ENGINEERING EVALUATION
West Contra Costa Sanitary Landfill; PLANT # 1840
APPLICATION # 8514

BACKGROUND

The West Contra Costa Sanitary Landfill (WCCSL) includes an active Municipal Solid Waste Landfill (S-15), a Landfill Gas Flare (A-8), a Power Plant (three landfill gas fired engines: S-5, S-6, and S-37), Waste Water Treatment Operations (S-21 through S-33 and S-38, S-39, and S-40), and an inactive Hazardous Waste Management Facility (HWMF, S-46). This facility was initially required to have a Title V permit, because site emissions exceeded the major facility thresholds. In addition, this site is now also a designated facility pursuant to the Emission Guidelines for MSW Landfills (40 CFR Part 60 Subpart Cc), because the total deign capacity of both disposal units exceeds 2.5 MM Mg and 2.5 MM m^3. The Title V Permit was initially issued on May 29, 2002.

This application concerns the 28-acre HWMF disposal unit. The HWMF is a separate disposal unit from the active landfill (S-15), but it is located adjacent to the active landfill. The HWMF opened in 1953 and accepted a variety of MSW, construction, and industrial wastes until 1991. From 1973 through 1985, this disposal unit was designated as a Class I facility and accepted hazardous wastes. Much of the waste placed in this area is non-decomposable waste including asbestos, ash, and other metal contaminated solids. In 2000-2001, approximately 100,000 tons of MSW were added to this unit in order to bring the area up to final closure sub-grade. WCCSL estimated that the total amount of decomposable waste in the HWMF is 198,000 tons.

WCCSL is now undergoing the final closure process for the HWMF, which includes the placement of the final impermeable clay cover over the entire hazardous waste disposal unit. In order to prevent build up or migration of decomposition gases under the final cover, WCCSL is proposing to install a gas collection system in the HWMF. In order to facilitate proper characterization of the applicable requirements and emissions from this disposal unit, it was assigned a separate source number (S-46) from the main landfill (S-15).

On July 9, 2003, the District issued an Authority to Construct for the gas collection system at S-46 pursuant to Application # 2789 and subject to Condition # 20754:

S-46 Hazardous Waste Management Facility (inactive, 28 acre, hazardous waste disposal unit) with Gas Collection System (19 horizontal collectors)

Condition # 20754

For: S-46 Hazardous Waste Management Facility with Gas Collection System

1. The S-46 Hazardous Waste Management Facility (HWMF) is inactive. The Permit Holder shall apply for and receive a Change of Permit Conditions before accepting any solid waste for disposal at S-46. The total cumulative amount of all decomposable wastes placed in the HWMF shall not exceed 198,000 tons. (basis: Regulation 2-1-301)

2. The Permit Holder has been issued an Authority to Construct for 19 horizontal collectors. Specific locations, depths, and lengths of associated piping are as described in detail in Permit Application # 2789. (basis: Regulation 2-1-301)

3. Collected landfill gas shall not be vented to the atmosphere or to any control device until the Permit Holder has received an Authority to Construct for a new control device or a Change of Permit Conditions for any existing control devices

that specifically allows for the control of landfill gas collected from the HWMF. (basis: Regulation 2-1-301)

The HWMF gas collection system (19 horizontal collectors with about 8410 linear feet of collection piping) was installed in 2003, but the collectors remain capped and inoperable in accordance with Condition # 20754, Part 3. The applicant provided detailed drawings of the installed collection system (see Appendix A).

NSR Applicability Determination for S-46 HWMF

Even though the HWMF disposal unit (S-46) and the main active landfill (S-15) are located on contiguous property, these disposal units have historically been viewed has separate landfills. The S-46 HWMF was an existing source prior to the date (March 7, 1979) on which the District began requiring permits for all sources that were not explicitly excluded or exempted from the District's permit regulation. Therefore, the HWMF has been considered to be a grandfathered source. Furthermore, Regulation 2-1-113.2.16 states that closed landfills that have less than 1,000,000 tons of decomposable solid waste in place and that do not have an operating landfill gas collection system are exempt from District permitting requirements. When considered as a separate landfill, S-46 currently meets the requirements of Regulation 2-1-113.2.16 because it has only about 0.2 million tons of decomposable waste in place and does not have an operating landfill gas collection system. Therefore, S-46 (when considered to be a separate landfill from S-15) currently qualifies for exemption from permit requirements. WCCSL has installed a landfill gas collection system at S-46 and will begin operating this collection system upon installation of the proposed A-11 Landfill Gas Flare. S-46 will loose the Regulation 2-1-113.2.16 exemption from permit requirements upon beginning operation of the landfill gas collection system. Any source that looses its exemption from permit requirements is not subject to New Source Review (NSR) pursuant to Regulation 2-1-232.

While the HWMF disposal unit and active landfill unit have been treated as separate sources in the past, these disposal units should be considered to be one single disposal site or one single MSW landfill for determining the applicability of the requirements of Regulation 8, Rule 34 and the federal Emission Guidelines for MSW Landfills (EG) in accordance with the definitions of Solid Waste Disposal Site in Regulation 8-34-201 and MSW Landfill in 40 CFR 60.751. In accordance with the requirements of Regulation 8-34-304 and the federal EG, collection and control of landfill gas is required for all productive areas of a solid waste disposal site or MSW landfill. Prior to the 2000/2001 MSW placement event at the HWMF, the NMOC emissions from the HWMF were very low compared to the total NMOC emissions from the entire solid waste disposal site. The HWMF was considered to be a non-productive area. Consequently, this area was not required to have a landfill gas collection system by either Regulation 8, Rule 34 or the federal EG.

After the 2000/2001 MSW placement event, the NMOC emissions from the HWMF were no longer less than 1% of the total NMOC emissions from the entire disposal facility. The HWMF is now required to have landfill gas collection and control systems installed and operational pursuant to Regulation 8-34-304.1. When the HWMF and active landfill are viewed as a single unit, the installation of a landfill gas collection system in the HWMF area does not create any new emissions. In order to clarify that the HWMF gas collection and control systems will operate independently of the systems for S-15, the HWMF will be assigned a separate source number (S-46), but the landfill design capacity limits in the conditions for S-15 will continue to apply to the entire disposal facility (S-15 and S-46). The entire facility is permitted to accept up to 10.92 million tons of decomposable waste. This limit will not be changed, and there will be no emission increases at the solid waste disposal facility. Therefore, NSR does not apply to the uncontrolled fugitive emissions from the area designated as S-46.

In either of the cases discussed above – viewing S-46 as a separate individual landfill or viewing S-46 as a subset of the entire disposal facility (S-15 plus S-46) – the uncontrolled fugitive emissions from the S-46 HWMF disposal unit are not subject to NSR. Therefore S-46 will be handled like a loss of exemption source. The emissions from S-46 will be calculated and

appropriate emission factors will be entered into the databank, but these emissions will not be subject to the BACT, Offset, or PSD requirements of Regulation 2, Rule 2, New Source Review.

NSR Applicability Determination for A-11 Landfill Gas Flare for HWMF

This application is for an Authority to Construct and Permit to Operate for an enclosed Landfill Gas Flare (A-11) that will control the collected landfill gas from the HWMF. The proposed flare is an older unit that will be moved to this facility from another site. The proposed unit is described below:

A-11 Landfill Gas Flare for HWMF, Perennial Energy Inc., Model # F-58-16-E, enclosed flare, 4.8 feet diameter by 16 feet high, 5.25 MM BTU/hour, 175 cfm of landfill gas at 500 BTU/scf; equipped with one blower, Aerovent, Model # 560-200-20HPBD3450-20, 20 hp, 3520 rpm; abating S-46 Hazardous Waste Management Facility with Gas Collection System.

