ENGINEERING EVALUATION REPORT/STATEMENT OF BASIS
WASTE MANAGEMENT OF ALAMEDA COUNTY, INC.
APPLICATION NUMBER 009790

BACKGROUND:
Waste Management of Alameda County has applied for an Authority to Construct the following equipment at the Tri-Cities Landfill, Facility #A2246.

A-3: Enclosed Landfill Gas Flare; LFG Specialties Model No. EF945I12, 2,500 SCFM maximum capacity, 75 MMBTU/hr

This flare is intended to replace the existing Landfill Gas Flare A-2.

EMISSIONS DISCUSSION:
Since the Landfill Gas Flare A-3 is new, all emissions must be added to the Cumulative Increase for the facility. The highest projected emissions from A-3 are as follows:

NOx and CO
The flare manufacturer has supplied the following highest expected emission factors for secondary pollutants from the flare:

- NOx: 0.06 lb/MMBTU
- CO: 0.30 lb/MMBTU

NMOC (POC) Emissions
Flares are subject to Regulation 8-34-301.3 and are limited to an exhaust gas NMOC concentration < 30 ppm by volume, dry basis, expressed as methane, corrected to 3% oxygen. This concentration limit can be converted to a mass emission as follows using data provided by the flare manufacturer for maximum operation (2,500 scfm, 75 MMBTU/hr) at 1400^{o} F:

LFG Combustion Rate:	2,500 scfm
Dry Exhaust Flow Rate:	41,775 dscfm
Excess O_2 in Dry Exhaust Stream:	13.6%
Oxygen Correction Factor:	0.41; [e.g.(20.9 – 13.6)/(20.9 – 3)]
Corrected Dry Exhaust Flow Rate:	17,037 dscfm @ 3% oxygen
Molecular Weight of Methane:	16 lb/lb-mole
Volume of Gas at 70^{o}F:	386 scf/lb-mole

NMOC = $[(30 \times 10^{-6})(16 \text{ lb/lb-mole})(17{,}037 \text{ dscf/min})]/(386 \text{ scf/lb-mole})(60 \text{ min/hr})$
= 1.3 lb/hr
= 0.02 lb/MMBTU

SO_2
Since the Sulfur Dioxide (SO_2) emissions will vary directly with the amount of Sulfur compounds present in the fuel, a mass balance calculation can be performed to determine SO_2 emissions based on the total concentration of sulfur compounds in the landfill gas. Assuming a maximum landfill gas total sulfur concentration of 200 ppm (vol), the SO_2 emission factor will be:

SO_2 = (200 X 10^{-6} lb-mole S/lb-mole gas)(lb-mole SO_2/lb-mole S)(64 lb SO_2/lb-mole SO_2)(lb-mole gas/386 scf)/(506.5 BTU/scf)
= 6.5 x 10^{-8} lb SO_2/BTU
= 0.065 lb/MMBTU

PM

AP-42 Table 2.4-5 "Emission Rates for Secondary Compounds Exiting Control Devices" provides a PM emission factor of 17 lb/10^6 dscf Methane. The applicant has stated that the landfill gas at the facility has an average methane content of 50%. At standard conditions (70 ^oF, 1 atm), a 50% methane landfill gas will have a higher heating value (HHV) of 497 BTU/scf. Therefore, the AP-42 PM emission factor can be converted to lb/MMBTU as follows:

PM = (17 lb/10^6 dscf Methane)(0.5 10^6 dscf Methane/10^6 scf LFG)(10^6 scf LFG/497 MMBTU)
= 0.017 lb/MMBTU

Assuming continuous use at the peak landfill gas capacity (2,500 scfm, 75 MMBTU/hr) the highest estimated emissions of secondary air pollutants from the Enclosed Landfill Gas Flare A-11 will be:

NOx = (0.06 lb/MMMBTU)(75 MMBTU/hr)(24 hr/day)(365 days/yr)
= 39,420 lb/yr
= 19.710 tons/yr

CO = (0.30 lb/MMMBTU)(75 MMBTU/hr)(24 hr/day)(365 days/yr)
= 197,100 lb/yr
= 98.550 tons/yr

POC = (0.02 lb/MMMBTU)(75 MMBTU/hr)(24 hr/day)(365 days/yr)
= 13,140 lb/yr
= 6.570 tons/yr

SO_2 = (0.065 lb/MMMBTU)(75 MMBTU/hr)(24 hr/day)(365 days/yr)
= 42,705 lb/yr
= 21.353 tons/yr

PM = (0.017 lb/MMMBTU)(75 MMBTU/hr)(24 hr/day)(365 days/yr)
= 11,169 lb/yr
= 5.585 tons/yr

The landfill gas condensate injection rate will not change from the current 5 gallon per minute maximum. Therefore, there is no increase of emissions from this operation.

CUMULATIVE EMISSIONS:

(lbs/day)		**(tons/yr)**	
NOx	= 108.0	NOx	= 19.710
CO	= 540.0	CO	= 98.550
POC	= 36.0	POC	= 6.570
SO_2	= 117.0	SO_2	= 21.353
PM	= 30.6	PM	= 5.585

TOXIC RISK ASSESSMENT:

Since the proposed Flare A-3 has a larger capacity than the existing Flare A-2 (i.e. 2,500 scfm, 75 MMBTU/hr for A-3 versus 1,375 scfm, 41.8 MMBTU/hr for A-2), the possible increased risk associated with the higher potential emissions must be evaluated. The Tri-Cities Landfill is scheduled for closure in 2006 and it is estimated that collected landfill gas will peak in that year at a rate of 1,575 scfm*. Therefore, the potential increased risk from the larger Flare A-3 will be based on a potential increased landfill gas flow rate of 200 scfm.

* 1,575 scfm is the estimated peak gas collection rate (occurring in 2006) given in the "Amended And Restated Landfill Gas Collection And Control System Design Plan" for the Tri-Cities Landfill submitted November 25, 2003.

Potential emissions of toxic air contaminants (TACs) from the Flare A-3 will occur as follows:

- Pass-through Emissions: TACs from the landfill gas that are not completely removed by combustion.
- Acid Gas Emissions: Halogenated compounds converted to acid gases during combustion.
- Secondary Organic TACs: Organic compounds converted to TACs during combustion.

