase records provided by the facility, the facility is subject to the requirements of §63.11116. This section states that the facility must handle the gasoline in a manner which will not result in vapor release to the atmosphere for an extended period of time. Measures to be taken include, but are not limited to:

    - Minimize gasoline spills;
    - Clean up spills as expeditiously as practicable;
    - Cover all open gasoline containers and all gasoline storage tank fill-pipes with a gasketed seal when not in use; and
    - Minimize gasoline sent to open waste collection systems that collect and transport gasoline to reclamation and recycling devices.

    There are no notification or reporting requirements for facilities with a throughput of less than 10,000 gallons per month, however, the facility shall supply records of gasoline throughput within 24 hours of a request by DAQ. Additionally, should the facility's monthly gasoline throughput exceed 10,000 gallons, the facility will be subject to the requirements of §63.11117 for facilities with a monthly throughput of 10,000 gallons of gasoline or more, or §63.11118 for facilities with a monthly throughput of 100,000 gallons of gasoline or more, whichever is applicable, and must meet the applicable notification, testing, monitoring,

recordkeeping, and reporting requirements. If an affected source's throughput ever exceeds an applicable throughput threshold, the affected source will remain subject to the requirements for sources above the threshold, even if the affected source throughput later falls below the applicable source threshold. [§63.11111(i)]

- ✓ The diesel-fired emergency generator (ID No. IES-11) is subject to 40 CFR 63, Subpart ZZZZ "Reciprocating Internal Combustion Engines" and is considered an existing emergency engine under this regulation.

- ✓ The diesel-fired emergency generator (ID No. IES-14) is subject to 40 CFR 63, Subpart ZZZZ "Reciprocating Internal Combustion Engines" and is considered as a new emergency engine under this regulation. The facility complies with this subpart by complying with NSPS Subpart IIII for this source.

- **PSD –** PSD is not impacted by this permitting action. The facility's permit contains a 15A NCAC 02Q .0317 PSD Avoidance Condition for CO emissions.

  - ✓ Montgomery County has triggered increment tracking under PSD for PM_{10} and NOx. This permitting action is neither expected to consume nor expand any increments.

- **112(r) –** The facility does not store any of the listed 112(r) chemicals in amounts that exceed the threshold quantities, therefore the facility is not required to maintain a written Risk Management Plan (RMP).

- **CAM –** CAM does not apply since the facility is regulated by NSPS and MACT regulations that were promulgated after 1990 and control the pollutants that would be subject to CAM.

- **Attainment status** – Montgomery County is in attainment for all criteria pollutants.

8. Other Regulatory Requirements

- A Zoning Consistency Determination is NOT required for this permit application.

- A P.E. Seal is NOT required for this permit application.

- No application fees are required for this application.

9. Air Toxics

The landfill has made a toxics demonstration for toxic air pollutants (TAP) in the past. The emissions from the landfill surface and from the facility's two LFG-fired flares were evaluated in 2012, and toxic emission rates were projected through CY2028 using AP-42 Ch 2.4 [November 1998]. Emission rates for acrylonitrile, benzene, methylene chloride (dichloromethane), ethyl mercaptan, hydrogen chloride, hydrogen sulfide, methyl mercaptan, and vinyl chloride exceeded their respective TPERs, and were subsequently modeled to determine their impacts at the facility's property boundary.

For this application, similar calculations were made and default concentrations from AP-42 were assumed for all pollutants, with the exception of hydrogen sulfide, for which the facility conservatively assumes a 100 ppmv concentration as opposed to the AP-42 value of 35.5 ppmv. The LFG generation rate was estimated through CY2025 using LandGEM with the following inputs:

Parameter	Value
Waste Acceptance Rate (TPY)	Historical, plus projected increase of ~3.4% annually
Methane Generation Rate ($year^{-1}$)	0.040
Potential Methane Generation Capacity (m^3/Mg)	100
NMOC Concentration (ppmv as hexane)	595 (AP-42 Default)
Methane Content (% by volume)	50
LFG Generation Rate (m^3/yr)	77,197,354

The emission rates for the previously evaluated TAPs are not expected to be exceeded through the renewal period and do not require further evaluation. Since the calculated emission rates for hydrogen chloride and hydrogen sulfide have increased, those increased emission rates warrant additional scrutiny.

