



Tracking No.:

January 29, 2024

Mr. Matthew Karl
Michigan Department of Environment, Great Lakes, and Energy
Lansing District Office
Air Quality Division
525 W. Allegan (Constitution Hall 1st Floor)
Lansing, MI 48909-7742

**Subject: Response to Violation Notice Dated January 8, 2024
Energy Developments Grand Blanc, LLC
Renewable Operating Permit No.: MI-ROP-N5991-2016 (Section 2)**

Energy Developments Grand Blanc, LLC (EDGB) is submitting this response to the Violation Notice (VN) dated January 8, 2024. This letter presents the written VN allegations and requires the requested clarifying information be submitted by the deadline of January 29, 2024.

AQD Statement:

On December 7, 2023, the AQD sent EDGB a Violation Notice (VN) citing violations noted in the 1st semi-annual 2023 compliance report and requested your written response by December 29, 2023. A copy of that letter is enclosed for your reference. EDGB submitted a Response to Violation Notice on December 28, 2023, however, the AQD has determined that this response does not sufficiently address the requested additional information and requires further follow up.

The Michigan Department of Environment, Great Lakes, and Energy (EGLE) Compliance and Enforcement policy identifies a Violation Notice as a formal means of notifying the regulated entity of a significant or priority violation, or when previous attempts to gain voluntary compliance have failed to correct the compliance issue or violation. A second Violation Notice is to be issued if the recipient of the VN fails to adequately and timely respond to the first VN.

The VN dated December 7, 2023 was issued to EDGB without any prior Compliance Communication (an informal telephone, e-mail, letter, or in person communication to a regulated entity to inform them of compliance issues or violations that need attention). EDGB responded to this VN in an adequate and timely manner and as indicated in the VN response, had already initiated corrective actions to ensure the violations associated with the VN do not reoccur; therefore, a second VN was not warranted.

Since the VN dated January 8, 2024 does not allege EDGB failed to respond or continue activities associated with the alleged violations within the VN dated December 7, 2023 and, instead requests additional information materially related to the responses to the original VN



response submitted December 28, 2023, a Compliance Communication would have been a more appropriate. Therefore, EDGB requests AQD rescind the VN dated January 8, 2024.

AQD Request 1:

An explanation of the difference in duration of the venting events and the duration of the treatment system downtime. As required by MI-ROP-N5991-2016 EUTREATMENTSYS SC VII.4.b and c., this explanation should include a description and duration of all periods when the gas stream is diverted from the treatment system through a bypass line or the indication of bypass flow and a description and duration of all periods when the treatment system was not operating for a period exceeding 1 hour and length of time the control device was not operating.

The duration of venting events provided in the original response submitted December 28, 2023 to the VN dated December 7, 2023 and correlate to the landfill gas (LFG) treatment system downtimes reported in EDGB's 1st semiannual 2023 report. During the seven (7) periods listed in the 2nd VN, there was no LFG processed through the treatment system and LFG was managed by alternate control devices (flares) owned by Citizen's Disposal, Inc. During these periods the blowers transporting LFG to the treatment system were shutdown and there was no flow to the treatment system or engines.

Prior to the installation of the Solar Spark Model CF-10 (solar flare) near EDGB Plant 2 in December 27, 2023, high oxygen (O₂) LFG event plant shutdowns resulted in high O₂ LFG remaining stagnant within the pipes leading to the treatment system and engines until plant startup after confirmation that LFG being extracted from the landfill no longer contained high O₂ concentrations. Since the high O₂ LFG was unable to be combusted by the engines, it was vented until combustible LFG reached the treatment system.

After the installation of the solar flare, the high O₂ LFG remains stagnant within the pipes leading to the treatment system and engines during treatment system shutdown until treatment system startup after confirmation that LFG being extracted from the landfill no longer contained high O₂ concentrations. The high O₂ LFG present in the piping is directed to the solar flare until combustible gas reaches the treatment system at which time the LFG is routed to the engines and ceases to be directed to the solar flare.

