Appendix A

Toxic Air Contaminants

ENGINE EMISSIONS FOR SOURCES 1 THROUGH 6

CAS #	Compounds	Mole Wt.	Conc. In ppm in LFG	Flow to engine lb/hr	Flow to engine lb/day	Flow to engine lb/yr	Engine DRE in %	Flow from engine lb/hr	Flow from engine lb/day	Flow from engine lb/yr	Emissions from 6 engines lb/yr	CATEF engine emissions lbs/MMcf	CATEF engine emissions lb/hr	CATEF engine emissions lb/day	CATEF engine emissions lb/yr	CATEF Emissions from 6 Engines lb/yr	Maximum Emissions from 6 Engines lb/yr	NPOC ?	Maximum NPOC from 6 Engines lb/yr	PEF for HAPs (see BAAQMD Reg 2, Rule 5, Table 2-5-B)	p eqnts
71-55-6	1,1,1-Trichloroethane (methyl chloroform)	133.4	1.00E-02	1.5E-04	3.5E-03	1.2E+00	93	1.0E-05	2.5E-04	8.7E-02	5.2E-01	6.75E-03	2.8E-04	6.8E-03	2.40E+00	1.44E+01	1.44E+01	NPOC	1.44E+01		
79-34-5	1,1,2,2-Tetrachloroethane	167.9	1.50E-02	2.8E-04	6.7E-03	2.4E+00	93	1.9E-05	4.7E-04	1.6E-01	9.9E-01						9.88E-01	NPOC	9.88E-01		
75-34-3	1,1-Dichloroethane (ethylidene dichloride)	99.0	6.72E-02	7.3E-04	1.8E-02	6.2E+00	93	5.1E-05	1.2E-03	4.3E-01	2.6E+00						2.61E+00				
75-35-4	1,1-Dichloroethane (vinylidene chloride)	96.9	1.50E-02	1.6E-04	3.9E-03	1.4E+00	93	1.1E-05	2.7E-04	9.5E-02	5.7E-01						5.71E-01				
107-06-2	1,2-Dichloroethane (ethylene dichloride)	99.0	3.16E-01	3.5E-03	8.3E-02	2.9E+01	93	2.4E-04	5.8E-03	2.0E+00	1.2E+01						1.23E+01				
78-87-5	1,2-Dichloropropane (propylene dichloride)	113.0	1.50E-02	1.9E-04	4.5E-03	1.6E+00	93	1.3E-05	3.1E-04	1.1E-01	6.7E-01						6.65E-01				
67-63-0	IPA	60.1	7.91E+00	5.3E-02	1.3E+00	4.4E+02	86.1	7.3E-03	1.8E-01	6.2E+01	3.7E+02						3.70E+02				
107-13-1	Acrylonitrile	53.1	5.00E-02	2.9E-04	7.0E-03	2.5E+00	86.1	4.1E-05	9.8E-04	3.4E-01	2.1E+00						2.07E+00				
71-43-2	Benzene	78.1	3.40E+00	2.9E-02	7.0E-01	2.5E+02	86.1	4.1E-03	9.8E-02	3.4E+01	2.1E+02	1.82E-01	7.6E-03	1.8E-01	6.46E+01	3.88E+02	3.88E+02				
75-25-2	Bromodichloromethane	163.8	3.11E-01	5.6E-03	1.4E-01	4.8E+01	93	3.9E-04	9.5E-03	3.3E+00	2.0E+01						2.00E+01				
75-15-0	Carbon disulfide	76.1	8.20E-02	6.9E-04	1.7E-02	5.8E+00	86.1	9.6E-05	2.3E-03	8.1E-01	4.9E+00						4.86E+00				
56-23-5	Carbon tetrachloride	153.8	1.50E-02	2.6E-04	6.1E-03	2.2E+00	93	1.8E-05	4.3E-04	1.5E-01	9.1E-01	7.78E-03	3.3E-04	7.8E-03	2.76E+00	1.66E+01	1.66E+01				
108-90-7	Chlorobenzene	112.6	8.66E-02	1.1E-03	2.6E-02	9.1E+00	93	7.5E-05	1.8E-03	6.4E-01	3.8E+00						3.83E+00				
46-358-1	Carbonyl sulfide	60.1	1.70E-01	1.1E-03	2.7E-02	9.5E+00	86.1	1.6E-04	3.8E-03	1.3E+00	8.0E+00						7.96E+00				
75-45-6	Chlorodifluoromethane	86.5	3.55E-01	3.4E-03	8.1E-02	2.9E+01	93	2.4E-04	5.7E-03	2.0E+00	1.2E+01						1.20E+01	NPOC	1.20E+01		
75-00-3	Chloroethane	64.5	1.13E-01	8.1E-04	1.9E-02	6.8E+00	93	5.6E-05	1.4E-03	4.8E-01	2.9E+00						2.86E+00				
67-66-3	Chloroform	119.4	1.00E-02	1.3E-04	3.2E-03	1.1E+00	93	9.2E-06	2.2E-04	7.8E-02	4.7E-01	6.02E-03	2.5E-04	6.1E-03	2.14E+00	1.28E+01	1.28E+01				
74-87-3	Chloromethane	50.5	2.36E-01	1.3E-03	3.2E-02	1.1E+01	93	9.2E-05	2.2E-03	7.8E-01	4.7E+00						4.68E+00				
106-46-7	Dichlorobenzene	147.0	2.26E+01	3.7E-01	8.8E+00	3.1E+03	93	2.6E-02	6.2E-01	2.2E+02	1.3E+03						1.30E+03				
75-71-8	Dichlorodifluoromethane	120.9	1.51E+00	2.0E-02	4.8E-01	1.7E+02	93	1.4E-03	3.4E-02	1.2E+01	7.2E+01						7.16E+01	NPOC	7.16E+01		
75-43-4	Dichlorofluoromethane	102.9	2.62E-03	3.0E-05	7.2E-04	2.5E-01	93	2.1E-06	5.0E-05	1.8E-02	1.1E-01						1.06E-01	NPOC	1.06E-01		
75-09-2	Methylene chloride	84.9	1.06E-01	1.0E-03	2.4E-02	8.4E+00	93	7.0E-05	1.7E-03	5.9E-01	3.5E+00	2.11E-01	8.9E-03	2.1E-01	7.49E+01	4.49E+02	4.49E+02	NPOC	4.49E+02		
64-17-5	Ethanol	46.1	2.72E+01	1.4E-01	3.3E+00	1.2E+03	86.1	1.9E-02	4.6E-01	1.6E+02	9.8E+02						9.77E+02				
100-41-4	Ethylbenzene	106.2	9.15E+00	1.1E-01	2.6E+00	9.1E+02	86.1	1.5E-02	3.6E-01	1.3E+02	7.6E+02						7.57E+02				
106-93-4	Ethylene dibromide	187.9	1.50E-02	3.1E-04	7.5E-03	2.6E+00	93	2.2E-05	5.2E-04	1.8E-01	1.1E+00	9.51E-03	4.0E-04	9.6E-03	3.38E+00	2.03E+01	2.03E+01				
75-69-4	Fluorotrichloromethane	137.4	6.74E-02	1.0E-03	2.5E-02	8.7E+00	93	7.2E-05	1.7E-03	6.1E-01	3.6E+00						3.63E+00	NPOC	3.63E+00		
110-54-3	Hexane	86.2	8.24E+01	7.8E-01	1.9E+01	6.6E+03	86.1	1.1E-01	2.6E+00	9.2E+02	5.5E+03						5.53E+03				
2148-87-8	Hydrogen Sulfide	34.1	1.20E+02	4.5E-01	1.1E+01	3.8E+03	86.1	6.3E-02	1.5E+00	5.3E+02	3.2E+03						3.19E+03				
7439-97-6	Mercury	200.6	2.92E-04	6.5E-06	1.6E-04	5.5E-02	0	6.5E-06	1.6E-04	5.5E-02	3.3E-01						3.28E-01				
78-93-3	MEK	72.1	1.06E+01	8.4E-02	2.0E+00	7.1E+02	86.1	1.2E-02	2.8E-01	9.9E+01	6.0E+02						5.96E+02				
108-10-1	MIK	100.2	7.50E-01	8.3E-03	2.0E-01	7.0E+01	86.1	1.2E-03	2.8E-02	9.8E+00	5.9E+01						5.85E+01				
127-18-4	Perc	165.8	4.98E-01	9.1E-03	2.2E-01	7.7E+01	93	6.4E-04	1.5E-02	5.4E+00	3.2E+01	1.26E-02	5.3E-04	1.3E-02	4.47E+00	2.68E+01	3.24E+01	NPOC	3.24E+01		
108-88-3	Toluene	92.1	1.69E+02	1.7E+00	4.1E+01	1.5E+04	86.1	2.4E-01	5.7E+00	2.0E+03	1.2E+04						1.21E+04				
79-01-6	TCE	131.4	2.08E-01	3.0E-03	7.2E-02	2.6E+01	93	2.1E-04	5.1E-03	1.8E+00	1.1E+01	8.31E-03	3.5E-04	8.4E-03	2.95E+00	1.77E+01	1.77E+01				
75-01-4	Vinyl chloride	62.5	3.84E-01	2.7E-03	6.4E-02	2.2E+01	93	1.9E-04	4.5E-03	1.6E+00	9.4E+00	3.95E-03	1.7E-04	4.0E-03	1.40E+00	8.41E+00	9.42E+00				
1330-20-7	Xylenes	106.2	1.98E+01	2.3E-01	5.6E+00	2.0E+03	86.1	3.2E-02	7.8E-01	2.7E+02	1.6E+03						1.64E+03				
7647-01-0	HCl	36.5	1.36E+01	5.5E-02	1.3E+00	4.6E+02	0	5.5E-02	1.3E+00	4.6E+02	2.8E+03	1.57E+00	6.6E-02	1.6E+00	5.57E+02	3.34E+03	3.34E+03				
83-32-9	Acenaphthene											1.80E-04	7.6E-06	1.8E-04	6.39E-02	3.83E-01	3.83E-01				
208-96-8	Acenaphthylene											8.14E-05	3.4E-06	8.2E-05	2.89E-02	1.73E-01	1.73E-01				
120-12-7	Anthracene											1.55E-04	6.5E-06	1.6E-04	5.50E-02	3.30E-01	3.30E-01				
56-55-6	Benzo(a)anthracene											2.06E-04	8.7E-06	2.1E-04	7.31E-02	4.39E-01	4.39E-01			0.1	E-02
50-32-8	Benzo(a)pyrene											3.20E-04	1.3E-05	3.2E-04	1.14E-01	6.82E-01	6.82E-01			1	E-01
205-99-2	Benzo(b)fluoranthene											3.26E-04	1.4E-05	3.3E-04	1.16E-01	6.94E-01	6.94E-01			0.1	E-02
191-24-2	Benzo(g,h,i)perylene											2.84E-04	1.2E-05	2.9E-04	1.01E-01	6.05E-01	6.05E-01				
207-08-9	Benzo(k)fluoranthene											4.12E-04	1.7E-05	4.2E-04	1.46E-01	8.78E-01	8.78E-01			0.1	E-02
218-01-9	Chrysene											3.38E-04	1.4E-05	3.4E-04	1.20E-01	7.20E-01	7.20E-01				
53-70-3	Dibenz(a,h)anthracene											1.91E-05	8.0E-07	1.9E-05	6.78E-03	4.07E-02	4.07E-02			1.05	E-02
206-44-0	Fluoranthene											6.47E-04	2.7E-05	6.5E-04	2.30E-01	1.38E+00	1.38E+00				
86-73-7	Fluorene											5.24E-04	2.2E-05	5.3E-04	1.86E-01	1.12E+00	1.12E+00				
50-00-0	Formaldehyde											6.95E-01	2.9E-02	7.0E-01	2.47E+02	1.48E+03	1.48E+03				
193-39-5	Indeno(1,2,3-cd)pyrene											1.27E-04	5.3E-06	1.3E-04	4.51E-02	2.71E-01	2.71E-01			0.1	E-02
91-20-3	Naphthalene											1.82E-02	7.6E-04	1.8E-02	6.46E+00	3.88E+01	3.88E+01				
85-01-8	Phenanthrene											2.00E-03	8.4E-05	2.0E-03	7.10E-01	4.26E+00	4.26E+00				
129-00-0	Pyrene											1.23E-03	5.2E-05	1.2E-03	4.37E-01	2.62E+00	2.62E+00				
NPOC and PAHs totals																			5.85E+02		E-01

