This is the template for 40 CFR Part 63, Subpart AAAA - National Emission Standards for Hazardous Air Pollutants (NESHAP) for a Municipal Solid Waste (MSW) landfill that has not installed a bioreactor and has accepted waste since November 8, 1987, or has additional capacity for waste deposition and meets any one of the following three criteria: is a major source as defined in 40 CFR 63.2, is collocated with a major source as defined in 40 CFR 63.2, is an area source landfill that has a design capacity equal to or greater than 2.5 million megagrams (Mg) and 2.5 million cubic meters (m^3) and has estimated uncontrolled emissions less than 50 megagrams per year (Mg/yr) NMOC as calculated according to 40 CFR 63.1959.

This template is meant to be inserted into the ROP shell document along with the associated parts and appendices that are specific to this template.

Included in this template is Part D, Flexible Group Special Conditions including the Flexible Group Summary Table. The template requires the landfill to continually calculate its NMOC emissions and submit the results annually.

The requirements for operating the collection and control system for the landfill are not included in this table. If the facility enters the operational stage during the time of the ROP, it will have to comply with those applicable conditions of the Subpart including submission of an amended ROP application.

Blue text is guidance or notes on the use of the template. Delete all blue text prior to issuing the final permit or submitting it with a permit application. Read through all conditions. If this template is being used for an ROP Reopening or Renewal, and the conditions were established in a PTI, the appropriate footnotes which reference enforceability must be added to each applicable condition in the template.

Red text identifies options. Select the option that applies to the source and change the text to black. Delete red text that does not apply and renumber conditions if necessary.

D. FLEXIBLE GROUP SPECIAL CONDITIONS

Part D outlines the terms and conditions that apply to more than one emission unit. The permittee is subject to the special conditions for each flexible group in addition to the General Conditions in Part A and any other terms and conditions contained in this ROP.

The permittee shall comply with all specific details in the special conditions and the underlying applicable requirements cited. If a specific condition type does not apply, NA (not applicable) has been used in the table. If there are no special conditions that apply to more than one emission unit, this section will be left blank.

{REMOVE ANY FLEXIBLE GROUPS THAT ARE NOT AT THE SOURCE OR ADD FLEXIBLE GROUPS THAT ARE AT THE SOURCE}

FLEXIBLE GROUP SUMMARY TABLE

The descriptions provided below are for informational purposes and do not constitute enforceable conditions.

Flexible Group ID	Flexible Group Description	Associated Emission Unit IDs
FGLANDFILL-AAAA<50	A Municipal Solid Waste (MSW) landfill that has accepted waste at any time since November 8, 1987. The MSW landfill has a design capacity greater than 2.5 million megagrams (Mg) and 2.5 million cubic meters, actual NMOC emissions less than 50 Mg per year as calculated according to 40 CFR 63.1959 and is collocated at a major source as defined in 40 CFR 63.2. This MSW landfill is subject to the requirements of 40 CFR Part 63, Subpart AAAA.	EULANDFILL

FGLANDFILL-AAAA<50
FLEXIBLE GROUP CONDITIONS

DESCRIPTION

A Municipal Solid Waste (MSW) landfill that has accepted waste at any time since November 8, 1987. The MSW landfill has a design capacity greater than 2.5 million megagrams (Mg) and 2.5 million cubic meters, actual NMOC emissions less than 50 Mg per year as calculated according to 40 CFR 63.1959 and is collocated at a major source as defined in 40 CFR 63.2. This MSW landfill is subject to the requirements of 40 CFR Part 63, Subpart AAAA.

