MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY
AIR QUALITY DIVISION

August 15, 2024

PERMIT TO INSTALL
101-24

ISSUED TO
North American Natural Resources Autumn Hills Generating

LOCATED AT
5615 Adams Street
Zeeland, Michigan 49646

IN THE COUNTY OF
Ottawa

STATE REGISTRATION NUMBER
N6006

The Air Quality Division has approved this Permit to Install, pursuant to the delegation of authority from the Michigan Department of Environment, Great Lakes, and Energy. This permit is hereby issued in accordance with and subject to Section 5505(1) of Article II, Chapter I, Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. Pursuant to Air Pollution Control Rule 336.1201(1), this permit constitutes the permittee's authority to install the identified emission unit(s) in accordance with all administrative rules of the Department and the attached conditions. Operation of the emission unit(s) identified in this Permit to Install is allowed pursuant to Rule 336.1201(6).

DATE OF RECEIPT OF ALL INFORMATION REQUIRED BY RULE 203: **April 9, 2024**	
DATE PERMIT TO INSTALL APPROVED: **August 15, 2024**	SIGNATURE:
DATE PERMIT VOIDED:	SIGNATURE:
DATE PERMIT REVOKED:	SIGNATURE:

PERMIT TO INSTALL

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COMMON ACRONYMS

AQD	Air Quality Division
BACT	Best Available Control Technology
CAA	Clean Air Act
CAM	Compliance Assurance Monitoring
CEMS	Continuous Emission Monitoring System
CFR	Code of Federal Regulations
COMS	Continuous Opacity Monitoring System
Department/department/EGLE	Michigan Department of Environment, Great Lakes, and Energy
EU	Emission Unit
FG	Flexible Group
GACS	Gallons of Applied Coating Solids
GC	General Condition
GHGs	Greenhouse Gases
HVLP	High Volume Low Pressure*
ID	Identification
IRSL	Initial Risk Screening Level
ITSL	Initial Threshold Screening Level
LAER	Lowest Achievable Emission Rate
MACT	Maximum Achievable Control Technology
MAERS	Michigan Air Emissions Reporting System
MAP	Malfunction Abatement Plan
MSDS	Material Safety Data Sheet
NA	Not Applicable
NAAQS	National Ambient Air Quality Standards
NESHAP	National Emission Standard for Hazardous Air Pollutants
NSPS	New Source Performance Standards
NSR	New Source Review
PS	Performance Specification
PSD	Prevention of Significant Deterioration
PTE	Permanent Total Enclosure
PTI	Permit to Install
RACT	Reasonable Available Control Technology
ROP	Renewable Operating Permit
SC	Special Condition
SCR	Selective Catalytic Reduction
SNCR	Selective Non-Catalytic Reduction
SRN	State Registration Number
TBD	To Be Determined
TEQ	Toxicity Equivalence Quotient
USEPA/EPA	United States Environmental Protection Agency
VE	Visible Emissions

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

POLLUTANT / MEASUREMENT ABBREVIATIONS

acfm	Actual cubic feet per minute
BTU	British Thermal Unit
°C	Degrees Celsius
CO	Carbon Monoxide
CO_2e	Carbon Dioxide Equivalent
dscf	Dry standard cubic foot
dscm	Dry standard cubic meter
°F	Degrees Fahrenheit
gr	Grains
HAP	Hazardous Air Pollutant
Hg	Mercury
hr	Hour
HP	Horsepower
H_2S	Hydrogen Sulfide
kW	Kilowatt
lb	Pound
m	Meter
mg	Milligram
mm	Millimeter
MM	Million
MW	Megawatts
NMOC	Non-Methane Organic Compounds
NO_x	Oxides of Nitrogen
ng	Nanogram
PM	Particulate Matter
PM10	Particulate Matter equal to or less than 10 microns in diameter
PM2.5	Particulate Matter equal to or less than 2.5 microns in diameter
pph	Pounds per hour
ppm	Parts per million
ppmv	Parts per million by volume
ppmw	Parts per million by weight
psia	Pounds per square inch absolute
psig	Pounds per square inch gauge
scf	Standard cubic feet
sec	Seconds
SO_2	Sulfur Dioxide
TAC	Toxic Air Contaminant
Temp	Temperature
THC	Total Hydrocarbons
tpy	Tons per year
µg	Microgram
µm	Micrometer or Micron
VOC	Volatile Organic Compounds
yr	Year