Notes: Assumptions

700 scfm lfg flow to each engine
96.5 % annual run time per engine
380 cu ft = vol of 1 lb-mole

FLARE EMISSIONS FOR SOURCE 7

		Mole Wt.	Conc. In ppm in LFG	Flow to flare lb/hr	Flow to flare lb/day	Flow to flare lb/yr	Flare DRE in %	Flow from flare lb/hr	Flow from flare lb/day	Flow from flare lb/yr	CATEF flare emissions lbs/MMcf	CATEF flare emissions lb/hr	CATEF flare emissions lb/day	CATEF flare emissions lb/yr	Maximum Flare Emissions lb/yr	NPOC ?	Maximum NPOC Emissions lb/yr	PEF for HAPs (see BAAQMD Reg 2, Rule 5, Table 2-5-1)	Benzo(a) pyrene equivalents lb/yr
71-55-6	1,1,1-Trichloroethane (methyl chloroform)	133.4	1.00E-02	8.4E-05	2.0E-03	5.5E-01	98	1.69E-06	4.0E-05	1.1E-02	8.90E-02	2.14E-03	5.1E-02	1.4E+01	1.40E+01	NPOC	1.40E+01		
79-34-5	1,1,2,2-Tetrachloroethane	167.9	1.50E-02	1.6E-04	3.8E-03	1.0E+00	98	3.18E-06	7.6E-05	2.1E-02					2.09E-02	NPOC	2.09E-02		
75-34-3	1,1-Dichloroethane (ethylidene dichloride)	99.0	6.72E-02	4.2E-04	1.0E-02	2.8E+00	98	8.40E-06	2.0E-04	5.5E-02	1.04E-01	2.50E-03	6.0E-02	1.6E+01	1.64E+01				
75-35-4	1,1-Dichloroethane (vinylidene chloride)	96.9	1.50E-02	9.2E-05	2.2E-03	6.0E-01	98	1.84E-06	4.4E-05	1.2E-02					1.21E-02				
107-06-2	1,2-Dichloroethane (ethylene dichloride)	99.0	3.16E-01	2.0E-03	4.7E-02	1.3E+01	98	3.95E-05	9.5E-04	2.6E-01	5.19E-02	1.25E-03	3.0E-02	8.2E+00	8.18E+00				
78-87-5	1,2-Dichloropropane (propylene dichloride)	113.0	1.50E-02	1.1E-04	2.6E-03	7.0E-01	98	2.14E-06	5.1E-05	1.4E-02					1.41E-02				
67-63-0	IPA	60.1	7.91E+00	3.0E-02	7.2E-01	2.0E+02	98	6.01E-04	1.4E-02	3.9E+00					3.95E+00				
107-13-1	Acrylonitrile	53.1	5.00E-02	1.7E-04	4.0E-03	1.1E+00	98	3.35E-06	8.0E-05	2.2E-02	2.15E+00	5.16E-02	1.2E+00	3.4E+02	3.39E+02				
71-43-2	Benzene	78.1	3.40E+00	1.7E-02	4.0E-01	1.1E+02	98	3.35E-04	8.1E-03	2.2E+00	9.78E-02	2.35E-03	5.6E-02	1.5E+01	1.54E+01				
75-25-2	Bromodichloromethane	163.8	3.11E-01	3.2E-03	7.7E-02	2.1E+01	98	6.44E-05	1.5E-03	4.2E-01					4.23E-01				
75-15-0	Carbon disulfide	76.1	8.20E-02	3.9E-04	9.5E-03	2.6E+00	98	7.89E-06	1.9E-04	5.2E-02					5.18E-02				
56-23-5	Carbon tetrachloride	153.8	1.50E-02	1.5E-04	3.5E-03	9.6E-01	98	2.91E-06	7.0E-05	1.9E-02	2.01E-02	4.82E-04	1.2E-02	3.2E+00	3.17E+00				
108-90-7	Chlorobenzene	112.6	8.66E-02	6.2E-04	1.5E-02	4.0E+00	98	1.23E-05	3.0E-04	8.1E-02	3.97E-02	9.53E-04	2.3E-02	6.3E+00	6.26E+00				
46-358-1	Carbonyl sulfide	60.1	1.70E-01	6.4E-04	1.5E-02	4.2E+00	98	1.29E-05	3.1E-04	8.5E-02					8.47E-02				
75-45-6	Chlorodifluoromethane	86.5	3.55E-01	1.9E-03	4.7E-02	1.3E+01	98	3.88E-05	9.3E-04	2.5E-01					2.55E-01	NPOC	2.55E-01		
75-00-3	Chloroethane	64.5	1.13E-01	4.6E-04	1.1E-02	3.0E+00	98	9.21E-06	2.2E-04	6.1E-02					6.05E-02				
67-66-3	Chloroform	119.4	1.00E-02	7.5E-05	1.8E-03	5.0E-01	98	1.51E-06	3.6E-05	9.9E-03	2.66E-02	6.38E-04	1.5E-02	4.2E+00	4.19E+00				
74-87-3	Chloromethane	50.5	2.36E-01	7.5E-04	1.8E-02	4.9E+00	98	1.51E-05	3.6E-04	9.9E-02					9.89E-02				
106-46-7	Dichlorobenzene	147.0	2.26E+01	2.1E-01	5.0E+00	1.4E+03	98	4.20E-03	1.0E-01	2.8E+01					2.76E+01				
75-71-8	Dichlorodifluoromethane	120.9	1.51E+00	1.2E-02	2.8E-01	7.6E+01	98	2.31E-04	5.5E-03	1.5E+00					1.52E+00	NPOC	1.52E+00		
75-43-4	Dichlorofluoromethane	102.9	2.62E-03	1.7E-05	4.1E-04	1.1E-01	98	3.41E-07	8.2E-06	2.2E-03					2.24E-03	NPOC	2.24E-03		
75-09-2	Methylene chloride	84.9	1.06E-01	5.7E-04	1.4E-02	3.7E+00	98	1.14E-05	2.7E-04	7.5E-02	9.00E-01	2.16E-02	5.2E-01	1.4E+02	1.42E+02	NPOC	1.42E+02		
64-17-5	Ethanol	46.1	2.72E+01	7.9E-02	1.9E+00	5.2E+02	98	1.58E-03	3.8E-02	1.0E+01					1.04E+01				
100-41-4	Ethylbenzene	106.2	9.15E+00	6.1E-02	1.5E+00	4.0E+02	98	1.23E-03	2.9E-02	8.1E+00					8.06E+00				
106-93-4	Ethylene dibromide	187.9	1.50E-02	1.8E-04	4.3E-03	1.2E+00	98	3.56E-06	8.5E-05	2.3E-02					2.34E-02				
75-69-4	Fluorotrichloromethane	137.4	6.74E-02	5.8E-04	1.4E-02	3.8E+00	98	1.17E-05	2.8E-04	7.7E-02					7.69E-02	NPOC	7.69E-02		
110-54-3	Hexane	86.2	8.24E+01	4.5E-01	1.1E+01	2.9E+03	98	8.97E-03	2.2E-01	5.9E+01					5.89E+01				
2148-87-8	Hydrogen Sulfide	34.1	1.20E+02	2.6E-01	6.2E+00	1.7E+03	98	5.17E-03	1.2E-01	3.4E+01					3.39E+01				
7439-97-6	Mercury	200.6	2.92E-04	3.7E-06	8.9E-05	2.4E-02	0	3.70E-06	8.9E-05	2.4E-02					2.43E-02				
78-93-3	MEK	72.1	1.06E+01	4.8E-02	1.2E+00	3.2E+02	98	9.66E-04	2.3E-02	6.3E+00					6.34E+00				
108-10-1	MIK	100.2	7.50E-01	4.7E-03	1.1E-01	3.1E+01	98	9.49E-05	2.3E-03	6.2E-01					6.23E-01				
127-18-4	Perc	165.8	4.98E-01	5.2E-03	1.3E-01	3.4E+01	98	1.04E-04	2.5E-03	6.9E-01					6.85E-01	NPOC	6.85E-01		
108-88-3	Toluene	92.1	1.69E+02	9.8E-01	2.4E+01	6.5E+03	98	1.97E-02	4.7E-01	1.3E+02	3.11E+00	7.46E-02	1.8E+00	4.9E+02	4.90E+02				
79-01-6	TCE	131.4	2.08E-01	1.7E-03	4.1E-02	1.1E+01	98	3.45E-05	8.3E-04	2.3E-01	2.94E-02	7.06E-04	1.7E-02	4.6E+00	4.64E+00				
75-01-4	Vinyl chloride	62.5	3.84E-01	1.5E-03	3.6E-02	1.0E+01	98	3.03E-05	7.3E-04	2.0E-01	3.56E-02	8.54E-04	2.1E-02	5.6E+00	5.61E+00				
1330-20-7	Xylenes	106.2	1.98E+01	1.3E-01	3.2E+00	8.7E+02	98	2.66E-03	6.4E-02	1.7E+01	3.13E-01	7.51E-03	1.8E-01	4.9E+01	4.94E+01				
7647-01-0	HCl	36.5	1.36E+01	3.1E-02	7.5E-01	2.1E+02	0	3.13E-02	7.5E-01	2.1E+02	1.97E+02	4.73E+00	1.1E+02	3.1E+04	3.11E+04				
123-91-1	1,4-Dioxane										1.08E-01	2.59E-03	6.2E-02	1.7E+01	1.70E+01				
75-07-0	Acetaldehyde										6.67E-02	1.60E-03	3.8E-02	1.1E+01	1.05E+01				
107-02-8	Acrolein										9.33E-02	2.24E-03	5.4E-02	1.5E+01	1.47E+01				
7440-38-2	Arsenic										5.68E-01	1.36E-02	3.3E-01	9.0E+01	8.96E+01				
56-55-6	Benzo(a)anthracene										4.59E-04	1.10E-05	2.6E-04	7.2E-02	7.24E-02			0.1	7.24E-03
50-32-8	Benzo(a)pyrene										7.48E-05	1.80E-06	4.3E-05	1.2E-02	1.18E-02			1	1.18E-02
205-99-2	Benzo(b)fluoranthene										1.63E-04	3.91E-06	9.4E-05	2.6E-02	2.57E-02			0.1	2.57E-03
192-97-2	Benzo(e)pyrene										7.41E-05	1.78E-06	4.3E-05	1.2E-02	1.17E-02				
191-24-2	Benzo(g,h,i)perylene										7.48E-05	1.80E-06	4.3E-05	1.2E-02	1.18E-02				
207-08-9	Benzo(k)fluoranthene										7.48E-05	1.80E-06	4.3E-05	1.2E-02	1.18E-02			0.1	1.18E-03
7440-43-9	Cadmium										4.87E-01	1.17E-02	2.8E-01	7.7E+01	7.68E+01				
18540-29-!	Chromium (Hex)										1.39E-01	3.34E-03	8.0E-02	2.2E+01	2.19E+01				
218-01-9	Chrysene										5.93E-04	1.42E-05	3.4E-04	9.4E-02	9.35E-02				
7440-50-8	Copper										4.61E+00	1.11E-01	2.7E+00	7.3E+02	7.27E+02				
53-70-3	Dibenz(a,h)anthracene										7.48E-05	1.80E-06	4.3E-05	1.2E-02	1.18E-02			1.05	1.24E-02
50-00-0	Formaldehyde										2.37E+01	5.69E-01	1.4E+01	3.7E+03	3.74E+03				
7664-39-3	HF										1.41E+02	3.38E+00	8.1E+01	2.2E+04	2.22E+04				
193-39-5	Indeno(1,2,3-cd)pyrene										7.48E-05	1.80E-06	4.3E-05	1.2E-02	1.18E-02			0.1	1.18E-03
7439-96-5	Manganese										1.68E+01	4.03E-01	9.7E+00	2.6E+03	2.65E+03				
91-20-3	Naphthalene										3.56E-02	8.54E-04	2.1E-02	5.6E+00	5.61E+00				
7440-02-0	Nickel										1.83E+02	4.39E+00	1.1E+02	2.9E+04	2.89E+04				
95-47-6	Xylene(o)										2.01E-01	4.82E-03	1.2E-01	3.2E+01	3.17E+01				
7440-66-6	Zinc										2.57E+00	6.17E-02	1.5E+00	4.1E+02	4.05E+02				
NPOC and PAHs totals																	1.59E+02		3.6E-02