Pass-through Emissions

This facility is required to perform a landfill gas characterization test on an annual basis to quantify the amounts of suspected toxic air contaminants common to landfill gas. The District has identified the list of compounds to be annually tested as those organic compounds appearing in AP-42 Table 2.4.1 that are also listed as TACs in BAAQMD Regulation 2, Rule 1, Table 2-1-316. In addition, Benzene and Toluene have been added because they appear in AP-42 Table 2.4-2 as likely components of landfill gas and Ethylbenzene has been included because the District has proposed adding it to Table 2-1-316. This combined list includes 29 TACs that are or may be present in landfill gas. The attached spreadsheet Table 1 estimates the pass-through emissions of each of these compounds from the Flare, using the following methodology and assumptions:

- The concentration of each listed TAC is based on the results of the most recent gas sampling (November 13, 2000) performed by Slakey and Associates. Where test results were not available, the AP-42 Table 2.4-1 default value was used.
- The increased LFG fuel feed rate to the flare is assumed to be a continuous 200 scfm (standard conditions: 1 atm, 70 degrees F), the difference in the potential combustion rate between the existing Flare A-2 and the proposed Flare A-3.
- The abatement efficiency for each compound class was taken from AP-42 Table 2.4-3 "Control Efficiencies for LFG Constituents" (11/98). (e.g. Typical control efficiencies; NMOC = 99.2%, Halogenated Species = 98.0%, Non-Halogenated Species = 99.7%)

Acid Gas Emissions

Spreadsheet Tables 2, 3, and 4 estimate the increased emissions of Hydrogen Chloride (HCl), Hydrogen Bromide (HBr), and Hydrogen Fluoride (HF) that are likely to occur during the combustion of halogenated compounds that are present or are thought to be present in the landfill gas at the Tri-Cities Landfill. These tables use the following methodology and assumptions:

- Compounds of interest are those that are listed in EPA AP-42 Table 2.4-1 "Default Concentrations For LFG Constituents" and which contain Chlorine, Bromine, or Fluorine.
- The concentrations used in the spreadsheet are based on the results of the most recent gas sampling performed by Slakey and Associates. AP-42 default values are used where test results are not available.
- The increased LFG fuel feed rate to the flare is assumed to be a continuous 200 scfm (standard conditions: 1 atm, 70 degrees F), the difference in the potential combustion rate between the existing Flare A-2 and the proposed Flare A-3.
- Halogenated compounds are completely combusted to yield HCl, HBr, and HF gases.

Secondary Organic TACs

Emissions estimates for secondary organic TACs from A-3 will be made using factors from the California Air Resources Board database of "California Air Toxics Emission Factors" (CATEF) for Landfill Gas Flares. 10 compounds thought to be secondary products of combustion and identified as TACs by the District were selected as compounds of interest. The estimated emissions of these compounds are summarized in spreadsheet Table 5. The following assumptions were used in the spreadsheet:

- The increased LFG fuel feed rate to the flare is assumed to be a continuous 200 scfm (standard conditions: 1 atm, 70 degrees F), the difference in the potential combustion rate between the existing Flare A-2 and the proposed Flare A-3.

Summary of Projected TAC Emissions

In combining the three TAC emission pathways for the Landfill Gas Flare A-3, a total of 42 TAC compounds are assumed to be emitted, and of these, 10 were found to have potential emissions that exceed the District's risk screen triggers. The estimated TAC emissions associated with this application are summarized as follows:

Compound	Estimated Emissions (lb/yr)	Risk Screen Trigger (lb/yr)	Risk Screen Trigger Exceeded? (yes or no)
Acetaldehyde	2.71 E+01	7.2 E+01	no
Acrolein	8.87 E+00	3.9 E+00	yes
Acrylonitrile	7.32 E-01	6.7 E-01	yes
Benzene	1.53 E-02	6.7 E+00	no
Carbon Disulfide	9.62 E-01	1.4 E+04	no
Carbon Tetrachloride	3.35 E-03	4.6 E+00	no
Chlorobenzene	1.53 E-01	1.4 E+04	no
Chlorodifluoromethane	6.12 E-01	1.4 E+05	no
Chloroethane	6.68 E-02	1.9E+06	no
Chloroform	1.95 E-03	3.6E+01	no
1,1-Dichloroethane	1.08 E-01	1.2 E+02	no
1,1-Dichloroethene	1.06 E-01	6.2E+03	no
1,2-Dichloroethane	2.21 E-01	8.7E+00	no
1,4-Dichlorobenzene	1.68 E-01	1.8 E+01	no
Dichlorodifluoromethane	1.03 E+01	1.4 E+05	no
Dichlorofluoromethane	1.47 E+00	1.4 E+05	no
Ethylbenzene	1.3 E+00	7.7 E+04	no
Ethylene Dibromide	1.02 E-03	2.7 E+00	no
Fluorotrichloromethane	5.69 E-01	1.4 E+05	no
Formaldehyde	3.1 E+03	3.3 E+01	yes
Hexane	2.63 E-01	8.3 E+04	no
Hydrogen Bromide	6.88 E+01	4.6 E+03	no
Hydrogen Chloride	3.88 E+02	1.4 E+03	no
Hydrogen Fluoride	2.55 E+01	1.1 E+03	no
Hydrogen Sulfide	5.19 E+00	8.1 E+03	no
Isopropyl Alcohol	6.02 E-01	4.4E+05	no
Methyl Ethyl Ketone	1.56 E+00	1.5 E+05	no
Methylene Chloride	1.80 E-01	1.9 E+02	no
PAH:			
Benzo(a)anthracene	2.23 E+00	4.4 E-02	yes
Benzo(a)pyrene	2.22 E+00	4.4 E-02	yes
Benzo(b)fluoranthene	2.22 E+00	4.4 E-02	yes
Benzo(k)fluoranthene	2.22 E+00	4.4 E-02	yes
Dibenz(a,h)anthracene	2.22 E+00	4.4 E-02	yes
Indeno(1,2,3-cd)pyrene	2.22 E+00	4.4 E-02	yes
Naphthalene	1.37 E+03	2.7 E+02	yes
Perchloroethylene	7.59 E-01	3.3 E+01	no
Toluene	4.01 E+00	3.9 E+04	no
1,1,1-Trichloroethane	3.49 E-01	6.2E+04	no
1,1,2,2-Tetrachloroethane	1.01 E+00	3.3E+00	yes
Trichloroethylene	3.72 E-01	9.7 E+01	no
Vinyl Chloride	2.72 E-01	2.5 E+00	no
Xylenes	2.31 E+00	5.8 E+04	no

As shown above, the estimated emissions of Acrolein, Acetaldehyde, Formaldehyde, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenz(a,h)anthracene, Indeno(1,2,3-cd)pyrene, and Naphthalene exceed the District's risk screen triggers for those compounds. Therefore, a risk screen is required.

In accordance with the District's Risk Management Policy a risk screen assessment must include all projected emissions of toxic air contaminants (TAC) from the proposed project plus any TAC emissions associated with sources that were permitted within the two-year period immediately preceding the date that the application for the proposed new equipment was deemed complete. Since the District is concurrently processing an application for an Authority to Construct (3) Landfill Gas Fired IC Engine Generator Sets (see Application #009222), the risk from these sources must be included with the proposed Flare A-3.