Emission Units: EULANDFILL

POLLUTION CONTROL EQUIPMENT

{Enter pollution control equipment names or NA}

I. EMISSION LIMIT(S)

NA

II. MATERIAL LIMIT(S)

NA

III. PROCESS/OPERATIONAL RESTRICTION(S)

1. The permittee must operate and maintain any affected source, including associated air pollution control equipment and monitoring equipment, in a manner consistent with safety and good air pollution control practices for minimizing emissions. **(40 CFR 63.1955(c))**

IV. DESIGN/EQUIPMENT PARAMETER(S)

NA

V. TESTING/SAMPLING

Records shall be maintained on file for a period of five years. **(R 336.1213(3)(b)(ii))**

1. The permittee shall determine the NMOC mass emission rate utilizing procedures and calculations as described in Appendices 5 and 7 and in accordance with the Department requirements. **(R 336.1213(3), 40 CFR 63.1959(a)(1))**

2. For Tier 2 NMOC emissions determination, no less than 30 days prior to testing, the permittee shall submit a complete test plan to the AQD. The AQD must approve the final plan prior to testing, including any modifications to the method in the test protocol that are proposed after initial submittal. The permittee must submit a complete report of the test results to the AQD within 60 days following the last date of the test. **(R 336.1213(3), R 336.2001, R 336.2003, R 336.2004, 40 CFR 63.1959(a)(3)(i))**

3. Upon completion of any Tier 1, 2, or 3 NMOC determination, the permittee must compare the results to the NMOC mass emission rate standard of 50 Mg per year. If the results are equal to or greater than 50 Mg per year, then the permittee may perform the next higher tier determination or submit a gas collection and control system design plan within one year as specified in 40 CFR 63.1981(d) and install and operate a gas collection and control system within 30 months according to 40 CFR 63.1959(b)(2)(ii) and (iii). **(40 CFR 63.1959(a)(2)(i and ii), 40 CFR 63.1959(a)(3)(iv), 40 CFR 63.1959(a)(4)(i), 40 CFR 63.1959(b)(1)(ii)(A))**

4. NMOC emission results must be recalculated annually if the NMOC mass emission rate is less than 50 Mg per year. **(40 CFR 63.1959(a))**

5. Tier 2 testing to determine site specific NMOC concentration must be performed at least once every five years when being used to demonstrate the facility NMOC emissions are less than 50 Mg per year. **(40 CFR 63.1959(a)(3)(iii))**

6. Tier 3 testing must be performed to determine a site-specific methane generation rate constant if the NMOC mass emission rate as calculated using the Tier 2 site-specific NMOC concentration is greater than or equal to 50 Mg/yr. **(40 CFR 63.1959(a)(4))**

See Appendices 5 and 7

VI. MONITORING/RECORDKEEPING

Records shall be maintained on file for a period of five years. **(R 336.1213(3)(b)(ii))**

1. The permittee must calculate the annual NMOC emission rates using methods outlined in Appendices 5 and 7. This shall be performed annually until such time as the calculated NMOC emission rate is equal to or greater than 50 Mg/yr or the landfill is closed. **(40 CFR 63.1959(b)(1)(ii))**

2. Except as provided in 40 CFR 63.1981(d)(2), each MSW landfill subject to the provisions of 40 CFR 63.1959(b)(ii) and (iii) must keep for at least 5 years up-to-date, readily accessible, on-site records of the design capacity report that triggered 40 CFR 63.1959(b), the current amount of solid waste in-place, and the year-by-year waste acceptance rate. Off-site records may be maintained if they are retrievable within 4 hours. Either paper copy or electronic formats are acceptable. **(40 CFR 63.1983(a))**

3. If the landfill is permanently closed, a closure notification shall be submitted to the AQD District Supervisor within 30 days, except for exemption allowed under 40 CFR 63.1981(f). **(40 CFR 63.1959(b)(1)(ii)(B))**

See Appendices 5 and 7

VII. REPORTING

1. Prompt reporting of deviations pursuant to General Conditions 21 and 22 of Part A. **(R 336.1213(3)(c)(ii))**

2. Semiannual reporting of monitoring and deviations pursuant to General Condition 23 of Part A. The report shall be received by March 15 for reporting period July 1 to December 31 and September 15 for reporting period January 1 to June 30. **(R 336.1213(3)(c)(i))**

3. Annual certification of compliance pursuant to General Conditions 19 and 20 of Part A. The report shall be received by March 15 for the previous calendar year. **(R 336.1213(4)(c))**