Notes: Assumptions

400 scfm lfg flow to flare
75 % annual run time for flare
380 cu ft = vol of 1 lb-mole

Appendix B

Health Risk Screening Analysis

INTEROFFICE MEMORANDUM
March 28, 2006

TO: **Donald Van Buren**

Via: **Scott B. Lutz**
Daphne Y. Chong

FROM: **Glen Long**

SUBJECT: **Results of Health Risk Screening Analysis for Ameresco Ox Mountain Landfill, Landfill Gas-to-Energy Plant (Half Moon Bay, CA), Plant #17040, Application #12649**

Per your request, we have completed a health risk screening analysis for the above referenced permit application. The analysis estimates the health risk resulting from toxic air contaminant (TAC) emissions from the proposal to install 6 LFG-fired engines plus one LFG fired flare. Results from the health risk screening analysis indicate that the maximum cancer risk is estimated at 1.0 in a million. In accordance with the District's Regulation 2-5, this risk level is considered acceptable.

EMISSIONS: Emissions of toxic air contaminants for the 6 engines and the flare are attached to this report.

MODELING: The ISCST3 air dispersion computer model was used to estimate annual average ambient air concentrations. The model was run with 1990, 1993 and 1994 Mt. Pise (PIS) meteorological data and Half Moon Bay terrain data. Model runs were made with rural dispersion coefficients. Stack and building parameters for the analysis were based on information provided by the applicant.

HEALTH RISK: Estimates of residential risk assume exposure to annual average TAC concentrations occur 24 hours per day, 350 days per year, for a 70-year lifetime. Risk estimates for offsite workers assume exposure occurs 8 hours per day, 245 day per year, for 40 years. The estimated health risks for this permit application are presented in the table below.

Receptor	Cancer Risk	Chronic Hazard Index
Resident	0.3 chances in a million	0.009
Worker	1.0 chances in a million	0.044