Risk Screen Results

A risk screen for the combined project emissions, including the (3) proposed Landfill Gas Fired IC Engine Generator Sets S-18, S-19 and S-20 and the proposed Landfill Gas Flare A-3 was completed on August 10, 2004 (see attached memorandum from Daphne Y. Chong to Ted Hull, August 10, 2004). The increased cancer risk to the maximally exposed receptor was found to be **0.13 in a million**. In accordance with the District's Risk Management Policy, this risk level is considered acceptable because it is less than one in a million.

BACT/RACT REVIEW:

In accordance with Regulation 2-2-112, BACT does not apply to emissions of secondary pollutants that are the direct result of the use of an abatement device that complies with the BACT or BARCT requirements for the control of another pollutant. Since the Enclosed Flare meets the BARCT requirements of Regulation 8-34-301.3 for organic compounds, BACT is not triggered for the emissions of secondary pollutants from the flare. However, Regulation 2-2-112 does require Reasonably Available Control Technology (RACT) for secondary pollutants. The District specifies RACT for Enclosed Landfill Gas Flares as that which will achieve the following emission rates:

- NOx: 0.06 lb/MMBTU
- CO: 0.30 lb/MMBTU

The Enclosed Landfill Gas Flare A-3 meets RACT for NOx and CO.

OFFSET REVIEW:

With the addition of the new Landfill Gas Flare A-3 (and removal of the existing Flare A-2) the permitted facility wide emissions of NOx will be 19.710 tons/yr. In accordance with Regulation 2-2-302, before the District may issue an authority to construct or permit to operate for a new or modified source at a facility that emits or will be permitted to emit more than 15 tons per year but less than 50 tons/yr of POC or NOx on a pollutant specific basis, emissions offsets shall be provided by the District at a 1.0 to 1.0 ratio from the Small Facility Banking Account in accordance with the provisions of Regulation 2-4-414. Offsets shall be provided for the emissions from the new or modified source, plus any pre-existing cumulative increase, minus any onsite contemporaneous emission reduction credits determined in accordance with Section 2-2-605. This facility has no pre-existing cumulative increase, but will have contemporaneous emission reduction credits from the removal of the existing Landfill Gas Flare A-2.

Contemporaneous Emission Reduction Credits

In accordance with Regulation 2-2-605, a baseline emission rate is used to determine the amount of available emission reduction credits, with the baseline period being the 3-year period immediately preceding the date that the application is complete. The baseline emission rate is the average actual emission rate of the source during the baseline period. Therefore, for the Landfill Gas Flare A-2, the baseline emission rate is equal to the average actual emissions from the flare that occurred between 07/06/01 and 07/06/04.

Based on information provided by the facility during the past 3 annual permit renewal cycles (10/31/01 through 10/31/03) the Flare A-2 has combusted an average of 497,479 thousand cubic feet of landfill gas per

year. Assuming that the gas is 50% methane (HHV = 1,013 BTU/scf), the average annual heat input to the flare during the baseline period is estimated to be 251,973 MMBTU/yr

Although it is intended that the baseline emission rate be based on actual emissions, no reliable actual emissions data is available for the Flare A-2. It is therefore recommended that the BARCT level emission factors used for A-3 in this application be applied to the existing Flare A-2 in order to estimate the baseline emissions. This approach is considered to be conservative because A-2 is an older flare that was not required to meet the current BARCT levels for NOx and CO. Using the baseline fuel consumption rate of 251,973 MMBTU/yr, the estimated baseline emissions for A-2 are as follows:

Table II: Baseline Emissions for A-2 Flare

Pollutant	BARCT Emission Factor (lb/MMBTU)	Baseline Emissions (lb/yr)	Baseline Emissions (tons/yr)
NOx	0.06	15,118	7.559
CO	0.30	75,592	37.796
POC	0.02	5,039	2.520
SO_2	0.065	16,378	8.189
PM	0.017	4,284	2.142

From Table II, above, the available amount of Contemporaneous Emission Reduction Credits for NOx will be 7.559 tons/yr.

Required Offsets

NOx: Offsets are required for this application as follows:

Table III: Required Offsets for Enclosed Landfill Gas Flare A-11

Pollutant	Emissions Increase (tons/yr)	Contemporaneous Emission Reduction Credits (tons/yr)	Net Emissions Increase (tons/yr)	Offset Ratio	Offsets Required (tons/yr)
NOx	19.710	7.559	12.151	1.0:1.0	12.151

PM and SO_2: As stated in Regulation 2-2-303, offsets of PM_{10} and SO_2 emission increases are only required if the facility is considered to be a major facility of PM_{10} and SO_2 emissions. The Tri-Cities Landfill is not a major facility for either PM_{10} or SO_2 emissions, because facility-wide emissions will be less than 100 tons/year. Therefore, Regulation 2-2-303 does not apply and PM_{10} and SO_2 offsets are not required.

PSD REVIEW

In accordance with Regulation 2-2-304, a PSD review is required for a new major facility, which will emit 100 tons per year or more of a regulated air pollutant, if it is one of the 28 PSD source categories listed in Section 169(1) of the federal Clean Air Act, or 250 tons per year or more for an unlisted category. PSD review is also required for a major modification of a major facility if the cumulative increase, from the PSD Baseline Date, minus the contemporaneous emission reduction credits at the facility are in excess of 40 tons per year of sulfur dioxide or nitrogen oxides, or 15 tons per year of PM10. Similarly, Regulation 2-2-305 requires a PSD review for a major modification of a major facility with an increase of 100 tons per year or more of carbon monoxide.

The Tri-Cities Landfill is not a PSD Major Facility for any pollutants, because maximum facility-wide emissions will be less than 250 tons/year for each pollutant. Note that landfills and landfill gas combustion equipment are NOT in one of the 28 listed categories that are subject to the lower PSD Major Facility threshold of 100 tons/year. Therefore, PSD review is not triggered for this application.

STATEMENT OF COMPLIANCE:

Public Notification Requirements (Regulation 2, Rule 1):
The project is over 1000 feet from the nearest school and is therefore not subject to the public notification requirements of Regulation 2-1-412.

CEQA Requirements (Regulation 2, Rule 1):
The proposed Landfill Gas Flare A-3 is considered to be an abatement device and is required for compliance with Regulation 8, Rule 34. In accordance with Regulation 2-1-312.2, permit applications involving the installation of abatement equipment are categorically exempt from CEQA review. Since the flare is expressly exempted from CEQA by 2-1-312.2, comparison to the significance thresholds is not required and no further CEQA review is necessary.