4. The permittee must submit an NMOC emission rate report annually by March 15 for the previous calendar year following the procedure specified in 40 CFR 63.1981(c)(1)(ii). **(40 CFR 63.1981(c))**

   a. The NMOC emission rate report must contain an annual or 5-year estimate of the NMOC emission rate calculated using the formula and procedures provided in 40 CFR 63.1959(a) or (b), as applicable. **(40 CFR 63.1981(c)(1))**

   b. The NMOC emission rate report must include all the data, calculations, sample reports and measurements used to estimate the annual or 5-year emissions. **(40 CFR 63.1981(c)(2))**

   c. If the estimated NMOC emission rate as reported in the annual report is less than 50 Mg per year in each of the next 5 consecutive years, the permittee may elect to submit an estimate of the NMOC emission rate for the next 5-year period in lieu of the annual report. This estimate must include the current amount of solid waste-in-place and the estimated waste acceptance rate for each year of the 5 years for which an NMOC emission rate is estimated. All data and calculations upon which this estimate is based must be provided. This estimate must be revised at least once every 5 years. If the actual waste acceptance rate exceeds the

estimated waste acceptance rate in any year reported in the 5-year estimate, a revised 5-year estimate must be submitted. The revised estimate must cover the 5-year period beginning with the year in which the actual waste acceptance rate exceeded the estimated waste acceptance rate. **(40 CFR 63.1981(c)(1)(ii)(A))**

5. The permittee must submit reports electronically according to 40 CFR 63.1981(l)(1) and (2) as follows:

   a. Within 60 days after the date of completing each performance test, the permittee must submit the results of each performance test. For data collected using test methods supported by the USEPA's Electronic Reporting Tool (ERT) as listed on the EPA's ERT website (https://www.epa.gov/electronic-reporting-air-emissions/electronic-reporting-tool-ert) at the time of the test, submit the results of the performance test to the USEPA via the Compliance and Emissions Data Reporting Interface (CEDRI). The CEDRI can be accessed through the EPA's CDX (https://cdx.epa.gov/). Performance test data must be submitted in a file format generated through the use of the EPA's ERT or an alternative file format consistent with the extensible markup using the language (XML) schema listed on the EPA's ERT website, once the XML schema is available. For data collected using test methods that are not supported by the EPA's ERT as listed on the EPA's ERT website at the time of the test, include the results of the performance test as an attachment in the ERT or an alternate electronic file consistent with the XML schema listed on the EPA's ERT website and submit the ERT generated package or alternative file to the EPA via CEDRI. **(40 CFR 63.1981(l)(1)(i) and (ii))**

   b. Each permittee must submit reports to the USEPA via the CEDRI (CEDRI can be accessed through the EPA's CDX). The permittee must use the appropriate electronic report in CEDRI for this subpart or an alternate electronic file format consistent with the XML schema listed on the CEDRI website (https://www.epa.gov/electronic-reporting-air-emissions/compliance-and-emissions-data-reporting-interface-cedri). If the reporting form specific to this subpart is not available in CEDRI at the time that the report is due, the permittee must submit the report to the USEPA at the appropriate address listed in 40 CFR 63.13. Once the form has been available in CEDRI for 90 calendar days, the permittee must begin submitting all subsequent reports via CEDRI. The NMOC emission rate reports, semi-annual reports, and bioreactor 40-percent moisture reports should be electronically reported as a spreadsheet template upload/form to CEDRI. **(40 CFR 63.1981(l)(2))**

6. The permittee shall submit any NMOC test reports to the AQD, in a format approved by the AQD. **(R 336.1213(3)(c), R 336.2001(5))**

See Appendix 8

VIII. STACK/VENT RESTRICTION(S)

NA

IX. OTHER REQUIREMENT(S)

1. If the NMOC emission rate is calculated to be equal to or greater than 50 Mg per year using Tier 1, 2, or 3 procedures, the permittee must either calculate NMOC emissions using the next higher tier procedure or submit a collection and control system design plan within one year as specified in 40 CFR 63.1981(d) and install and operate a gas collection and control system within 30 months according to 40 CFR 63.1959(b)(2)(ii)(B) or (C) and 40 CFR 63.1959(b)(2)(iii). Additionally, within 90 days of determining NMOC emissions are above 50 Mg per year, the permittee shall apply for a revision of this permit to reflect applicable requirements of 40 CFR Part 63, Subpart AAAA. **(R 336.1216(2), 40 CFR 63.1959(a)(2)(i) and (ii))**