The total duration of venting time determination methodology was provided in the December 28, 2023 VN response. Following each of the high O₂ downtime events and based on discussion with site personnel, there was a 2–3-minute period where treated high O₂ LFG was vented to the atmosphere prior to the startup of the engines. As a conservative measure, EDGB used 5-minutes of venting for each shutdown period utilizing a maximum flow of 2,412.5 standard cubic feet per minute (scfm) (maximum engine capacity) to quantify emissions per event as provided in the December 28, 2023 VN response. In addition to utilizing a longer venting duration than site personnel reported, EDHB calculated emissions for the release of the maximum LFG typically combusted which contains higher methane (CH₄) concentrations than that of high O₂ LFG. In the initial VN response, the estimated emissions were calculated for only six (6) events totaling 30-minutes and it should be corrected to seven (7) events for a total of 35-minutes, as referenced in both violation notices. The revised calculations show there were no excess emissions during these events. The revised emission estimates are provided in the table below.



Pollutant	Estimated Emissions			
	Per Event		1 st Semi-Annual Total	
	Pounds	Tons	Pounds	Tons
CO	0.13	6.50e-05	0.88	4.39e-04
SO ₂	1.56	7.80e-04	10.96	5.48e-03
VOC	0.01	5.00e-06	0.09	4.46e-05
Total HAP	0.32	1.60e-04	2.26	1.13e-03
Single HAP (Toluene)	0.12	6.00e-5	0.81	4.04e-04

The reason for each treatment system shutdown is provided in the table outlined in the 2nd VN and previously in EDGB's 1st semiannual 2023 report. Per 40 CFR 63, Subpart AAAA, all downtime events for the treatment system including a duration and explanation should be provided for a reporting period. This requirement was met as all pertinent information was included as part of EDGB's 1st semiannual 2023 report.

EDGB does not believe a violation of the treatment system regulatory reporting requirements was committed based on information provided above.

AQD Request 2:

Please submit a copy of the Rule 278a permit to install exemption demonstration for the solar flare. EDGB should also make sure the solar flare complies with the federal requirements of 40 CFR 62, Subpart OOO and 40 CFR 63, Subpart AAAA.

The solar flare is designed with a maximum capacity of 140 scfm and was installed under the exemption provided in Rule 336.1285(2)(aa) – Landfills and associated flares and leachate collection and handling equipment. As part of this determination, emission calculations for the solar flare were performed. No pollutant exceeds the Significance Levels (Rule 119) as summarized below:

Pollutant	TPY	Significance Level in TPY
CO	5.77	100
NOx	1.27	40
SO ₂	4.84	40
VOC	0.04	40
PM ₁₀	0.29	15
PM _{2.5}	0.29	10
Total HAP	0.21	--
Single HAP (Hydrogen Chloride)	0.15	--
Lead	0.00	0.6

The solar flare does meet the specific criteria of Rule 336.1278 and qualifies for the exemption since the projected emission calculations are not significant and; therefore, does not meet the definition of a major source modification, does not create a new major source of hazardous air



pollutants (HAPs), is not subject to the construction or modification of a source subject to any part of 40 CFR 61, and is not subject to an existing permit limit or applicable requirement.

In addition, EDHB is meeting the requirements of Rule 336.1278a within this VN response as we are providing:

- A description of the exempt process or process equipment, including the date of installation.*
- The specific exemption being used by the process or process equipment.*
- An analysis demonstrating that R 336.1278 does not apply to the process or process equipment.*
- The demonstration required by this rule being provided within 30 days of a written request from the department.*

The solar flare is designed to operate in compliance with 40 CFR 60.18 (equivalent to 40 CFR 63.11). Though the requirements for flare are equivalent in each regulation, it is important to note as of September 27, 2021, EDGB began compiling with 40 CFR 63, Subpart AAAA in lieu of the Federal Plan Subpart 000.

The flare is designed to operate with greater than 98% Non-methane Organic Compound (NMOC) destruction when the British thermal unit (BTU) content of the gas is greater than 200 Btu/scf and the exit velocity at the recommended limit of 140 scfm which is less than 7.45 feet per second (ft/s), as outlined in 40 CFR 60.18 (40 CFR 63.11) and the enclosed solar flare specifications. EDGB maintains records of this exemption determination in the site files.