The A-11 flare is considered to be a new source pursuant to the definition in Regulation 2-1-232. Therefore, A-11 is subject to Regulation 2, Rule 2, New Source Review. As discussed above, this flare is required in order meet the control system requirements of Regulation 8, Rule 34. Flares complying with Regulation 8-34-301.3 are considered to be Best Available Retrofit Control Technology (BARCT) for POC emissions from landfills. Since the A-11 flare will meet BARCT for POC emissions from the landfill, the emissions of secondary pollutants (NO_x, CO, SO_2, and PM_{10}) are subject to Reasonably Available Control Technology (RACT) requirements instead of Best Available Control Technology (BACT) requirements pursuant to Regulation 2-2-112. The offset requirements of Regulation 2-2-302 will continue to apply to POC and NO_x emissions from A-11.

EMISSIONS

Although the disposal history for decomposable waste in the HWMF is not well known, WCCSL originally estimated that this area contained 198,000 tons of decomposable waste, with 98,000 tons placed between 1953 and 1985 and 100,000 tons of MSW placed in 2000/2001. In the current permit application, the consultant based the gas generation rate calculations on the following waste placement history: 151,000 tons placed between 1955 and 1966 and 59,700 tons placed between 2000 and 2002. Since WCCSL's original waste placement history results in the highest estimate of gas generation, it will be used for these calculations.

The procedures described in AP-42 Chapter 2.4 were used to determine uncontrolled emissions from the S-46 HWMF. Equation 1 on page 2.4-3 of AP-42 was used to estimate the maximum gas generation rate from the decomposable waste using the AP-42 default input values for L_0 (100 m^3/Mg) and k (0.04 $year^{-1}$). The maximum landfill gas generation rate occurred in 2002 and was estimated to be 60 scfm of landfill gas containing 50% methane. About 77% of this gas was generated from the recently placed MSW. Since waste deposition has ceased, gas generation rates at the HWMF will decline from this maximum rate. Detailed calculations are attached in Appendix B.

WCCSL tested 10 probe wells in June 2002. Methane content ranged from 1.5% to 87%, with an average of 69% (excluding the one well at 1.5%). Additional gas samples were collected from representative wells in October 2002 for toxic component characterization. A detailed analysis of these gas characterization tests is attached. For many compounds, the measured concentrations were similar to AP-42 default concentrations. However, the concentrations of several chlorinated compounds (vinyl chloride, ethyl chloride, and trichlorofluoromethane) were more than 10 times the AP-42 concentrations. Although no contaminants were detected in the method blanks, the test report indicated a QC problem with the vinyl chloride data and stated that the vinyl chloride data may not be accurate. Except for the possible inaccuracy of the vinyl chloride data, the HWMF gas data is expected to be more representative of the gas content than

AP-42 concentration data or data for the main active landfill. Therefore, the HWMF gas data will be used to calculate maximum POC, NPOC, and toxic emissions for this project.

HWMF Emissions (S-46)

Maximum amount of non-methane organic compounds (NMOC) that is generated by the S-46 disposal area was determined to be 11,476 pounds/year (5.738 tons/year) of NMOC. About 97% of this NMOC is precursor organic compounds (POC) and 3% is non-precursor organic compounds (NPOC). The collection system is assumed to collect a minimum of 75% of the generated NMOC. The remaining 25% of the generated NMOC will be emitted as fugitive emissions from S-46. The maximum fugitive emissions from S-46 are summarized in Table 1 below. Detailed calculations are presented in Appendix B. As discussed above in the NSR Applicability Determination for S-46, these emissions are not subject to NSR and will not be included in the plant cumulative emission increases for this site.

Table 1

Summary of Emissions and Emission Factors for S-46 HWMF with Landfill Gas Collection System

	Max. Conc. In HWMF Gas ppmv	Max. Fugitive Emissions pounds/year	Databank Pollutant Code	Emission Factor pounds/ton
Hydrogen Sulfide	27.7	19.1	**5020**	**9.64E-05**
1,1 Dichloroethane (ethylidene dichloride)	8.8	17.6	**314**	**8.90E-05**
1,1 Dichloroethene (vinylidene chloride)	1.5	2.9	**360**	**1.49E-05**
1,1,1 Trichloroethane	2.2	5.9	**565**	**3.00E-05**
1,2 Dichloroethene (cis and trans)	1.4	2.7	370	1.39E-05
1,4 Dichlorobenzene	0.3	0.9	**528**	**4.51E-06**
2 Butanone (methyl ethyl ketone)	2.3	3.4	**169**	**1.69E-05**
Benzene	4.4	7.0	**41**	**3.51E-05**
Chloroethane (ethyl chloride)	26.2	34.2	**449**	**1.73E-04**
Chloromethane (methyl chloride)	3.1	3.2	**730**	**1.60E-05**
Ethyl Benzene	3.6	7.7	**333**	**3.90E-05**
Methyl tert-Butyl Ether	1.4	2.5	**628**	**1.26E-05**
Methylene Chloride	10.1	17.4	**396**	**8.76E-05**
Tetrachloroethene (perchloroethylene)	1.5	5.0	**210**	**2.54E-05**
Toluene	8.8	16.4	**293**	**8.28E-05**
Trichloroethene	1.6	4.3	**295**	**2.15E-05**
Trichlorofluoromethane	8.7	24.2	631	1.22E-04
Trichlorotrifluoroethane	6.5	23.1	480	1.16E-04
Vinyl Chloride	90.4	114.3	**518**	**5.77E-04**
Xylenes (o,m,p)	3.4	7.3	**307**	**3.69E-05**
Sum of Identified NMOC		299.9		
Total Unidentified NMOC		2569.0	**989**	**1.30E-02**
Total NMOC (as CH4)	8840	2868.9		
Total NPOC (as CH4) from LFG data	233	75.6		
Total POC (as CH4) from LFG data	8607	2793.3		

Throughput Basis for Emission Factors: 198,000 tons of decomposable waste in place

Due to databank space limitations, only 20 pollutant codes may be entered. Emission factors in bold will be entered in the databank. The other non-bold factors are not significant, because the compounds are not HAPs and have either no risk screen trigger levels or very high trigger levels (>100,000 pounds/year).

Flare Emissions (A-11)

All collected landfill gas will be vented to the A-11 Landfill Gas Flare for HWMF. For these calculations, the maximum permitted flare emissions are based on the maximum combustion capacity of the flare: 252 M scf/Day and 91,980 M scf/Year of landfill gas at 500 BTU/scf (about 50% methane). However, the actual flow rate to the flare is only expected to be about 34% of this maximum permitted rate. The calculation bases for the emission factors are discussed below for each type of pollutant. The emission factors and emission rates are summarized in Table 2 for Criteria Pollutants and Table 3 for Toxic Pollutants.

Precursor Organic Compound (POC) Emissions:
In order for the flare to comply with Regulation 8-34-301.3, the flare will be required to achieve at least 98% destruction of NMOC. Alternatively, the flare may also comply with Regulation 8-34-301.3 by emitting no more than 30 ppmv of NMOC expressed as methane at 3% oxygen. Both cases were evaluated. Maximum POC emissions occur when the flare is emitting NMOC at the 30 ppmv concentration limit and all NMOC is assumed to be POC.

Toxic Organic Compound Emissions:
For individual toxic compounds, emissions are based on the maximum measured concentration in the HWMF landfill gas and the appropriate destruction efficiency achieved by the flare. This flare is assumed to achieve at least 85% destruction efficiency for any individual toxic organic compound (excluding hydrogen sulfide). This assumption is based on an older version of AP-42 Chapter 2.4, which listed destruction efficiencies for many individual compounds. The destruction efficiencies were at least 85% for each of the compounds listed in Table 1.

Non-Precursor Organic Compound Emissions:
Analyses of the HWMF landfill gas indicate that it contains five non-precursor organic compounds (NPOC): 1,1,1 trichloroethane, methylene chloride, perchloroethylene, trichlorofluoromethane, and trichlorotrifluoroethane. Maximum NPOC emissions are equal to the sum of the abated emission rates for these compounds, which are also toxic organic compounds (see methodology above).

Hydrogen Sulfide Emissions:
Since hydrogen sulfide (H_2S) is easily oxidized to sulfur dioxide and water, the flare is assumed to achieve at least 98% destruction efficiency for H_2S.