Maximum Achievable Control Technology (MACT) Requirement (Regulation 2-2-317):
Total HAP emissions from this facility (including fugitive emissions from the landfill) have been determined to be less than 25 tons/year of all HAPs combined and less than 10 tons/year of any single HAP. Therefore, Regulation 2-2-317 does not apply.

Major Facility Review (Regulation 2, Rule 6):
This facility was initially issued an MFR Permit on November 28, 2001, which expires on October 31, 2006. The permit will be revised in conjunction with this application to reflect the proposed change of flares. In accordance with Regulation 2-6-215, the proposed revision to the MFR Permit is a "Minor Revision", because it is neither a "Significant Revision" as defined by Regulation 2-6-226 nor an "Administrative Permit Amendment" as defined by Regulation 2-6-201.

Landfill Gas Emission Control System Requirements (Regulation 8, Rule 34):
District Regulation 8-34-301.3 requires enclosed ground type flares to reduce the amount of NMOC in the collected gas by at least 98 percent by weight or emit less than 30 ppm (vol) NMOC (expressed as methane @ 3% O_2). Annual source testing and continuous flare temperature monitoring will be required in order to demonstrate compliance with this requirement.

Particulate Matter and Visible Emissions (Regulation 6):
The new Flare A-3 is expected to comply with the Ringelmann 1 limit of Regulation 6-301 and will have no visible emissions. The flare will also comply with Regulation 6-310 (PM $\leq$ 0.15 grains/dscf), because it is expected to emit less than 0.02 grains/dscf (converted AP-42 PM emission factor for Enclosed Landfill Gas Flares).

Sulfur Dioxide (Regulation 9, Rule 1)
Regulation 9-1-302 limits SO_2 emissions from the exhaust stream of any source (other than a ship) to 300 ppm (dry).

Given the following:

Max. Est. SO_2 Emission Rate:	4.9 lb/hr
Peak Exhaust Flow Rate:	41,775 dscfm
Molecular Weight of SO_2:	64 lb/lb-mole
Volume of Gas at 70^oF:	386 scf/lb-mole

ppm SO_2 = (4.9 lb SO_2/hr)(hr/60 min)(min/41,775 dscf)(lb-mole SO_2/64 lb SO_2)(386 dscf gas/lb-mole gas)

= 1.18×10^{-5} lb-mole SO_2/lb-mole gas
= 11.8 ppm SO_2

Since the SO_2 exhaust concentration based on the mass emission rate is well below 300 ppm it is anticipated that the Flare A-3 will comply with Regulation 9-1-302.

Federal Requirements:
No new federal requirements are triggered by the proposed A-3 Flare.

MONITORING ANALYSIS:
In order to demonstrate compliance with the applicable NOx and CO emissions limits established in this application, the permit holder of the Landfill Gas Flare A-3 will be required by permit conditions to perform District approved source testing. Initial source testing is required prior to permit issuance, with an annual testing requirement thereafter. This is in addition to the previous monitoring requirements for the Flare A-2 that will now apply to A-3. The District concludes that the proposed monitoring is adequate to demonstrate compliance with the applicable emission standards.

PERMIT CONDITIONS:
It is recommended that the permit conditions for the Landfill and Flare be modified as follows to account for the replacement of the existing Flare A-2 with a new Flare A-3.

Condition # 8366
FOR S-1: LANDFILL WITH GAS COLLECTION SYSTEM AND ~~A-2~~A-3: LANDFILL GAS FLARE

1. The TriCities Landfill S-1 is permitted for a total refuse capacity of 19,271,000 cubic yards (approximately 13,489,700 tons), with a maximum refuse acceptance rate of 2,628 tons/day. Prior to increasing the design capacity of the landfill, the owner/operator of this site shall first apply for and receive from the District a modified permit to operate. (Basis: Cumulative Increase, Offsets, and Toxic Risk Management Policy)

2. The Permit Holder shall apply for and receive an Authority to Construct before modifying the landfill gas collection system described below. Increasing or decreasing the number of wells or collectors, or significantly changing the length of collectors or the locations of wells or collectors are modifications that are subject to the Authority to Construct requirement.

   The Permit Holder has been issued a Permit to Operate for the landfill gas collection system components listed below. Well and collector locations, depths, and lengths are as described in detail in Permit Application # 3515.

	Required Components
Total Number of Vertical Wells:	25

   (Basis: Regulations 2-1-301, 8-34-301.1, and 8-34-305)

3. In order to demonstrate compliance with the above requirements, the S-1 Permit Holder shall maintain the following records:
   a. Monthly records of the quantity of refuse accepted and placed in the landfill.
   b. For areas of the landfill not controlled by a landfill gas collection system, the Permit Holder shall maintain a record of the date that waste was initially placed in the area or cell.
   c. The cumulative amount of waste placed in each uncontrolled area or cell on a monthly basis.
   d. If the Permit Holder plans to exclude an uncontrolled area or cell from the collection system requirement, the types and amounts of all non-decomposable waste placed in the area or cell shall be recorded. If non-decomposable waste makes up less than 100% of the contents of a given cell, that percentage shall be noted.
   e. The initial operation date for each new landfill gas well and collector.
   f. An accurate map of the landfill that indicates the locations of all refuse boundaries and the locations of all wells and collectors as identified in the Collection and Control System Design Plan. Any areas containing only non-decomposable waste shall be clearly identified. This map shall be updated at least every six months to indicate changes in refuse boundaries and to include any newly installed wells and collectors.

These records shall be kept on-site and be made available for inspection to District personnel upon request for a period of five years from the date on which a record was made. (Basis: Cumulative Increase and Regulations 2-6-501 and8-34-304)

4. The landfill gas collection system described in Part 2 above shall be operated continuously. Wells shall not be disconnected or removed from operation nor shall isolation or adjustment valves be closed without written authorization from the District, unless the Permit Holder complies with all applicable requirements of Regulation 8, Rule 34, Sections 113, 116, 117, and 118. (Basis: Regulations 8-34-301 and 8-34-305)

5. All landfill gas collected by the gas collection system for S-1 shall be abated at all times by the Landfill Gas Flare ~~A-2~~A-3. Under no circumstances shall raw landfill gas be vented to the atmosphere. This limitation does not apply to unavoidable landfill gas emissions that occur during collection system installation, maintenance, or repair performed in compliance with Regulation 8, Rule 34, Sections 113, 116, 117, or 118 or to inadvertent component or surface leaks that do not exceed the limits specified in 8-34-301.2 or 8-34-303. (Basis: Regulation 8-34-301)