Acute Hazard Index
0.268

ENGINE EMISSIONS

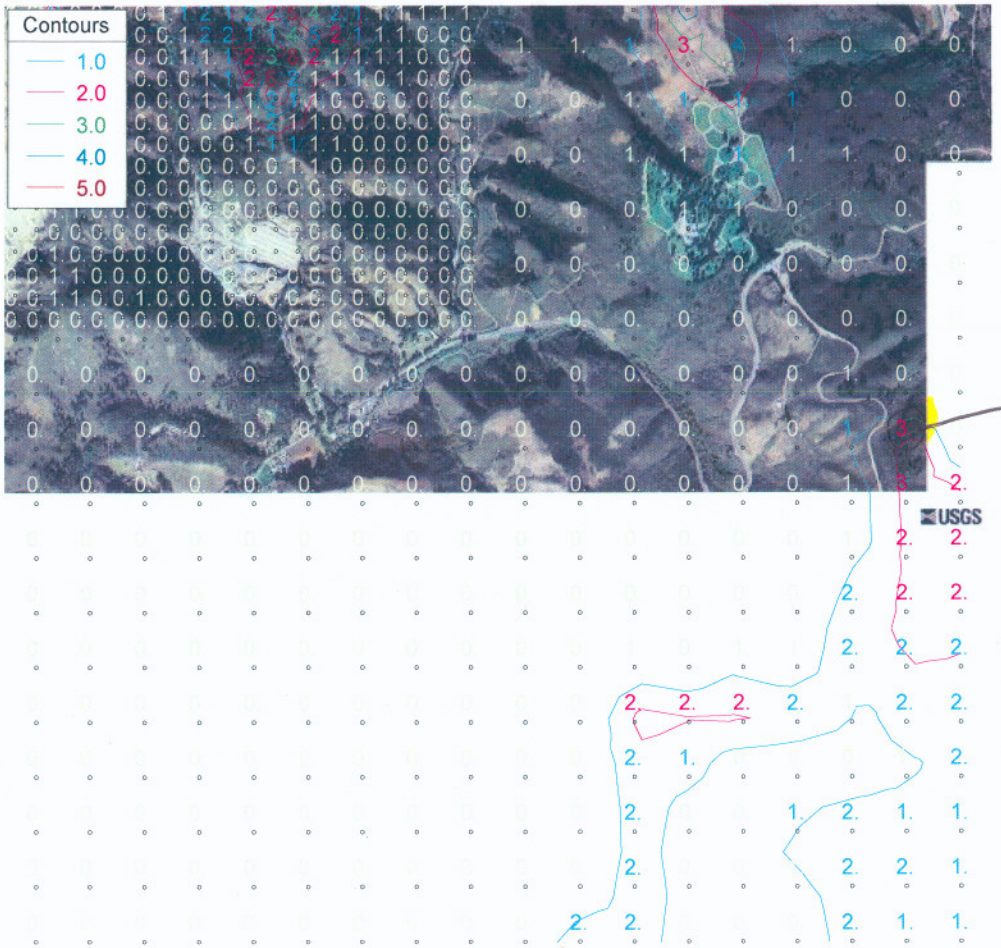
CAS #	Compounds	MAX of CATEF and Source Spec	NON-CANCER: Acute Inhalation REL(ug/m3)	Acute HI Emission Rate (g/s)/ug/m^3)	Chronic Inhalation REL(ug/m3)	Residential Chronic HI Emission Rate	Worker Chronic HI Emission Rate	Student Chronic HI Emission Rate	CANCER: Multipathway Cancer Potentcy Factor (mg/kg-d)^-1	Residential Inhalation dose	Worker Inhalation dose	Student Inhalation dose	Residential Emission	Worker Emission	Student Emission	% Total Risk Emission
71-55-6	1,1,1-Trichloroethane (methyl chloroform)	1.438E+01	6.80E+04	3.04E-09	1.00E+03	1.98E-07	4.63E-08	4.25E-08								0.0
79-34-5	1,1,2,2-Tetrachloroethane	9.880E-01							2.00E-01	4.12E-09	8.12E-10	2.18E-10	8.23E-04	1.62E-04	4.36E-05	0.1
75-34-3	1,1-Dichloroethane (ethylidene dichloride)	2.609E+00							5.70E-03	1.09E-08	2.14E-09	5.76E-10	6.20E-05	1.22E-05	3.28E-06	0.0
75-35-4	1,1-Dichloroethane (vinylidene chloride)	5.706E-01			7.00E+01	1.12E-07	2.62E-08	2.41E-08								
107-06-2	1,2-Dichloroethane (ethylene dichloride)	1.227E+01			4.00E+02	4.23E-07	9.87E-08	9.07E-08	7.20E-02	5.11E-08	1.01E-08	2.71E-09	3.68E-03	7.26E-04	1.95E-04	0.4
78-87-5	1,2-Dichloropropane (propylene dichloride)	6.651E-01														
67-63-0	IPA	3.705E+02	3.20E+03	1.67E-06	7.00E+03	7.30E-07	1.70E-07	1.56E-07								
107-13-1	Acrylonitrile	2.067E+00			5.00E+00	5.70E-06	1.33E-06	1.22E-06	1.00E+00	8.61E-09	1.70E-09	4.56E-10	8.61E-03	1.70E-03	4.56E-04	1.0
71-43-2	Benzene	3.877E+02	1.30E+03	4.29E-06	6.00E+01	8.91E-05	2.08E-05	1.91E-05	1.00E-01	1.61E-06	3.19E-07	8.56E-08	1.61E-01	3.19E-02	8.56E-03	19.6
75-25-2	Bromodichloromethane	1.999E+01														
75-15-0	Carbon disulfide	4.864E+00	6.20E+03	1.13E-08	8.00E+02	8.39E-08	1.96E-08	1.80E-08								
56-23-5	Carbon tetrachloride	1.657E+01	1.90E+03	1.25E-07	4.00E+01	5.71E-06	1.33E-06	1.22E-06	1.50E-01	6.90E-08	1.36E-08	3.66E-09	1.04E-02	2.04E-03	5.49E-04	1.3
108-90-7	Chlorobenzene	3.825E+00			1.00E+03	5.28E-08	1.23E-08	1.13E-08								
46-358-1	Carbonyl sulfide	7.957E+00														
75-45-6	Chlorodifluoromethane	1.205E+01			5.00E+04	3.32E-09	7.75E-10	7.12E-10								
75-00-3	Chloroethane	2.861E+00			3.00E+04	1.32E-09	3.07E-10	2.82E-10								
67-66-3	Chloroform	1.282E+01	1.50E+02	1.23E-06	3.00E+02	5.90E-07	1.38E-07	1.26E-07	1.90E-02	5.34E-08	1.05E-08	2.83E-09	1.01E-03	2.00E-04	5.38E-05	0.1
74-87-3	Chloromethane	4.676E+00														
106-46-7	Dichlorobenzene	1.304E+03			8.00E+02	2.25E-05	5.24E-06	4.82E-06	4.00E-02	5.43E-06	1.07E-06	2.88E-07	2.17E-01	4.29E-02	1.15E-02	26.4
75-71-8	Dichlorodifluoromethane	7.164E+01														
75-43-4	Dichlorofluoromethane	1.058E-01			7.00E+02	2.08E-09	4.86E-10	4.47E-10								
75-09-2	Methylene chloride	4.495E+02	1.40E+04	4.62E-07	4.00E+02	1.55E-05	3.62E-06	3.32E-06	3.50E-03	1.87E-06	3.69E-07	9.92E-08	6.55E-03	1.29E-03	3.47E-04	0.8
64-17-5	Ethanol	9.767E+02														
100-41-4	Ethylbenzene	7.569E+02			2.00E+03	5.22E-06	1.22E-06	1.12E-06								
106-93-4	Ethylene dibromide	2.026E+01			8.00E-01	3.49E-04	8.15E-05	7.48E-05	2.50E-01	8.44E-08	1.67E-08	4.47E-09	2.11E-02	4.16E-03	1.12E-03	2.6
75-69-4	Fluorotrichloromethane	3.634E+00			7.00E+02	7.16E-08	1.67E-08	1.53E-08								
110-54-3	Hexane	5.533E+03			7.00E+03	1.09E-05	2.54E-06	2.34E-06								
2148-87-8	Hydrogen Sulfide	3.187E+03														
7439-97-6	Mercury	3.284E-01	1.80E+00	2.62E-06	9.00E-02	5.03E-05	1.17E-05	1.08E-05								
78-93-3	MEK	5.956E+02	1.30E+04	6.59E-07	1.00E+03	8.21E-06	1.92E-06	1.76E-06								
108-10-1	MIK	5.854E+01														
127-18-4	Perc	3.241E+01	2.00E+04	2.33E-08	3.50E+01	1.28E-05	2.98E-06	2.74E-06	2.10E-02	1.35E-07	2.66E-08	7.15E-09	2.83E-03	5.59E-04	1.50E-04	0.3
108-88-3	Toluene	1.213E+04	3.70E+04	4.72E-06	3.00E+02	5.58E-04	1.30E-04	1.20E-04								
79-01-6	TCE	1.770E+01			6.00E+02	4.07E-07	9.50E-08	8.72E-08	7.00E-03	7.37E-08	1.46E-08	3.91E-09	5.16E-04	1.02E-04	2.74E-05	0.1
75-01-4	Vinyl chloride	9.418E+00	1.80E+05	7.53E-10	2.60E+01	5.00E-06	1.17E-06	1.07E-06	2.70E-01	3.92E-08	7.74E-09	2.08E-09	1.06E-02	2.09E-03	5.61E-04	1.3
1330-20-7	Xylenes	1.638E+03	2.20E+04	1.07E-06	7.00E+02	3.23E-05	7.53E-06	6.92E-06								
7647-01-0	HCl	3.345E+03	2.10E+03	2.29E-05	9.00E+00	5.13E-03	1.20E-03	1.10E-03								
83-32-9	Acenaphthene	3.834E-01														
208-96-8	Acenaphthylene	1.734E-01														
120-12-7	Anthracene	3.302E-01														
56-55-6	Benzo(a)anthracene	4.388E-01							6.00E+00							
50-32-8	Benzo(a)pyrene	6.817E-01							6.00E+01	2.84E-09	5.60E-10	1.51E-10	1.70E-01	3.36E-02	9.03E-03	20.7
205-99-2	Benzo(b)fluoranthene	6.945E-01							6.00E+00	2.89E-09	5.71E-10	1.53E-10	1.74E-02	3.43E-03	9.20E-04	2.1
191-24-2	Benzo(g,h,i)perylene	6.050E-01														
207-08-9	Benzo(k)fluoranthene	8.777E-01							6.00E+00	3.66E-09	7.21E-10	1.94E-10	2.19E-02	4.33E-03	1.16E-03	2.7
218-01-9	Chrysene	7.200E-01							6.00E-01	3.00E-09	5.92E-10	1.59E-10	1.80E-03	3.55E-04	9.54E-05	0.2
53-70-3	Dibenz(a,h)anthracene	4.069E-02							6.30E+01	1.69E-10	3.34E-11	8.98E-12	1.07E-02	2.11E-03	5.66E-04	1.3
206-44-0	Fluoranthene	1.378E+00														
86-73-7	Fluorene	1.116E+00														
50-00-0	Formaldehyde	1.481E+03	9.40E+01	2.27E-04	3.00E+00	6.81E-03	1.59E-03	1.46E-03	2.10E-02	6.17E-06	1.22E-06	3.27E-07	1.30E-01	2.56E-02	6.86E-03	15.7
193-39-5	Indeno(1,2,3-cd)pyrene	2.705E-01							6.00E+00	1.13E-09	2.22E-10	5.97E-11	6.76E-03	1.33E-03	3.58E-04	0.8
91-20-3	Naphthalene	3.877E+01			9.00E+00	5.94E-05	1.39E-05	1.27E-05	1.20E-01	1.61E-07	3.19E-08	8.56E-09	1.94E-02	3.82E-03	1.03E-03	2.4
85-01-8	Phenanthrene	4.261E+00														
129-00-0	Pyrene	2.620E+00														
als			TOTAL	2.66E-04	TOTAL	1.32E-02	3.07E-03	2.82E-03	TOTAL				8.23E-01	1.62E-01	4.36E-02	100.00
			Per Engine	4.43890E-05	**Per Engine**	2.19409E-03	5.11953E-04	4.70161E-04	**Per Engine**				1.37103E-01	2.70574E-02	7.26698E-03	