2. The permittee is exempted from the requirements to submit an NMOC emission rate report, after installing a collection and control system that complies with 40 CFR 63.1959(b)(2), during such time as the collection and control system is in operation and in compliance with 40 CFR 63.1958 and 40 CFR 63.1960. **(40 CFR 63.1981(c)(3))**

3. The permittee must comply with all applicable provisions of the National Emissions Standards for Hazardous Air Pollutants: Municipal Solid Waste Landfills as specified in 40 CFR Part 63, Subparts A and AAAA. **(40 CFR Part 63, Subparts A and AAAA)**

Remove these footnotes if no PTIs are associated with this emission unit or flexible group.

Footnotes:

[1] This condition is state only enforceable and was established pursuant to Rule 201(1)(b).

[2] This condition is federally enforceable and was established pursuant to Rule 201(1)(a).

E. NON-APPLICABLE REQUIREMENTS

At the time of the ROP issuance, the AQD has determined that no non-applicable requirements have been identified for incorporation into the permit shield provision set forth in the General Conditions in Part A pursuant to Rule 213(6)(a)(ii).

If the facility requests an entry into this section, refer to the ROP Manual 4.B.2, “ROP Shell Instructions.”

APPENDICES

Appendix 1. Acronyms and Abbreviations

Common Acronyms		Pollutant / Measurement Abbreviations	
AQD	Air Quality Division	acfm	Actual cubic feet per minute
BACT	Best Available Control Technology	BTU	British Thermal Unit
CAA	Clean Air Act	°C	Degrees Celsius
CAM	Compliance Assurance Monitoring	CO	Carbon Monoxide
CEM	Continuous Emission Monitoring	CO_2e	Carbon Dioxide Equivalent
CEMS	Continuous Emission Monitoring System	dscf	Dry standard cubic foot
CFR	Code of Federal Regulations	dscm	Dry standard cubic meter
COM	Continuous Opacity Monitoring	°F	Degrees Fahrenheit
Department/ department	Michigan Department of Environment, Great Lakes, and Energy	gr	Grains
		HAP	Hazardous Air Pollutant
EGLE	Michigan Department of Environment, Great Lakes, and Energy	Hg	Mercury
		hr	Hour
EU	Emission Unit	HP	Horsepower
FG	Flexible Group	H_2S	Hydrogen Sulfide
GACS	Gallons of Applied Coating Solids	kW	Kilowatt
GC	General Condition	lb	Pound
GHGs	Greenhouse Gases	m	Meter
HVLP	High Volume Low Pressure*	mg	Milligram
ID	Identification	mm	Millimeter
IRSL	Initial Risk Screening Level	MM	Million
ITSL	Initial Threshold Screening Level	MW	Megawatts
LAER	Lowest Achievable Emission Rate	NMOC	Non-methane Organic Compounds
MACT	Maximum Achievable Control Technology	NO_x	Oxides of Nitrogen
MAERS	Michigan Air Emissions Reporting System	ng	Nanogram
MAP	Malfunction Abatement Plan	PM	Particulate Matter
MSDS	Material Safety Data Sheet	PM10	Particulate Matter equal to or less than 10 microns in diameter
NA	Not Applicable		
NAAQS	National Ambient Air Quality Standards	PM2.5	Particulate Matter equal to or less than 2.5 microns in diameter
NESHAP	National Emission Standard for Hazardous Air Pollutants	pph	Pounds per hour
		ppm	Parts per million
NSPS	New Source Performance Standards	ppmv	Parts per million by volume
NSR	New Source Review	ppmw	Parts per million by weight
PS	Performance Specification	%	Percent
PSD	Prevention of Significant Deterioration	psia	Pounds per square inch absolute
PTE	Permanent Total Enclosure	psig	Pounds per square inch gauge
PTI	Permit to Install	scf	Standard cubic feet
RACT	Reasonable Available Control Technology	sec	Seconds
ROP	Renewable Operating Permit	SO_2	Sulfur Dioxide
SC	Special Condition	TAC	Toxic Air Contaminant
SCR	Selective Catalytic Reduction	Temp	Temperature
SDS	Safety Data Sheet	THC	Total Hydrocarbons
SNCR	Selective Non-Catalytic Reduction	tpy	Tons per year
SRN	State Registration Number	µg	Microgram
TEQ	Toxicity Equivalence Quotient	µm	Micrometer or Micron
USEPA/EPA	United States Environmental Protection Agency	VOC	Volatile Organic Compounds
		yr	Year
VE	Visible Emissions		