6. The combustion zone temperature of the flare shall be maintained at a minimum temperature of 1450 degrees F, averaged over any 3-hour period. If a source test demonstrates compliance with all applicable requirements at a different temperature, the APCO may revise this minimum temperature limit in accordance with the procedures identified in Regulation 2-6-414 or 2-6-415, based on the following criteria. The minimum combustion zone temperature for the flare shall be equal to the average combustion zone temperature determined during the most recent complying source test minus 50 degrees F, provided that the minimum combustion zone temperature is not less than 1400 degrees F. (Basis: Regulation 8-34-301, Toxic Risk Management Policy, RACT, and 40 CFR 60.758(c)(1)(i))

7. The Landfill Gas Flare ~~A-2~~A-3 shall be equipped with a combustion temperature readout monitor and continuous recorder to measure and record the temperature in the combustion zone. (Basis: Regulation 8-34-507)

8. Emissions of Nitrogen Oxides (NOx) from the Flare A-3 shall not exceed 0.06 pounds per million BTU (calculated as NO_2). (basis: RACT and Offsets)

9. Emissions of Carbon Monoxide (CO) from the Flare A-3 shall not exceed 0.3 pounds per million BTU. (basis: RACT and Offsets).

~~8~~10. In order to demonstrate compliance with Regulation 8, Rule 34, Section 301.3, Regulation 9, Rule 1, Section 302, ~~and~~ 40 CFR 60 .752(b)(2)(iii)(B), and the above requirements, the Permit Holder shall ensure that a District approved source test is conducted annually on the Landfill Gas Flare (~~A-2~~A-3). The annual source test shall determine the following:

a. Landfill gas flow rate to the flare (dry basis)
b. Concentrations (dry basis) of methane (CH_4) and total non-methane organic compounds (NMOC) in the landfill gas;
c. Stack gas flow rate from the flare (dry basis)
d. Concentrations (dry basis) of nitrogen oxides (NOx), carbon monoxide (CO), CH_4, NMOC, and O_2 in the flare stack gas
e. The NMOC destruction efficiency achieved by the flare
f. The average combustion temperature in the flare during the test period.

Annual source tests shall be conducted no sooner than 9 months and no later than 12 months after the previous source test. The Source Test Section of the District shall be contacted to obtain its approval of the source test procedures at least 14 days in advance of each source test. The Source Test Section shall be notified of the scheduled test date at least 7 days in advance of each source test. The source test report shall be submitted to the Compliance and Enforcement Division within 45

days after the test date. (Basis: Regulations 8-34-301.3 and 8-34-412 and 40 CFR 60.752(b)(2)(iii)(B))

~~9~~11. The heat input to the ~~A-2~~ A-3 Flare shall not exceed ~~1,003.2~~ 1,800 million BTU per day or ~~366,168~~ 657,000 million BTU per year. In order to demonstrate compliance with this part, the Permit Holder shall calculate and record on a monthly basis the maximum daily and total monthly heat input to the flare based on the landfill gas flow rate recorded pursuant to Part ~~8~~10, the average methane concentration in the landfill gas based on the most recent source test, and a high heating value for methane of 1013 BTU/scf. The records shall be retained for five years and shall be made available to the District staff upon request. (Basis: Regulation 2-1-301)

~~10~~12. Total reduced sulfur compounds in the collected landfill gas shall be monitored as a surrogate for monitoring sulfur dioxide in control systems exhaust. The concentration of total reduced sulfur compounds in the collected landfill gas shall not exceed 1300 ppmv (dry). In order to demonstrate compliance with this part, the Permit Holder shall measure the total sulfur content in collected landfill gas on a quarterly basis using a draeger tube. The landfill gas sample shall be taken from the main landfill gas header. The Permit Holder shall follow the manufacturer's recommended procedures for using the draeger tube and interpreting the results. The Permit Holder shall conduct the first draeger tube test no later than 3 months after the issue date of the MFR Permit and quarterly thereafter. (Basis: Regulations 9-1-302 and 2-6-503)

~~11~~13. On rainless operating days, water shall be applied as necessary and at least 2 times per full operational day to all unpaved roadways and active soil removal and fill areas associated with this facility to suppress dust emissions. On operating days when rain has fallen in the last 24 hours, water shall be applied as necessary to prevent visible dust emissions. (Basis: Regulations 6-301 and 1-301)

~~12~~14. Paved roadways at the facility shall be kept sufficiently clear of dirt and debris as to prevent visible particulate emissions from vehicle traffic or wind. (Basis: Regulations 6-301 and 1-301)

~~13~~15. Visible dust emissions from any part of the facility shall not exceed Ringelmann 1.0 or result in fallout on adjacent property in such quantities as to cause a public nuisance. (Basis: Regulations 6-301 and 1-301)

~~14~~16. In order to demonstrate compliance with Parts #~~11~~13 and #~~12~~14, the operator of this facility shall keep records of all site watering and road cleaning activities in a District approved log. These records shall be kept on-site and be made available for inspection to District personnel upon request for a period of five years from the date on which the record was made. (Basis: Regulation 2-6-501)

~~15~~17. The Permit Holder shall limit the quantity of VOC soil handled per day so that no more than 15 pounds of total carbon could be emitted to the atmosphere per day. VOC soil is any soil that contains volatile organic compounds, as defined in Regulation 8-40-213, at a concentration of 50 ppmw or less. Soil containing more than 50 ppmw of VOC is considered to be "contaminated soil" and is subject to Part ~~16~~18 of these conditions. Soil containing only non-volatile hydrocarbons and meeting the requirements of Regulation 8-40-113 is not subject to Parts ~~15~~17 and ~~16~~18 of these conditions. In order to demonstrate compliance with this condition, the Permit Holder shall maintain the following records in a District approved log:

a. Daily records of the amount of VOC soil handled at the landfill. The total amount (in pounds per day) represents Q in the equation in subpart ~~15~~17c. (see below)
b. Daily records of the VOC content of all soils handled at the landfill. The VOC content (C in the equation below) is expressed as parts per million by weight total carbon..
c. Calculate and record on a daily basis the VOC Emission Rate (E) using the following equation: $E = Q \times C / 1{,}000{,}000$

These records shall be maintained on-site or shall be made readily available to District staff upon request for at least 5 years from the date on which a record was made. (Basis: Regulation 8-2-301)

~~16~~18. Handling Procedures for Soil Containing Volatile Organic Compounds

a. The procedures listed below in subparts b-l do not apply if the following criteria are satisfied. However, the record keeping requirements in subpart m, below, are applicable.
   i. The Permit Holder has appropriate documentation demonstrating that either the organic content of the soil or the organic concentration above the soil is below the "contaminated" level (as defined in Regulation 8, Rule 40, Sections 205, 207, and 211). The handling of soil containing VOCs in concentrations below the "contaminated" level is subject to Part ~~15~~17 above.
   ii. The Permit Holder has no documentation to prove that soil is not contaminated, but source of the soil is known and there is no reason to suspect that the soil might contain organic compounds.