GENERAL CONDITIONS

1. The process or process equipment covered by this permit shall not be reconstructed, relocated, or modified, unless a Permit to Install authorizing such action is issued by the Department, except to the extent such action is exempt from the Permit to Install requirements by any applicable rule. **(R 336.1201(1))**

2. If the installation, construction, reconstruction, relocation, or modification of the equipment for which this permit has been approved has not commenced within 18 months, or has been interrupted for 18 months, this permit shall become void unless otherwise authorized by the Department. Furthermore, the permittee or the designated authorized agent shall notify the Department via the Supervisor, Permit Section, Air Quality Division, Michigan Department of Environment, Great Lakes, and Energy, P.O. Box 30260, Lansing, Michigan 48909-7760, if it is decided not to pursue the installation, construction, reconstruction, relocation, or modification of the equipment allowed by this Permit to Install. **(R 336.1201(4))**

3. If this Permit to Install is issued for a process or process equipment located at a stationary source that is not subject to the Renewable Operating Permit program requirements pursuant to Rule 210 (R 336.1210), operation of the process or process equipment is allowed by this permit if the equipment performs in accordance with the terms and conditions of this Permit to Install. **(R 336.1201(6)(b))**

4. The Department may, after notice and opportunity for a hearing, revoke this Permit to Install if evidence indicates the process or process equipment is not performing in accordance with the terms and conditions of this permit or is violating the Department's rules or the Clean Air Act. **(R 336.1201(8), Section 5510 of Act 451, PA 1994)**

5. The terms and conditions of this Permit to Install shall apply to any person or legal entity that now or hereafter owns or operates the process or process equipment at the location authorized by this Permit to Install. If the new owner or operator submits a written request to the Department pursuant to Rule 219 and the Department approves the request, this permit will be amended to reflect the change of ownership or operational control. The request must include all of the information required by subrules (1)(a), (b), and (c) of Rule 219 and shall be sent to the District Supervisor, Air Quality Division, Michigan Department of Environment, Great Lakes, and Energy. **(R 336.1219)**

6. Operation of this equipment shall not result in the emission of an air contaminant which causes injurious effects to human health or safety, animal life, plant life of significant economic value, or property, or which causes unreasonable interference with the comfortable enjoyment of life and property. **(R 336.1901)**

7. The permittee shall provide notice of an abnormal condition, start-up, shutdown, or malfunction that results in emissions of a hazardous or toxic air pollutant which continue for more than one hour in excess of any applicable standard or limitation, or emissions of any air contaminant continuing for more than two hours in excess of an applicable standard or limitation, as required in Rule 912, to the Department. The notice shall be provided not later than two business days after start-up, shutdown, or discovery of the abnormal condition or malfunction. Written reports, if required, must be filed with the Department within 10 days after the start-up or shutdown occurred, within 10 days after the abnormal conditions or malfunction has been corrected, or within 30 days of discovery of the abnormal condition or malfunction, whichever is first. The written reports shall include all of the information required in Rule 912(5). **(R 336.1912)**

8. Approval of this permit does not exempt the permittee from complying with any future applicable requirements which may be promulgated under Part 55 of 1994 PA 451, as amended or the Federal Clean Air Act.

9. Approval of this permit does not obviate the necessity of obtaining such permits or approvals from other units of government as required by law.

10. Operation of this equipment may be subject to other requirements of Part 55 of 1994 PA 451, as amended and the rules promulgated thereunder.

11. Except as provided in subrules (2) and (3) or unless the special conditions of the Permit to Install include an alternate opacity limit established pursuant to subrule (4) of Rule 301, the permittee shall not cause or permit to be discharged into the outer air from a process or process equipment a visible emission of density greater than the most stringent of the following. The grading of visible emissions shall be determined in accordance with Rule 303 (R 336.1303). **(R 336.1301)**
    a) A six-minute average of 20 percent opacity, except for one six-minute average per hour of not more than 27 percent opacity.
    b) A visible emission limit specified by an applicable federal new source performance standard.
    c) A visible emission limit specified as a condition of this Permit to Install.