The hydrogen sulfide emission rate appears to have increased due to a change in the assumed hydrogen sulfide concentration used for the submitted calculations. As previously stated, the facility has assumed a more conservative hydrogen sulfide concentration than the AP-42 value, which has resulted in an increase in the calculated emission rate. The increase in the calculated hydrogen chloride emission rate is small and can likely be attributed to rounding errors or other minor calculational variances.

Emission rates and impacts for hydrogen chloride and hydrogen sulfide as modeled in 2012:

Toxic Air Pollutant	Averaging Period	Modeled Emission Rates		Concentration at Property Boundary* ($\mu g/m^3$)	AAL ($\mu g/m^3$)	% AAL
		Landfill	Flares			
Hydrogen chloride	lb/hr	-----	1.38	42.1	700	6.0%
Hydrogen sulfide	lb/day	6.60	7.99×10^{-2}	0.26	120	0.22%

Facility-wide emission rates and impacts for all modeled pollutants, including increases for hydrogen chloride and hydrogen sulfide:

Toxic Air Pollutant	Averaging Period	Modeled Emission Rates		Concentration at Property Boundary* ($\mu g/m^3$)	AAL ($\mu g/m^3$)	% AAL
		Landfill	Flares			
Acrylonitrile	lb/day	1.83	2.22×10^{-2}	0.072	30	0.24%
	lb/hr	7.64×10^{-2}	9.24×10^{-4}	0.244	1000	0.02%
Benzene	lb/yr	297.58	3.59	0.016	0.12	13%
Ethyl mercaptan	lb/hr	3.22×10^{-2}	2.60×10^{-3}	0.103	100	0.10%
Hydrogen chloride	lb/hr	-----	1.40	42.8	700	6.1%
Hydrogen sulfide	lb/day	16.21	0.23	0.64	120	0.54%
Methylene chloride (Dichloromethane)	lb/yr	2,419.51	194.47	0.133	24	0.55%
	lb/hr	0.276	2.22×10^{-2}	0.881	1700	0.05%
Methyl mercaptan	lb/hr	2.72×10^{-2}	3.30×10^{-4}	0.087	50	0.17%
Vinyl chloride	lb/yr	914.02	73.76	0.05	0.38	13%

* The modeled impacts have been extrapolated and compared to the AALs for hydrogen chloride and hydrogen sulfide based on the calculated emission rates submitted in the application. The modeled impacts and emission rates remain the same for all other pollutants.

The facility is subject to MACT Subpart AAAA, and therefore not subject to permitting for toxics per 15A NCAC 02Q .0702(a)(27)(B). None of the toxic air pollutants evaluated exceed their respective TPER or AAL after the modification; therefore, DAQ has determined that there is NOT an unacceptable risk to human health resulting from this modification. Emissions of toxic air pollutants should continue to be periodically evaluated as the landfill grows.

10. Emissions Review

Pollutant	Potential After Controls / Limitations tons/yr	Potential Before Controls / Limitations tons/yr
PM (TSP)	13.40	0
PM_{10}	13.40	0
$PM_{2.5}$	13.40	0
SO_2	23.76	0
NOx	54.25	0
CO	<250	0
VOC	18.39	69.40

The facility's actual emissions as reported on the annual AQEI are indicated on the table at the beginning of this review.

MSW Landfill Emissions:
Landfill volume emissions were calculated using the methane generation rate of 77,197,354 m^3/yr as calculated using LandGEM, and pollutant concentrations from AP-42 Chapter 2.4, November 1998. VOC emissions are 39% of NMOC. Post collection and control potential emissions were calculated by applying a collection efficiency of 75% and a destruction efficiency of 98%.