*For HVLP applicators, the pressure measured at the gun air cap shall not exceed 10 psig.

Appendix 2. Schedule of Compliance

{CHOOSE ONE}

The permittee certified in this ROP application that this stationary source is in compliance with all applicable requirements of this ROP except for the following: {Enter condition number(s)}. As a result, the permittee was required to submit a Schedule of Compliance as defined in Rule 119(a), pursuant to Rule 210(2) and Rule 213(4).

A Schedule of Compliance for any applicable requirements that the permittee is not in compliance with at the time of the ROP issuance is supplemental to, and shall not sanction non-compliance with, the underlying applicable requirements on which it is based.

The permittee shall adhere to this schedule of compliance and submit the required certified progress reports accordingly.

Compliance Plan

The permittee outlined the details of achieving compliance in a narrative compliance plan. The details of the compliance plan are outlined below.

Insert the narrative details from the Compliance Plan that was submitted

Schedule of Compliance

The following schedule of compliance conforms with the provisions of Rule 119(a) and Rule 213(4).

Emission Unit/ Flexible Group ID and Condition No.	Applicable Requirement	Remedial Measure	Required Action	Milestone Date	Progress Reports

Progress Reports

The permittee shall submit Certified Progress Reports using the MiEnviro form ROP General Compliance Report. **(R 336.1213(4)(b))**

Progress reports shall contain the following information:

The projected dates for achieving scheduled activities, milestones or compliance as required in the schedule of compliance. **(R 336.1213(4)(b)(i))**

The actual dates that the activities, milestones, or compliance are achieved. **(R 336.1213(4)(b)(i))**

An explanation of why any dates in the Schedule of Compliance were not or will not be met. **(R 336.1213(4)(b)(ii))**

A description of any preventative or corrective measures adopted in order to ensure that the schedule of compliance is met. **(R 336.1213(4)(b)(ii))**

{OR}

The permittee certified in the ROP application that this stationary source is in compliance with all applicable requirements and the permittee shall continue to comply with all terms and conditions of this ROP. A Schedule of Compliance is not required. **(R 336.1213(4)(a), R 336.1119(a)(ii))**

Appendix 3. Monitoring Requirements

Specific monitoring requirement procedures, methods or specifications are detailed in Part A or the appropriate Source-Wide, Emission Unit and/or Flexible Group Special Conditions. Therefore, this appendix is not applicable.

Appendix 4. Recordkeeping

{CHOOSE ONE}

Specific recordkeeping requirement formats and procedures are detailed in Part A or the appropriate Source-Wide, Emission Unit and/or Flexible Group Special Conditions. Therefore, this appendix is not applicable.

Appendix 5. Testing Procedures

The permittee must use the following approved procedures, to measure the pollutant emissions for the applicable requirements referenced in FGLANDFILL-AAAA<50. **(40 CFR 63.1959(a))**

Tier 1

The permittee must calculate NMOC mass emission rate utilizing Equation 1 or 2 in Appendix 7, as applicable, and compare it to the standard of 50 Mg per year. **(40 CFR 63.1959(a)(2))**

Tier 2

The permittee must determine the site-specific NMOC concentration using the following sampling procedure. The permittee must install at least two sample probes per hectare, evenly distributed over the landfill surface that has retained waste for at least 2 years. If the landfill is larger than 25 hectares in area, only 50 samples are required. The sample probes should be evenly distributed across the sample area. The sample probes should be located to avoid known areas of nondegradable solid waste.