FLARE EMISSIONS		MAX of CATEF and Source Spec lb/yr	Acute Inhalation REL(ug/m3)	Acute HI Emission Rate (g/s)/ug/m^3)	Chronic Inhalation REL(ug/m3)	Residential Chronic HI Emission Rate	Worker Chronic HI Emission Rate	Student Chronic HI Emission Rate	Multipathway Cancer Potentcy Factor (mg/kg-d)^-1	Residential Inhalation dose	Worker Inhalation dose	Student Inhalation dose	Residential Emission rate	Worker Emission rate	Student Emission rate	% Total Risk Emission Rate
71-55-6	1,1,1-Trichloroethane (methyl chloroform)	1.403E+01	6.80E+04	2.97E-09	1.00E+03	1.94E-07	4.52E-08	4.148E-08								0.0
79-34-5	1,1,2,2-Tetrachloroethane	2.089E-02							2.00E-01	8.70E-11	1.72E-11	4.61E-12	1.74E-05	3.44E-06	9.23E-07	0.0
75-34-3	1,1-Dichloroethane (ethylidene dichloride)	1.640E+01							5.70E-03	6.83E-08	1.35E-08	3.62E-09	3.89E-04	7.68E-05	2.06E-05	0.0
75-35-4	1,1-Dichloroethane (vinylidene chloride)	1.207E-02			7.00E+01	2.38E-09	5.55E-10	5.095E-10								0.0
107-06-2	1,2-Dichloroethane (ethylene dichloride)	8.184E+00			4.00E+02	2.82E-07	6.58E-08	6.047E-08	7.20E-02	3.41E-08	6.73E-09	1.81E-09	2.45E-03	4.84E-04	1.30E-04	0.1
78-87-5	1,2-Dichloropropane (propylene dichloride)	1.407E-02														0.0
67-63-0	IPA	3.946E+00	3.20E+03	1.77E-08	7.00E+03	7.77E-09	1.81E-09	1.666E-09								0.0
107-13-1	Acrylonitrile	3.390E+02			5.00E+00	9.35E-04	2.18E-04	2.004E-04	1.00E+00	1.41E-06	2.79E-07	7.48E-08	1.41E+00	2.79E-01	7.48E-02	79.4
71-43-2	Benzene	1.542E+01	1.30E+03	1.71E-07	6.00E+01	3.54E-06	8.27E-07	7.596E-07	1.00E-01	6.42E-08	1.27E-08	3.40E-09	6.42E-03	1.27E-03	3.40E-04	0.4
75-25-2	Bromodichloromethane	4.228E-01														0.0
75-15-0	Carbon disulfide	5.181E-02	6.20E+03	1.20E-10	8.00E+02	8.93E-10	2.08E-10	1.914E-10								0.0
56-23-5	Carbon tetrachloride	3.169E+00	1.90E+03	2.40E-08	4.00E+01	1.09E-06	2.55E-07	2.342E-07	1.50E-01	1.32E-08	2.61E-09	7.00E-10	1.98E-03	3.91E-04	1.05E-04	0.1
108-90-7	Chlorobenzene	6.260E+00			1.00E+03	8.63E-08	2.01E-08	1.850E-08								0.0
46-358-1	Carbonyl sulfide	8.475E-02														0.0
75-45-6	Chlorodifluoromethane	2.548E-01			5.00E+04	7.03E-11	1.64E-11	1.506E-11								0.0
75-00-3	Chloroethane	6.051E-02			3.00E+04	2.78E-11	6.49E-12	5.961E-12								0.0
67-66-3	Chloroform	4.194E+00	1.50E+02	4.02E-07	3.00E+02	1.93E-07	4.50E-08	4.132E-08	1.90E-02	1.75E-08	3.45E-09	9.26E-10	3.32E-04	6.55E-05	1.76E-05	0.0
74-87-3	Chloromethane	9.889E-02														0.0
106-46-7	Dichlorobenzene	2.757E+01			8.00E+02	4.75E-07	1.11E-07	1.019E-07	4.00E-02	1.15E-07	2.27E-08	6.09E-09	4.59E-03	9.07E-04	2.43E-04	0.3
75-71-8	Dichlorodifluoromethane	1.515E+00														0.0
75-43-4	Dichlorofluoromethane	2.238E-03			7.00E+02	4.41E-11	1.03E-11	9.448E-12								0.0
75-09-2	Methylene chloride	1.419E+02	1.40E+04	1.46E-07	4.00E+02	4.89E-06	1.14E-06	1.049E-06	3.50E-03	5.91E-07	1.17E-07	3.13E-08	2.07E-03	4.08E-04	1.10E-04	0.1
64-17-5	Ethanol	1.040E+01														0.0
100-41-4	Ethylbenzene	8.061E+00			2.00E+03	5.56E-08	1.30E-08	1.191E-08								0.0
106-93-4	Ethylene dibromide	2.339E-02			8.00E-01	4.03E-07	9.41E-08	8.641E-08	2.50E-01	9.74E-11	1.92E-11	5.16E-12	2.44E-05	4.81E-06	1.29E-06	0.0
75-69-4	Fluorotrichloromethane	7.685E-02			7.00E+02	1.51E-09	3.53E-10	3.245E-10								0.0
110-54-3	Hexane	5.893E+01			7.00E+03	1.16E-07	2.71E-08	2.488E-08								0.0
2148-87-8	Hydrogen Sulfide	3.394E+01														0.0
7439-97-6	Mercury	2.431E-02	1.800E+00	1.942E-07	9.00E-02	3.73E-06	8.69E-07	7.982E-07								0.0
78-93-3	MEK	6.343E+00	1.30E+04	7.02E-09	1.00E+03	8.75E-08	2.04E-08	1.875E-08								0.0
108-10-1	MIK	6.234E-01														0.0
127-18-4	Perc	6.854E-01	2.00E+04	4.93E-10	3.50E+01	2.70E-07	6.30E-08	5.787E-08	2.10E-02	2.85E-09	5.63E-10	1.51E-10	5.99E-05	1.18E-05	3.18E-06	0.0
108-88-3	Toluene	4.904E+02	3.70E+04	1.91E-07	3.00E+02	2.25E-05	5.26E-06	4.831E-06								0.0
79-01-6	TCE	4.636E+00			6.00E+02	1.07E-07	2.49E-08	2.284E-08	7.00E-03	1.93E-08	3.81E-09	1.02E-09	1.35E-04	2.67E-05	7.16E-06	0.0
75-01-4	Vinyl chloride	5.613E+00	1.80E+05	4.49E-10	2.60E+01	2.98E-06	6.95E-07	6.381E-07	2.70E-01	2.34E-08	4.61E-09	1.24E-09	6.31E-03	1.25E-03	3.35E-04	0.4
1330-20-7	Xylenes	4.935E+01	2.20E+04	3.23E-08	7.00E+02	9.72E-07	2.27E-07	2.084E-07								0.0
7647-01-0	HCl	3.106E+04	2.10E+03	2.13E-04	9.00E+00	4.76E-02	1.11E-02	1.020E-02								0.0
123-91-1	1,4-Dioxane	1.703E+01	3.00E+03	8.16E-08	3.00E+03	7.83E-08	1.83E-08	1.678E-08	2.70E-02	7.09E-08	1.40E-08	3.76E-09	1.92E-03	3.78E-04	1.02E-04	0.1
75-07-0	Acetaldehyde	1.052E+01			9.00E+00	1.61E-05	3.76E-06	3.454E-06	1.00E-02	4.38E-08	8.65E-09	2.32E-09	4.38E-04	8.65E-05	2.32E-05	0.0
107-02-8	Acrolein		1.90E-01		6.00E-02											0.0
7440-38-2	Arsenic		1.90E-01		3.00E-02				1.20E+01							0.0
56-55-3	Benzo(a)anthracene	7.238E-02							6.00E+00	3.01E-10	5.95E-11	1.60E-11	1.81E-03	3.57E-04	9.59E-05	0.1
50-32-8	Benzo(a)pyrene	1.179E-02							6.00E+01	4.91E-11	9.70E-12	2.60E-12	2.95E-03	5.82E-04	1.56E-04	0.2
205-99-2	Benzo(b)fluoranthene	2.570E-02							6.00E+00	1.07E-10	2.11E-11	5.67E-12	6.42E-04	1.27E-04	3.40E-05	0.0
192-97-2	Benzo(e)pyrene	1.168E-02														0.0
191-24-2	Benzo(g,h,i)perylene	1.179E-02														0.0
207-08-9	Benzo(k)fluoranthene	1.179E-02							6.00E+00	4.91E-11	9.70E-12	2.60E-12	2.95E-04	5.82E-05	1.56E-05	0.0
7440-43-9	Cadmium				2.00E-02				1.50E+01							0.0
18540-29-9	Chromium (Hex)				2.00E-01				5.10E+02							0.0
218-01-9	Chrysene	9.350E-02							6.00E-01	3.89E-10	7.69E-11	2.06E-11	2.34E-04	4.61E-05	1.24E-05	0.0
7440-50-8	Copper		1.00E+02		2.40E+00											0.0
53-70-3	Dibenz(a,h)anthracene	1.179E-02							6.30E+01	4.91E-11	9.70E-12	2.60E-12	3.10E-03	6.11E-04	1.64E-04	0.2
50-00-0	Formaldehyde	3.737E+03	9.40E+01	5.72E-04	3.00E+00	1.72E-02	4.01E-03	3.682E-03	2.10E-02	1.56E-05	3.07E-06	8.25E-07	3.27E-01	6.45E-02	1.73E-02	18.4
7664-39-3	HF	2.223E+04	2.40E+02	1.33E-03	1.40E+01	2.19E-02	5.11E-03	4.694E-03								0.0
193-39-5	Indeno(1,2,3-cd)pyrene	1.179E-02							6.00E+00	4.91E-11	9.70E-12	2.60E-12	2.95E-04	5.82E-05	1.56E-05	0.0
7439-96-5	Manganese				2.00E-01											0.0
91-20-3	Naphthalene	5.613E+00			9.00E+00	8.60E-06	2.01E-06	1.843E-06	1.20E-01	2.34E-08	4.61E-09	1.24E-09	2.81E-03	5.54E-04	1.49E-04	0.2
7440-02-0	Nickel		6.00E+00		5.00E-02				9.10E-01							0.0
95-47-6	Xylene(o)	3.169E+01	2.20E+04	2.07E-08	7.00E+02	6.24E-07	1.46E-07	1.338E-07								0.0
7440-66-6	Zinc				3.50E+01											0.0
ls			TOTAL	2.11833E-03	TOTAL	8.76906E-02	2.04611E-02	1.87908E-02				TOTAL	1.77825E+00	3.50938E-01	9.42537E-02	100.0

Ox Mountain Max Residential Receptor - 0.255 Risk

Ox Mountain LFG Power Plant - Cancer Risk

C:\beest\ox mtn\bluescape_2006_2_1\Glen\Glen\Risk_92_RISK_RES.GRF



Res. MEI = 0.3

Scale: 1" = 871.2 Meters

PERIOD VALUES FOR GROUP: ALL

Max = 5.26999 (552860, 4151360)

Ox Mountain Max Worker Receptor = 1.0 Risk in a million

Ox Mountain LFG Power Plant - Cancer Risk

C:\beest\ox mtn\bluescape_2006_2_1\Glen\Glen\Risk_92_RISK_WRK.GRF

Scale: 1" = 164.3 Meters

PERIOD VALUES FOR GROUP: ALL

Max = 1.04004 (552860, 4151360)

Worker Chronic HI - 0.04448

Ox Mountain LFG Power Plant - Cancer Risk

C:\beest\ox mtn\bluescape_2006_2_1\Glen\Glen\Risk_92_CHI_WRK.GRF

Scale: 1" = 32.5 Meters

PERIOD VALUES FOR GROUP: ALL

Max = 0.04468 (552600, 4150700)