b. The Permit Holder shall provide notification to the Compliance and Enforcement Division of the Permit Holder's intention to accept contaminated soil at the facility at least 24 hours in advance of receiving the contaminated soil. The Permit Holder shall provide an estimate of the amount of contaminated soil to be received, the degree of contamination (range and average VOC Content), and the type or source of contamination.

c. Any soil received at the facility that is known or suspected to contain volatile organic compounds (VOCs) shall be handled as if the soil were contaminated, unless the Permit Holder receives test results proving that the soil is not contaminated. To prove that the soil is not contaminated, the Permit Holder shall collect soil samples in accordance with Regulation 8-40-601 within 24 hours of receipt of the soil by the facility. The organic content of the collected soil samples shall be determined in accordance with Regulation 8-40-602.
   i. If these test results indicate that the soil is still contaminated or if the soil was not sampled within 24 hours of receipt by the facility, the Permit Holder must continue to handle the soil in accordance with the procedures set forth in subparts e.-l. below, until the soil has completed treatment or has been placed in a final disposal location and adequately covered. Storing soil in a temporary stockpile or pit is not considered treatment. Co-mingling, blending, or mixing of soil lots is not considered treatment.
   ii. If these test results indicate that the soil – as received at the facility – has an organic content of 50 ppmw or less, then the soil may be considered to be not contaminated and need not be handled in accordance with the procedures listed in subparts e.-l. below.

d. Any contaminated soil received at the facility shall be clearly identified as contaminated soil, shall be handled in accordance with subparts e.-l. below, and shall be segregated from non-contaminated soil. Contaminated soil lots may not be co-mingled, blended, or otherwise mixed with non-contaminated soil lots prior to treatment, reuse, or disposal. Mixing soil lots in an attempt to reduce the overall concentration of the contaminated soil or to circumvent any requirements or limits is strictly prohibited.

e. On-site handling of contaminated soil shall be limited to no more than 2 on-site transfers per soil lot. For instance, unloading soil from off-site transport vehicles into a temporary storage pile is 1 transfer. Moving soil from a temporary storage to a staging area is 1 transfer. Moving soil from a temporary storage pile to a final disposal site is 1 transfer. Moving soil from a staging area to a final disposal site is 1 transfer. Therefore, unloading soil from off-site transport into a temporary storage pile and then moving the soil from that temporary storage pile to the final disposal site is allowed. Unloading soil from off-site transport into a staging area and then moving the soil from that staging area to the final disposal site is allowed. However, unloading soil from off-site transport to a temporary storage pile, moving this soil to a staging area, and then moving the soil again to a final disposal site is 3 on-site transfers and is not allowed.

f. If the contaminated soil has an organic content of less than 500 ppmw, the contaminated soil shall be treated, deposited in a final disposal site, or transported off-site for treatment within 90 days of receipt at the facility.

g. If the contaminated soil has an organic content 500 ppmw or more, the contaminated soil shall be treated, deposited in a final disposal site, or transported off-site for treatment within 45 days of receipt at the facility.

h. All active storage piles shall meet the requirements of Regulation 8-40-304 by using water sprays, vapor suppressants or approved coverings to minimize emissions. The exposed surface area of any active storage pile (including the active face at a landfill) shall be limited to 6000 ft^2.

The types of storage piles that may become subject to these provisions include (but are not limited to) truck unloading areas, staging areas, temporary stockpiles, soil on conveyors, bulldozers or trucks, the active face of a landfill, or other permanent storage pile at the final disposal location.

i. All inactive storage piles shall meet the requirements of Regulation 8-40-305 including the requirement to cover contaminated soil during periods of inactivity longer than one hour. The types of storage piles that may become subject to these provisions include (but are not limited to) soil on trucks or other on-site equipment, staging areas, temporary stockpiles, and the permanent storage pile at the final disposal location. District approved coverings for inactive storage piles include continuous heavy-duty plastic sheeting (in good condition, joined at the seams, and securely anchored) or encapsulating vapor suppressants (with re-treatment as necessary to prevent emissions).

j. The Permit Holder must:
   i. Keep contaminated soil covered with continuous heavy-duty plastic sheeting (in good condition, joined at the seams, and securely anchored) whenever soil is to be stored in temporary stockpiles or during on-site transport in trucks. Soil in trucks shall not be left uncovered for more than 1 hour.
   ii. Establish a tipping area for contaminated soils near the active face that is isolated from the tipping area for other wastes.
   iii. Spray contaminated soil with water or vapor suppressant immediately after dumping the soil from a truck at the tipping area.
   iv. Ensure that all contaminated soil is transferred from the tipping area to the active face immediately after spraying with water or vapor suppressant.
   v. Ensure that contaminated soil in the tipping area is not disturbed by subsequent trucks. Trucks shall not drive over contaminated soil in the tipping area or track contaminated soil out of the tipping area on their wheels.
   vi. Spray contaminated soil on the active face with water or vapor suppressant (to keep the soil visibly moist) until the soil can be covered with an approved covering.
   vii. Limit the area of exposed soil on the active face to no more than 6000 ft^2.
   viii. Ensure that contaminated soil spread on the active face is completely covered on all sides with one of the following approved coverings: at least 6 inches of clean compacted soil, at least 12 inches of compacted garbage, or at least 12 inches of compacted green waste.
   ix. Ensure that covering of soil on the active face is completed within one hour of the time that the soil was first dumped from a truck at the tipping area.

k. Contaminated soil shall not be used as daily, intermediate, or final cover material for landfill waste operations unless the requirements of Regulation 8, Rule 40, Sections 116 or 117 have been satisfied.

l. Contaminated soil is considered to be a decomposable solid waste pursuant to Regulation 8, Rule 34. All contaminated soil disposed of at a site shall be included in any calculations of the amount of decomposable waste in place that are necessary for annual reporting requirements or for purposes of 8-34-111 or 8-34-304.

m. The Permit Holder shall keep the following records for each lot of soil received, in order to demonstrate on-going compliance with the applicable provisions of Regulation 8, Rule 40.
   i. For all soil received by the facility (including soil with no known contamination), record the arrival date at the facility, the soil lot number, the amount of soil in the lot, the organic content or organic concentration of the lot (if known), the type of contamination (if any), and keep copies of any test data or other information that documents whether the soil is contaminated (as defined in 8-40-205) or not contaminated, with what, and by how much.
   ii. If the soil is tested for organic content after receipt by the facility, a report with the sampling date, test results, and the date results were received.
   iii. For all on-site handling of contaminated soil, use a checklist or other approved method to demonstrate that appropriate procedures were followed during all on-site handling activities. One checklist shall be completed for each day and for each soil lot (if multiple lots are handled per day).

iv. For soil aerated in accordance with 8-40-116 or 117 record the soil lot number, the amount of soil in the lot, the organic content, the final placement date, the final placement location, and describe how the soil was handled or used on-site.
v. For final disposal at a landfill, record on a daily basis the soil lot number, the amount of soil placed in the landfill, the disposal date, and the disposal location.