Nitrogen Oxide and Carbon Monoxide Emissions:
The applicant indicated that this flare would comply with the District's RACT emission limits for nitrogen oxide (NO_x) and carbon monoxide (CO) emissions from enclosed landfill gas flares. These limits are 0.06 pounds NO_x per MM BTU and 0.30 pounds of CO per MM BTU. The landfill gas heat content is assumed to be 500 BTU/scf at 70 °F.

Particulate Matter Emissions:
Particulate matter emissions are based on the AP-42 emission rate for flares of 17 pounds per MM scf of methane (at 68 °F) listed on page 2.4-15 of AP-42, Chapter 2.4, fifth edition. The methane heat content of 1013 BTU/scf at 60 °F and 1 atm was used to convert this factor to pounds/MM BTU. The landfill gas heat content is assumed to be 500 BTU/scf at 70 °F.

Sulfur Dioxide Emissions:
The landfill gas is assumed to contain a maximum 150 ppmv of total reduced sulfur compounds (TRS) expressed as H_2S. Meeting this concentration level is generally considered RACT for sulfur dioxide emissions from landfill gas flares. BAAQMD data indicates that the landfill gas from most Bay Area landfills contains less than 150 ppmv of TRS. Testing at this site found 70 ppmv of TRS expressed as H_2S. Therefore, this site is expected to comply with a concentration limit of 150 ppmv of TRS expressed as H_2S. To determine the maximum sulfur dioxide (SO_2) emissions, the District assumes that 100% of the sulfur in the gas is converted to SO_2.

Hydrogen Chloride Emissions:

The maximum concentrations of chlorinated compounds detected in the HWMF landfill gas were used to determine the maximum chlorine ion concentration of 226.9 ppmv. To determine the maximum hydrogen chloride (HCl) emissions, the District assumes that 100% of the chlorine ion in the gas is converted to HCl.

Table 2. Criteria Pollutant Emissions From A-11 Landfill Gas Flare for HWMF

	Basis for Emission Factor	Emission Factor (after control)	Maximum Flare Emissions	Maximum Flare Emissions	Cumulative Emission Increases
	lbs/MM BTU	pounds/M scf	pounds/day	pounds/year	tons/year
NO_x (at RACT limit)	0.060	0.0298	7.51	2742.5	1.371
CO (at RACT limit)	0.300	0.1491	37.57	13712.7	6.856
PM_{10} (at AP-42 factor)	0.017	0.0085	2.13	778.9	0.389
POC, expressed as CH_4, (at 8-34-301.3 flare exhaust limit: 30 ppmv as CH_4 at 3% O_2)	0.014	6.93 E-3	1.75	637.5	0.319
	ppmv in LFG	pounds/M scf	pounds/day	pounds/year	tons/year
SO_2 (at RACT limit)	150	2.48 E-2	6.26	2283.7	1.142
NPOC, expressed as CH_4, (from LFG concentration data)	233	1.45 E-3	0.07	133.2	0.067

Table 3. Toxic Pollutant Emissions From A-11 Landfill Gas Flare for HWMF

	Max. Conc. In HWMF LFG	Emission Factor (after control)	Maximum Flare Emissions	Risk Screen Trigger Levels	Emissions > Triggers ?
Compounds Detected in HWMF Landfill Gas	ppmv	pounds/M scf	pounds/year	pounds/year	
Hydrogen Sulfide	27.7	4.88 E-5	4.5	8100	
1,1 Dichloroethane (ethylidene dichloride)	8.8	3.38 E-4	31.0	120	
1,1 Dichloroethene (vinylidene chloride)	1.5	5.64 E-5	5.2	6200	
1,1,1 Trichloroethane	2.2	1.14 E-4	10.5	62000	
1,2 Dichloroethene (cis and trans)	1.4	5.27 E-5	4.8	N/A	
1,4 Dichlorobenzene	0.3	1.71 E-5	1.6	18	
2 Butanone (methyl ethyl ketone)	2.3	6.44 E-5	5.9	150000	
Benzene	4.4	1.33 E-4	12.3	6.7	YES
Chloroethane (ethyl chloride)	26.2	6.56 E-4	60.3	1900000	
Chloromethane (methyl chloride)	3.1	6.06 E-5	5.6	N/A	
Ethyl Benzene	3.6	1.48 E-4	13.6	N/A	
Methyl tert-Butyl Ether	1.4	4.79 E-5	4.4	N/A	
Methylene Chloride	10.1	3.33 E-4	30.6	190	
Tetrachloroethene (perchloroethylene)	1.5	9.65 E-5	8.9	33	
Toluene	8.8	3.15 E-4	28.9	39000	
Trichloroethene	1.6	8.15 E-5	7.5	97	
Trichlorofluoromethane	8.7	4.64 E-4	42.6	140000	
Trichlorotrifluoroethane	6.5	4.43 E-4	40.6	140000	
Vinyl Chloride	90.4	2.19 E-3	201.4	2.5	YES
Xylenes (o,m,p)	3.4	1.40 E-4	12.9	58000	
Secondary Combustion Emissions	ppmv of Cl^-	lbs HCl/M scf	pounds/year	pounds/year	
Hydrogen Chloride (HCl)	226.9	2.14 E-2	1966.2	1400	YES

Compounds in **bold** are HAPs. Compounds in *italics* are NPOCs.

PLANT CUMULATIVE INCREASE

As discussed in the background section, S-46 is not subject to new source review. Therefore, the emissions from S-46 are not included in the plant cumulative emission increase inventory. The emission increases in Table 4 below are from A-11 only.

Facility-wide emissions (including S-46 and A-11) will be 23.0 tons/year of NOx and 70.0 tons/year of total organic compounds. Most of the organic compound emissions are fugitive emissions from the S-15 Landfill (66.74 tons of organic compounds, which includes both POC and NPOC). The NPOC compounds include ethane, acetone, perchloroethylene, methylene chloride, 1,1,1 TCA, CFC's, and HCFC's. For NPOC's that have been speciated, the total facility emissions are 1.65 tons/year. Ethane and acetone have not been speciated. From AP-42, landfill gas contains 7.01 ppmv of acetone and 889 ppmv of ethane. However, data from a few Bay Area landfills indicates that landfill gas contains much lower levels of ethane (<200 ppmv). Using the Bay Area ethane data, acetone and ethane account for about 12.5% (8.5 tons/year) of the total organic compound emissions from landfills. Total NPOC emissions from this facility are about 10.15 tons/year and POC emissions are about 59.85 tons/year. Since NOx and POC emissions will exceed 15 tons/year, offsets are required. Since POC emissions exceed 50 tons/year, this facility is responsible for providing any required POC offsets. The small facility banking account may be used to provide any required NOx offsets.

Application # 27193 involved the replacement of an IC Engine (S-37 replaced S-4) and resulted in the excess contemporaneous on-site emission reductions listed in Table 4 below. Since The S-4 IC engine was shut down in August 1999, these credits are valid for 5 years, until August 2004. The total of the current inventory plus Application # 8541 increases minus the excess contemporaneous on-site emission reduction credits from Application # 27193 is less than 0. Therefore no additional offsets are required for Application # 8541.

Table 4. Plant Cumulative Emission Increase Inventory Changes

	Current Inventory Total for Post 4-5-91 Applications* Tons/Year	Application # 8541 Emission Increases Tons/Year	Excess Contemporaneous On-Site Emission Reduction Credits from Application # 27193 Tons/Year	Offsets (none are required) Tons/Year	New Inventory Total Tons/Year
NO_x	0.000	1.371	-10.166	0.000	0.000
CO	0.000	6.856	-0.478		6.378
PM_{10}	0.040	0.389			0.429
SO_2	2.952	1.142			4.094
POC	1.727	0.319	-3.738	0.000	0.000
NPOC	0.000	0.067			0.067

* The Authorities to Construct that were issued pursuant to Applications # 2788 and # 2952 have expired without use and the applications have been cancelled. Since the ATC's were never used, the emission increases from these applications will be deleted from the cumulative increase inventory and the NOx offsets will be returned to the small facility banking account. The current inventory total does not include emissions from these cancelled applications.

