ENGINEERING EVALUATION
West Contra Costa Sanitary Landfill; PLANT # 1840
APPLICATION # 2789

BACKGROUND

The West Contra Costa Sanitary Landfill (WCCSL) includes an active Municipal Solid Waste Landfill (S-15) and a closed Hazardous Waste Management Facility (HWMF). The HWMF is a separate disposal unit from the sanitary landfill but is contiguous with the sanitary landfill. 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 only. The site 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 will be assigned a separate source number from the main landfill:

S-46 Hazardous Waste Management Facility with Gas Collection System

WCCSL originally proposed a passive gas collection system that would vent to a proposed A-9 Carbon Adsorption System (eight VSC-200 carbon canisters). The proposed canisters were to be arranged in four sets with two canisters in series for each set. Each proposed canister has a maximum exhaust rate of 100 cfm and contains at least 150 pounds of carbon. However, as discussed in more detail in the Statement of Compliance Section, the proposed carbon system will not comply with Regulation 8, Rule 34 and the federal emission guidelines. Therefore, WCCSL has withdrawn this carbon system as a control option and is seeking other alternatives.

This application is now only for the Authority to Construct for the gas collection system. WCCSL will not vent the gas collection system until a control device is approved by the District. WCCSL will submit a separate application for the control device, after all control options have been explored with DTSC, which also regulates the control of landfill gas from the HWMF.

EMISSIONS

Although the disposal history for decomposable waste in the HWMF is not well known, WCCSL estimated that this area contains 198,000 tons of decomposable waste, with 100,000 tons coming from the MSW that was placed in 2001. EPA's LANDGEM program was used to estimate the maximum gas generation rate (occurring in Year 2002) from this 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 is estimated to be 60 scfm of gas containing 50% methane. Since gas generation rates will continue to decline in this area (because waste deposition has ceased), the maximum annual emissions will be calculated based on the maximum predicted gas generation rate of 60 scfm (32,453 Mscf/year).

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 the main landfill concentration data. Therefore, the HWMF gas data (if available) will be used to calculate maximum POC, NPOC, and toxic emissions for this project. AP-42 default concentration data will be used for any compounds that were not tested for.

Maximum uncontrolled emissions were determined to be 11,476 pounds/year of non-methane organic compounds (NMOC). About 76% of the NMOC is precursor organic compounds (POC) and 24% is non-precursor organic compounds (NPOC), mainly ethane. The collection system is assumed to collect 75% of the generated emissions with 25% emitted as fugitive emissions. Collected landfill gas will be vented to a control device.

In order for a control device to comply with Regulation 8, Rule 34, the device will be required to achieve at least 98% destruction of NMOC. WCCSL is expected to meet this requirement by using either their existing flare or engines or by using a new stand alone enclosed flare. Any of these options are expected to achieve the required 98% control efficiency. Flares and engines are expected to achieve a minimum of 75% control for individual toxic compounds. For these calculations the appropriate destruction efficiency (ε) was either 98% for hydrogen sulfide and unidentified NMOCs or 75% for identified toxic compounds.

Maximum emissions after control were calculated using the following procedure:

Total Emissions/Year = (pounds generated/year)*(0.25 pounds fugitive/pound generated)
+ (pounds generated/year)*(0.75 pounds collected/pound generated)*
(1-ε pounds emitted/pound collected)

Emissions are summarized in Table 1 below for criteria pollutants and significant toxic compounds. Detailed emission calculations are attached.

Table 1. Emissions After Control by a Combustion Device

Pollutant	Abated Emissions (pounds/year)	Maximum Daily Emissions (pounds/day)
POC	3054	8.37
NPOC	122	0.33
Toxic Compound	Abated Emissions (pounds/year)	Risk Screen Trigger Level (pounds/year)
1,1 dichloroehtane (ethylidene dichloride)	30.8	120
1,4 dichlorobenzene	1.6	18
benzene	12.2	6.7
chloromethane (methyl chloride)	5.5	190
methylene chloride	30.4	190
perchloroethylene	8.8	33
trichloroethylene	7.4	97
vinyl chloride	16.2	2.5

The abated emissions of benzene and vinyl chloride will exceed the risk screen trigger levels. Therefore a risk screen will be required for the combustion device that is chosen to control the

emissions from the HWMF. The risk screen will be conducted as part of the application for the control device since the necessary input parameters are not known at this time.