12. Collected air contaminants shall be removed as necessary to maintain the equipment at the required operating efficiency. The collection and disposal of air contaminants shall be performed in a manner so as to minimize the introduction of contaminants to the outer air. Transport of collected air contaminants in Priority I and II areas requires the use of material handling methods specified in Rule 370(2). **(R 336.1370)**

13. The Department may require the permittee to conduct acceptable performance tests, at the permittee's expense, in accordance with Rule 1001 and Rule 1003, under any of the conditions listed in Rule 1001. **(R 336.2001)**

EMISSION UNIT SPECIAL CONDITIONS

EMISSION UNIT SUMMARY TABLE

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

Emission Unit ID	Emission Unit Description (Including Process Equipment & Control Device(s))	Installation Date / Modification Date	Flexible Group ID
EUGSFLARE	One (1) emergency (or "back-up") non-enclosed flare (open flare). The rated design capacity of the flare is 3,000 standard cubic feet per minute (scfm). The gas shall be treated by EUTREATMENTSYS prior to being routed to the flare.	TBD	NA

Changes to the equipment described in this table are subject to the requirements of R 336.1201, except as allowed by R 336.1278 to R 336.1291.

EUGSFLARE
EMISSION UNIT CONDITIONS

DESCRIPTION

One (1) emergency (or "back-up") non-enclosed flare (open flare). The rated design capacity of the flare is 3,000 standard cubic feet per minute (scfm).

Flexible Group ID: NA

POLLUTION CONTROL EQUIPMENT

The Landfill gas shall be treated by EUTREATMENTSYS prior to being routed to EUGSFLARE for particulates.

I. EMISSION LIMIT(S)

Pollutant	Limit	Time Period / Operating Scenario	Equipment	Monitoring / Testing Method	Underlying Applicable Requirements
1. NO_x	9.5 tpy[a]	12-month rolling time period as determined at the end of each calendar month.	EUGSFLARE	SC VI.5	R 336.1205(1)(a) & (3), 40 CFR 52.21(c) & (d)
2. CO	36.1 tpy[b]	12-month rolling time period as determined at the end of each calendar month.	EUGSFLARE	SC VI.5	R 336.1205(1)(a) & (3), 40 CFR 52.21(c) & (d)
3. SO_2	27.6 tpy[c]	12-month rolling time period as determined at the end of each calendar month.	EUGSFLARE	SC V.4, SC VI.4	R 336.1205(1)(a) & (3), 40 CFR 52.21(c) & (d)

[a]Based on 0.068 lb NO_X per MMBtu gas
[b]Based on 0.310 lb CO per MMBtu gas
[c]Based on 700 ppm of hydrogen sulfide (H_2S) or total reduced sulfur (TRS) content as restricted in EUGSFLARE

4. The flare shall be operated with no visible emissions, as determined by the methods specified in 40 CFR 60.18(f), except for periods not to exceed a total of 5 minutes during any 2 consecutive hours. **(40 CFR 60.18(c)(1))**

II. MATERIAL LIMIT(S)

Material	Limit	Time Period / Operating Scenario	Equipment	Monitoring / Testing Method	Underlying Applicable Requirements
1. Landfill gas	473.0 MMscf/yr	12-month rolling time period as determined at the end of each calendar month.	EUGSFLARE	VI.6	R 336.1205(1)(a) & (3), R 336.1224, R 336.1225, R 336.1702, 40 CFR 52.21(c) & (d)

III. PROCESS/OPERATIONAL RESTRICTION(S)

1. The permittee shall operate the flare in accordance with 40 CFR 60.18. **(40 CFR 60.18)**

2. The flare shall be operated with a flame present at all times, as determined by the methods specified in 40 CFR 60.18(f). **(40 CFR 60.18(c)(2))**

3. The flare shall be used only with the net heating value of the gas being combusted 7.45 MJ/scm (200 Btu/scf) or greater if the flare is non-assisted. The net heating value of the gas being combusted shall be determined by the methods specified in 40 CFR 60.18(f). **(40 CFR 60.18(c)(3)(iii))**