STATEMENT OF COMPLIANCE

CEQA Requirements (Regulation 2, Rule 1):

The Engineering Evaluation for the Hazardous Waste Management Facility with Gas Collection System (S-46) uses fixed standards and objective measurements and does not involve any element of discretion. In accordance with District Permit Handbook Chapters 11.9

"Miscellaneous Organic Operations", the approval of the Permit to Operate for S-46 is considered ministerial. In addition, this action is categorically exempt from CEQA review pursuant to Regulation 2-1-312.4 because this action is due to a loss of exemption. The issuance of an Authority to Construct for the A-11 Flare is also categorically exempt from CEQA review pursuant to Regulation 2-1-312.2, because the flare is an abatement device. Therefore, no further CEQA review is required for this application.

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.

New Source Review (Regulation 2, Rule 2):

As discussed in the background section, S-46 is not subject to Regulation 2, Rule 2. The A-11 Landfill Gas Flare for HWMF is subject to Regulation 2, Rule 2.

BACT: The emissions of POC and NPOC from the A-11 Flare will each be less than 10 pounds per highest day. Therefore BACT is not required for these pollutants. The emissions of secondary pollutants (NOx, CO, SO_2, and PM_{10}) from A-11 are exempt from BACT requirements pursuant to Regulation 2-2-112, because A-11 is required in order to achieve BARCT for emissions of POC and NPOC from the S-46 HWMF.

RACT: The applicant indicated that the A-11 Flare would comply with the RACT limits of 0.06 pounds of NO_x per MM BTU and 0.30 pounds of CO per MM BTU. The emission limits for the flare are based on these RACT levels. The landfill gas at this facility is expected to contain no more than 150 ppmv of total reduced sulfur compounds, which is considered RACT for SO_2 emissions. This flare is equipped with a fuel filter and a condenser to remove particulate matter and water from the landfill gas prior to combustion. Such fuel pretreatment systems are considered RACT for PM_{10} emissions from landfill gas flares. Although the flare is expected to comply with RACT for each secondary pollutant, RACT is not required for NO_x, SO_2, and PM_{10} because the emissions of these pollutants are each less than 10 pounds/day. RACT is required for CO emissions and the flare is complying with RACT for CO.

Offsets: As discussed in the Plant Cumulative Increase section, this facility is subject to offset requirements for NO_x and POC, because facility-wide NO_x and POC emissions will exceed 15 tons/year. However, offsets are not required for this application because the excess contemporaneous on-site emission reduction credits from Application # 27193 exceed the cumulative emission increases for Application # 8514.

PSD: This facility is not major for any pollutants; therefore, the PSD requirements (Regulations 2-2-304, 305, 306, 308, and 309) do not apply.

MACT: Total HAP emissions from this facility were determined to be less than 25 tons/year with no single HAP emissions exceeding 10 tons/year. Therefore, this facility is not major for HAPs and Regulation 2-2-317 does not apply.

New Source Review (Toxic Risk Management Policy):

Related applications are any applications for new and modified equipment that were approved within the two years prior to the current application. Related applications are:

- Application # 2417 for the approval of the collection and control system design plan (no emission increases)
- Application # 2789 for the approval of the S-46 HWMF gas collection and control system (no emission increases because S-46 is being treated as a loss of exemption)
- Application # 8366 for an Authority to Construct for gas collection system modifications at the S-15 active landfill (no emission increases)

Since none of these applications resulted in emission increases, there are no related projects that must be included in the Toxics NSR review.

For the current application, maximum emissions of benzene, vinyl chloride, and hydrogen chloride from the A-11 Landfill Gas Flare will exceed the risk screen trigger levels. Therefore, a risk screening analysis is required for this project. A risk screening analysis was conducted using ISCST3 with meteorological data from the Chevron Refinery Met-Station.

The risk screen determined that the maximum incremental cancer risks were 0.11 in a million to the nearest residential receptor and 0.02 in a million to the nearest industrial receptor. The maximum hazard index at either a residential or industrial receptor was 0.002. Since the maximum cancer risks are less than 1 in a million and the hazard index is less than 1, this project complies with the District's Toxic Risk Management Policy as proposed. Best Available Control Technology for toxics (TBACT) is not required. The detailed risk screen report is provided in Appendix C.

Major Facility Review (Regulation 2, Rule 6):

A Title V Permit has been issued for this facility. The addition of S-46, A-11, and Condition # 20754 will require a minor modification of the Title V permit. The necessary Title V permit modifications will be proposed under this permit application in a separate document. This evaluation report serves as the statement of basis for this minor MFR permit revision.

Applicable District Requirements (Regulation 8, Rule 34):

The HWMF is a Class I Hazardous Waste Disposal Unit. The Regulation 8-34-201 definition of Solid Waste Disposal Site applies to all contiguous disposal units for non-hazardous or designated waste, but generally excludes disposal units for hazardous waste. (This definition was intended to be consistent with EPA's definitions in the MSW Landfill NSPS/EG.) However, the addition of MSW to a hazardous waste disposal area makes this area a contiguous disposal unit for non-hazardous waste. On March 7, 2003, Mr. John Brock from EPA, Region IX, sent an email response stating that EPA believes that this HWMF is now subject to the federal Emission guidelines due to the disposal of MSW in this area during 2000 and 2001.

WCCSL is expected to comply with Regulation 8, Rule 34 by installing a landfill gas collection system and venting the landfill gas collection system to the A-11 Landfill Gas Flare, which will achieve at least 98% control of NMOC.

Federal Requirements:

NSPS/EG: As of 2000 (when MSW was added to the HWMF) the HWMF became subject to the Emission Guidelines. Compliance with Regulation 8, Rule 34 will ensure compliance with the EG.

NESHAPS: There are no NESHAPS requirements currently applicable to the HWMF. The MSW Landfill NESHAP applies to this entire facility as of January 16, 2004. The permit holder is expected to prepare and maintain on-site the required Start-up, Shut-down, Malfunction Plan for the HWMF gas collection system and A-11 flare.

PERMIT CONDITIONS

The following permit condition revisions are proposed in order to ensure proper operation of the A-11 Landfill Gas Flare.

Condition # 20754

For: S-46 Hazardous Waste Management Facility with Gas Collection System and A-11 Landfill Gas Flare for HWMF

1. The S-46 Hazardous Waste Management Facility (HWMF) is inactive. The Permit Holder shall apply for and receive a Change of Permit Conditions before accepting any solid waste for disposal at S-46. The total cumulative amount of all decomposable wastes placed in the HWMF shall not exceed ~~198,000~~210,700 tons. (~~b~~Basis: Regulation 2-1-301)

2. The Permit Holder has been issued an Authority to Construct for 19 horizontal collectors. Specific locations, depths, and lengths of associated piping are as described in detail in Permit Application # 2789. The Permit Holder shall apply for and receive an Authority to Construct before modifying this gas collection system. Increasing or decreasing the number of wells or collectors, or significantly changing the length of collectors, or the locations of wells or collectors are all considered to be modifications that are subject to the Authority to Construct requirement. Upon start-up of the A-11 Landfill Gas Flare, this gas collection system shall be operated continuously. Wells shall not be shut off, disconnected or removed from operation 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. (~~b~~Basis: Regulations 2-1-301 and 8-34-301.1)

3. Upon start-up of A-11, all ~~C~~collected landfill gas shall be vented to the properly operating A-11 Landfill Gas Flare. Raw landfill gas shall not be vented to the atmosphere~~ or to any control device until the Permit Holder has received an Authority to Construct for a new control device or a Change of Permit Conditions for any existing control devices that specifically allows for the control of landfill gas collected from the HWMF~~, except for unavoidable landfill gas emissions that occur during collection system installation, maintenance, or repair that is performed in compliance with Regulation 8, Rule 34, Sections 113, 116, 117, or 118 and for inadvertent component or surface leaks that do not exceed the limits specified in 8-34-301.2 or 8-34-303. (~~b~~Basis: Regulations 2-1-301 and 8-34-301)

4. The combustion zone temperature of the A-11 Landfill Gas Flare shall be maintained at a minimum of 1400 degrees Fahrenheit, 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: Toxic Risk Management Policy and Regulation 8-34-301.3)