Example:

- CY2025 LFG generation rate from LandGEM = 77,197,354 m^3/year (or 8,812.5 m^3/hour)
- Methane is 50% of this gas stream (4,406.25 m^3/hour)
- Q_{NMOC} = Emission rate of NMOCs, m^3/hour
- C_{NMOC} = Concentration of NMOCs (595 ppmv, AP-42 default)
- Multiplication factor for 50% methane concentration in landfill gas = 2.0
- Molecular weight of NMOC (as n-hexane) = 86.18 g/gmol

$$Q_{NMOC} = 2.0 \times Q_{CH_4} \times \left(\frac{C_{NMOC}}{1\times10^6}\right) \text{ (AP-42, Equation 3)}$$

$$Q_{NMOC} = 2.0 \times 4{,}406.25 \frac{m^3}{hour} \times \left(\frac{595 \text{ parts}}{1\times10^6}\right) = 5.24 \frac{m^3}{hour}$$

The uncontrolled mass emissions of NMOC (UM_{NMOC}) was found using Equation 4 of AP-42, Section 2.4.4.2.

$$UM_{NMOC} = 5.24 \frac{m^3}{hour} \times \left[\frac{86.18 \text{ g/gmol} \times 1 \text{ atm}}{8.205 \times 10^{-5} \frac{m^3 - atm}{gmol - K} \times 1000 \frac{g}{kg} \times (273 + 25℃) \text{ K}}\right] \times 2.2 \frac{lb}{kg}$$

$$UM_{NMOC} = 40.63 \frac{lb \text{ NMOC}}{hour} = 177.96 \frac{tons \text{ NMOC}}{year}$$

To calculate the VOC component of the landfill's uncontrolled surface emissions, AP-42 states in note "c" of Table 2.4-2 that VOC emissions are 39 wt.% of the NMOC emission rate, therefore:

$$UM_{VOC} = 0.39 \times 177.96 \frac{tons \text{ NMOC}}{year} = 69.40 \frac{tons \text{ VOC}}{year}$$

Volume emission of VOC from the landfill surface were calculated using AP-42 Section 2.4-6 Equation 5:

$$CM_P = \left[UM_P \times \left(1 - \frac{\eta_{col}}{100}\right)\right] + \left[UM_P \times \frac{\eta_{col}}{100} \times \left(1 - \frac{\eta_{cnt}}{100}\right)\right]$$

Where:
CM_p = Controlled mass emissions of pollutant
UM_p = Uncontrolled mass emission of pollutant
η_{col} = Collection efficiency of the landfill gas collection system, percent (75%)
η_{cnt} = Control efficiency of the landfill gas control flare (98%)

Only the first term is considered for emissions from the landfill surface, therefore:

$$CM_{VOC} = \left[69.40 \frac{tons}{year} \times \left(1 - \frac{75}{100}\right)\right] = 17.35 \frac{tons}{year}$$

Flare Emissions:
VOC emissions for the flares were calculated in similar fashion as above but are based on the maximum capacity of the flares, regardless of LFG generation rate from the landfill, and assume a 98% control efficiency for collected gas.

Particulate, NOx, and CO emissions were calculated using the following emission factors:
NOx: 0.068 lb/mmBtu (AP-42 13.5-1)
CO: 0.37 lb/mmBtu (AP-42 13.5-1 as listed in permit)
PM: 17 lb/10^6 ft^3 CH_4 (AP-42 2.4-5)

The flares are rated for a total heat input of 182.16 mmBtu/hr at 3,000 ft^3 CH_4 per minute (1,576.8 million ft^3 CH_4 per year), with a heat value of 506 Btu per cubic foot of landfill gas.

Examples:

$$\frac{182.16 \text{ mmBtu}}{\text{hour}} \times \frac{0.068 \text{ lb NOx}}{\text{mmBtu}} \times \frac{8{,}760 \text{ hours}}{\text{year}} \times \frac{1 \text{ ton}}{2000 \text{ lb}} = 54.25 \frac{\text{tons NOx}}{\text{year}}$$

$$\frac{182.16 \text{ mmBtu}}{\text{hour}} \times \frac{0.37 \text{ lb CO}}{\text{mmBtu}} \times \frac{8{,}760 \text{ hours}}{\text{year}} \times \frac{1 \text{ ton}}{2000 \text{ lb}} = 295.21 \frac{\text{tons CO}}{\text{year}}$$

$$\frac{1{,}576.8 \text{ million ft}^3 \text{ CH}_4}{\text{year}} \times \frac{17 \text{ lb PM}}{\text{million ft}^3 \text{ CH}_4} \times \frac{1 \text{ ton}}{2000 \text{ lb}} = 13.40 \frac{\text{tons PM}}{\text{year}}$$

All particulate emissions from the combustion of landfill gas are considered as $PM_{2.5}$. The landfill has accepted a permit limitation to emit less than 250 tons of CO per year to avoid PSD permitting.

