MM San Diego LLC – Miramar & Miramar Energy
One North Lexington Avenue
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September 16, 2022

Jim Swaney
San Diego County Air Pollution Control District
10124 Old Grove Road
San Diego, CA 92131-1649

Subject: Risk Reduction Plan
MM San Diego LLC – Miramar & Miramar Energy LLC

Mr. Swaney,

As required, please find enclosed the Risk Reduction Plan for the aforementioned facility that was prepared on our behalf by SCS Engineers. This plan is being submitted prior to the September 18, 2022 deadline and includes a check for $7,870.00 to cover the application fee estimate.

Please direct all questions regarding this submittal to Suparna Chakladar at (951) 833-4153.

Sincerely,

[redacted]

Anthony J. Falbo
Chief Operating Officer
OPAL Fuels
MM San Diego LLC – Miramar
Miramar & Miramar Energy LLC

Enclosure Modification Application for Risk Reduction Activities

cc: Suparna Chakladar, OPAL
Benjamin Wong, SDAPCD

Modification Application for Risk Reduction Activities
MM San Diego LLC – Miramar & Miramar Energy

MM San Diego LLC
5087 Junction Road
Lockport, NY 14094
(951) 833-4153

SCS ENGINEERS

01222225.00 Task 2 | September 2022

7041 Koll Center Parkway, Suite 135
Pleasanton, CA 94566

Table of Contents

Section Page

Tables

Appendices

This document is dated September 2022 and was prepared and reviewed by the following:

[redacted]

Gabrielle F. Stephens
Senior Project Manager

[redacted]

Patrick S. Sullivan, REPA, CPP, BCES
Senior Vice President
SCS ENGINEERS

1.0 INTRODUCTION

1.1 OVERVIEW

This application, prepared by SCS Engineers (SCS), on behalf of MM San Diego LLC – Miramar and Miramar Energy (Facility) details the risk reduction activities that will be implemented at the landfill gas to energy (LFGTE) plant at the Miramar Landfill (Miramar or landfill) to reduce health risk. This document serves as both a modification application to have these risk reduction activities permitted, as well as serving as the risk reduction audit and plan (RRAP) detailed in San Diego Air Pollution Control District (SDAPCD) Rule 1210 (e).

> SDAPCD Rule 1210 (e) reads as follows:*(1) Except as provided in Subsections (e)(2), (e)(3) and (e)(4), within six months of receipt of written notice from the Air Pollution Control Officer that a stationary source's most recent approved public health risk assessment indicates potential public health risks equal to or greater than one or more of the following significant risk mitigation levels, the owner or operator shall submit to the Air Pollution Control Officer, for review for completeness, a stationary source toxic air contaminant risk reduction audit and plan:*
>
> *(i) Maximum incremental cancer risks equal to or greater than 100 in one million, or*
>
> *(ii) Cancer burden equal to or greater than 1.0, or*
>
> *(iii) Total acute noncancer health hazard index equal to or greater than 1.0, or*
>
> *(iv) Total chronic noncancer health hazard index equal to or greater than 1.0.*
>
> *The risk reduction audit and plan shall contain airborne toxic risk reduction measures proposed by the owner or operator which will be sufficient to reduce the stationary source emissions to levels that result in potential public health risks below the significant risk mitigation levels specified above. Such emission reductions shall be accomplished within five years of the date the plan is submitted to the Air Pollution Control Officer.*
>
> *(5) The risk reduction audit and plan submitted by the owner or operator shall contain all of the following:*
>
> *(i) The name, location and standard industrial classification (SIC) code of the stationary source.*
>
> *(ii) The identification of the emission units and toxic air contaminants emitted by each emission unit that contribute to potential public health risks above the significant risk mitigation levels specified in Subsection (e)(1). Emission units shall be listed by decreasing contribution to the total potential public health risks estimated for the stationary source. Toxic air contaminants shall be listed for each emission unit by decreasing contribution to the potential public health risk estimated for that unit.*
>
> *The plan need not include identification of emission units which emit toxic air contaminants in amounts which the approved public health risk assessment indicates Regulation XII -14-Rule 1210 do not cause maximum incremental cancer risks greater than 1.0 in a million,*

nor a total acute noncancer health hazard index of 1.0 or greater, nor a total chronic noncancer health hazard index of 1.0 or greater. The plan shall include identification of all emission units for which the owner or operator proposes to reduce toxic air contaminant emissions as part of the risk reduction audit and plan.

1.2 BACKGROUND INFORMATION

1.2.1 Applicant Name and Address

MM San Diego LLC – Miramar and Miramar Energy
5087 Junction Road
Lockport, NY 14094

1.2.2 Facility Address

MM San Diego LLC – Miramar and Miramar Energy
5244 Convoy Street
San Diego, CA 92111

1.2.3 Nature of Business

Landfill Gas to Energy

1.2.4 Persons to Contact Regarding Application

Ms. Suparna Chakladar
Vice President
OPAL Fuels
5087 Junction Road
Lockport, NY 14094
(951) 833-4153

Mr. Patrick Sullivan
Senior Vice President
SCS Engineers
3117 Fite Circle, Suite 108
Sacramento, California 95827
(916) 503-2956

1.2.5 Operation Schedule

24 hours per day
7 days per week
52 weeks per year

1.2.6 Status of Application

This is a modification application for risk reduction activities.