5. Nitrogen Oxide (NOx) emissions from A-11 shall not exceed 0.06 pounds of NOx (calculated as NO2) per million BTU. The Permit Holder may demonstrate compliance with this emission rate limit by having a nitrogen oxide concentration in the flare exhaust of no more than 15 ppmv of NOx, corrected to 15% oxygen, dry basis. (Basis: RACT and Cumulative Increase)

6. Carbon Monoxide (CO) emissions from A-11 shall not exceed 0.30 pounds of CO per million BTU. The Permit Holder may demonstrate compliance with this emission rate limit by having a carbon monoxide concentration in the flare exhaust of no more than 122 ppmv of CO, corrected to 15% oxygen, dry basis. (Basis: RACT and Cumulative Increase)

7. The concentration of total reduced sulfur compounds in the landfill gas vented to A-11 shall not exceed 150 ppmv, expressed as H_2S, dry basis. (Basis: RACT and Cumulative Increase)

8. In order, to demonstrate compliance with Regulation 8, Rule 34, Sections 301.3 and 412 and Parts 5 and 6 above, the Permit Holder shall ensure that a District approved source test is conducted on the A-11 Landfill Gas Flare, within 60 days of initial start-up of A-11 and annually thereafter. As a minimum, the source tests shall determine the following:
   a. landfill gas flow rate to the flare (dry basis);
   b. concentrations (dry basis) of carbon dioxide (CO_2), nitrogen (N_2), oxygen (O_2), 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 NO_x, CO, NMOC, and O_2 in the flare stack gas;
   e. NMOC destruction efficiency achieved by the flare; and
   f. the average combustion temperature in the flare during the test period.

   The Source Test Section of the District shall be contacted to obtain their 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 of the test date.
   (Basis: Regulations 8-34-301.3 and 8-34-412, RACT, and Cumulative Increase)

9. The Permit Holder shall conduct a characterization of the landfill gas concurrent with the annual source test required by Part 8 above. The landfill gas sample shall be drawn from the HWMF landfill gas header. In addition to the compounds listed in part 8b, the landfill gas shall be analyzed for all the organic compounds and sulfur compounds listed below. All concentrations shall be reported on a dry basis. The test report shall be submitted to the Compliance and Enforcement Division within 45 days of the test date. (Basis: Toxic Risk Management Policy, AB-2588 Air Toxics Hot Spots Act, and Regulations 8-34-412 and 9-1-302)

Organic Compounds	Organic Compounds
acrylonitrile	ethylbenzene
benzene	ethylene dibromide
benzyl chloride	fluorotrichloromethane
carbon tetrachloride	hexane
chlorobenzene	isopropyl alcohol
chlorodifluoromethane	methyl ethyl ketone
chloroethane	methylene chloride
chloroform	perchloroethylene
1,1 dichloroethane	toluene
1,1 dichlorethene	1,1,1 trichloroethane
1,2 dichloroethane	1,1,2,2 tetrachloroethane
1,4 dichlorobenzene	trichloroethylene
dichlorodifluoromethane	vinyl chloride
dichlorofluoromethane	xylenes

Sulfur Compounds
hydrogen sulfide
carbon disulfide
carbonyl sulfide
dimethyl sulfide
ethyl mercaptan
methyl mercaptan

*10. If the concentrations (dry basis) of toxic air contaminants in the collected landfill gas exceed any of the limits listed below, the Permit Holder shall submit a permit application for a Change of Permit Conditions within 30 days of receiving the test results.

Acrylonitrile	=	6.3 ppmv
Benzene	=	4.4 ppmv
Vinyl Chloride	=	90.4 ppmv

(Basis: Toxic Risk Management Policy and AB-2588 Air Toxics Hot Spots Act)

11. In order to demonstrate compliance with the above conditions, the Permit Holder shall maintain the following records in a District approved logbook.
   a. record the initial start-up date for each collector in the HWMF collection system,
   b. record the initial start-up date for the A-11 Landfill Gas Flare,
   c. record the dates, times, durations, and reasons for each shut-down of (i) an individual collector, (ii) the entire collection system, or (iii) the A-11 Flare.
   d. maintain records of the test dates and the test results for any tests conducted to demonstrate compliance with these permit conditions.

   (Basis: Regulations 2-1-301, 8-34-501, and 2-6-501)

12. The annual report for the S-46 HWMF, which is required by BAAQMD Regulation 8-34-411 and 40 CFR Part 63.1980(a), shall be combined with the annual report for the S-15 Landfill and shall be submitted in accordance with the schedule identified in Condition # 17821, Part 15. (Basis: Regulation 8-34-411 and 40 CFR Part 63.1980(a))

RECOMMENDATION

Issue an Authority to Construct for the following equipment:

A-11 **Landfill Gas Flare for HWMF,** Perennial Energy Inc., Model # F-58-16-E, enclosed flare, 4.8 feet diameter by 16 feet high, 5.25 MM BTU/hour, 175 cfm of landfill gas at 500 BTU/scf; equipped with one blower, Aerovent, Model # 560-200-20HPBD3450-20, 20 hp, 3520 rpm; abating S-46 Hazardous Waste Management Facility with Landfill Gas Collection System.

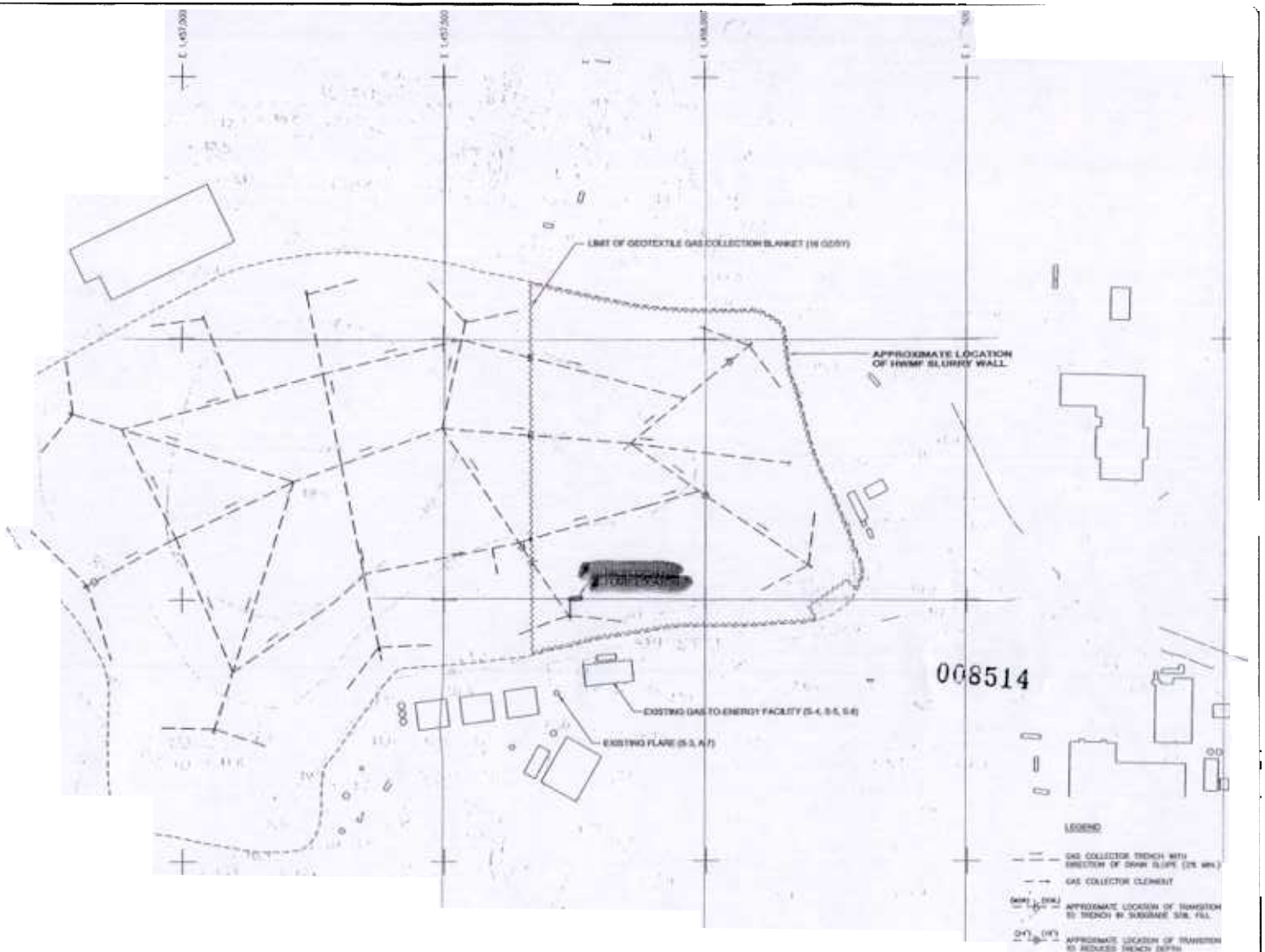
Issue a Change of Conditions for the following equipment:

S-46 **Hazardous Waste Management Facility with Gas Collection System**; abated by A-11 Landfill Gas Flare for HWMF.