The solar flare is only used when there is high O₂ within the LFG stream or similar events that would prevent the engines from using the treated LFG. The solar flare will not operate continuously (24 hours per day, 365 days per year) and is expected to operate on an event-by-event basis.

Based on the solar flare information provided, no violation associated with the installation and use of the solar flare has occurred. EDGB is allowed to operate exempt devices if records of the determination are maintained and support the determination.

Request 3:

EDGB should review if the Renewable Operating Permit (ROP) Rule 215 Change Notification or Rule 216 Amendment/Notification application needs to be submitted to incorporate the new solar flare into the ROP.

Since installation of the solar flare is exempt from the permit to install requirements and is an insignificant source, it is exempt from inclusion in an administratively complete ROP application under Rule 336.1212(3)(f) for a facility going through the ROP renewal process. Therefore, no Rule 215 or Rule 216 notification is required to be submitted.



EDGB does not believe a violation of Rule 215 or Rule 216 has occurred, as the solar flare is an exempt unit and has been documented to show compliance with the exemption rules and does not need to be incorporated into the ROP.

Please contact me at Meghan.Stackhouse@edlenergy.com or (517) 243-3676 with any questions or concerns.

Sincerely,

A handwritten signature in blue ink, appearing to read 'MS'.

Meghan Stackhouse
Regulatory Compliance and Sustainability Director
EDL Energy

Enclosure: Violation Noticed dated January 8, 2024
Solar Flare Emission Calculations
Solar Flare Specifications

cc: Rocky Tondo, Stephanie Reeves, Elizabeth Park – EDL Energy (Electronically)
Summer Hitchens, Katharine Henry – ICT (Electronically)
Kelly DeWitt – EGLE (Electronically & Hard Copy)
Jenine Camilleri – EGLE (Hard Copy)
Sarah Marshall – US EPA (Electronically)



GRETCHEN WHITMER
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF
ENVIRONMENT, GREAT LAKES, AND ENERGY
LANSING DISTRICT OFFICE



PHILLIP D. ROOS
DIRECTOR

January 8, 2024

VIA EMAIL

Rocky Tondo
Energy Developments Grand Blanc LLC
PO Box 14217
Lansing, Michigan 48901

SRN: N5991, Genesee County

Dear Rocky Tondo:

SECOND VIOLATION NOTICE

The Department of Environment, Great Lakes, and Energy (EGLE), Air Quality Division (AQD), has received the 1st semiannual 2023 compliance report for Energy Developments Grand Blanc (EDGB) located at 2361 West Grand Blanc Road, Grand Blanc, Michigan. The purpose of this semiannual compliance report was to report EDGB's compliance with the requirements of the federal Clean Air Act; Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451); the Air Pollution Control Rules; and the conditions of Renewable Operating Permit (ROP) number MI-ROP-N5991-2016.

On December 7, 2023, the AQD sent EDGB a Violation Notice (VN) citing violations noted in the 1st semiannual 2023 compliance report and requested your written response by December 29, 2023. A copy of that letter is enclosed for your reference. EDGB submitted a Response to Violation Notice on December 28, 2023, however, the AQD has determined that this response does not sufficiently address the requested additional information and requires further follow up.

The first additional piece of information requested in the December 7, 2023, VN was an explanation of how the duration of venting events was determined. The EDGB December 29, 2023, response noted:

"The duration of the venting events was determined through discussion with site personnel which noted that each event lasted between two (2) and three (3) minutes. This allowed for purging of the small volume of high oxygen gas present within the system. For emission calculations, EDGB conservatively utilized five (5) minutes for the event durations."