1.2.7 Facility Status

Existing

2.0 PROJECT DESCRIPTION

2.1 EXISTING OPERATION

The MM San Diego Energy LLC LFGTE facility is located at the Miramar Landfill in San Diego, California. The Landfill is owned and operated by the City of San Diego, Environmental Services Department and has been in operation since 1983. The Landfill is equipped with a landfill gas (LFG) collection and control system (GCCS) whereby the Landfill's Central Blower Station sends LFG via conveyance pipeline to the LFGTE Facility, which is comprised of the following:

- Four generators each driven by tandem LFG-fired reciprocating engines, eight engines total (Inventory Devices 1, 2, 3, 4, 5, 6, 7, 8) - Caterpillar Engines, each engine rated at 1,138 brake horsepower (bhp)

- Two generators each driven by a single LFG-fired reciprocating engine (Inventory Devices 1632 and 1633) - Caterpillar Engines 3520, each engine rated at 2,233 bhp

In addition, at the time of the 2018 inventory and subsequent health risk assessment (HRA), the Facility owned and operated two (2) LFG-fired flares A and B (Inventory Devices 1 and 2). The flares have been returned to the Landfill since January 1, 2019.

Last, the Facility owns and operates one (1) diesel-fired engine driving an emergency generator (Inventory Device 984491) – Caterpillar Diesel Engine rated at 587 bhp. This was also transferred to the Landfill on January 1, 2019.

2.2 REASON FOR PERMITTING ACTION

The Facility received notice from the SDAPCD that the 2018 HRA indicated that public risk was above the significant risk mitigation levels under Rule 1210. This requires the Facility to submit a RRAP within six months. This document will define risk reduction measures that can be implemented into the Facility's air permits for the LFG-fired engines (APCD2006-PTO-950731 and APCD2013-PTO-001632).

3.0 RISK REDUCTION

The 2018 emission inventory included the following emission units that contribute to public health risks above the significant mitigation levels:

- Eight (8) LFG I.C. engines (point source) permitted by PTO No. 950731
- Two (2) LFG I.C. engines (point source) permitted by PTO Nos. 001362/001633

- Two (2) enclosed LFG flares (point source) permitted by PTO No. 950804 that City of San Diego assumed ownership and operation since January 1, 2019
- One (1) diesel-fired engine (point source) that City of San Diego assumed ownership and operation since January 1, 2019

3.1 RISK CONTRIBUTION

According to the 2018 HRA approval, dated March 22, 2022, the LFG-fired engines contribute the most to total health risk at the facility, as seen in **Table 1.**

Table 1. Emission Unit Health Risk Contribution

Source	Worker Chronic	Worker 8-Hour Chronic	Maximum Acute
LFG-fired Engines	100%	100%	100%

Specific toxic air contaminants (TACs) that contribute the most to overall health risk under each risk condition are available in **Table 2**, including actual and percent contribution.

Table 2. Specific TAC Health Risk Contribution

TAC	Worker Chronic	Worker 8-Hour Chronic	Maximum Acute
Arsenic	31% (0.56)	-	-
Formaldehyde	57% (1.04)	98% (1.04)	99% (20.65)
Hydrogen Chloride (HCl)	11% (0.2)	-	-
Total Risk	1.82	1.06	20.86

By far, the largest contributors to total risk are post-combustion byproducts and a non-volatile metal presumed to being released from the LFG-fired engines. The RRAP is required due to chronic, non-cancer risks in excess of a hazard index (HI) of 1.0. Therefore, sources and TACs contributing to the chronic, non-cancer risk per Tables 1 and 2 will be the focus of this RRAP.

3.2 RISK REDUCTION EVALUATION

Tables 1 and 2 above show that the largest contribution to health risk for the Facility are post-combustion byproducts and metals from the LFG-fired engines, specifically arsenic, formaldehyde, and HCl.

3.2.1 Formaldehyde

The industry standard for reducing post-combustion formaldehyde from these types of emission units is by implementing and maintaining an enhanced operation and maintenance (O&M) plan.

The Facility has been following a regimented O&M plan to reduce this health risk since the 2018 emission inventory year. The LFG-fired engines are serviced as follows:

- 500 hour Service:
    - Oxygen Sensor calibration – ensures accurate measurement of exhaust and optimum air/fuel ratio for the engine.
        - Calibrated on the CAT 3516 engines
        - Replaced on the CAT 3520 engines
    - Inspect/clean spark plugs.

- 1000 hour Service –
    - Calibrate oxygen sensors
    - Perform valve lash and recession readings
    - Remove and replace spark plugs
    - Replace all air filters

- 6 month Service –
    - Cylinder heads are removed and all buildup cleaned, if any
    - Software replaced

- Annual Service –

  Top End Overhauls includes the following work that impacts efficiency and combustion:

  1. The following components will be replaced with rebuilt or new components as specified:
     - Cylinder Heads - Rebuilt
     - Turbochargers and Turbo Wastegate - Rebuilt
     - Gas Regulator and Throttle Plate (if applicable) - Rebuilt
     - MAP Sensor - New
  2. Clean and inspect the following components:
     - Complete engine fuel delivery, control and metering components to include rod and ball joints, governor, Woodward E^3 System; adjust as needed
     - Intake and Exhaust System including Wastegate Seat and Turbo Manifold
     - Rocker Arms, Valve Bridges, Valve Lifters