By: Carol S. Allen June 18, 2004
Senior Air Quality Engineer Date

APPENDIX A

HWMF Gas Collection System Drawings



Topographic base compiled using photogrammetric methods by Carlwrigh
Date of photography: May 20, 2002
HWMI area revised September 2003.

SCALE
0 100 200 FEET

FOR PERMITTING ONLY

REV	DATE	DESCRIPTION	DRN BY	DES BY	CHK BY	APP BY

DATE OF ISSUE OCT. 2003
DRN BY KAB
DES BY SN
CHK BY APW
APP BY

Shaw EMCON/OWT, Inc.

WEST COUNTY LANDFILL, INC.
WEST CONTRA COSTA SANITARY LANDFILL
RICHMOND, CALIFORNIA
HAZARDOUS WASTE MANAGEMENT FACILITY
GAS COLLECTION AND CONTROL SYSTEM
SITE PLAN

DRAWING NO. 1
PROJECT NO. 354-001.059

APPENDIX B

Emission Calculations

TABLE 1

Summary of Emissions and Emission Factors for S-46 HWMF with Landfill Gas Collection System

	Max. Conc. In HWMF Gas ppmv	Max. Fugitive Emissions pounds/year	Databank Pollutant Code	Emission Factor pounds/ton
Hydrogen Sulfide	27.7	19.1	**5020**	**9.64E-05**
1,1 Dichloroethane (ethylidene dichloride)	8.8	17.6	**314**	**8.90E-05**
1,1 Dichloroethene (vinylidene chloride)	1.5	2.9	**360**	**1.49E-05**
1,1,1 Trichloroethane	2.2	5.9	**565**	**3.00E-05**
1,2 Dichloroethene (cis and trans)	1.4	2.7	370	1.39E-05
1,4 Dichlorobenzene	0.3	0.9	**528**	**4.51E-06**
2 Butanone (methyl ethyl ketone)	2.3	3.4	**169**	**1.69E-05**
Benzene	4.4	7.0	**41**	**3.51E-05**
Chloroethane (ethyl chloride)	26.2	34.2	**449**	**1.73E-04**
Chloromethane (methyl chloride)	3.1	3.2	**730**	**1.60E-05**
Ethyl Benzene	3.6	7.7	**333**	**3.90E-05**
Methyl tert-Butyl Ether	1.4	2.5	**628**	**1.26E-05**
Methylene Chloride	10.1	17.4	**396**	**8.76E-05**
Tetrachloroethene (perchloroethylene)	1.5	5.0	**210**	**2.54E-05**
Toluene	8.8	16.4	**293**	**8.28E-05**
Trichloroethene	1.6	4.3	**295**	**2.15E-05**
Trichlorofluoromethane	8.7	24.2	631	1.22E-04
Trichlorotrifluoroethane	6.5	23.1	480	1.16E-04
Vinyl Chloride	90.4	114.3	**518**	**5.77E-04**
Xylenes (o,m,p)	3.4	7.3	**307**	**3.69E-05**
Sum of Identified NMOC		299.9		
Total Unidentified NMOC		2569.0	**989**	**1.30E-02**
Total NMOC (as CH4)	8840	2868.9		
Total NPOC (as CH4) from LFG data	233	75.6		
Total POC (as CH4) from LFG data	8607	2793.3		

Throughput Basis for Emission Factors: 198000 tons of decomposable waste in place
Due to databank space limitations, only 20 pollutant codes may be entered. Bold values will be used. The other non-bold compounds are not significant, because they have no risk screen trigger levels or very high trigger levels (>100,000 pounds/year) and are not HAPs.

Application # 8514 at Plant # 1840: Emissions from HWMF and A-11 Landfill Gas Flare

Maximum Landfill Gas Generation Rate

Refuse Placement Dates	Waste Placed	LFG Generation in 2002 *	
years	tons	m^3/yr	scfm
1953-1985	98000	203234	13.66
2000-2001	100000	683529	45.93
TOTAL	198000	886763	59.58
Maximum Landfill Gas Generation Rate		**31316**	**M scf/year**

* For each group of dates, the methane generation rate (Q_{CH4}) was calculated using Equation 1 on page 2.4-3 of AP-42: $Q_{CH4} = L_0 * R * (e^{-kc} - e^{-kt})$. The landfill gas is assumed to contain 50% methane; therefore, $Q_{LFG} = 2 * Q_{CH4}$.

AP-42 Equation Inputs

	Name	Value *	Units
Methane Generation Rate Constant	k	0.04	$year^{-1}$
Methane Generation Potential	L_0	100	m^3 CH_4 / Mg
Average Annual Refuse Acceptance	R	calculated	Mg / year
Time Since Landfill Closure	c	calculated	years
Time Since Initial Refuse Placement	t	calculated	years

* AP-42, page 2.4-4, lists these recommended values of L_0 and k for most landfills. For k, 0.04 is recommended for landfills in areas that get more than 25 inches/year of rain.

Emissions at Expected Gas Generation Rate and Meeting Regulation 8-34 Limits

Expected Gas Flow Rate to Control Device	60	scf/min
Expected Emissions Calculation Basis	31316	M scf/year
Maximum Permitted Flare Throughput Rate	252	M scf / Day
Maximum Permitted Flare Throughput Rate	91980	M scf / Year

Maximum Flare Capacity

Heat Input to Flare:	5.25	MM BTU/hour
Maximum Gas Flow Rate:	176.1	scfm
Maximum Annual Rate:	92546	M scf/year
Exhaust Rate at 0% O2	840.5	sdcfm
Exhaust Rate at 3% O2	981.3	sdcfm

Landfill Gas Assumptions

Methane Content:	50%	
Landfill Gas Heat Content:	496.9	BTU/scf
Flue Gas Rate at 0% O2:	4.773	scf flue / scf LFG
Flue Gas Factor at 0% O2:	9605	scf flue / MM BTU
Max. LFG Sulfur Content:	150	ppmv as H2S (RACT)