4. Flares used to comply with provisions of 40 CFR Part 60 Subpart A shall be operated at all times when emissions may be vented to them. **(40 CFR 60.18(e))**

5. Within 30 days from the commencement of trial operation of EUGSFLARE, the permittee shall submit to the AQD District Supervisor, for review and approval, a preventative maintenance / malfunction abatement plan (PM / MAP) for EUGSFLARE. After approval of the PM / MAP by the AQD District Supervisor, the permittee shall not operate EUGSFLARE unless the PM / MAP, or an alternate plan approved by the AQD District Supervisor, is implemented, and maintained. The plan shall incorporate procedures recommended by the equipment manufacturer as well as incorporating standard industry practices. At a minimum the plan shall include:
   a) Identification of the equipment and the supervisory personnel responsible for overseeing the inspection, maintenance, and repair.
   b) Description of the items or conditions to be inspected and frequency of the inspections or repairs.
   c) Identification of the equipment and, if applicable, air-cleaning device, operating parameters that shall be monitored to detect a malfunction or failure, the normal operating range of these parameters and a description of the method of monitoring or surveillance procedures.
   d) Identification of the major replacement parts that shall be maintained in inventory for quick replacement.
   e) A description of the corrective procedures or operational changes that shall be taken in the event of a malfunction or failure to achieve compliance with the applicable emission limits.

   If at any time the PM / MAP fails to address or inadequately addresses an event that meets the characteristics of a malfunction, the permittee shall amend the PM / MAP within 45 days after such an event occurs. The permittee shall also amend the PM / MAP within 45 days if new equipment is installed or upon request from the AQD District Supervisor. The permittee shall submit the PM / MAP and any amendments to the PM / MAP to the AQD District Supervisor for review and approval. If the AQD does not notify the permittee within 90 days of submittal, the PM / MAP or amended PM / MAP shall be considered approved. Until an amended plan is approved, the permittee shall implement corrective procedures or operational changes to achieve compliance with all applicable emission limits. **(R 336.1911, R 336.1912)**

6. The permittee shall only burn landfill gas in EUGSFLARE which has been treated to remove particulates and moisture by the AQD approved treatment system. **(R336.1205, R336.1224, R336.1225, R336.1331, R336.1910)**

IV. DESIGN/EQUIPMENT PARAMETER(S)

1. The design capacity of EUGSFLARE shall not exceed 3,000 scfm. **(R 336.1225, 40 CFR 52.21(c) & (d))**

2. The permittee shall install, calibrate, maintain, and operate according to the manufacturer's specifications, a landfill gas flow rate measuring device for EUGSFLARE to record the flow to or bypass of the flare at least every 15 minutes. **(R 336.1205(1)(a) & (3), R 336.1225, R 336.1702)**

3. EUGSFLARE, a non-assisted flares shall be designed for and operated with an exit velocity, as determined by the methods specified in 40 CFR 60.18(f)(4), less than 18.3 m/sec (60 ft/sec), except as provided in 40 CFR 60.18(c)(4)(ii) and (iii) **(40 CFR 60.18(c)(4)(i))**:

a) Non-assisted flares designed for and operated with an exit velocity, equal to or greater than 18.3 m/sec (60 ft/sec) but less than 122 m/sec (400 ft/sec) are allowed if the net heating value of the gas being combusted is greater than 37.3 MJ/scm (1,000 Btu/scf). **(40 CFR 60.18(c)(4)(ii))**
b) Non-assisted flares designed for and operated with an exit velocity, as determined by the methods specified in 40 CFR 60.18(f)(4) less than the velocity, Vmax, as determined by the method specified in 40 CFR 60.18(f)(5), and less than 122 m/sec (400 ft/sec) are allowed. **(40 CFR 60.18(c)(4)(iii))**

4. The permittee shall install, calibrate, maintain, and operate according to the manufacturer's specifications, a heat sensing device, such as an ultraviolet beam sensor or thermocouple, at the pilot light or the flame itself to indicate the continuous presence of a flame. **(R 336.1205, R 336.1224, R 336.1225, R 336.1702)**