- 40,000 hour Service –

  In frame overhauls includes the following work that impacts efficiency and combustion:

  1. The following components will be replaced with rebuilt or new components as specified:
     - Cylinder Heads - Rebuilt
     - Turbochargers and Wastegate - Rebuilt
     - Gas Regulator and Throttle Plate - Rebuilt
     - Woodward E^3 Consumables - New
     - Engine to Gen Coupling - New
     - Cylinder Packs, Main and Rod Bearings - New
     - Valvetrain (Rockers, Bridges, Pushrods, etc.) - New/Rebuilt
  2. Clean and inspect the following components:
     - Complete engine fuel delivery, control and metering components to include rod and ball joints, governor, Woodward E^3 System; adjust as needed

- Intake and Exhaust System including Wastegate seat and Turbo Manifold
- Valve Lifters

- 80,000 hour Service -

  Out of frame overhaul includes the following work that impacts efficiency and combustion:

  1. The following components will be replaced with rebuilt or new components as specified:
     - Cylinder Heads - Remanufactured
     - Turbochargers, Turbo WG/Seat/Body - Rebuilt/Remanufactured
     - Gas Regulator and Throttle Plate (if applicable) - Rebuilt
     - Woodward E^3 consumables (if applicable) - New
     - Cylinder Packs, Main and Rod Bearings - New
     - Valve Train (rockers, pushrods, adjusters, bridges) - Remanufactured/Replace
  2. Clean and inspect the following components:
     - Complete engine fuel delivery, control and metering components to include rod and ball joints, governor, Woodward E^3 System; adjust as needed
     - Intake and Exhaust System

In addition, the Facility believes that the testing method used for formaldehyde emissions may be overestimating the actual emissions from the LFG engines. As used in the South Coast Air Quality Management District (SCAQMD), the California Air Resource Board (CARB) Method 430 may be more accurate for purposes of determining formaldehyde emissions from LFG engines. The emissions from engines tested in the SCAQMD region indicate concentrations on average four times lower than the emissions used by SDAPCD, but as high as thirty-four times lower than the emissions used by SDAPCD. Example testing results from facilities within the SCAQMD can be found in Appendix A.

3.2.2 Arsenic

The SDAPCD based the arsenic emissions for the LFG engines on sampling results for arsine and trimethylarsine from May 4, 2016, June 15, 2016, and February 28, 2017. However, the analysis was not performed using a United Stated Environmental Protection Agency (EPA) or other regulatory agency approved method nor from an accredited laboratory. We do not believe that all arsine and trimethylarsine is converted to arsenic during combustion; therefore, the emissions used for the 2018 HRA may be overstated. This was the case for a landfill facility in the Santa Barbara County Air Pollution Control District (SBCAPCD) where the SBCAPCD assumed arsenic would be emitted in a significant amount but recent stack testing data showed arsenic emissions were non-detect for all three runs. We believe that the arsenic emissions and risk contribution were overestimated in the 2018 emission inventory and HRA. Therefore, the Facility will conduct arsenic testing to verify the actual emissions of arsenic for the LFG engines and update the HRA accordingly. A sampling protocol will be submitted to the SDAPCD for approval prior to testing, as the time to prepare and submit the protocol, receive approval, provide notifications, complete the testing, and receive the report in time for evaluation prior to the RRAP due date was not feasible.

3.2.3 Hydrogen Chloride

The SDAPCD based the HCl emissions from the LFG engines on a default emission factor of 7.43 pounds per million cubic feet (lb/mmscf) burned from the EPA's Compilation of Air Emission Factors (known as AP-42), Section 2.4, Table 2.4-1. The default emission factor assumes that total chloride

is fully converted (100%) to HCl emissions and the individual chlorinated compounds are present at the concentrations listed in AP-42. SCS has seen from testing data that this is not the case, and emissions of HCl are lower than assuming 100% conversion of chlorides. Furthermore, we also know that the AP-42 concentration for chlorinated compounds are overstated. A copy of this documentation can be found in Appendix B. Therefore, the Facility may consider conducting HCl testing to verify the actual emissions of HCl for the LFG engines and update the HRA, if necessary. A sampling protocol will be submitted to the SDAPCD for approval prior to testing. A sampling protocol will be submitted to the SDAPCD for approval prior to testing, as the time to prepare and submit the protocol, receive approval, provide notifications, complete the testing, and receive the report in time for evaluation prior to the RRAP due date was not feasible.

3.3 RISK REDUCTION SCHEDULE

Risk reduction activities (i.e. O&M Plan) planned for the Facility is expected to reduce the risk to below the significant risk mitigation thresholds. The Facility will conduct a one-time testing for the risk drivers (i.e. arsenic and HCl) and implement the Enhanced O&M plan to achieve better combustion for formaldehyde control. After performing one year of Enhanced O&M and testing for Arsenic and HCl, the Facility will evaluate their O&M plan and RRAP, and adjust as necessary.