The permittee must collect and analyze one sample of landfill gas from each probe to determine the NMOC concentration using 40 CFR Part 60, Appendix A-7, Methods 25 or 25C. Taking composite samples from different probes into a single cylinder is allowed; however, equal sample volumes must be taken from each probe. For each composite, the sampling rate, collection times, beginning and ending cylinder vacuums, or alternative volume measurements must be recorded to verify that composite volumes are equal. Composite sample volumes should not be less than one liter unless evidence can be provided to substantiate the accuracy of smaller volumes. Terminate compositing before the cylinder approaches ambient pressure where measurement accuracy diminishes. If more than the required number of samples is taken, all samples must be used in the analysis. The permittee must divide the NMOC concentration from 40 CFR Part 60, Appendix A-7, Method 25 or 25C by six (6) to convert from CNMOC as carbon to CNMOC as hexane. If the landfill has an active or passive gas removal system in place, Method 25 or 25C samples may be collected from these systems instead of surface probes provided the removal system can be shown to provide sampling as representative as the two-sampling probes per hectare requirement. For active collection systems, samples may be collected from the common header pipe. The sample location on the common header pipe must be before any gas moving, condensate removal, or treatment system equipment. For active collection systems, a minimum of three (3) samples must be collected from the header pipe. **(40 CFR 63.1959(a)(3))**

Tier 3

The site-specific methane generation rate constant must be determined using the procedures provided in 40 CFR Part 60, Appendix A-1, Method 2E. The permittee must estimate the NMOC mass emission rate using **Equation 1** (40 CFR 63.1959(a)(1)(i)) or **Equation 2** (40 CFR 63.1959(a)(1)(ii)) and using a site-specific methane generation rate constant (k), and the site-specific NMOC concentration as determined in 40 CFR 63.1959(a)(3) instead of the default values provided in 40 CFR 63.1959(a)(1). The permittee must compare the resulting NMOC mass emission rate to the standard of 50 Mg per year. **(40 CFR 63.1959(a)(4))**

Appendix 6. Permits to Install

{CHOOSE ONE}

{For Initial ROP Issuance}
The following table lists any Permit to Install and/or operate, that relates to the identified emission units or flexible groups as of the effective date of this ROP. This includes all Permits to Install and/or operate that are hereby incorporated into Source-Wide PTI No. SWPTI####### v#.#. PTIs issued after the effective date of this ROP, including amendments or modifications, will be identified in Appendix 6 upon renewal.

Permit to Install Number	Description of Equipment	Corresponding Emission Unit(s) or Flexible Group(s)

{OR}

{For ROP Renewals}
The following table lists any PTIs issued, or ROP revision applications received since the effective date of the previously issued ROP No. MI-ROP-{SRN}-{YEAR}. {Note: this should be the most recently issued ROP, not a revision. If any revisions have been done since ROP issuance, do not include the "a, b, c" sequential number here.} Those ROP revision applications that are being issued concurrently with this ROP renewal are identified by an asterisk (*). Those revision applications not listed with an asterisk were processed prior to this renewal.

Source-Wide PTI No MI-PTI-{SRN}-{YEAR} {Note: this should be the most recent version of the Source-Wide PTI. Include the latest sequential letter after the number if there was a revision.} is being reissued as Source-Wide PTI No. SWPTI####### v#.#.

{For a PTI that does not have an associated ROP revision application or an ROP revision application that does not have an associated PTI, enter NA in the appropriate column in the table below.}

Permit to Install Number	ROP Revision Application Number	Description of Equipment or Change	Corresponding Emission Unit(s) or Flexible Group(s)

Appendix 7. Emission Calculations

The permittee shall use the following calculations in conjunction with monitoring, testing or recordkeeping data to determine compliance with the applicable requirements referenced in FGLANDFILL-AAAA<50.