Residential Chronic HI - 0.0.0093

Ox Mountain LFG Power Plant - Cancer Risk

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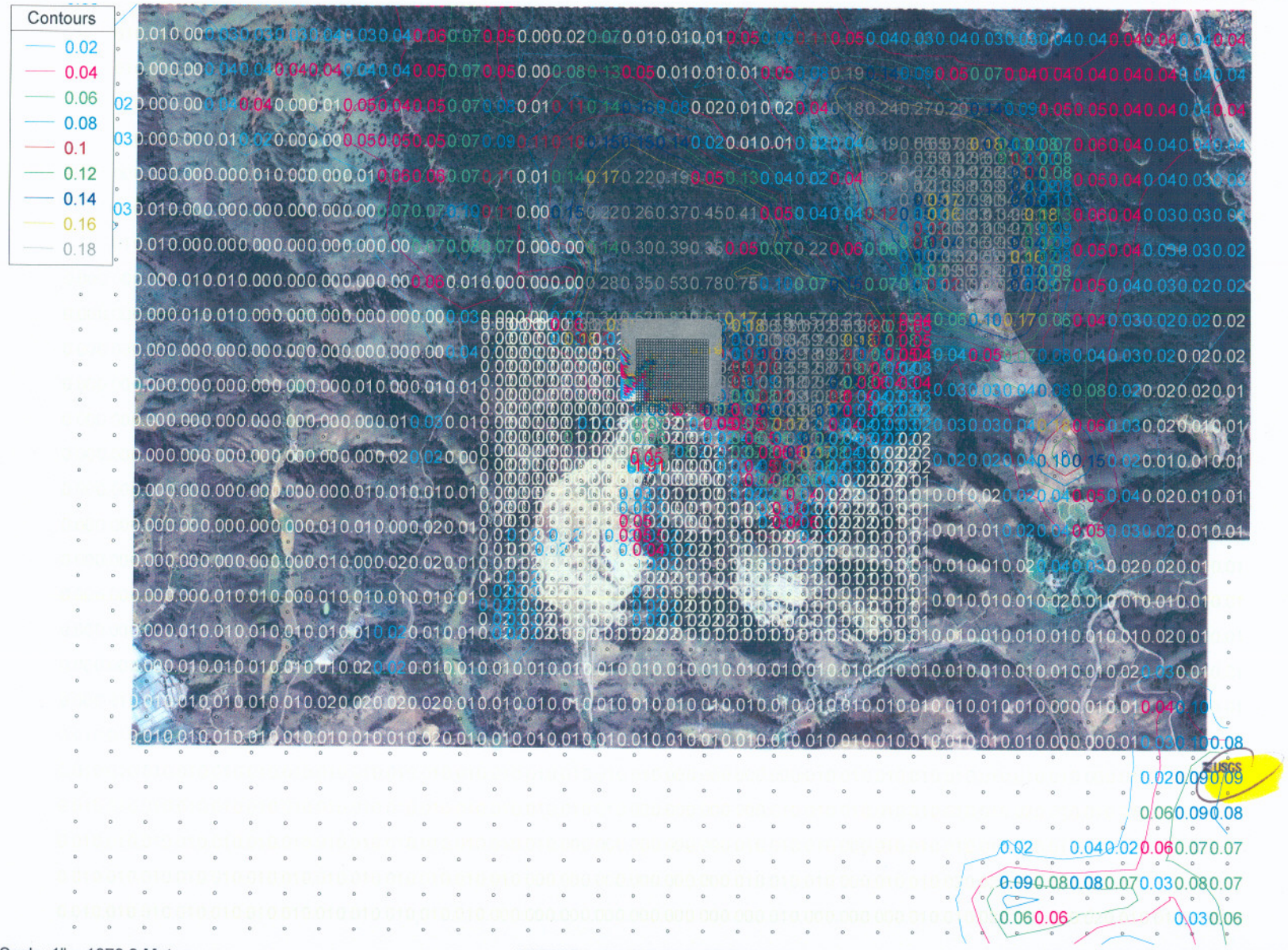

Scale: 1" = 1078.3 Meters

PERIOD VALUES FOR GROUP: ALL

Max = 0.19149 (552600, 4150700)

Acute HI - 0.0.0093

Ox Mountain LFG Power Plant - Cancer Risk

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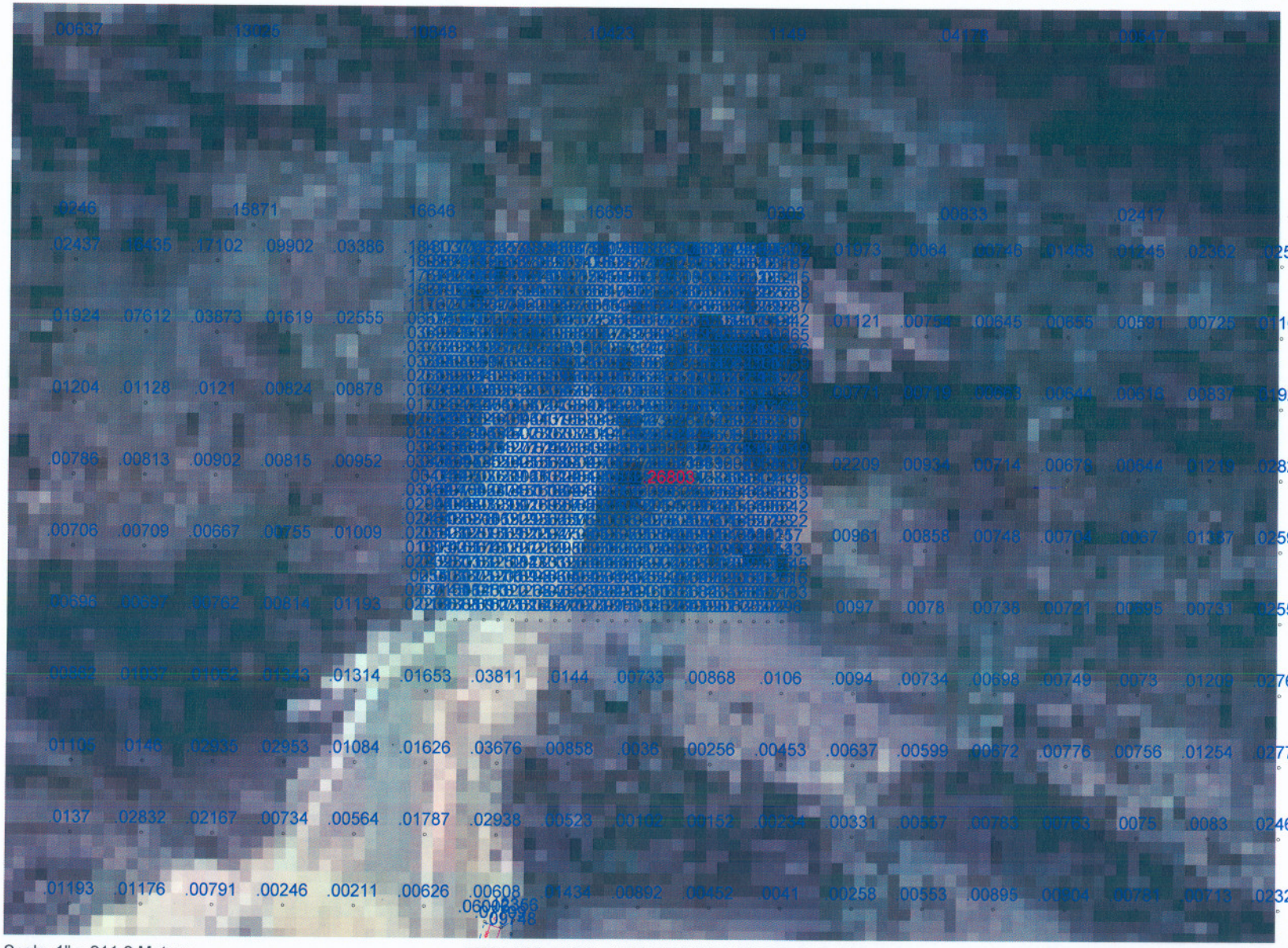

Scale: 1" = 211.2 Meters

HIGH 1ST HIGH 1-HR VALUES FOR GROUP: ALL

Max = 0.26803 (552840, 4151380)

Appendix C

PSD Air Quality Impact Analysis

OFFICE MEMORANDUM

April 6, 2006

TO: DONALD VAN BUREN

VIA: SCOTT LUTZ
BRIAN BATEMAN

FROM: GLEN LONG

SUBJECT: AMERESCO OX MOUNTAIN LANDFILL, LANDFILL GAS-TO-ENERGY PLANT, PLANT # 17040 (HALF MOON BAY, CA) PSD MODELING ANALYSIS (PERMIT APPLICATION #12649)

I have reviewed the modeling analysis submitted by Bluescape Environmental for the Ox Mountain Landfill Gas –to-Energy plant. The attached document summarizes my findings.

Based upon the emission estimates provided in the January 31, 2006 submittal the proposed project would meet all state and national CO and NO_2 ambient air quality standards. The air quality impact analysis was based on EPA approved models and calculation procedures, and was performed in accordance with Section 414 of the District's NSR Rule (Regulation 2, Rule 2).

SUMMARY OF AIR QUALITY IMPACT ANALYSIS FOR THE AMERESCO OX MOUNTAIN LANDFILL GAS-TO-ENERGY PLANT PROJECT

April 6, 2006

BACKGROUND

Ameresco Half Moon Bay, LLC has submitted a permit application (# 12649) for the installation of six landfill gas (LFG) fired Internal Combustion (IC) engines and generators and one flare. The gensets will recover energy from landfill gas in the form of electricity. The project is located in Half Moon Bay, CA with the following UTM coordinates (552.588 E, 4150.763 N). The proposed project will result in an increase in air pollutant emissions of NO_2 and CO, triggering regulatory requirements for an air quality impact analysis.

AIR QUALITY IMPACT ANALYSIS REQUIREMENTS

Requirements for air quality impact analysis are given in the District's New Source Review (NSR) Rule: Regulation 2, Rule 2.

The criteria pollutant annual worst case emissions for the Project are listed in Table I, along with the corresponding significant emission rates for an air quality impact analysis.

Table I
Comparison of proposed Project's annual worst case emissions to significant emission rates for air quality impact analysis

Pollutant	Proposed Project's Emissions (tons/year)	Significant Emission Rate (Reg-2-2-304 to 2-2-306)	EPA PSD Significant Emission Rates for major stationary sources (tons/year)	Significant emission rate?
NO_x	92.9	100	40	Yes
CO	324.8	100	100	Yes
PM_{10}	14.9	100	15	No
SO_x	29.2	100	40	No

Table I indicates that the proposed project emissions exceed the EPA significant emission levels for carbon monoxide (CO) – 324.8 tons/yr. Therefore, this source is classified as a major stationary source as defined under the Federal Clean Air Act. Because it is a major source, the air quality impact of the facility must be investigated for all pollutants emitted in quantities larger than the EPA PSD significant emission rates. The only additional pollutant that must be modeled is NO_x at 92.9 tons/yr. (The proposed Project's SO_2 and PM_{10} emissions are below the EPA PSD

significant emission rate.) The detailed requirements for an air quality impact analysis are given in Sections 304, 305 and 306 of the District's NSR Rule and 40 CFR 51.166 of the Code of Federal Regulations.