3.4 RISK REDUCTION DEMONSTRATION

As noted above, the Facility has implemented a robust O&M plan that will create the emission reductions necessary to reduce risk. In addition, actual emissions from the LFG engines will be revised and updated with testing for the risk drivers (i.e. arsenic and if needed, HCl) using the methodologies noted in Section 3.2. The significant risk mitigation levels for the Facility are the following:

- Total acute noncancer health hazard index equal to or greater than 1.0
- Total chronic noncancer health hazard index equal to or greater than 1.0

We believe that enhanced O&M will improve combustion efficiency, which will reduce emissions of formaldehyde and to the arsenic and HCl emissions to a lesser degree. Since we believe that the arsenic and HCl emissions and subsequent risk are overstated, the Facility plans to perform testing and then re-evaluate the health risk.

Table 3 below shows the revised forecast for a future risk assessment within the 5-year timeframe for risk reductions requirements per Rule 1210.

Table 3. Proposed HRA Risk Reduction

Risk Type	2018 HRA	2026 HRA	Units
Chronic Maximum Worker	1.82	<1	Hazard Index (HI)
Acute Maximum	20.86	<1	Hazard Index (HI)
Chronic Maximum 8-Hour Worker	1.06	<1	Hazard Index (HI)

3.5 PROGRESS REPORTS

Rule 1210(e) requires progress reports to be submitted at least annually under this RRAP. The Facility will provide progress reports as required on an annual basis incorporated into the toxic air contaminant emission inventory report. This report will detail actions taken by the Facility to reduce TAC emissions and the estimated public health risk reduction achieved, as supported by annual testing.

4.0 APPLICATION FORM AND FEE

The General Permit or Registration Application Form can be found in Appendix C. Enclosed with the application are fees in the amount of $7,870. The fee estimate provided by the SDAPCD can be found in Appendix D.

5.0 CONCLUSION

The Facility has included all required information from Rule 1210(e) regarding the RRAP. The risk reduction activities detailed in this permit modification application serve to update the current permit and show that the Facility is taking all necessary steps to reduce health risk.

Appendix A

SCAQMD Formaldehyde Testing Results

6.0 TEST RESULTS SUMMARY

Emissions Compliance Data Summary
E1 Engine Stack Outlet
Sylmar, California
September 30, 2021

Parameter	Run 1 Min Load	Run 2 Mid Load	Run 3 Full Load	Emission Limits
Oxygen (O_2)				
%	10.11	10.16	10.11	--
Carbon Dioxide (CO_2)				
%	9.94	9.81	9.82	--
Nitrogen Oxide (NO_X as NO_2)				
ppmvd	13.5	16.62	14.6	--
ppmvd @ 15% O_2	7.40	9.13	7.96	11
lb/day	19.5	25.5	24.2	34
Carbon Monoxide (CO)				
ppmvd	391	389	396	--
ppmvd @ 15% O_2	214	214	217	250
lb/day	341	364	401	459
ROG, NMOC, & Methane[1]				
NMOC as Carbon, ppmvd	--	--	16.4	--
ppmvd @ 15% O_2, as Carbon	--	--	9.01	30
lb/day, as Carbon	--	--	6.45	31
ppmvd @ 3% O_2 (as Hexane)	--	--	4.56	20
methane @ 15% O_2	--	--	1,649	3,000
Particulate (PM)				
mg	--	--	8.40	--
gr/dscf	--	--	0.0020	gr/scf @8,829 dscfm flow rate
lb/day	--	--	3.6	24
Stack Flow Data (Measured Volumetric Flow)				
dscfm	--	--	8,508	--
Moisture Fraction				
%	--	--	0.099	--

[1] The ROC, NMOC, & Methane was taken during RATA runs six thru seven RATA.

Fuel Gas Data Summary
E1 Engine Landfill Gas Inlet
Sylmar, California
September 30, 2021

Parameter[1]	Run 1 Low Load	Run 2 Mid Load	Run 3 Full Load	Emission Limits
Exhaust Data				
Stack Flow Rate, dscfm (Fuel Based Calculation)	8,356	8,938	9,672	--
Fuel Data				
fuel flow, ft^3/hr	56,373	60,019	68,282	--
$F\text{-}Factor_{dry}$	9,525	9,525	9,525	--
Fuel Gas Calorific Values				
GCV, BTU/lb	6,458	6,458	6,458	--
GCV, BTU/ft_3	482	482	482	--
Heat Input				
MMBtu/hr (average)	27.17	28.93	31.47	--
Fuel Sulfur / Sulfur Dioxide (SO_X as SO_2)				
H_2S in Fuel, ppmv	--	--	4.62	150
lb/day	--	--	1.20	27

[1] The landfill gas sample was taken during RATA runs six thru seven.

Ammonia Emissions Compliance Data Summary
E1 Engine Stack Outlet
Sylmar, California
September 30, 2021

Parameter	Run 1	Run 2	Average	Emission Limits
Ammonia (NH_3)				
ppmvd	0.12	0.29	0.20	--
ppmvd @ 15% O_2	0.07	0.16	0.11	10

CARB 430 Emissions Data Summary
E1 Engine Stack Outlet
Sylmar, California
September 30, 2021

Parameter	Run 1	Run 2	Run 3	Average	Emission Limits
Oxygen (O_2)					
%	10.17	10.21	10.18	10.19	--
Formaldehyde					
ppmvd	0.25	0.31	0.40	0.32	--
ppmvd @ 15% O_2	0.14	0.17	0.22	0.17	--
Acetaldehyde					
ppmvd	3.28E-03	3.75E-03	3.28E-03	3.43E-03	--
ppmvd @ 15% O_2	1.80E-03	2.07E-03	1.80E-03	1.89E-03	--