Default Values

The permittee must calculate the NMOC emission rate using either **Equation 1** (the equation provided in 40 CFR 63.1959(a)(1)(i)(A)) or **Equation 2** (the equation provided in 40 CFR 63.1959(a)(1)(ii)(A)). Both equations may be used if the actual year-to-year solid waste acceptance rate is known, as specified in **Equation 1** (40 CFR 63.1959 (a)(1)(i)(A)), for part of the life of the landfill and the actual year-to-year solid waste acceptance rate is unknown, as specified in **Equation 2** (the equation provided in 40 CFR 63.1959 (a)(1)(ii)(A)), for part of the life of the landfill. The values to be used in both equations are 0.05 per year for k, 170 cubic meters per megagram for L_o, and 4,000 ppm by volume as hexane for the C_{NMOC}. For landfills located in geographical areas with a thirty-year annual average precipitation of less than 25 inches, as measured at the nearest representative official meteorologic site, the k value to be used is 0.02 per year. **(40 CFR 63.1959(a)(1))**

Equation 1

The following equation must be used if the actual year-to-year solid waste acceptance rate is known.
(40 CFR 63.1959(a)(1)(i)(A))

$$M_{NMOC} = \sum_{i=1}^{n} 2\,kL_oM_i\left(e^{-kt_i}\right)(C_{NMOC})(3.6\,x\,10^{-9})$$

Where:

M_{NMOC} = Total NMOC emission rate from the landfill, megagrams per year

k = methane generation rate constant, $year^{-1}$

L_o = methane generation potential, cubic meters per megagram solid waste

M_i = mass of solid waste in the i^{th} section, megagrams

t_i = age of the i^{th} section, years

C_{NMOC} = concentration of NMOC, parts per million by volume as hexane

3.6×10^{-9} = conversion factor

The mass of nondegradable solid waste may be subtracted from the total mass of solid waste in a particular section of the landfill when calculating the value for M_i if documentation of the nature and amount of such wastes is maintained.

Equation 2

The following equation shall be used if the actual year-to-year solid waste acceptance rate is unknown. **(40 CFR 63.1959 (a)(1)(ii)(A)**

$$M_{NMOC} = 2L_o\ R\ (e^{-kc} - e^{-kt})\ (C_{NMOC})\ (3.6 \times 10^{-9})$$

Where:

M_{NMOC} = mass emission rate of NMOC, megagrams per year

L_o = methane generation potential, cubic meters per megagram solid waste

R = average annual acceptance rate, megagrams per year

k = methane generation rate constant, $year^{-1}$

t = age of landfill, years

C_{NMOC} = concentration of NMOC, parts per million by volume as hexane

c = time since closure, years; for active landfill c = 0 and $e^{-kc} = 1$

3.6×10^{-9} = conversion factor

The mass of nondegradable solid waste may be subtracted from the total mass of solid waste in a particular section of the landfill when calculating the value of R, if documentation of the nature and amount of such wastes is maintained.

Tier 1

The permittee must calculate NMOC mass emission rate utilizing Equation 1 or 2 in **Appendix 7**, as applicable, and compare it to the standard of 50 Mg per year. **(40 CFR 63.1959(a)(1)(ii)(A) (a)(2))**

If the resulting **Tier 1** calculated NMOC mass emission rate is less than 50 Mg per year, the permittee must submit annually an estimate of NMOC emissions in an NMOC emission rate report as provided in 40 CFR 63.1981(c) and must recalculate the NMOC mass emission rate annually as required under 40 CFR 63.1959(b). **(40 CFR 63.1959(a)(2)(i))**

If the NMOC mass emission rate as calculated using the Tier 2 site-specific NMOC concentration is equal to or greater than 50 Mg per year, then the permittee must either:

1. Submit a gas collection and control system design plan within 1 year as specified in 40 CFR 63.1981(d) and install and operate a gas collection and control system within 30 months of the first annual report in which the NMOC emission rate equals or exceeds 50 Mg/yr according to 40 CFR 63.1959(b)(2)(ii) and (iii).. **(40 CFR 63.1959(a)(2)(ii)(A)**
2. Determine a site-specific NMOC concentration and recalculate the NMOC emission rate using **Tier 2** procedures (40 CFR 63.1959(a)(3)). **(40 CFR 63.1959(a)(2)(ii)(B))**, or
3. Determine the site-specific methane generation rate constant and recalculate the NMOC emission rate using the procedure specified in **Tier 3** procedures (40 CFR 63.1959(a)(4)). **(40 CFR 63.1959(a)(2)(ii)(C))**