To calculate potential SO_2 emissions, AP-42 Chapter 2.4 was used along with information submitted by the facility in the application:

- Total flare design rating = 6,000 ft^3/minute (or 169.90 m^3/min = 10,194 m^3/hour)
- Methane is only 50% of this gas stream (5,097 m^3/hour)
- Q_S = Emission rate of reduced sulfur compounds, m^3/hour
- C_S = Concentration of reduced sulfur compounds (100 ppmv, as H_2S assumed by facility)
- Multiplication factor for 50% methane concentration in landfill gas = 2.0
- Molecular weight of H_2S = 34.08 g/mole
- Molecular weight of sulfur = 32.06 g/mole

$$Q_{H_2S} = 2.0 \times Q_{CH_4} \times \left(\frac{C_S}{1 \times 10^6}\right) \text{ (AP-42, Equation 3)}$$

$$Q_{H_2S} = 2.0 \times 5{,}097 \frac{m^3}{hour} \times \left(\frac{100 \text{ parts}}{1 \times 10^6}\right) = 1.02 \frac{m^3}{hour}$$

Conversion of H_2S flow rate to flow rate of sulfur only:

$$Q_s = Q_{H_2S} \times \frac{MW_S}{MW_{H_2S}} = 1.02 \frac{m^3\ H_2S}{hour} \times \frac{32.06\ g\ S/mole}{34.08\ g\ H_2S/mole} = 0.96 \frac{m^3\ S}{hour}$$

The mass of the pre-combustion sulfur present in the methane was found using Equation 4 of AP-42, Section 2.4.4.2.:

$$UM_s = 0.687 \frac{m^3}{hour} \times \left[\frac{32.06\ g/gmol \times 1\ atm}{8.205 \times 10^{-5} \frac{m^3 - atm}{gmol - K} \times 1000 \frac{g}{kg} \times (273 + 25°C)\ K}\right] \times 2.2 \frac{pounds}{kg}$$

$$UM_s = 2.77 \frac{pounds}{hour}$$

To calculate SO_2 emitted from the combustion of sulfur, Equation 10 of Section 2.4-8 was used.

$$SO_2\ emitted = UM_s \times \frac{\eta_{col}}{100} \times 2.0$$

Where:
UM_S = Uncontrolled mass emission rate of sulfur compounds (2.77 lb sulfur/hour)
η_{col} = Collection efficiency of the landfill gas collection system, percent (assumed 100% by facility)
2.0 = Ratio of the molecular weight of SO_2 to the molecular weight of Sulfur

$$SO_2\ emitted = 2.77 \frac{lb}{hour} \times \frac{100}{100} \times 2.0 \times 8760 \frac{hours}{year} \times \frac{1\ ton}{2000\ lb} = 24.27 \frac{tons\ SO_2}{year}$$

AP-42 does not account for the destruction efficiency of the flare, however, when the nominally assumed 98% control efficiency is accounted for, the hourly emission rate of SO_2 is 5.43 lb/hr or 23.76 tons per year.

11. Statement of Compliance

The latest compliance inspection was conducted by Jeff Cole, of FRO DAQ, on November 5, 2019. The facility was found to be operating in apparent compliance at the time. The landfill has no negative compliance history in the last five years.

12. Public Notice 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.

The 30-day public notice period was from MONTH XX, 2020 through MONTH XX, 2020.

The EPA 45-day review period was from MONTH XX, 2020 through MONTH XX, 2020.

[Number of] comments were received during the public notice period and the EPA review period.

13. Comments and Recommendations

The permit renewal application for the Uwharrie Environmental Landfill located in Mount Gilead, Montgomery County, NC has been reviewed by DAQ to determine compliance with all procedures and requirements. DAQ has determined that this facility is complying or will achieve compliance, as specified in the permit, with all requirements that are applicable to the affected sources. The DAQ recommends the issuance of Air Permit No. 08826T12.