A facility that requires an air quality impact analysis must also, according to Section 417 of the NSR Rule, provide an analysis of the impact of the source and source-related growth on visibility, soils and vegetation. These analyses are also included in this report.

AIR QUALITY IMPACT ANALYSIS SUMMARY

The required contents of an air quality impact analysis are specified in Section 414 of Regulation 2, Rule 2. According to subsection 414.1, if the maximum air quality impacts of a new or modified stationary source do not exceed significant levels for air quality impacts, as defined in Section 2-2-233, no further analysis is required. (Consistent with EPA regulations, it is assumed that emission increases will not interfere with the attainment or maintenance of AAQS, or cause an exceedance of a PSD increment if the resulting maximum air quality impacts are less than specified significance levels). If the maximum impact for a particular pollutant is predicted to exceed the significant impact level, a full impact analysis is required that includes the estimation of background pollutant concentrations and, if applicable, a PSD increment consumption analysis. EPA also requires a Class I increment analysis of any PSD source which increases NO_2 or PM_{10} concentrations by 1 $\mu g/m^3$ or more (24-hour average) in a Class I area.

Air Quality Modeling Methodology

Maximum ambient concentrations of NO_2 and CO were estimated for various plume dispersion scenarios using established modeling procedures. The plume dispersion scenarios addressed include simple terrain impacts (for receptors located below stack height), complex terrain impacts (for receptors located at or above stack height), impacts due to building downwash, and impacts due to inversion breakup fumigation.

Emissions from the six IC engines will be exhausted from six 9.7 meter exhaust stacks. The flare will be exhausted from a 7.6 meter stack. Table II shows the emission rates used in the modeling analysis. These estimated emission rates are taken from the January 31, 2006 District PSD Air Quality Modeling Report submittal.

The EPA models SCREEN3 (version 96043) and ISCST3 (version 02035) were used in the air quality impacts analyses. A land use analysis of the facility and its surroundings showed that the use of the rural dispersion coefficients is appropriate. ISCST3 was run using three years of meteorological data (1990, 1993 and 1994) collected at the District Mt. Pise meteorological station located approximately 8 km southeast of the project site. The Mt Pise meteorological station is considered representative of the project site meteorology. Because the exhaust stacks are less than Good Engineering Practice (GEP) stack height, ambient impacts due to building downwash were evaluated. Inversion breakup fumigation was evaluated using the SCREEN3 model. The Project is located 3.8 km from the ocean, which is beyond the 3 km distance required to investigate shoreline fumigation.

Table II
Averaging period emission rates used in modeling analysis (g/s)

Pollutant/ Source	Maximum (1-hour)	Maximum (8-hour)	Maximum Annual Average
CO			
Each IC engine	1.562	1.562	—
Flare	0.302	0.302	—
NO_x			
Each IC engine	0.446	—	0.431
Flare	0.091	—	0.091

Air Quality Modeling Results

The maximum predicted ambient impacts are summarized in Table III. (The SCREEN3 inversion break-up fumigation analysis resulted in fumigation occurring at distances less than 2000 meters, and as a result it is believed that the fumigation concentration is not likely to exceed the unstable/limited mixing concentration estimated by the simple terrain screening procedure.) Shown in Figure 1 is the location of the maximum modeled impact. The corresponding significant ambient impact level listed in Section 233 of the District's NSR Rule is also shown in Table III. In accordance with Regulation 2-2-414 further analysis (a background air quality analysis) is required only if any of the modeled impacts are above the significant air quality impact levels. Table III shows that further analysis is required only for the 8-hour CO, 1-hour NO_2 and annual NO_2 modeled impacts.

Background Air Quality Levels

Regulation 2-2-111 entitled "Exemption, PSD Monitoring," exempts an applicant from the requirement of monitoring background concentrations in the impact area (section 414.3) provided the impacts from the proposed project are less than specified levels or if the existing ambient concentrations in the impact area are no greater than specified levels. Table IV lists the applicable exemption standard and the maximum impact from the proposed facility.

TABLE III
Maximum predicted ambient impacts of proposed project ($\mu g/m^3$)
[Overall maximum in bold type]

Pollutant	Avg. Time	ISCST3 Modeled Impact	Significant Air Quality Impact Level
CO	1-hour 8-hour	**1323** **581**	2000 500
NO_2	1-hour annual	**378**[a] **6.2**[b]	19 1.0

[a] For 1-hour NO2 it is conservatively assumed all NOx is NO_2
[b] The EPA default annual ambient NO_2/NOx ratio of 0.75 was used to adjust from NOx To NO_2

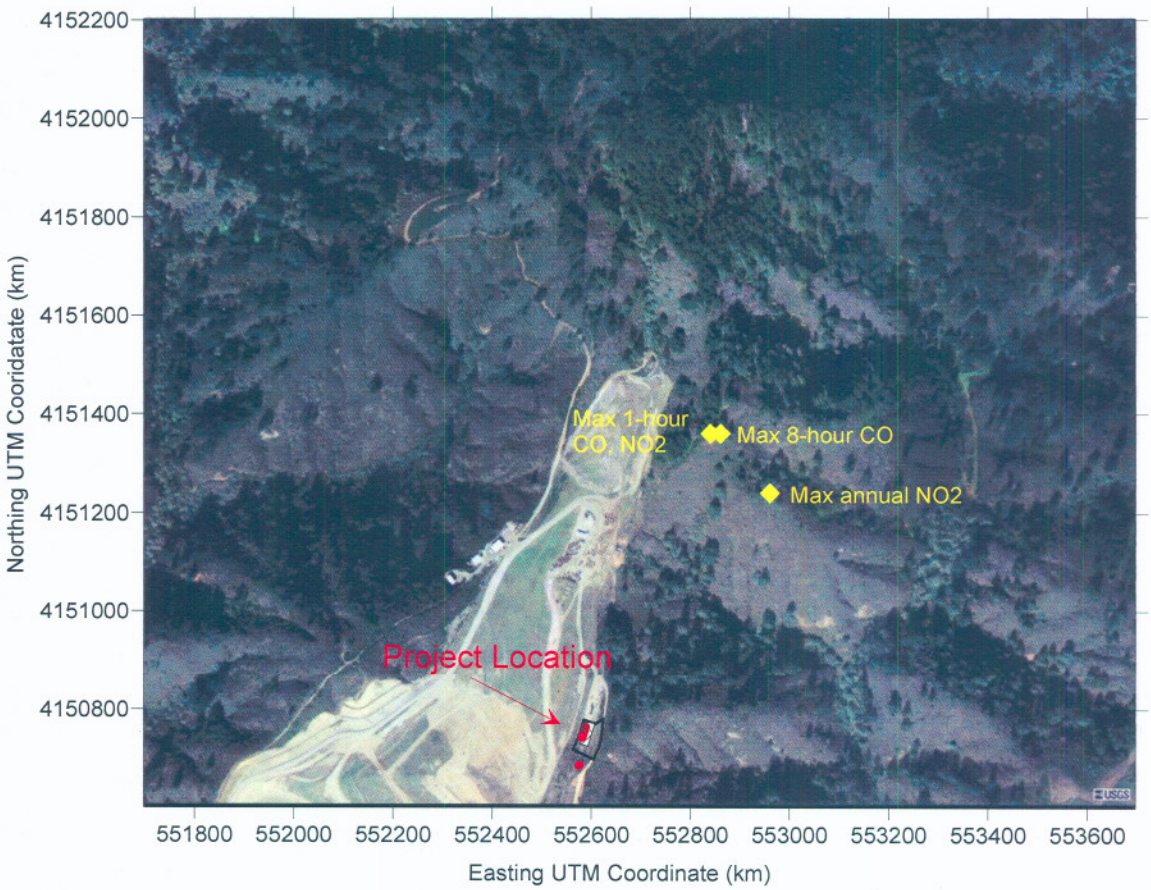

Figure 1. Map of the project area and location of maximum impact.

TABLE IV
PSD monitoring exemption levels and maximum impacts from the proposed project ($\mu g/m^3$)

Pollutant	Averaging Time	Exemption Level	Maximum Impacts from Proposed Project
CO	8-hour	575	581
NO_2	annual	14	6.2

As shown in Table IV, the NO_2 impact is well below the preconstruction monitoring threshold. The 8-hour CO impact is above the exemption level. Section 2.4 of Ambient Monitoring Guidelines for Prevention of Significant Deterioration (PSD) (EPA-450/4-87) states, however, that monitoring data from "regional sites" may be used in lieu of onsite data if the proposed source is in an area free from the impact of other point sources and area sources associated with other human activities. The Ameresco Half Moon Bay, LLC Project is such a project. The area immediately surrounding the landfill is remote. The nearest population center is Half Moon Bay, located about five km to the southeast of the project.

The Monterey Bay Unified Air Pollution Control District-operated Davenport Monitoring Station, located 57 km south-southeast of the project, was chosen as being conservatively representative of the regional background CO and NO_2 concentrations. Table V lists the concentrations measured at the station over the past 3 years (2003 through 2005). Also listed in Table V are background ozone concentrations.

TABLE V
Background CO, NO_2 and O_3 ($\mu g/m^3$) at the Davenport Monitoring Station for the past three years (maximum is in bold type)

	CO	NO_2		O_3
Year	Highest 8-hour	Highest 1-hour	Annual	Highest 1-hour
2003	1,838	**64.1**	—[a]	137.8
2004	**2,412**	60.4	**7.5**	**153.5**
2005	1,838	56.6	7.5	127.9

[a] Annual average NO_2 data capture rate 70 percent. Unable to determine 2003 annual average background concentration.

Background ozone (O_3) concentrations are required to use the Ozone Limiting Method (Cole and Summerhays, 1979) to convert project 1-hour NOx concentrations to 1-hour NO_2 concentrations. It is assumed ten percent of the maximum NOx concentration is thermally converted to NO_2. The remaining 90 percent is converted to NO_2 by the available ozone concentrations. If ozone concentrations exceed 90 percent of the maximum NO_2, then all of the NO would be converted to NO_2.

Table VI below contains the comparison of the ambient standards with the proposed project impacts added to the maximum background concentrations. The National Ambient Air Quality Standards and the California ambient air quality standards are not exceeded from the proposed project.