PLANT CUMULATIVE INCREASE

Table 1. Plant Cumulative Emission Increase Inventory Changes

	Current Inventory Total for Post 4-5-91 Applications Tons/Year	Application #2789 Emission Increases Tons/Year	New Inventory Total Tons/Year
POC	-23.930	1.527	-22.403
NPOC	0.000	0.061	0.061

STATEMENT OF COMPLIANCE

CEQA Requirements (Regulation 2, Rule 1):

The Engineering Evaluation for the collection and control system described in this application uses fixed standards and objective measurements and does not involve any element of discretion. In accordance with District Permit Handbook Chapter 11.9 “Miscellaneous Organic Operations”, the approval of the Authority to Construct is considered ministerial. Therefore, no further CEQA review is required.

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):

BACT: The emissions from S-46 after control by a combustion device will not exceed either 10 pounds/day of POC or 10 pounds/day of NPOC. No other criteria pollutants are expected. Therefore, BACT is not required.

Offsets: Total POC emissions from this facility will exceed 15 tons/year of POC. Therefore, offsets are required. This facility has 23.93 tons/year of contemporaneous on-site emission reductions from the 1999 replacement of a landfill gas fired IC engine. These on-site credits are sufficient to offset all emission increases from this project.

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 (issued within the last two years) include Applications # 2788 for a landfill gas fired IC engine and # 2952 for 4 landfill gas fired microturbines. None of this equipment has been installed.

For Application # 2788, the projected emissions of benzene, formaldehyde, acrylonitrile, and vinyl chloride from S-41 exceeded the risk screen trigger levels and a risk screening analysis was conducted. Maximum risk was determined to be 0.8 in a million. Therefore, TBACT was not

required. Note that most this risk was due to acrylonitrile emissions, but the AP-42 acrylonitrile concentration data has a low confidence rating. Based on limited data for Bay Area landfill gas, acrylonitrile concentrations are expected to be well below the AP-42 concentration. Consequently, the maximum risk from S-41 is likely to be 0.2 in a million or less.

For Application # 2952, projected toxic air contaminant emissions from the microturbines did not exceed any risk screen trigger levels. A risk analysis was not conducted and TBACT was not required.

For the current application, maximum emissions of benzene and vinyl chloride (after control by a combustion device) will exceed the risk screen trigger levels. Therefore, a risk screening analysis is required for this project. The risk screen will be conducted as part of the application for the control device, when this application is submitted. To ensure that no unauthorized emissions will occur, permit conditions will prohibit the gas collection system from venting to any devices until the applicant receives approval from the District.

Major Facility Review (Regulation 2, Rule 6):

A Title V Permit has been issued for this facility. The addition of this source is expected to require a minor modification of the Title V permit. The necessary Title V permit modifications will be proposed under the permit application for the control device.

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 a control device achieving at least 98% control of NMOC. WCCSL is currently discussing several control options with the Department of Toxic Substances Control (DTSC), which also has regulatory authority over the landfill gas from the HWMF. The issue is: "Can WCCSL use their existing flares and engines to control landfill gas from the HWMF without these devices being considered hazardous waste incinerators?" If the combustion device that is controlling landfill gas from the HWMF will be considered a hazardous waste incinerator, WCCSL plans to install a separate stand alone flare. In either case, WCCSL will submit an application for the control device that will be used to control gas from the HWMF.

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 will apply to this entire facility in January 2004.