V. TESTING/SAMPLING

Records shall be maintained on file for a period of five years. **(R 336.1201(3))**

1. Within 180 days after commencement of initial startup, the permittee must verify visible emissions from EUGSFLARE, by testing at owner's expense, in accordance with Department requirements. Testing must be performed using an approved USEPA Method 22 listed in 40 CFR Part 60, Appendix A. No less than 30 days prior to testing, the permittee must submit a complete test plan to the appropriate AQD District Office. The AQD must approve the final plan prior to testing. The permittee must submit a complete report of the test results to the appropriate AQD District Office within 60 days following the last date of the test. **(R 336.2001, R 336.2003, R 336.2004, 40 CFR 60.18(f))**

2. Within 180 days after commencement of initial startup, the permittee must verify the following:

   a) The net heating value of the gas being combusted in the flare must be calculated and recorded using the equation provided in Appendix 7. **(40 CFR 60.18(f)(3))**

   b) The exit velocity for steam-assisted, air-assisted, or non-assisted flares as determined by the methods provided in Appendix 7. **(40 CFR 60.18(f)(5) and (6))**

3. Within 180 days from the commencement of trial operation of EUGSFLARE, the permittee must verify visible emissions, the net heating value, and exit velocity from EUGSFLARE and at a minimum, every five years from the date of the last test, thereafter. **(R 336.2001, R 336.2003, R 336.2004, 40 CFR 60.18(f))**

4. The permittee shall verify the hydrogen sulfide (H_2S), or total reduced sulfur (TRS) content of the landfill gas burned in EUGSFLARE monthly by gas sampling (e.g. Draeger Tubes, Tedlar Sampling Bags, etc.) and semi-annually by gas sampling using an EPA approved method and laboratory analysis, at the owner's expense, in accordance with Department requirements. This sampling shall be conducted separately from sampling done elsewhere at the stationary source. If at any time, the H_2S (TRS equivalent) concentration of the landfill gas sample exceeds 700 ppmv, the permittee shall sample and record the H_2S (TRS equivalent) concentration of the landfill gas weekly and shall review all operating and maintenance activities for the landfill gas collection and treatment system along with keeping records of corrective actions taken. Once the H_2S (TRS equivalent) concentration of the landfill gas (determined from 4 weekly) is maintained below 700 ppmv for one month after an exceedance, the permittee may resume monthly monitoring and recordkeeping. If EUGSFLARE does not operate in a calendar month H_2S (TRS equivalent) sampling is not required with proper required record showing that it did not operate throughout the month. No less than 30 days prior to the initial test for each type of gas sampling, the permittee shall submit a complete test plan to the AQD Technical Programs Unit and District Office. The AQD must approve the final plan prior to the first test for each type of gas sampling. Thereafter, the permittee shall submit a test plan upon the request of the AQD District Supervisor or if any changes are made to the approved testing protocol. The permittee shall keep all records on file at the facility and make them available to the Department upon request. **(R 336.1205(3), R 336.1225, R 336.2001, R 336.2003, R 336.2004, 40 CFR 52.21(c) & (d))**

VI. MONITORING/RECORDKEEPING

Records shall be maintained on file for a period of five years. **(R 336.1201(3))**

1. The permittee shall complete all required calculations in a format acceptable to the AQD District Supervisor by the 30th day of the calendar month, for the previous calendar month, unless otherwise specified in any

monitoring/recordkeeping special condition. **(R 336.1205, R 336.1224, R 336.1225, R 336.1702(a), R 336.1910, R 336.1911)**

2. The following records for the flare shall be maintained onsite:
   a) Records indicating presence of flare pilot flame. **(40 CFR 60.18(f)(2))**
   b) The net heating value of the gas being combusted in the flare shall be calculated and recorded using the equation provided in Appendix A. **(40 CFR 60.18(f)(3))**
   c) The actual exit velocity of the flare shall be calculated and recorded by dividing the volumetric flow rate (in units of standard temperature and pressure), as determined by Federal Reference Test Methods 2, 2A, 2C, or 2D as appropriate, by the unobstructed (free) cross sectional area of the flare tip. **(40 CFR 60.18(f)(4))**
   d) The maximum permitted velocity, Vmax, for flares complying with 40 CFR 60.18(c)(4)(iii) shall be calculated and recorded using the equation provided in Appendix A. **(40 CFR 60.18(f)(5))**
   e) The maximum permitted velocity, Vmax, for air-assisted flares shall be calculated and recorded using the equation provided in Appendix A. **(40 CFR 60.18(f)(6))**