TABLE VI
California and national ambient air quality standards and ambient air quality levels from the proposed ($\mu g/m^3$)

Pollutant	Averaging Time	Maximum Background	Maximum project impact	Maximum project impact plus maximum background	California Standard	National Standard
CO	8-hour	2,412	581	2,993	10,000	10,000
NO_2	1-hour annual	64 7.5	191 6.2	255 13.7	470 —	— 100

PSD Increment Consumption Analysis

The impact from the proposed project exceeds the significance levels for 8-hour CO, 1-hour NO_2 and annual average NO_2. PSD increments have only been established by the EPA for annual average NO_2. PSD Increments are the maximum increases in concentration that are allowed to occur above baseline concentrations for each pollutant for which an increment has been established. The baseline concentrations are defined for each pollutant and averaging time, and are the ambient concentrations of each pollutant existing at the time that the first complete PSD application affecting the area is submitted. Federal regulations establish the dates after which major and minor source impacts on increment consumption need to be considered. Table VII contains the dates applicable to the proposed project. The District's emissions data bank was searched for all major sources that have had significant permitted increases in NO_2 since February 8, 1988 within 50 km of the impact area. The minor source baseline date is the earliest date after the trigger date on which a complete PSD application was received by the District. The District's emissions data bank was also searched for all minor sources that have had permitted increases in NO_2 since February 8, 1988 within 20 km of the impact area.

TABLE VII
Trigger dates for NO_2 for proposed project

Date	NO_2
Major Source Baseline Date	February 8, 1988
Trigger Date	February 8, 1988
Minor Source Baseline Date	July 1, 1988

An impact area, a circular area extending from the source to the most distant point where modeling indicates that the ambient impact will be significant, was established. Based on the modeling, an area approximately 3.1 km in radius surrounding the project site was identified as the area in which the proposed project could have a significant air quality impact on ambient NO_2 levels. As shown in Table VIII, the maximum modeled NO_2 increment consumption is 6.5 $\mu g/m^3$, which is below the allowable Class II Increment of 25.

TABLE VIII
Maximum modeled increment consumption for NO_2

Averaging Period	Maximum modeled increment consumed($\mu g/m^3$)	Class II Increment($\mu g/m^3$)
annual	6.5	25

CLASS I PSD INCREMENT ANALYSIS

EPA requires an increment analysis of any PSD source if it increases NO_2 or PM_{10} concentrations by 1 $\mu g/m^3$ or more (24-hour average) and if it is within 100 km of a Class I area. Pt. Reyes National Seashore is located 55 km to the north northwest of the project, and is the only Class I area within 100 km of the facility. A screening analysis showed that the maximum 24-hour NO_2 is 0.50 $\mu g/m^3$ within the Class I area. Therefore a Class I PSD increment consumption analysis is not required.

VISIBILITY, SOILS AND VEGETATION IMPACT ANALYSIS

Visibility impacts were assessed using EPA's VISCREEN (version 88341) visibility screening model. The Level I analysis shows that the proposed project will not cause any impairment of visibility at Point Reyes, the nearest Class I area.

The project maximum 1-hour average NO_2, including background, is 255 $\mu g/m^3$ (Table VI). This concentration is well below the California 1-hour average NO_2 standard of 470 $\mu g/m^3$. Crop damage from NO_2 requires exposure to concentrations higher than 470 $\mu g/m^3$ for periods longer than one hour.

Maximum project 1-hour NO_2 concentrations would be less than all of the applicable State and national primary and secondary ambient air quality standards, which are designed to protect the public welfare from any known or anticipated effects, including plant damage. Therefore, the facility's impact on soils and vegetation would be insignificant.

CONCLUSIONS

The results of the air quality impact analysis indicate that the proposed project would not interfere with the attainment or maintenance of applicable national ambient air quality standards for CO and NO_2. This analysis was based on EPA approved models and calculation procedures and was performed in accordance with Section 414 of the District's NSR Rule.

Appendix D

CEQA-Related Information

Form Appendix H

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
939 Ellis Street . . . San Francisco, CA 94109. . . (415) 749-4990 . . . FAX (415) 749-5030
Website: www.baaqmd.gov

APPENDIX H

ENVIRONMENTAL INFORMATION FORM

(To Be Completed By Applicant)

Date Filed: 5/16/05

General Information

1. Name and address of developer or project sponsor:
   Ameresco Half Moon Bay LLC, 111 Speen Street, Suite 410, Framingham, Massachusetts, 01701

2. Address of project: Ameresco Half Moon Bay LLC, 12310 San Mateo Road, Half Moon Bay, California, 94109

   Assessor's Block and Lot Number: _____

3. Name, address, and telephone number of person to be contacted concerning this project:
   Carl von Saltza, Director of Engineering, 48 Union Wharf, Portland, Maine 04101, (207) 842-6333

4. Indicate number of the permit application for the project to which this form pertains:
   N/A

5. List and describe any other related permits and other public approvals required for this project, including those required by city, regional, state, and federal agencies:
   CEQA Exemption from San Mateo County

6. Existing zoning district: _____

7. Proposed use of site (Project for which this form is filed):
   Landfill Gas-to-Energy Facility for production of power for use and/or sale at Ox Mountain Landfill

Project Description

8. Site size. **On existing Ox Mountain Landfill site.**
9. Square footage. **Approximately 20,000 square feet.**
10. Number of floors of construction. **N/A**
11. Amount of off-street parking provided. **N/A**
12. Attach plans. **See Figures 1-3**
13. Proposed scheduling. **Date of Initial Construction: October 2005**
    Date of Completion: December 2005
14. Associated project. **N/A**

15. Anticipated incremental development. **N/A**

16. If residential, include the number of units, schedule of unit sizes, range of sale prices or rents, and type of household size expected. **N/A**

17. If commercial, indicate the type, whether neighborhood, city or regionally oriented, square footage of sales area, and loading facilities. **N/A**

18. If industrial, indicate type, estimated employment per shift, and loading facilities. **LFGTE Facility, 2 employees, 40 hours per week**

19. If institutional, indicate the major function, estimated employment per shift, estimated occupancy, loading facilities, and community benefits to be derived from the project. **N/A**

20. If the project involves a variance, conditional use or rezoning application, state this and indicate clearly why the application is required. **N/A**

Are the following items applicable to the project or its effects? Discuss below all items checked yes. Attach additional sheets as necessary.

	Yes	No
21. Change in existing features of any bays, tidelands, beaches, or hills, or substantial alteration of ground contours.	☐	☒
22. Change in scenic views or vistas from existing residential areas or public lands or roads.	☐	☒
23. Change in pattern, scale or character of general area of project.	☐	☒
24. Significant amounts of solid waste or litter.	☐	☒
25. Change in dust, ash, smoke, fumes or odors in vicinity.	☐	☒
26. Change in ocean, bay, lake, stream or groundwater quality or quantity, or alteration of existing drainage patterns.	☐	☒
27. Substantial change in existing noise or vibration levels in the vicinity.	☐	☒
28. Site on filled land or on slope of 10 percent or more.	☐	☒
29. Use of disposal of potentially hazardous materials, such as toxic substances, flammables or explosives.	☐	☒
30. Substantial change in demand for municipal services (police, fire, water, sewage, etc.).	☐	☒
31. Substantially increase fossil fuel consumption (electricity, oil, natural gas, etc.).	☐	☒
32. Relationship to a larger project or series of projects.	☐	☒

Environmental Setting

33. Describe the project site as is exists before the project, including information on topography, soil stability, plants and animals, and any cultural, historical or scenic aspects. Describe any existing structures on the site, and the use of the structures. Attach photographs of the site. Snapshots or Polaroid photos will be accepted.

    The proposed LFGTE facility will be located at the existing Ox Mountain Landfill (Facility # A2266) which is currently under permit by the BAAQMD. Existing structures on site include buildings associated with the landfill which includes two LFG flare stations. Please note that the County of San Mateo will be the lead CEQA agency.

34. Describe the surrounding properties, including information on plants and animals and any cultural, historical or scenic aspects. Indicate the type of land use (residential, commercial, etc.), intensity of land use (one-family, apartment houses, shops, department stores, etc.), and scale of development (height, frontage, set-back, rear yard, etc.). Attach photographs of the vicinity. Snapshots or Polaroid photos will be accepted.

    The area surrounding the landfill is open space. The LFGTE facility will be approximately 400' from the property line. The land use surrounding the area is mixed commercial, residential, and agricultural. Again, please not that the County of San Mateo will be the lead CEQA agency for the project.

Certification

I hereby certify that the statements furnished above and in the attached exhibits present the data and information required for this initial evaluation to the best of my ability, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

5/17/05
Date

Carl von Salzer
Signature

For _____

(Note: This is only a suggested form. Public agencies are free to devise their own format for initial studies.)

Environmental Consultants

3050 Fite Circle
Suite 106
Sacramento, California 95827

PH. 916-361-1297
FAX 916-361-1299
www.scsengineers.com

SCS ENGINEERS

May 1, 2006
File No. 01203117.02, Task 2

Mr. Donald P. Van Buren
Air Quality Engineer II
Bay Area Air Quality Management District
939 Ellis Street
San Francisco, California 94109
(415) 749-4746

SUBJECT: CEQA NOTICE OF EXEMPTION FOR AMERESCO HALF MOON BAY LLC, OX MOUNTAIN LANDFILL, HALF MOON BAY, CALIFORNIA

Dear Mr. Van Buren:

On behalf of Ameresco Half Moon Bay, LLC (Ameresco), SCS Engineers (SCS) hereby submits this notice of exemption (attached) provided by the County of San Mateo, Planning and Building Division, in compliance with Section 21152 (b) of the Public Resource Code, California Environmental Quality Act (CEQA). The notice of exemption is for the Energy Co-Generation, landfill gas to energy (LFGTE) project located at 12310 San Mateo Road, Half Moon Bay, California. The attached shows that CEQA has been satisfied with the above project.

Sincerely,

Patrick S. Sullivan R.E.A C.C.P.
Vice President
SCS Engineers

Attachment: Notice of Exemption, San Mateo County Planning and Building Division

Cc: Carl von Saltza; Ameresco, w/attachment
Linda Nugent; Ameresco, w/attachment

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
MAY -3 AM 10:58
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Reason why project is exempt: [illegible]
existing industrial facilities.

Lead Agency Contact Person: J. CASTANEDA
Telephone: (650) 363-4161

Signature: _____ Date: 5/1/06

Name (printed): James A. Castañeda
Project Planner

(X) Signed by Lead Agency
( ) Signed by Applicant

fpincatexmpt

TOTAL P.02