Maximum Emissions from S-46 HWMF Gas Collection System After Control by a Flare

	Max. Conc. In HWMF Gas	Uncontrolled Factor	Uncontrolled Emissions	Minimum Collection System	Max. Fugitive Emissions	Control Efficiency	Expected Flare Emissions	Maximum Flare Emissions	Maximum Flare Emissions	Maximum Total Emissions	NSR Emissions: from flare only	Cumulative Emission Increases
Regulated Air Pollutants	ppmv as CH_4	pounds/M scf	pounds/year	Efficiency	pounds/year	average	pounds/year	pounds/year	pounds/day	pounds/year	pounds/year	tons/year
Total HAPs		3.19E-02	1000	75%	249.9	85%	150.0	440.4				
Total NMOC (as CH4)	8840	3.66E-01	11476	75%	2868.9	98%	229.5	674.1				
Total NPOC (as CH4) from LFG data	233	9.65E-03	302	75%	75.6	98%	45.3	133.2	0.07	209	133.2	0.067
Total POC (as CH4) from LFG data	8607	3.57E-01	11173	75%	2793.3	98%	184.2	541.0				
						Reg Limit						
	lbs/MM BTU					lbs/M scf						
Flare POC at 8-34-301.3 limit (30 ppmv as CH4 a	0.014					0.0069	217.0	637.5	1.75	3431	637.5	0.319
Secondary Combustion Emissions	lbs/MM BTU	pounds/M scf					pounds/year	pounds/year	pounds/day	pounds/year	pounds/year	tons/year
Nitrogen Oxides (NOx) at BACT trigger	0.060	0.0298					933.7	2742.5	7.51	2743	2742.5	1.371
Carbon Monoxide (CO) at RACT limit	0.300	0.1491					4668.6	13712.7	37.57	13713	13712.7	6.856
Particulate Matter (PM10) at AP-42 factor	0.017	0.0085					265.2	778.9	2.13	779	778.9	0.389
Sulfur Dioxide (SO2) at RACT limit	0.050	0.0248					777.5	2283.7	6.26	2284	2283.7	1.142
	Max. Conc. In HWMF Gas	Uncontrolled Factor	Uncontrolled Emissions	Minimum Collection System	Max. Fugitive Emissions	Control Efficiency	Expected Flare Emissions	Maximum Flare Emissions	Total Abated Emissions	Toxics NSR Emissions: from flare only	Risk Screen Trigger Levels	Emissions > Triggers ?
Compounds Detected in HWMF Gas	ppmv	pounds/M scf	pounds/year	Efficiency	pounds/year	assumed	pounds/year	pounds/year	pounds/year	pounds/year	pounds/year	
Hydrogen Sulfide	27.7	2.44E-03	76.4	75%	19.1	98%	1.5	4.5	23.6	4.5	8100	
1,1 Dichloroethane (ethylidene dichloride)	8.8	2.25E-03	70.5	75%	17.6	85%	10.6	31.0	48.7	31.0	120	
1,1 Dichloroethene (vinylidene chloride)	1.5	3.76E-04	11.8	75%	2.9	85%	1.8	5.2	8.1	5.2	6200	
1,1,1 Trichloroethane	2.2	7.58E-04	23.7	75%	5.9	85%	3.6	10.5	16.4	10.5	62000	
1,2 Dichloroethene (cis and trans)	1.4	3.51E-04	11.0	75%	2.7	85%	1.6	4.8	7.6	4.8	N/A	
1,4 Dichlorobenzene	0.3	1.14E-04	3.6	75%	0.9	85%	0.5	1.6	2.5	1.6	18	
2 Butanone (methyl ethyl ketone)	2.3	4.29E-04	13.4	75%	3.4	85%	2.0	5.9	9.3	5.9	150000	
Benzene	4.4	8.88E-04	27.8	75%	7.0	85%	4.2	12.3	19.2	12.3	6.7	YES
Chloroethane (ethyl chloride)	26.2	4.37E-03	136.8	75%	34.2	85%	20.5	60.3	94.5	60.3	1900000	
Chloromethane (methyl chloride)	3.1	4.04E-04	12.7	75%	3.2	85%	1.9	5.6	8.7	5.6	N/A	
Ethyl Benzene	3.6	9.88E-04	30.9	75%	7.7	85%	4.6	13.6	21.4	13.6	N/A	
Methyl tert-Butyl Ether	1.4	3.19E-04	10.0	75%	2.5	85%	1.5	4.4	6.9	4.4	N/A	
Methylene Chloride	10.1	2.22E-03	69.4	75%	17.4	85%	10.4	30.6	47.9	30.6	190	
Tetrachloroethene (perchloroethylene)	1.5	6.43E-04	20.1	75%	5.0	85%	3.0	8.9	13.9	8.9	33	
Toluene	8.8	2.10E-03	65.6	75%	16.4	85%	9.8	28.9	45.3	28.9	39000	
Trichloroethene	1.6	5.43E-04	17.0	75%	4.3	85%	2.6	7.5	11.7	7.5	97	
Trichlorofluoromethane	8.7	3.09E-03	96.7	75%	24.2	85%	14.5	42.6	66.8	42.6	140000	
Trichlorotrifluoroethane	6.5	2.95E-03	92.2	75%	23.1	85%	13.8	40.6	63.7	40.6	140000	
Vinyl Chloride	90.4	1.46E-02	457.2	75%	114.3	85%	68.6	201.4	315.7	201.4	2.5	YES
Xylenes (o,m,p)	3.4	9.33E-04	29.2	75%	7.3	85%	4.4	12.9	20.2	12.9	58000	
Sum of Identified NMOC		3.83E-02	1199.6	75%	299.9		179.9	528.5		528.5		
Total Unidentified NMOC		3.28E-01	10275.9	75%	2569.0	98%	49.6	145.6		145.6		
Secondary Combustion Emissions	lbs/MM BTU					lbs/M scf	pounds/year	pounds/year	pounds/year	pounds/year	pounds/year	
Hydrogen Chloride (HCl) from LFG data [6.]	0.043					0.0214	669.4	1966.2	1966.2	1966.2	1400	YES

Notes for the Maximum Emissions Table:

1. Compounds in **bold text** are HAPs.
2. Compounds in *italic text* are NPOCs.
3. Standard conditions are 70 F and 1 atm.
4. If compounds were not detected, calculations are based on 1/2 the reported detection limit.
5. Control efficiency is assumed to be 85% for any individual compound except H2S, which is readily combusted. The unidentified NMOC are mainly ethane and other alkanes, which are readily combusted. The control efficiency for H2S and the unidentified alkanes is assumed to be 98%.
6. Hydrogen chloride emissions are based on the total concentration of chlorine ion (226.9 ppmv) measured in the landfill gas.

Application # 8514 from the West Contra Costa Sanitary Landfill (Plant # 1840)

Summary of October 2002 Tests on S-46 HWMF Gas

	Formula	Molecular Weight	[c.] HWMF-1	[c.] HWMF-2	Corrected for Air Infil. HWMF-1	Corrected for Air Infil. HWMF-2	Average Corrected Conc.	Maximum Corrected Conc.	Calculation Basis	[d.] Uncontrolled pounds/M scf
Methane	CH4	16.04	43.70%	49.10%	50.0%	50.0%	50%	50%	50.0%	
Carbon Dioxide	CO2	44.01	54.00%	43.50%	50.0%	50.0%	50%	50%	50.0%	
Nitrogen	N2	28.01	1.86%	5.88%	0.0%	0.0%	0%	0%	0.0%	
Oxygen	O2	32.00	0.43%	1.51%	0.0%	0.0%	0%	0%	0.0%	
			ppmv	ppmv	ppmv	ppmv	ppmv	ppmv	ppmv	pounds/M scf
Total NMOC	CH4	16.04	8800	5200	8839	5280	7060	8839	8840	3.66E-01
Hydrogen Sulfide	H2S	34.08	27.50	10.40	27.62	10.56	19.09	27.62	27.7	2.44E-03
1,1 Dichloroethane (ethylidene dichloride) [a.]	CH3CHCl2	98.96	8.70	3.50	8.74	3.55	6.15	8.74	8.8	2.25E-03
1,1 Dichloroethene (vinylidene chloride) [a.]	Cl2C:CH2	96.94	0.45	1.40	0.45	1.42	0.94	1.42	1.5	3.76E-04
1,1,1 Trichloroethane [a.]	Cl3CCH3	133.40	2.10	0.19	2.11	0.19	1.15	2.11	2.2	7.58E-04
1,2 Dichloroethene (cis and trans)	ClHC:CHCl	96.94	1.31	0.50	1.32	0.51	0.91	1.32	1.4	3.51E-04
1,4 Dichlorobenzene [a.]	C6H4Cl2	147.00	0.29	0.17	0.29	0.17	0.23	0.29	0.3	1.14E-04
2 Butanone (methyl ethyl ketone) [a.]	CH3COCH2CH3	72.11	2.20	0.34	2.21	0.35	1.28	2.21	2.3	4.29E-04
Benzene [a.]	C6H6	78.11	4.30	0.93	4.32	0.94	2.63	4.32	4.4	8.88E-04
Chloroethane (ethyl chloride) [a.]	C2H5Cl	64.51	26.00	6.10	26.11	6.19	16.15	26.11	26.2	4.37E-03
Chloromethane (methyl chloride) [a.]	CH3Cl	50.49	3.00	1.80	3.01	1.83	2.42	3.01	3.1	4.04E-04
Ethyl Benzene [a.]	C6H5C2H5	106.17	3.50	0.58	3.52	0.59	2.05	3.52	3.6	9.88E-04
Methyl tert-Butyl Ether [a.]	(CH3)3COCH3	88.15	0.60	1.30	0.60	1.32	0.96	1.32	1.4	3.19E-04
Methylene Chloride [a., b.]	CH2Cl2	84.93	7.70	9.90	7.73	10.05	8.89	10.05	10.1	2.22E-03
Tetrachloroethene (perchloroethylene) [a., b.]	Cl2C:CCl2	165.83	1.40	0.15	1.41	0.15	0.78	1.41	1.5	6.43E-04
Toluene [a.]	C6H5CH3	92.14	8.70	5.80	8.74	5.89	7.31	8.74	8.8	2.10E-03
Trichloroethylene [a.]	CHCl:CCl2	131.39	1.50	0.19	1.51	0.19	0.85	1.51	1.6	5.43E-04
Trichlorofluoromethane [b.]	CCl3F	137.37	1.50	8.50	1.51	8.63	5.07	8.63	8.7	3.09E-03
Trichlorotrifluoroethane [b.]	CCl3F3	175.37	4.50	6.40	4.52	6.50	5.51	6.50	6.5	2.95E-03
Vinyl Chloride [a., e.]	CH2:CHCl	62.50	90.00	42.00	90.40	42.65	66.52	90.40	90.4	1.46E-02
Xylenes (o,m,p) [a.]	C6H4(CH3)2	106.17	3.30	2.16	3.31	2.19	2.75	3.31	3.4	9.33E-04