3. The permittee shall keep, in a satisfactory manner, records of gas sampling and analysis for H_2S and TRS concentration in the raw landfill gas routed to EUGSFLARE and any explanations for sampling exceeding 700 ppm H_2S concentrations. If the exceedance continues to be repeated occurrence (other than startup, shutdown, and/or malfunction), the permittee shall submit PTI application to increase the H2S concentration of the landfill gas. The permittee shall keep all records on file and make them available to the Department upon request. **(R 336.1205(1)(a) & (3), R 336.1224, R 336.1225, R 336.1901)**

4. The permittee shall calculate and keep, in a satisfactory manner, records of monthly and 12-month rolling total SO_2 mass emissions for EUGSFLARE. Calculations shall be performed according to Appendix B or other method as approved by the AQD District Supervisor. The calculations shall utilize the actual gas monthly usage, and the sulfur concentration from the most recent gas sampling data unless otherwise requested by the AQD. The permittee shall keep all records on file and make them available to the Department upon request. **(R 336.1205(1)(a) & (3))**

5. The permittee shall maintain the following records for EUGSFLARE:
   a) Landfill gas flow rate in cfh (cubic feet per hour)
   b) Landfill gas throughput in MMBtu/yr (HHV).
   c) Landfill gas quality in Btu/ft^3 (HHV) on a monthly average.
   d) Landfill gas flow rate in MMscf/yr.
   e) Emission factors used to estimate emissions (HHV in MMBtu/cfm)
   f) Calculated CO and NOx emissions, tons, on a rolling 12-month time period, as determined at the end of each calendar month.

   The permittee shall keep, in a satisfactory manner, records of monthly and 12-month rolling CO and NO_X mass emissions for EUGSFLARE. Calculations shall be performed according to Appendix B or other method as approved by the AQD District Supervisor. The permittee shall keep all records on file and make them available to the Department upon request. **(R 336.1205(1)(a) & (3), 40 CFR 52.21(c) & (d))**

6. The permittee shall keep, in a satisfactory manner, records of the total volume (MMscf) landfill gas burned in EUGSFLARE on a hourly, monthly and 12-month rolling time period. **(R 336.1205(1)(a) & (3), R 336.1224, R 336.1225, R 336.1702, 40 CFR 52.21(c) & (d))**

7. The permittee shall keep, in a satisfactory manner, all records related to, or as required by, the PM / MAP for EUGSFLARE. **(R 336.1205(1)(a) & (3), R 336.1224, R 336.1225, R 336.1702(a), R 336.1910, R 336.1911, R 336.1912)**

VII. REPORTING

1. Within 30 days after completion of the installation, construction, reconstruction, relocation, or modification authorized by this Permit to Install, the permittee or the authorized agent pursuant to Rule 204, shall notify the AQD District Supervisor, in writing, of the completion of the activity. Completion of the installation, construction, reconstruction, relocation, or modification is considered to occur not later than commencement of trial operation of EUGSFLARE. **(R 336.1201(7)(a))**

VIII. STACK/VENT RESTRICTION(S)

The exhaust gases from the stacks listed in the table below shall be discharged unobstructed vertically upwards to the ambient air unless otherwise noted:

Stack & Vent ID	Maximum Exhaust Diameter / Dimensions (inches)	Minimum Height Above Ground (feet)	Underlying Applicable Requirements
1. SVGSFLARE	14	45	R 336.1225 40 CFR 52.21(c) & (d)

IX. OTHER REQUIREMENT(S)

1. The permittee shall comply with all provisions of the National Emission Standards for Hazardous Air Pollutants as specified in 40 CFR Part 63, Subparts A and AAAA, as they apply to EUGSFLARE. **(40 CFR Part 63 Subparts A and AAAA).**

2. The permittee shall comply with all provisions of the New Source Performance Standards for Municipal Solid Waste Landfills specified in 40 CFR Part 60, Subparts A and XXX, as they apply to EUGSFLARE. **(40 CFR Part 60 Subparts A and XXX)**

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

APPENDIX A
Net Heating Value of the Gas Being Combusted in the Flare

The permittee shall use the following calculations in conjunction with monitoring, testing or recordkeeping data to determine compliance with the applicable requirements referenced in EUGSFLARE.