Tier 2

The permittee must recalculate the NMOC mass emission rate using **Equation 1** or **Equation 2** in **Appendix 7** and using the average site-specific NMOC concentration from the collected samples (**Tier 2** testing in **Appendix 5**) instead of the default value in the equation provided in 40 CFR 63.1959(a)(1). **(40 CFR 63.1959(a)(3)(ii))**

If the resulting **Tier 2** NMOC mass emission rate is less than 50 Mg per year, the permittee must submit a periodic estimate of NMOC emissions in an NMOC emission rate report as provided in 40 CFR 63.1981(c) and must recalculate the NMOC mass emission rate annually as required under 40 CFR 63.1959(b). The site-specific NMOC concentration must be retested every 5 years. **(40 CFR 63.1959(a)(3)(iii))**

If the NMOC mass emission rate as calculated using the Tier 2 site-specific NMOC concentration is equal to or greater than 50 Mg per year, then the permittee must either:

1. Submit a gas collection and control system design plan within 1 year as specified in 40 CFR 63.1981(d) and install and operate a gas collection and control system within 30 months of the first annual report in which the NMOC emission rate equals or exceeds 50 Mg/yr according to 40 CFR 63.1959(b)(2)(ii) and (iii). **(40 CFR 63.1959(a)(3)(iv)(A)** or
2. Determine the site-specific methane generation rate constant and recalculate the NMOC emission rate using the site-specific methane generation rate using the procedure specified in **Tier 3** (40 CFR 63.1959(a)(4)). **(40 CFR 63.1959(a)(3)(iv)(B))**

Tier 3

The site-specific methane generation rate constant must be determined using the procedures provided in 40 CFR Part 60, Appendix A-1, Method 2E. The permittee must estimate the NMOC mass emission rate using **Equation 1** (40 CFR 63.1959(a)(1)(i)) or **Equation 2** (40 CFR 63.1959(a)(1)(ii)) and using a site-specific methane generation rate constant (k), and the site-specific NMOC concentration as determined in 40 CFR 63.1959(a)(3) instead of the default values provided in 40 CFR 63.1959(a)(1). The permittee must compare the resulting NMOC mass emission rate to the standard of 50 Mg per year. **(40 CFR 63.1959(a)(4))**

If the NMOC mass emission rate as calculated using the Tier 2 site-specific NMOC concentration and Tier 3 site-specific methane generation rate is equal to or greater than 50 Mg per year, the permittee must submit a gas collection and control system design plan within 1 year as specified in 40 CFR 63.1981(d) and install and operate a gas collection and control system within 30 months of the first annual report in which the NMOC emission rate equals or exceeds 50 Mg/yr according to 40 CFR 63.1959(b)(2)(ii) and (iii).. **(40 CFR 63.1959(a)(4)(i)(A))**

If the NMOC mass emission rate is less than 50 Mg per year, then the permittee must recalculate the NMOC mass emission rate annually, using **Equation 1** or **Equation 2** in **Appendix 7**, and using the site-specific Tier 2 NMOC concentration and Tier 3 methane generation rate constant and submit a periodic NMOC emission rate report as provided in 40 CFR 63.1981(c). The calculation of the methane generation rate constant (**Tier 3**) is performed only once, and the value obtained from this test must be used in all subsequent annual NMOC emission rate calculations. **(40 CFR 63.1959(a)(4)(ii))**

Appendix 8. Reporting

A. Annual, Semiannual, and Deviation Certification Reporting

The permittee shall use the MiEnviro forms ROP Annual Compliance Certification and ROP Semi-Annual Compliance Certification for the annual, semiannual and deviation certification reporting referenced in the Reporting Section of the Source-Wide, Emission Unit and/or Flexible Group Special Conditions.

B. Other Reporting

Specific reporting requirement formats and procedures are detailed in Part A or the appropriate Source-Wide, Emission Unit and/or Flexible Group Special Conditions. Therefore, Part B of this appendix is not applicable.