PERMIT CONDITIONS

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)

RECOMMENDATION

Issue a Permit to Operate for the existing inactive HWMF and an Authority to Construct for the gas collection system described below:

S-46 **Hazardous Waste Management Facility**; 28 acre closed hazardous waste disposal unit: Modification to Install: a gas collection system consisting of 19 horizontal collectors.

By: Carol S. Allen July 8, 2003
Senior Air Quality Engineer Date

Application # 2789 at Plant # 1840 Gas Collection and Control System for Hazardous Waste Management Facility

Maximum Gas Generation based on EPA LANDGEM

Dates	Waste Placed	Gas Generation in 2002 *	
years	tons	m3/yr	scfm
1953-1985	98000	203234	13.66
2000-2001	100000	683529	45.93
TOTAL	198000	886763	59.58
Annual Emissions Calculation Basis		**31316**	**M scf/year**

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

Maximum Gas Flow Rate to Control Device	60	scf/min
Daily Emissions Calculation Basis	85797	scf/day
Regulation 8-34-301.3 or .4 Limits	98%	control of NMOC
Maximum Daily Emissions (POC and NPOC)	8.70	pounds/day NMOC
Maximum Annual Emissions (POC and NPOC)	1.588	tons/year NMOC

Maximum Emissions from S-46 HWMF Passive Gas Collection System After Control by a Combustion Device

	Max. Conc. In HWMF Gas	Uncontrolled Factor	Uncontrolled Emissions	Collection Efficiency	Control Efficiency	Abated Emissions	Abated Emissions	Average Emissions	est. cnc. as CH_4	max. at limit	limit	lbs adsrb / scf gas	scf / canister
Regulated Air Pollutants	ppmv as CH_4	pounds/M scf	pounds/year	average	average	pounds/year	tons/year	pounds/day	ppmv	ppmv	lbs/day		
Total NMOC (as CH4)	8840	3.66E-01	11476	75%	98%	3175	1.588		2446			2.650E-04	220719
Total POC (as CH4)	8625	3.58E-01	11197	75%	98%	3054	1.527	8.37	2352	2812	10.00	96.2%	2924
Total NPOC (as CH4)	215	8.89E-03	278	75%	98%	122	0.061	0.33	94	2812	10.00	3.8%	73283
Total HAPs		1.85E-02	580	75%	75%	254	0.127						
	Max. Conc. In HWMF Gas	Uncontrolled Factor	Uncontrolled Emissions	Collection Efficiency	Control Efficiency	Abated Emissions	Risk Screen Trigger Levels	Emissions > Triggers ?					
Compounds Detected in HWMF Gas	ppmv	pounds/M scf	pounds/year	average	assumed	pounds/year	pounds/year						
Hydrogen Sulfide	27.7	2.44E-03	76.4	75%	98%	20.2	8100			2.50			
1,1 Dichloroethane (ethylidene dichloride)	8.8	2.25E-03	70.5	75%	75%	30.8	120			256.91			
1,1 Dichloroethene (vinylidene chloride)	1.5	3.76E-04	11.8	75%	75%	5.1	6200			0.83			
1,1,1 Trichloroethane	2.2	7.58E-04	23.7	75%	75%	10.4	62000			0.17			
1,2 Dichloroethene (cis and trans)	1.4	3.51E-04	11.0	75%	75%	4.8	N/A						
1,4 Dichlorobenzene	0.3	1.14E-04	3.6	75%	75%	1.6	18			86.74			
2 Butanone (methyl ethyl ketone)	2.3	4.29E-04	13.4	75%	75%	5.9	150000			0.04			
Benzene	4.4	8.88E-04	27.8	75%	75%	12.2	6.7	YES		1816.04			
Chloroethane (ethyl chloride)	26.2	4.37E-03	136.8	75%	75%	59.8	1900000			0.03			
Chloromethane (methyl chloride)	3.1	4.04E-04	12.7	75%	75%	5.5	190			29.16			
Ethyl Benzene	3.6	9.88E-04	30.9	75%	75%	13.5	N/A						
Methyl tert-Butyl Ether	1.4	3.19E-04	10.0	75%	75%	4.4	N/A						
Methylene Chloride	10.1	2.22E-03	69.4	75%	75%	30.4	190			159.83			
Tetrachloroethene (perchloroethylene)	1.5	6.43E-04	20.1	75%	75%	8.8	33			266.85			
Toluene	8.8	2.10E-03	65.6	75%	75%	28.7	39000			0.74			
Trichloroethene	1.6	5.43E-04	17.0	75%	75%	7.4	97			76.72			
Trichlorofluoromethane	8.7	3.09E-03	96.7	75%	75%	42.3	140000			0.30			
Trichlorotrifluoroethane	6.5	2.95E-03	92.2	75%	75%	40.4	140000			0.29			
Vinyl Chloride	7.3	1.19E-03	37.1	75%	75%	16.2	2.5	YES		6496.06			
Xylenes (o,m,p)	3.4	9.33E-04	29.2	75%	75%	12.8	58000			0.22			
Sum of Identified NMOC		2.49E-02	779.6	75%		341.1							
Total Unidentified NMOC		3.42E-01	10696.0	75%	98%	2834.4							