All records shall be retained for at least 5 years from the date of entry and shall be made available for District inspection upon request. (Basis: Regulations 8-40-301, 8-40-304 and 8-40-305)

~~17~~19. The annual report required by BAAQMD Regulation 8-34-411 shall be submitted in two semi-annual increments. The reporting periods and report submittal due dates for the semi-annual increments of the Regulation 8-34-411 report and the MSW Landfill NESHAP report, which is required pursuant to 40 CFR Part 63.1980(a), shall be synchronized with the reporting periods and report submittal due dates for the semi-annual MFR Permit monitoring reports that are required by Section I.F of the MFR Permit for this site. A single report may be submitted to satisfy the requirements of Section I.F, Regulation 8-34-411, and 40 CFR Part 63.1980(a), provided that all items required by each applicable reporting requirement are included in the single report. (Basis: Regulation 8-34-411 and 40 CFR Part 63.1980(a))

RECOMMENDATIONS:

It is recommended that an Authority to Construct be issued to Waste Management of Alameda County, Inc. for the following:

A-3: Enclosed Landfill Gas Flare; LFG Specialties Model No. EF945I12, 2,500 SCFM maximum capacity, 75 MMBTU/hr

It is also recommended that 12.151 tons of NOx offsets be provided for this application from the District's Small Facility Banking Account.

By: _____
Ted Hull
Air Quality Engineer II

Tri-Cities Recycling

Application #009790

Table 1: Increase of Abated TAC Emissions from Proposed Landfill Gas Flare A-3

Pollutant	Molecular Weight	Average Concentration (ppmv)	Pollutant in Gas Stream (lb/hr)	Abatement Efficiency (%)	Abated TAC Emissions (lb/yr)	Risk Screen Trigger (RST) (lb/yr)	TAC Emissions Above RST? (yes or no)
Acrylonitrile	53.06	*6.33*	1.044E-02	99.2%	7.32E-01	6.7E-01	yes
Benzene	78.11	0.09	2.185E-04	99.2%	1.53E-02	6.7E+00	no
Carbon Disulfide	76.13	*5.80*	1.373E-02	99.2%	9.62E-01	1.4E+04	no
Carbon Tetrachloride	153.84	*4.00E-03*	1.913E-05	98.0%	3.35E-03	4.6E+00	no
Chlorobenzene	112.56	*0.25*	8.748E-04	98.0%	1.53E-01	1.4E+04	no
Chlorodifluoromethane	86.47	*1.30*	3.495E-03	98.0%	6.12E-01	1.4E+05	no
Chloroethane	64.52	0.19	3.811E-04	98.0%	6.68E-02	1.9E+06	no
Chloroform	119.39	*3.00E-03*	1.113E-05	98.0%	1.95E-03	3.6E+01	no
1,1-Dichloroethane	98.97	0.20	6.154E-04	98.0%	1.08E-01	1.2E+02	no
1,1-Dichloroethene	96.94	*0.20*	6.027E-04	98.0%	1.06E-01	6.2E+03	no
1,2-Dichloroethane	98.96	0.41	1.261E-03	98.0%	2.21E-01	8.7E+00	no
1,4-Dichlorobenzene	147.01	*0.21*	9.598E-04	98.0%	1.68E-01	1.8E+01	no
Dichlorodifluoromethane	120.91	*15.70*	5.901E-02	98.0%	1.03E+01	1.4E+05	no
Dichlorofluoromethane	102.92	*2.62*	8.383E-03	98.0%	1.47E+00	1.4E+05	no
Ethylbenzene	106.16	5.60	1.848E-02	99.2%	1.30E+00	7.7E+04	no
Ethylene Dibromide	187.88	*1.00E-03*	5.841E-06	98.0%	1.02E-03	2.7E+00	no
Fluorotrichloromethane	137.38	*0.76*	3.246E-03	98.0%	5.69E-01	1.4E+05	no
Hexane	86.18	1.40	3.751E-03	99.2%	2.63E-01	8.3E+04	no
Hydrogen Sulfide	34.08	186.34	1.974E-01	99.7%	5.19E+00	8.1E+03	no
Isopropyl Alcohol	60.11	4.60	8.596E-03	99.2%	6.02E-01	4.4E+05	no
Methyl Ethyl Ketone	72.11	9.90	2.219E-02	99.2%	1.56E+00	1.5E+05	no
Methylene Chloride	84.94	0.39	1.030E-03	98.0%	1.80E-01	1.9E+02	no
Perchloroethylene	165.83	0.84	4.330E-03	98.0%	7.59E-01	3.3E+01	no
Toluene	92.13	20.00	5.728E-02	99.2%	4.01E+00	3.9E+04	no
1,1,1-Trichloroethane	133.41	*0.48*	1.991E-03	98.0%	3.49E-01	6.2E+04	no
1,1,2,2-Tetrachloroethane	167.85	*1.11*	5.792E-03	98.0%	1.01E+00	3.3E+00	no
Trichloroethylene	131.39	0.52	2.124E-03	98.0%	3.72E-01	9.7E+01	no
Vinyl Chloride	62.50	0.80	1.554E-03	98.0%	2.72E-01	2.5E+00	no
Xylenes	106.16	10.00	3.300E-02	99.2%	2.31E+00	5.8E+04	no

Potential Increased LFG Combustion Rate: **200** scfm

Notes:

1. Average Concentration is either based on analytical test results of landfill gas at the site or AP-42 Default Values (*shown in italics*).
2. Pollutant in Gas Stream (lb/hr) = [(Concentration/1,000,000) x MW (lb/lb-mole) x LFG(scfm) x 60(min)]/386 (scf/lb-mole)
3. Abatement Efficiencies for each class of compound were taken from AP-42 Table 2.4-3 "Control Efficiencies For LFG Constituents".