However, in the 1st semiannual 2023 compliance report Table 1 Treatment System downtime, the following durations were noted for the dates of the events:

Start Downtime	End Downtime	Duration of Event (Hr)	Reason
1/30/23 9:00	1/30/23	1.0	Landfill O2
2/20/23 15:00	2/20/23 17:30	2.5	High O2
4/5/23 10:09	4/5/23 10:33	0.4	High O2 Plant Trip
4/13/23 14:48	4/13/23 15:30	0.7	High O2
6/15/23 5:02	6/15/23 15:05	10.0	Plant Trip High O2
6/15/23 20:26	6/16/23 9:03	12.6	High O2
6/20/23 8:50	6/20/23 9:19	0.5	High O2

Please submit a written response to this Second Violation Notice by January 29, 2024, (which coincides with 21 calendar days from the date of this letter). The written response should include:

An explanation of difference in the duration of the venting events and the duration of the treatment system downtime. As required by MI-ROP-N5991-2016 EUTREATMENTSYS SC VII.4.b and c., this explanation should include a description and duration of all periods when the gas stream is diverted from the treatment system through a bypass line or the indication of bypass flow and a description and duration of all periods when the treatment system was not operating for a period exceeding 1 hour and length of time the control device was not operating.

Also, the VN response indicated that the site modification to ensure that treated LFG is controlled in the future was the installation of a solar flare. The VN response noted that an air permit applicability determination was performed for the solar flare. Please submit a copy of a Rule 278a permit to install exemption demonstration for the solar flare. EDGB should also make sure that the solar flare complies with the federal requirements of 40 CFR Part 62 Subpart OOO – Federal Plan Requirements for Municipal Solid Waste Landfills that Commenced Construction On or Before July 17, 2014, and Have Not Been Modified or Reconstructed Since July 17, 2014, and 40 CFR Part 63 Subpart AAAA – NESHAP for Municipal Solid Waste Landfills. EDGB should review what renewable operating permit (ROP) Rule 215 change notification or Rule 216 amendment/modification application needs to be submitted to incorporate the new solar flare into the ROP.

Please submit the written response to Matt Karl at EGLE, AQD, Lansing District, at P.O. Box 30242, Lansing, Michigan 48909-7742 and karlm@michigan.gov and submit a copy to Jenine Camilleri, Enforcement Unit Supervisor at EGLE, AQD, P.O. Box 30260, Lansing, Michigan 48909-7760.

If EDGB believes the above observations or statements are inaccurate or do not constitute violations of the applicable legal requirements cited, please provide appropriate factual information to explain your position.

Rocky Tondo
Energy Developments Grand Blanc, LLC
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January 8, 2024

Thank you for your attention to resolving the violation cited above and for the cooperation that was extended to me during my inquiry about the semiannual compliance report for EDGB. If you have any questions regarding the violation or the actions necessary to bring this facility into compliance, please contact me at the number listed below.

Sincerely,

A handwritten signature in blue ink that reads "Matthew R. Karl".

Matt Karl
Senior Environmental Quality Analyst
Air Quality Division
517-282-2126

Enclosure

cc: Meghan Stackhouse, EDL Energy
Sarah Marshall, EPA Region 5
Annette Switzer, EGLE
Christopher Ethridge, EGLE
Brad Myott, EGLE
Jenine Camilleri, EGLE
Bob Byrnes, EGLE

Summary of Air Pollutant and GHG Emissions

Pollutant	Emission Factors		Emission Rates		Notes
	Value	Unit	(lb/hr)	(TpY)	
<u>Criteria Pollutants</u>					
CO	0.31	lb/MMBtu	1.32	5.77	2
NO _x	0.068	lb/MMBtu	0.29	1.27	2
PM ₁₀	17.00	lb/dscf CH4	0.07	0.29	3
PM _{2.5}	17.00	lb/dscf CH4	0.07	0.29	3,4
SO ₂	780.66	ppmv	1.11	4.84	1
VOC	232.05	ppmv	0.01	0.04	7
<u>Hazardous Air Pollutants</u>					
HAP (T)	--	--	0.05	0.21	
HAP (S)	--	--	0.03	0.15	
<u>Greenhouse Gases</u>					
GHG-CO ₂	52.07	kg/MMBtu	488.01	2,137.47	5
GHG-CH ₄	3.20E-03	kg/MMBtu	0.03	0.13	6
GHG-N ₂ O	6.30E-04	kg/MMBtu	0.01	0.03	6
GHG-CO ₂ e	--	--	488.04	2,137.63	