SCAQMD Rule 218.1 Facility CEMS Relative Accuracy
E1 Engine Stack Outlet
Sylmar, California
September 30, 2021

Parameter	Emission Standard	Reference Mean	CEMS Mean	Relative Accuracy			Acceptance Criteria	Performance Specifications Number (Rule 218.1)
				RM %	AES %	APS		
Oxygen (O_2)								
%	--	10.16	10.01	1.70	--	--	≤ 20% RM	3
Nitrogen Oxide (NO_X)								
ppmvd	--	11.40	10.42	11.59	--	--	≤ 20% RM	2
ppmvd @ 15% O_2	--	6.28	5.65	13.24	--	--	≤ 20% RM	2

RM = Reference Method
APS = Alternative Performance Specification
AES = Applicable Emissions Standard

1.1 SUMMARY OF RESULTS

Facility: Prima Deshecha
Source: ICE #1
Load: Normal
Date: 6/2/2022

Parameter Engine Load	Units	Full Load	Limits	Pass/ Fail
Outlet ROCs [Duplicate Average]				
NMOC, as methane	ppmv	25.85		
NMOC @ 15% O_2	ppmv	**14.18**	**40**	**Pass**
NMOC, as hexane	ppmv	4.31		
NMOC, as hexane @ 3% O_2	ppmv	**7.17**	**20**	**Pass**
Emission Rate	lb/hr	0.62		
Emission Rate	lb/day	**14.90**	**46**	**Pass**
Emission Rate	lb/MMBTU	0.020		
Emission Rate	g/bhp-hr	0.066		
Inlet ROCs				
NMOC, as methane	ppmv	3893		
Emission Rate	lb/hr	10.17		
Outlet Methane				
Methane	ppmv	1379.5		
Methane @ 15% O_2	ppmv	**759.80**	**3000**	**Pass**
Emission Rate	lb/hr	33.13		
Inlet Methane				
Methane	ppmv	482,447		
Emission Rate	lb/hr	1,285.3		
Aldehydes [Triplicate Average]				
Formaldehyde	ppmv	1.382		
Emission Rate	lb/hr	0.062		
Acetaldehyde	ppmv	0.056		
Emission Rate	lb/hr	0.0037		
Inlet Sulfur	ppmv	90.86		
Emission Rate	lb/hr	0.514		
Outlet Sulfur	ppmv	5.35		
Emission Rate	lb/day	**12.345**	**27**	**Pass**
Particulate Matter	gr/dscf	0.0014		
Emission Rate	lb/hr	0.11		
Emission Rate	lb/day	**2.69**	**113**	**Pass**
Emission Rate	g/bhp-hr	0.012		
O_2	%	10.15	-	
CO_2	%	10.03	-	
Fuel Usage	SCFM	1,051.9	-	
Heat Input	MMBtu/hr	**30.80**	**35**	**Pass**
Load Generated, avg	KW	3,032	-	
BHP, Rated	Bhp	4,235	-	
Flow, Calculated	dscfm	9,482	-	

1.1 SUMMARY OF RESULTS

Facility: Prima Deshecha
Source: ICE #2
Load: Normal
Date: 6/3/2022

Parameter Engine Load	Units	Full Load	Limits	Pass/ Fail
Outlet ROCs [Duplicate Average]				
NMOC, as methane	ppmv	28.90	-	
NMOC @ 15% O_2	ppmv	**15.65**	**40**	Pass
NMOC, as hexane	ppmv	4.82	-	
NMOC, as hexane @ 3% O_2	ppmv	**7.91**	**20**	Pass
Emission Rate	lb/hr	0.64		
Emission Rate	lb/day	**15.40**	**46**	Pass
Emission Rate	lb/Mmbtu	0.020		
Emission Rate	g/bhp-hr	0.069	-	
Inlet ROCs				
NMOC, as methane	ppmv	3299	-	
Emission Rate	lb/hr	8.71	-	
Outlet Methane				
Methane	ppmv	1313.50	-	
Methane @ 15% O_2	ppmv	**714.11**	**3000**	Pass
Emission Rate	lb/hr	32.76	-	
Inlet Methane				
Methane	ppmv	504,623	-	
Emission Rate	lb/hr	1,359.14	-	
Aldehydes [Triplicate Average]				
Formaldehyde	ppmv	9.350	-	
Emission Rate	lb/hr	0.389	-	
Acetaldehyde	ppmv	0.210	-	
Emission Rate	lb/hr	0.0129	-	
Inlet Sulfur	ppmv	102.45		
Emission Rate	lb/hr	**0.59**		
Outlet Sulfur	ppmv	5.88		
Emission Rate	lb/day	**14.07**	**27**	
Particulate Matter	gr/dscf	0.0017		
Emission Rate	lb/hr	0.13		
Emission Rate	lb/day	**3.05**	**113**	Pass
Emission Rate	g/bhp-hr	0.014		
O_2	%	10.01	-	
CO_2	%	10.21	-	
Fuel Usage	SCFM	1,063.4	-	
Heat Input	MMBtu/hr	**32.54**	**35**	Pass
Load Generated, avg	KW	3,050	-	
BHP, Rated	Bhp	4,235	-	
Flow, Calculated	dscfm	9,846	-	