Net Heating Value of the Gas Being Combusted in the Flare

The net heating value of the gas being combusted in the flare shall be calculated and recorded using the equation provided in 40 CFR 60.18(f)(3). **(40 CFR 60.18(f)(3))**

$$H_T = K \sum_{i=1}^{n} C_i H_i$$

Where:

HT = Net heating value of the sample,
MJ/scm; where the net enthalpy per mole of off-gas is based on combustion at 25 °C and 760 mm Hg, but

K = Constant, 1.740×10^{-7} $\left(\frac{1}{ppm}\right)$ $\left(\frac{g\ mole}{scm}\right)$ $\left(\frac{MJ}{kcal}\right)$

where the standard temperature for $\left(\frac{g\ mole}{scm}\right)$ is 20°C;

the standard temperature for determining the volume corresponding to one mole is 20 °C.

Ci = Concentration of sample component i in ppm on a wet basis, as measured for organics by Reference Method 18 and measured for hydrogen and carbon monoxide by ASTM D1946–77 or 90 (Reapproved 1994) (Incorporated by reference as specified in 40 CFR 60.17); and

Hi = Net heat of combustion of sample component i, kcal/g mole at 25 °C and 760 mm Hg. The heats of combustion may be determined using ASTM D2382–76 or 88 or D4809–95 (incorporated by reference as specified in 40 CFR 60.17) if published values are not available or cannot be calculated.

n= Number of sample components.

Calculation for Vmax Steam-assisted and Non-assisted Flares

The maximum permitted velocity, Vmax, for flares complying with 40 CFR 60.18(c)(4)(iii) shall be calculated and recorded using the equation provided in 40 CFR 60.18(f)(5). **(40 CFR 60.18(f)(5))**

Log10 (Vmax) = (HT + 28.8) / 31.7

Where:

- Vmax = Maximum permitted velocity
- HT = Net heating value as determined above
- 28.8 M/sec = Constant
- 31.7 = Constant

Appendix B
Emission Calculations for SO_2, NO_X, and CO

The permittee shall use the following calculations in conjunction with monitoring, testing or recordkeeping data to determine compliance with the applicable requirements referenced in EUGSFLARE

SO_2 Emission Calculations

The following calculation for SO_2 emissions shall utilize the actual gas usage, and the sulfur concentration from the most recent laboratory test sample.

SO_2 lbs/month = [(scf/month) x ($ppmv_{sulfur}$ * 1E-06) x (MW SO_2)] ÷ [(R x T)]
Where:

- scf = standard cubic feet of LFG for the period; this value can be estimated using LFG totalizer readings, by multiplying standard cubic feet per minute by the number of minutes in the period, or another acceptable method.
- $ppmv_{sulfur}$ = parts per million by volume of Sulfur in the gas (based on the most recent test sample)
- MW_{SO2} = Molecular Weight of SO_2 = 64.066 lb/lb-mol
- R = Universal Gas Constant = 0.7302 atm-ft^3/lb-mol-R
- T = Standard Temperature at which the flowmeter is calibrated.

NO_X and CO Mass Emissions

The following monthly and 12-month rolling emission calculations for NO_X and CO shall utilize the heating value (HHV) of the landfill gas.

NO_X or CO = [(HI) x (EF)] = PPM
Current PPM + Previous 11 PPM = PPY
PPY / (2000 lbs/ton) = TPY

Where:

- EF_{NOX} = 0.068 lb/MMBTU (open flare)
- EF_{CO} = 0.310 lb/MMBTU (open flare)
- HI = HHV Heat Input (MMBTU/month)
- PPM = Pounds Per Month of pollutant
- PPY = Pounds per 12-month rolling time period
- TPY = Tons per year