Notes:

- 1 - Site specific or manufacturer guaranteed emission factor
- 2 - AP42 5th Ed., Table 13.5-2, February 2018
- 3 - AP42 5th Ed., Table 2.4-5, November 1998
- 4 - PM_{2.5} is assumed to be equal to PM₁₀
- 5 - 40 CFR 98, Subpart A Table A-1
- 6 - 40 CFR 98, Subpart C, Tables C-1, C-2, Rev. September 10, 2010; factors are for biogas
- 7 - AP42 5th Ed., Table 2.4-2, November 1998
- 8 - AP42 5th Ed., Table 13.5-1, April 2015

Summary of Conditions and Assumptions

<u>Fuel Information</u>			<u>Operating Schedule</u>		
	Value	Unit		Value	Unit
Methane Heating Value [HHV]	1,012	Btu/ft ³	Hours Per Day ¹	24	hr/day
LFG Moisture ¹	8%		Days Per Year ¹	365	day/yr
LFG Methane Content ¹	50%		Hours Per Year	8,760	hr/yr
Carbon Dioxide Content ¹	49.8%		<u>Standard Conditions and Assumptions</u>		
LFG Heating Value	506	Btu/ft ³		Value	Unit
LFG Temperature ²	77	°F	Standard Temperature	59	°F
LFG Temperature [absolute]	537	R	Standard Temperature [absolute]	519	R
LFG Inlet Flow [wet] ¹	140	scfm	Standard Pressure	1	atm
LFG Inlet Flow [dry]	129	scfm	Universal Gas Constant	0.7302	atm-ft ³ /lb-mol-R
Methane Inlet Flow [dry] LFG	64	scfm	<u>NMOC & VOC in LFG</u>		
Heat Input	4.3	MMBtu/hr		Value	Unit
<u>Sulfur to SO₂</u>			NMOC Concentration ⁸	595	ppmv
	Value	Unit	VOC Fraction in LFG ⁸	39%	
Sulfur conversion to SO ₂	99.7%		VOC Concentration	232.05	ppmv
Total Sulfur Concentration in LFG ¹	780.66	ppmv	<u>Destruction and Conversion Efficiencies</u>		
				Value	
			Halogenated Compounds ^{4,5}	98%	
			Non-Halogenated Compounds ^{4,5}	91%	
			Sulfur to SO ₂ ⁶	99.70%	

<u>Global Warming Potential</u>	
CO ₂ ⁷	1
CH ₄ ⁷	25
N ₂ O ⁷	298

LFG Compound	CAS	MW (lb/lb-mol)	Conc in Inlet Gas (ppmv) ¹	DE (%)
Carbon Dioxide	124-38-9	44.01	498,043	0%

Notes:

- 1 - Site specific or typical conditions
- 2 - AP42 5th Ed., "Compilation of Air Pollutant Emissions Factors, Vol. 1: Stationary Point and Area Sources," Page 2.4-5, Nov. 1998 Use AP 42 value if LFG temp not known
- 3 - Equipment rating/manufacturer specifications
- 4 - AP42 5th Ed., "Compilation of Air Pollutant Emissions Factors, Vol. 1: Stationary Point and Area Sources," Page 2.4-3, Nov. 1998.
- 5 - According to AP42, control efficiencies for halogenated and non-halogenated compounds range from 91%-99% and from 38%-99% respectively. "Typical" control efficiencies for halogenated and non-halogenated compounds are 98% and 99.7% respectively.
- 6 - Sulfur-containing compounds are non-halogenated; therefore 99.7% conversion to SO₂ is assumed.
- 7 - 40 CFR 98, Subpart A Table A-1
- 8 - AP42 5th Ed., Table 2.4-2, November 1998