Appendix B

HCl Study for EPA

September 1, 2022
Project 796949

Mr. Roy Huntley
Emission Factor And Inventory Group (MD-14)
Office of Air Quality Planning and Standards
U. S. Environmental Protection Agency
Research Triangle Park, NC 27711

Re: Submission of Hydrogen Chloride Test Data from Landfill Gas Fired Combustion Devices

Dear Mr. Huntley:

As discussed in a meeting with you in June and October 1999, the Waste Industry Air Coalition (WIAC) has compiled and reviewed 19 stack-test reports to develop an emission factor for hydrogen chloride (HCl) from landfill gas-fired devices, specifically flares. This review focused on two main items: 1) validity of the stack test methods used, and 2) a review of the HCl concentrations to determine if the stack tests would indeed prove that HCl concentrations are overstated based on methodologies presented in the EPA AP-42, Section 2.4.

Stack Test Methods

There are four stack-test methods used in the enclosed stack-test reports: 1) EPA Method 26, 2) EPA Method 0050, 3) South Coast Air Quality Management District (SCAQMD) Method 5/California Air Resources Board (CARB) Method 421, and 4) Method referenced as EPA 600-325.3. EPA Method 26 is an approved stack-test method for HCl; if the test is conducted consistent with EPA protocol, the results are technically valid and useable. EPA Method 0050 is referenced from *Measurement of HCl and Cl_2* (*EPA Methods Manual for Compliance with BIF Regulations, EPA/530-SW-91-010, December 1990).* The BIF Regulations are EPA regulations for the treatment of hazardous waste in boilers, furnaces and other thermal treatments. The final two methods appear to have relatively similar preparation, sampling and analytical methodologies as EPA Method 26 and would be appropriate for use in this comparison.

Review of Hydrogen Chloride Concentrations

AP-42 Section 2.4 has a table of compounds typically found in landfill gas—some of these compounds are chlorinated. The methodology used to determine the HCl concentration in the outlet of a landfill gas-fired device is to *assume* that the device oxidizes at least 98 percent of the chlorinated compound during combustion and converts the free chlorine atoms into HCl (i.e., mass balance). Additionally, AP-42 provides a calculation methodology that assumes a default concentration for total chloride (C_{Cl}) of 42.0 ppmv. In AP-42, page 2.4-9 it states that "This value was derived from the default LFG constituent concentrations presented in Table 2.4-1". The use of this methodology and the derivation of the default concentration is very confusing and potentially not technically correct. Because of this confusion, the use a a default HCL outlet concentration based on the attached stack tests would greatly simplify the derivation of HCl emissions.

The stack-test results reviewed show a much lower and more reasonable concentration of HCl than using the methods described in AP-42. According to the reports, the maximum tested HCl concentration is 55.53 ppmv, an average maximum concentration of 12.68 ppmv, and an average average concentration of 9.43 ppmv (see summary attached). If you have any questions about the above information or attachments, please call me at (978) 682-1980.

Sincerely,

EMCON

Edwin P. Valis, Jr.
Project Manager

Attachments: Summary of Hydrogen Chloride Concentrations
Stack Test Reports

cc: Mike Michels – SWANA w/o Attachments
Michele Laur - EPA
Susan Thornloe - EPA
Ed Repa – EIA w/o Attachments

5.0 TEST RESULTS

The emission test results are summarized in Tables 2 through 4. Detailed emission calculations are presented in Appendix IV.

TABLE 2 – SUMMARY OF TOTAL PARTICULATE MATTER EMISSIONS

Run	One	Two	Three	Average
Date	7/19/05	7/19/05	7/20/05	---
Time	0950-1255	1345-1530	0645-0814	---
Front Half PM				
Grains/dscf	0.0041	0.0044	0.0011	0.0032
Pounds/mmBtu	0.0174	0.0178	0.0053	0.0135
Pounds/hour	0.253	0.239	0.076	0.189
Condensable Organic PM				
Grains/dscf	ND < 0.0001	0.0014	ND < 0.0001	0.0005
Pounds/mmBtu	ND < 0.0001	0.0058	ND < 0.0001	0.0019
Pounds/hour	ND < 0.0001	0.0776	ND < 0.0001	0.0259
Condensable Inorganic PM				
Grains/dscf	0.0021	0.0055	0.0022	0.0033
Pounds/mmBtu	0.0087	0.0225	0.0107	0.0140
Pounds/hour	0.1255	0.3009	0.1537	0.1934
Total Condensable PM				
Grains/dscf	0.0021	0.0069	0.0022	0.0037
Pounds/mmBtu	0.0087	0.0283	0.0107	0.0159
Pounds/hour	0.1255	0.3785	0.1537	0.2193
Total PM (Front and Back Half)				
Grains/dscf	0.0062	0.0113	0.0033	0.0069
Pounds/mmBtu	0.0261	0.0462	0.0160	0.0294
Pounds/hour	0.3785	0.6175	0.2297	0.4086

Grains/dscf = grains per dry standard cubic feet
Pounds/MMBtu = pounds per million British thermal units
Pounds/hour = pounds per hour