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 75% 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%.

Toxic Air Contaminant Emissions for Application # 2789 from Plant # 1840

	Risk Screen Trigger Levels pounds/year	Abated Emissions pounds/year	Total From 4 Cannister Sets grams/second	Per Carbon Cannister Set grams/second	Emissions > Triggers
Vinyl Chloride	2.5	475.1	6.83E-03	1.71E-03	YES
Acrylonitrile	0.67	0.4	5.57E-06	1.39E-06	
1,1 Dichloroethane (ethylidene dichloride)	120	40.3	5.80E-04	1.45E-04	
Methylene Chloride	190	63.8	9.18E-04	2.29E-04	
Benzene	6.7	0.8	1.13E-05	2.83E-06	
Chloromethane (methyl chloride)	190	12.2	1.75E-04	4.38E-05	
Tetrachloroethene (perchloroethylene)	33	0.6	8.40E-06	2.10E-06	
Hydrogen Sulfide	8100	102.6	1.48E-03	3.69E-04	
1,4 Dichlorobenzene	18	0.1	1.42E-06	3.55E-07	
Trichloroethene	97	0.5	6.97E-06	1.74E-06	
Dichlorodifluoromethane	140000	127.4	1.83E-03	4.58E-04	
Trichlorofluoromethane	140000	111.5	1.60E-03	4.01E-04	
Trichlorotrifluoroethane	140000	88.2	1.27E-03	3.17E-04	
Isopropyl Alcohol	440000	202.0	2.91E-03	7.26E-04	
Carbon Disulfide	14000	3.7	5.33E-05	1.33E-05	
Bromodichloromethane	140000	34.4	4.95E-04	1.24E-04	
Dichlorofluoromethane	140000	18.1	2.60E-04	6.50E-05	
Chloroethane (ethyl chloride)	1900000	154.5	2.22E-03	5.56E-04	
Chlorodifluoromethane	140000	7.5	1.08E-04	2.71E-05	
1,1 Dichloroethene (vinylidene chloride)	6200	0.3	4.44E-06	1.11E-06	
Toluene	39000	1.6	2.27E-05	5.67E-06	
2 Butanone (methyl ethyl ketone)	150000	4.6	6.68E-05	1.67E-05	
o,m,p Xylenes	58000	0.7	9.99E-06	2.50E-06	
Hexane	83000	0.9	1.37E-05	3.41E-06	
1,1,1 Trichloroethane	62000	0.7	9.98E-06	2.49E-06	

* Compounds are listed in descending order of the expected impact on health affects.

Application # 2789 from the West Contra Costa Sanitary Landfill (Plant # 1840)

Summary of October 2002 Tests on S-46 HWMF Gas

	Formula	Molecular Weight	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	7.3	1.19E-03
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. Therefore, calculations will be based on the AP-42 default ppmv for vinyl chloride.