a. Compounds in **bold text** are HAPs.
b. Compounds in *italic text* are NPOCs.
c. If compounds were not detected, calculations are based on 1/2 the reported detection limit.
d. Standard conditions are 70 F and 1 atm.
e. The analytical report stated that the vinyl chloride data could not be validated. However, several compounds have concentrations that are an order of magnitude

APPENDIX C

Risk Screen Report

INTEROFFICE MEMORANDUM

June 18, 2004

To: Scott Lutz Via: Daphne Chong

From: Carol Allen

Subject: Risk Screen Report for Application # 8514, A-11 Landfill Gas Flare

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Please review and approve the enclosed Risk Screen Report for Application # 8514. The analysis estimates the incremental health risk resulting from toxic air contaminant (TAC) emissions from a proposed new Landfill Gas Flare (A-11), which will control emissions from the inactive S-46 Hazardous Waste Management Facility with Gas Collection System. The applicant is required to collect and control the landfill gas from S-46 as part of the final closure activities for this landfill. The permitting of S-46 is being handled as a loss of exemption; however, the A-11 Flare is subject to New Source Review.

Site-specific landfill gas concentration data was used to determine the maximum emissions from A-11 operating at maximum capacity. Although the measure vinyl chloride concentration could not be validated, this concentration (90 ppmv) is expected to represent a worst-case scenario, because vinyl chloride concentrations in landfill gas are typically much lower than 90 ppmv. The emissions of benzene, vinyl chloride and hydrogen chloride exceeded the risk screen trigger levels.

The emission rates (g/s) for each carcinogen and the unit risk factors (risk / $\mu g/m^3$) for these compounds were used to determine a weighted emission rate for each carcinogen. The sum of these weighted emission rates times 10^6 was used as the input to the air dispersion modeling analysis. A sum of weighted emission rates for non-carcinogenic compounds was determined in a similar fashion using the inverse of the reference exposure level as the weighting factor for each compound.

The ISCST3 air dispersion computer model was used to estimate annual average ambient air concentrations and the resulting increased cancer risk and hazard index. The model was run with Year 2001 meteorological data (300 meter mixing height) from the Chevron Refinery Met-Station. The flare was modeled as a point source with stack data provided by the applicant. The rural terrain option was used with no terrain elevations.

Estimates of residential risk assume continuous 70-year exposure to annual average TAC concentrations. Estimates of risk to off-site workers assume exposure occurs 8 hours per day and 240 hours per year for 46 years out of a 70-year lifetime. The off-site worker adjustment factor is: (8 hrs/24 hrs)*(240 days/365 days)*(46 years/70 years) = 0.144 * residential risk

The modeling results indicate that the maximum incremental cancer risk for a resident is 0.5 in a million and the maximum hazard index is 0.007. However, these maximum impacts occur in a mud flat area north of the facility that has no residential or industrial receptors. **The maximum incremental cancer risk for the nearest residential receptor is 0.11 in a million. The maximum incremental cancer risk for an industrial receptor is 0.02 in a million. The hazard index is less 0.002 for the nearest residential and industrial receptors.**

Since the maximum incremental cancer risk is less than 1 in a million and the hazard index is less than 1, this project complies with the District's Toxic Risk Management Policy as proposed, and TBACT is not required. Additional details of the analysis are included in the attached materials. Please notify me if you have any questions or need additional information.

Toxic Air Contaminant Emissions for Application # 8514 from Plant # 1840

	Toxics NSR Emissions: from flare only	Emissions (E)	Unit Risk Factor (URF)	Weighted Emission Rate, WER = E*URF	ISCST3 Input Factor WER * 10^6
Carcinogens	pounds/year	grams/second	risk / $\mu g/m^3$	(g/s)*risk/($\mu g/m^3$)	
1,1 Dichloroethane (ethylidene dichloride)	31.05	4.47E-04	1.60E-06	7.14E-10	
1,4 Dichlorobenzene	1.57	2.26E-05	1.10E-05	2.49E-10	
Benzene	12.25	1.76E-04	2.90E-05	5.11E-09	
Methylene Chloride	30.58	4.40E-04	1.00E-06	4.40E-10	
Tetrachloroethene (perchloroethylene)	8.87	1.28E-04	5.90E-06	7.53E-10	
Trichloroethene	7.49	1.08E-04	2.00E-06	2.16E-10	
Vinyl Chloride	201.42	2.90E-03	7.80E-05	2.26E-07	
Total Weighted Emission Rate				**2.33E-07**	**2.3346E-01**

	Toxics NSR Emissions: from flare only	Emissions (E)	Reference Exposure Level (REL) (chonic inhalation)	Weighted Emission Rate, WER = E/REL	ISCST3 Input Factor = WER
Non-Carcinogens	pounds/year	grams/second	$\mu g/m^3$	(g/s)/($\mu g/m^3$)	
1,1 Dichloroethene (vinylidene chloride)	5.18	7.46E-05	7.00E+01	1.07E-06	
1,1,1 Trichloroethane	10.46	1.50E-04	1.00E+03	1.50E-07	
2 Butanone (methyl ethyl ketone)	5.91	8.50E-05	1.00E+03	8.50E-08	
Chloroethane (ethyl chloride)	60.26	8.67E-04	3.00E+04	2.89E-08	
Ethyl Benzene	13.63	1.96E-04	2.00E+03	9.80E-08	
Hydrogen Chloride (HCl) from LFG data	1966.24	2.83E-02	9.00E+00	3.14E-03	
Hydrogen Sulfide	4.49	6.45E-05	1.00E+01	6.45E-06	
Methyl tert-Butyl Ether	4.40	6.33E-05	8.00E+03	7.91E-09	
Toluene	28.91	4.16E-04	3.00E+02	1.39E-06	
Trichlorofluoromethane	42.61	6.13E-04	7.00E+02	8.75E-07	
Trichlorotrifluoroethane	40.64	5.84E-04	7.00E+02	8.35E-07	
Xylenes (o,m,p)	12.87	1.85E-04	7.00E+02	2.64E-07	
Total Weighted Emission Rate				**3.15E-03**	**3.1536E-03**