Summary of Air Toxics

LFG Compound	CAS	MW (lb/lb-mol)	Conc in Inlet Gas (ppmv) ¹	DE ³ (%)	Emissions	
					(lb/hr)*	(tpy)*
1,1,1 - Trichloroethane (methyl chloroform)	71-55-6	133.41	0.48	98%	2.84E-05	1.24E-04
1,1,2,2 - Tetrachloroethane	79-34-5	167.85	1.11	98%	8.26E-05	3.62E-04
1,1 - Dichloroethane (ethylidene dichloride)	75-34-3	98.96	2.35	98%	1.03E-04	4.52E-04
1,1 - Dichloroethene (vinylidene chloride)	75-35-4	96.94	0.20	98%	8.64E-06	3.79E-05
1,2 - Dichloroethane (ethylene dichloride)	107-06-2	98.96	0.41	98%	1.79E-05	7.83E-05
1,2 - Dichloropropane (propylene dichloride)	78-87-5	112.99	0.18	98%	9.02E-06	3.95E-05
2-Propanol (isopropyl alcohol)	67-63-0	60.11	50.10	91%	6.01E-03	2.63E-02
Acetone (2-propanone)	67-64-1	58.08	7.01	91%	8.13E-04	3.56E-03
Acrylonitrile (Propenenitrile)	107-13-1	53.06	6.33	91%	6.70E-04	2.94E-03
Benzene	71-43-2	78.12	1.91	91%	2.98E-04	1.30E-03
Bromodichloromethane	75-27-4	163.83	3.13	98%	2.27E-04	9.96E-04
Butane	106-97-8	58.12	5.03	91%	5.84E-04	2.56E-03
Carbon Disulfide	75-15-0	76.14	0.58	99.7%	2.94E-06	1.29E-05
Carbon Tetrachloride	56-23-5	153.84	0.00	98%	2.73E-07	1.20E-06
Carbonyl Sulfide	463-58-1	60.07	0.49	99.7%	1.96E-06	8.58E-06
Chlorobenzene (monochlorobenzene)	108-90-7	112.56	0.25	98%	1.27E-05	5.55E-05
Chlorodifluoromethane (CFC-22, freon-22)	75-45-6	86.47	1.30	98%	4.99E-05	2.18E-04
Chloroethane (ethyl chloride)	75-00-3	64.52	1.25	98%	3.58E-05	1.57E-04
Chloroform (trichloromethane)	67-66-3	119.38	0.03	98%	1.59E-06	6.96E-06
Chloromethane (methyl chloride)	74-87-3	50.49	1.21	98%	2.71E-05	1.19E-04
1,4 Dichlorobenzene (p-dichlorobenzene)	106-46-7	147.00	0.21	98%	1.39E-05	6.08E-05
Dichlorodifluoromethane (CFC-12, freon-12)	75-71-8	120.91	15.70	98%	8.42E-04	3.69E-03
Dichlorofluoromethane (freon-21)	75-43-4	102.92	2.62	98%	1.20E-04	5.24E-04
Dichloromethane (methylene chloride)	75-09-2	84.93	14.30	98%	5.39E-04	2.36E-03
Dimethyl Sulfide (methyl sulfide)	75-18-3	62.13	7.82	99.7%	3.23E-05	1.42E-04
Ethane	74-84-0	30.07	889.00	91%	5.34E-02	2.34E-01
Ethanol (ethyl alcohol)	64-17-5	46.08	27.20	91%	2.50E-03	1.10E-02
Ethyl Mercaptan	75-08-1	62.13	2.28	99.7%	9.43E-06	4.13E-05
Ethylbenzene	100-41-4	106.17	4.61	91%	9.77E-04	4.28E-03
Ethylene dibromide (1,2 dibromoethane)	106-93-4	187.88	0.00	98%	8.33E-08	3.65E-07
Fluorotrichloromethane (CFC-11, freon-11)	75-69-4	137.37	0.76	98%	4.63E-05	2.03E-04
Hexane	110-54-3	86.18	6.57	91%	1.13E-03	4.95E-03
Hydrogen Sulfide ³	7783-06-4	34.08	767.00	99.7%	1.74E-03	7.62E-03
Mercury (total)	7439-97-6	200.61	0.00	0%	1.30E-06	5.69E-06
Methyl Ethyl Ketone (2-butanone)	78-93-3	72.11	7.09	91%	1.02E-03	4.47E-03
Methyl Isobutyl Ketone (hexone)	108-10-1	100.16	1.87	91%	3.74E-04	1.64E-03
Methyl Mercaptan	74-93-1	48.11	2.49	99.7%	7.97E-06	3.49E-05
Pentane	109-66-0	72.15	3.29	91%	4.74E-04	2.08E-03
Tetrachloroethylene (perchloroethylene, -ethene)	127-18-4	165.83	3.73	98%	2.74E-04	1.20E-03
Propane	74-98-6	44.10	11.10	91%	9.77E-04	4.28E-03
Toluene (methylbenzene)	108-88-3	92.14	39.30	91%	7.23E-03	3.17E-02
Trichloroethylene (trichloroethene)	79-01-6	131.38	2.82	98%	1.64E-04	7.20E-04
t - 1,2 - Dichloroethene (1,2 dichloroethylene)	156-60-5	96.94	2.84	98%	1.22E-04	5.35E-04
Vinyl Chloride (chloroethylene, VCM)	75-01-4	62.50	7.34	98%	2.03E-04	8.91E-04
Xylenes (m, o, p)	1330-20-7	106.17	12.10	91%	2.56E-03	1.12E-02
Hydrogen Chloride ²	7647-01-0	36.46	42.00	0%	3.40E-02	1.49E-01
Total Sulfur	--	--	780.66	--	--	--
Total HAP	--	--	--	--	0.05	0.21
Maximum Single HAP	--	--	--	--	0.03	0.15