Tri-Cities Recycling

Application #009790

Table 2: Secondary HCl Emissions From Landfill Gas Combustion

Pollutant	Molecular Weight	Average Concentration (ppmv)	Moles of Cl- Produced in Combustion	Concentration of Chloride (ppmv)	Chloride in Landfill Gas (lb/hr)	Exhausted HCl Emissions (lb/hr)	Secondary HCl Emissions (lb/yr)
Bromodichloromethane	163.83	*3.13*	2.0	6.3	6.900E-03	7.107E-03	6.23E+01
Carbon Tetrachloride	153.84	*4.00E-03*	4.0	0.0	1.763E-05	1.816E-05	1.59E-01
Chlorobenzene	112.56	*0.25*	1.0	0.3	2.755E-04	2.838E-04	2.49E+00
Chlorodifluoromethane	86.47	*1.30*	1.0	1.3	1.433E-03	1.476E-03	1.29E+01
Chloroethane	64.52	1.90	1.0	1.9	2.094E-03	2.157E-03	1.89E+01
Chloroform	119.39	*0.03*	1.0	0.0	3.306E-05	3.406E-05	2.98E-01
Chloromethane	50.49	*1.21*	1.0	1.2	1.334E-03	1.374E-03	1.20E+01
Dichlorobenzene	147.00	*0.21*	2.0	0.4	4.629E-04	4.768E-04	4.18E+00
Dichlorodifluoromethane	120.91	1.70	2.0	3.4	3.747E-03	3.860E-03	3.38E+01
1,1-Dichloroethane	98.97	0.20	2.0	0.4	4.409E-04	4.541E-04	3.98E+00
1,1-Dichloroethene	96.94	*0.20*	2.0	0.4	4.409E-04	4.541E-04	3.98E+00
cis-1,2-Dichloroethene	96.95	0.97	2.0	1.9	2.138E-03	2.202E-03	1.93E+01
1,2-Dichloroethane	98.96	0.41	2.0	0.8	9.038E-04	9.309E-04	8.15E+00
Dichlorofluoromethane	102.92	*2.62*	2.0	5.2	5.775E-03	5.949E-03	5.21E+01
Fluorotrichloromethane	137.38	*0.76*	3.0	2.3	2.513E-03	2.588E-03	2.27E+01
Methylene Chloride	84.94	0.39	2.0	0.8	8.597E-04	8.855E-04	7.76E+00
Perchloroethylene	165.83	0.84	4.0	3.4	3.703E-03	3.814E-03	3.34E+01
1,1,2,2-Tetrachloroethane	167.85	*1.11*	4.0	4.4	4.894E-03	5.040E-03	4.42E+01
1,1,1-Trichloroethane	133.41	*0.48*	3.0	1.4	1.587E-03	1.635E-03	1.43E+01
Trichloroethylene	131.39	0.52	3.0	1.6	1.719E-03	1.771E-03	1.55E+01
Vinyl Chloride	62.50	0.80	2.0	1.6	1.763E-03	1.816E-03	1.59E+01
						Total HCl =	**3.88E+02**

Table 3: Secondary HBr Emissions From Landfill Gas Combustion

Pollutant	Molecular Weight	Average Concentration (ppmv)	Moles of Br- Produced in Combustion	Concentration of Bromide (ppmv)	Bromide in Landfill Gas (lb/hr)	Exhausted HBr Emissions (lb/hr)	Secondary HBr Emissions (lb/yr)
Bromodichloromethane	163.83	*3.13*	1.0	3.1	7.775E-03	7.853E-03	6.88E+01
Ethylene Dibromide	187.88	*1.00E-03*	2.0	0.0	4.968E-06	5.018E-06	4.40E-02
						Total HBr =	**6.88E+01**

Tri-Cities Recycling

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Table 4: Secondary HF Emissions From Landfill Gas Combustion

Pollutant	Molecular Weight	Average Concentration (ppmv)	Moles of F- Produced in Combustion	Concentration of Fluoride (ppmv)	Fluoride in Landfill Gas (lb/hr)	Exhausted HF Emissions (lb/hr)	Secondary HF Emissions (lb/yr)
Chlorodifluoromethane	86.47	*1.30*	1.0	1.3	7.678E-04	8.062E-04	7.06E+00
Dichlorodifluoromethane	120.91	1.70	2.0	3.4	2.008E-03	2.109E-03	1.85E+01
Dichlorofluoromethane	102.92	*2.62*	2.0	5.2	3.095E-03	3.250E-03	2.85E+01
Fluorotrichloromethane	137.38	*0.76*	3.0	2.3	1.347E-03	1.414E-03	1.24E+01
					Total HF =		**2.55E+01**

Potential Increased LFG Combustion Rate: **200** scfm

Notes:

1. Average Concentration is either based on analytical test results of landfill gas at the site or AP-42 Default Values (*shown in italics).*
2. Chloride in Landfill Gas (lb/hr) = [(Chloride Concentration/1,000,000) x 35.453 (lb/lb-mole) x LFG(scfm) x 60(min)]/386 (scf/lb-mole)
3. Bromide in Landfill Gas (lb/hr) = [(Bromide Concentration/1,000,000) x 79.904 (lb/lb-mole) x LFG(scfm) x 60(min)]/386 (scf/lb-mole)
3. Fluoride in Landfill Gas (lb/hr) = [(Fluoride Concentration/1,000,000) x 18.9984 (lb/lb-mole) x LFG(scfm) x 60(min)]/386 (scf/lb-mole)

Table 5: Secondary Organic TAC Emissions From Landfill Gas Flare

Secondary Pollutant	CATEF (Mean) Emission Factor (lb/MMcf, LFG)	Increased Emissions (lb/yr)	Risk Screen Trigger (RST) (lb/yr)	TAC Emissions Above RST? (yes or no)
Acetaldehyde	2.58E-01	2.71E+01	7.20E+01	no
Acrolein	8.44E-02	8.87E+00	3.90E+00	yes
Formaldehyde	2.95E+01	3.10E+03	3.30E+01	yes
PAH:				
Benzo(a)anthracene	2.12E-02	2.23E+00	4.40E-02	yes
Benzo(a)pyrene	2.11E-02	2.22E+00	4.40E-02	yes
Benzo(b)fluoranthene	2.11E-02	2.22E+00	4.40E-02	yes
Benzo(k)fluoranthene	2.11E-02	2.22E+00	4.40E-02	yes
Dibenz(a,h)anthracene	2.11E-02	2.22E+00	4.40E-02	yes
Indeo(1,2,3-cd)pyrene	2.11E-02	2.22E+00	4.40E-02	yes
Naphthalene	1.30E+01	1.37E+03	2.70E+02	yes

Potential Increased LFG Combustion Rate: **200** scfm

Note:

* Emissions estimates were made using factors from the CARB database of "California Air Toxics Emissions Factors" (CATEF) for Landfill Gas Fired Flare.