TABLE 3- SUMMARY OF CO, NO_x, SO_2 AND VOC EMISSIONS

Run	1	2	3	Average
Date	7/19/05	7/19/05	7/20/05	---
Time	0950-1255	1345-1530	0645-0814	---
Carbon Monoxide				
ppmv, dry	<1.0	<1.0	<1.0	<1.0
ppmv, dry @ 7% O_2	<2.0	<1.9	<2.3	<2.1
pounds/hour	<0.031	<0.028	<0.036	<0.031
pounds/MMBtu	<0.0022	<0.0021	<0.0025	<0.0022
Nitrogen Oxides as NO_2				
ppmv, dry	13.7	13.8	10.7	12.7
ppmv, dry @ 7% O_2	27.4	26.5	24.9	26.3
pounds/hour	0.70	0.63	0.63	0.65
pounds/MMBtu	0.048	0.047	0.044	0.047
Sulfur Dioxide				
ppmv, dry	<1.0	1.4	1.0	<1.1
ppmv, dry @ 7% O_2	<2.0	2.7	2.2	<2.3
pounds/hour	<0.071	0.087	0.078	<0.078
pounds/MMBtu	<0.0049	0.0065	0.0055	<0.0056
Total Non-methane Hydrocarbons (as Methane)				
ppmv, dry	<1.1	<1.1	1.3	<1.1
ppmv, dry @ 7% O_2	<2.4	<2.4	2.6	<2.5
pounds/hour	<0.022	<0.023	0.024	<0.023
pounds/MMBtu	<0.0015	<0.0015	0.0016	<0.0015
Destruction Efficiency				
Percent (%)	>99.4	>99.6	99.6	>99.6

ppmv, dry = parts per million by volume, dry basis
ppmv, dry @ 7% O_2 = parts per million by volume, dry basis corrected to 7% oxygen
pounds/hour = pounds per hour
pounds/MMBtu = pounds per million British thermal units

TABLE 4-SUMMARY OF HYDROGEN CHLORIDE EMISSIONS

Run	1	2	3	Average
Date	7/20/05	7/20/05	7/20/05	---
Time	0935-1035	1207-1307	1400-1500	---
ppmv, dry	0.55	0.63	0.71	0.63
ppmv, dry @ 7% O_2	1.2	1.4	1.4	1.4
pounds/hour	0.025	0.030	0.029	0.028

ppmv, dry = parts per million by volume, dry basis

ppmv, dry @ 7% O_2 = parts per million by volume, dry basis corrected to 7% oxygen

pounds/hour = pounds per hour

TABLE 1.
HYDROCHLORIC ACID EMISSIONS
LOPEZ CANYON LANDFILL
LOS ANGELES, CALIFORNIA

A	B	C	D	E
COMPOUNDS	**Molecular Weight** (g/Mol)	**Rep. Conc. of Compounds Found in LFG** (ppmv)	**Maximum Uncontrolled LFG Emissions** (lb/hr)	**Maximum Uncontrolled LFG Emissions** (tons/yr)
Hydrochloric acid (AP-42)	36 50	27 639	0.163	0.712
Hydrochloric acid (source test)	NA	NA	0.21	0.920

INPUT MODEL VARIABLES

Landfill Gas Flow to Flare	1010 cfm
Estimated methane content of LFG	50%

Appendix C

General Permit Application Form

Internal Use Only	
APP ID: APCD	-APP/CER-
SITE ID: APCD	-SITE-

GENERAL PERMIT OR REGISTRATION APPLICATION FORM

APCD AIR POLLUTION CONTROL DISTRICT COUNTY OF SAN DIEGO

Submittal of this application does not grant permission to construct or to operate equipment except as specified in Rule 24(c).

REASON FOR SUBMITTAL OF APPLICATION:

- ☐ New Installation
- ☐ Amendment to Existing Authority to Construct or Application
- ☒ Change of Permit Conditions
- ☐ Registration of Portable Equipment
- ☐ Existing Unpermitted Equipment or Rule 11 Change
- ☐ Change of Equipment Location
- ☐ Change Permit to Operate Status to Inactive
- ☐ Other (Specify)_____
- ☐ Modification of Existing Permitted Equipment
- ☐ Change of Equipment Ownership *(please provide proof of ownership)*
- ☐ Banking Emissions

List affected APP/PTO Record ID(s): APCD2006-PTO-950731 APCD2013-PTO-001632

APPLICANT INFORMATION

Name of Business (DBA) MM San Diego LLC – Miramar and Miramar Energy

Does this organization own or operate any other APCD permitted equipment at this or any other adjacent locations? ☐Yes ☒No

If yes, list assigned Site Record IDs listed on your Permits

Name of Legal Owner (if different from DBA)

Equipment Owner	Authority to Construct Mailing Address
Name: MM San Diego LLC – Miramar and Miramar Energy	Name: MM San Diego LLC – Miramar and Miramar Energy
Mailing Address: 5087 Junction Road	Mailing Address: 5244 Convoy Street
City: Lockport State: NY Zip: 14094	City: San Diego State: CA Zip: 92111
Phone: (951) 833-4153	Phone: (951) 833-4153
E-Mail Address: schakladar@opalfuels.com	E-Mail Address: schakladar@opalfuels.com

Permit To Operate Mailing Address	Invoice Mailing Address
Name: MM San Diego LLC – Miramar and Miramar Energy	Name: Same as Equipment Owner
Mailing Address: 5244 Convoy Street	Mailing Address:
City: San Diego State: CA Zip: 92111	City: State: Zip:
Phone: (951) 833-4153	Phone: ( )
E-Mail Address: schakladar@opalfuels.com	E-Mail Address:

EQUIPMENT/PROCESS INFORMATION: Type of Equipment: ☒ Stationary ☐ Portable, ***if portable please enter below the equipment storage address.*** **If portable, will operation exceed 12 consecutive months at the same location ☐ Yes ☐ No**

Equipment Location Address 5244 Convoy Street City San Diego State: CA

Parcel No. _____ Zip 92111 Phone (951) 833-4153 E-mail:schakladar@opalfuels.com

Site Contact Suparna Chakladar Phone (951) 833-4153

General Description of Equipment/Process Landfill Gas to Energy

Application Submitted by ☐ Owner ☐ Operator ☐ Contractor ☒ Consultant Affiliation SCS Engineers

EXPEDITED APPLICATION PROCESSING: ☐ **I hereby request Expedited Application Processing and understand that:**
a) Expedited processing will incur additional fees and permits will not be issued until the additional fees are paid in full (see Rule 40(d)(8)(iv) for details) b) Expedited processing is contingent on the availability of qualified staff c) Once engineering review has begun this request cannot be cancelled d) Expedited processing does not guarantee action by any specific date nor does it guarantee permit approval.

[redacted] **ication is true and correct.**

Date 9/16/22

Print Name Anthony Falbo Company MM San Diego LLC

Phone (716) 713-4135 E-mail Address afalbo@opalfuels.com

Internal Use Only	
APP ID: APCD	-APP/CER-
SITE ID: APCD	-SITE-

GENERAL PERMIT OR REGISTRATION APPLICATION FORM

AIR POLLUTION CONTROL DISTRICT
COUNTY OF SAN DIEGO

Internal Use Only

Date _____ Staff Initials: _____ Amt Rec'd $ _____ Fee Schedule _____

RNP: _____ EMF: _____ NBF: _____ TA: _____ *GEN_APP_Form_Rev Date: Aug. 2017*

Appendix D

SDAPCD Fee Estimate

SAN DIEGO COUNTY AIR POLLUTION CONTROL DISTRICT

APPLICATION FEE ESTIMATE

Applicant Site ID/EIF ID:	*APCD1996-SITE-09778*	*Enter PTO/TVP for Modifications*	
Applicant DBA:	*Minnesota Methane LLC San Diego Faciliy*	Fee Schedule:	91A
		Reason for Submittal:	Risk Reduction
		Existing Site?	Yes
APCD Engineer:	*Jim Swaney*	Estimate Date:	8/17/2022
Equipment Description:	*Risk Reduction Plan for 2018 HRA*		

ACTIVITY		EMPLOYEE CLASSIFICATION	LABOR HOURS	COST	SUBTOTAL	
Initial Evaluation Fee - T&M (Rule 40(d)(3)(i))						
Authority to Construct		Engineering Services	20.0	$4,760.00		ETM
Permit to Operate		Engineering Services	2.0	$476.00	$5,236.00	ETM
T&M Application - No Fixed Fee, see above						
Authority to Construct/Permit to Operate			N/A	T+M	$0.00	ETM
Additional Evaluation and Processing Fees (Rule 40(d)(5))						
New Source Review		Engineering Services		$0.00	$0.00	NSR
		Monitoring Services		$0.00	$0.00	AQI
Prev. Significant Deterioration		Engineering Services		$0.00	$0.00	PSD
Toxics New Source Review		Engineering Services		$0.00		
(Health Risk Assessment)		Monitoring Services		$0.00		
		HRA Base Estimate	Standard	$2,536.00	$2,536.00	TNS
Tile V		Engineering Services		$0.00	$0.00	TIV
NESHAPS/ATCM/NSPS		Engineering Services		$0.00	$0.00	HAP
CEQA		Engineering Services		$0.00	$0.00	CEQ
AB 3205 Notice		Engineering Services		$0.00		
		Public Notice Costs		$0.00	$0.00	AB3
Equipment subject to Rule 11(a)(3)		Engineering Services		$0.00	$0.00	R51
H&SC 42301(e)		Engineering Services		$0.00	$0.00	HSC
Testing or Test Witness		Engineering Services		$0.00		STF
		Source Testing Services		$0.00		ad-hoc
Fixed Test Fee Sched.	NA	Fixed Testing Fees		$0.00	$0.00	ad-hoc
Miscellaneous Fees						
Processing Fee (Rule 40(d)(1)(ii))			1.0	$98	$98.00	EFX
Renewal Fee (Rule 40(e)(2)(ii))			N/A	N/A	$0.00	REN
Emissions Fee (Rule 40(e)(2)(iv))				N/A	$0.00	EMF

ESTIMATE TOTAL: $7,870.00

NOTES:

(1) To avoid possible processing delays, this document should be submitted with your application forms.

(2) The fees contained in this estimate are are based on APCD Rule 40. Final fee may be more or less than this estimate (see Rule 40(d)(1)(iii)).

(3) Emissions determined to be greater than 5 tons per year will be charged a emission fee on a ton per year basis. (see Rule 40 (e)(2)(iv)(A))

(4) Fees paid by credit card will be assessed a 2.19% processing fee (see Rule 40(c)(5))

(5) Federal government payments made through DFAS: Please reference the above liste Site ID Record number in your DFAS submittal.

(6) This estimate is valid only for applications received by the District by June 30, 2023