Notes:

1 - AP42 5th Ed., Table 2.4-1, Nov. 1998, except where noted differently

2 - Default ionic Cl LFG concentration of 42 ppmv as listed in AP-42, Section 2.4.4.

3 - AP-42 gives ranges for control efficiencies. Control efficiencies for halogenated compounds and non-halogenated compounds range from 91-99.7 percent and 38-91 percent respectively.

4 - Site specific weekly H₂S sampling



2183 Pennsylvania Avenue
Apalachin, NY 13732
Ph: 800-800-7671
Fx: 607-625-2689
www.solar-spark.com



Model CF-10
Product Specification
Data

LSC ENVIRONMENTAL PRODUCTS, LLC

PRODUCT SPECIFICATION DATA

U. S. PATENT NOS. 5,957,681; 5,984,668

Revised: 8 AUG 03

PRODUCT

CF-10 Landfill Gas Vent Flare with SFI-100 Solar Igniter for 6-volt system or
SFI-200 Solar Igniter for 12-volt system.

APPLICATIONS

For use on landfill gas vents, wells or leachate system cleanout lines to combust flammable gases at low ambient pressure without need for blowers or external power. Similar applications exist on wastewater treatment and biogas facilities and petroleum or natural gas production and transmission installations.

BRIEF DESCRIPTION

Standard unit includes solar-powered, continuous ignition system, all-weather variable flow flarehead, inline flame arrester, 2" ID stainless steel ball valve, 2" ID Schedule 40 black steel piping and 4" black steel bushing at base. Optional equipment includes various flange base adapters and cold weather insulation kits. Guy wire kits are also available. Pre-engineered flarehead modification parts can be provided to handle elevated gas pressures or flow rates.

REGULATORY APPROVAL STATUS

The CF-10 vent flare has received approvals for use at landfills in many states. Regulations vary from state to state; however, environmental comparisons always favor combustion over release of raw gas.

When properly maintained and operated, this unit is consistent with gas flow and operating requirements specified at 40 CFR 60.18 and 40 CFR 60.33c. USEPA has determined that these regulations require addition of a thermocouple and flame pilot for compliance at NSPS/EG landfill sites. These parts are available as optional accessories.

ENGINEERING SPECIFICATIONS

I. SFI-100 SOLAR IGNITION SYSTEM (6-volt system)

SOLAR COLLECTOR: 6" X 13" Solar-electric trickle charge plate; 5W panel providing 10V peak with 8V at 300mA normal charging power

BATTERY TYPE & VOLTAGE: 6-volt rechargeable gel cell

SHIPPING WEIGHT: 21 lbs.

DARK TIME ENDURANCE: Fully-charged system will function for 21 days in darkness.

SPARK INTERVAL: 1.5 seconds

SPARK PLUG TYPE: LSC SparkPilot™;

SPARKPILOT™ GAP: 0.045 - 0.050 inch

SPARKPILOT™ REPLACEMENT FREQUENCY (average):
greater than 1 year

IGNITION WIRE: 7 mm metallic wire insulated ignition cable with crimped eyelet terminals

IGNITION WIRE INSULATORS: Molded polyethylene with stainless steel clamps

FLAME ZONE SPARK STRAP: 1/8" stainless steel

GROUNDING STAKE: Galvanized steel with eyelet terminal

II. SFI-200 SOLAR IGNITION SYSTEM (12-volt system)

SOLAR COLLECTOR: 13" X 13" Solar-electric trickle charge plate; 6W panel providing 18V peak with 13V at 300mA normal charging power

BATTERY TYPE & VOLTAGE: 12-volt rechargeable gel cell

SHIPPING WEIGHT: 31 lbs.

DARK TIME ENDURANCE: Fully-charged system will function for 14 days in darkness.

SPARK INTERVAL: 1.25 seconds

SPARK PLUG TYPE: LSC SparkPilot™

SPARKPILOT™ GAP: 0.045 - 0.050 inch

SPARKPILOT™ REPLACEMENT FREQUENCY (average):
greater than 1 year

IGNITION WIRE: 7 mm metallic wire insulated ignition cable with crimped eyelet terminals

IGNITION WIRE INSULATORS: Molded polyethylene with stainless steel clamps

FLAME ZONE SPARK STRAP: 1/8" stainless steel

GROUNDING STAKE: Galvanized steel with eyelet terminal

III. CF-10 GAS VENT FLARE

SHIPPING WEIGHT: 83 lbs.

COMBUSTION FLAREHEAD: Patented double expansion gas/air mixing

chamber; 2" inlet, 8" outlet. Heavy carbon steel construction with high-wind carburetion profile. Two SparkPilot™ taps for extra low or normal gas flows and for optional redundant safety ignition system.

FLAME ARRESTER: Three-inch diameter inline stainless steel wire-gauze flame arrester. Flame arrester elements should be replaced approximately every twelve months depending upon gas moisture and corrosivity.

The flame arrester is sized to absorb the flame front heat and, thus, extinguish a momentary back flash flame at the specified gas qualities and flow conditions.

HEIGHT: 96" inlet to top of flarehead (add ground height of flange to determine ground height of flame).

TRANSMISSION PIPES: 2" ID Black steel Schedule 40 standard pipes with NPT thread.

BALL VALVE: 2" ID Carbon steel body with stainless steel inner trim and ball valve.

BASE BUSHING: Schedule 40 black steel reducer bushing to 4" male NPT threads. This bushing is subsequently mated to the specific flange adapter required for local application.

IV. **FLARE WARRANTY:** One-year warranty on all parts.

RECOMMENDED PERFORMANCE RANGES

I. GAS FLOW RATE

The standard CF-10 unit is designed for effective combustion and reignition over a range of 5-140 SCFM of landfill gas or other low-grade biogas. Inlet gas pressure corresponding to these flow rates is typically 0.5 to 5 inches of water column. Higher flow rates can be accommodated if methane concentrations are adequate for flame stability.

II. GAS QUALITY

Combusted gas should have an equivalent methane concentration between approximately 30% - 60% of total gas at the above-recommended flow rates.

III. FLAME TEMPERATURE

Average readings approximately 900°F. - 1200°F. depending upon gas quality, flow rate and wind velocity. This will normally produce thermal destruction efficiencies of greater than 99% for volatile compounds.

IV. REIGNITION LIMITS

A properly operating CF-10 unit should provide continuous reignition of gases in less than 60 seconds after flameout regardless of wind direction or velocity.

The flarehead is designed for high efficiency in windy conditions. No external windshields are recommended.