

Summary Report

Landfill Name or Identifier: Davis Landfill

Date: Thursday, April 7, 2022

Description/Comments:

About LandGEM:

First-Order Decomposition Rate Equation:

$$Q_{CH_4} = \sum_{i=1}^n \sum_{j=0.1}^1 k L_o \left(\frac{M_i}{10} \right) e^{-k t_{ij}}$$

Where,

Q_{CH_4} = annual methane generation in the year of the calculation ($m^3/year$)

i = 1-year time increment

n = (year of the calculation) - (initial year of waste acceptance)

j = 0.1-year time increment

k = methane generation rate ($year^{-1}$)

L_o = potential methane generation capacity (m^3/Mg)

M_i = mass of waste accepted in the i^{th} year (Mg)

t_{ij} = age of the j^{th} section of waste mass M_i accepted in the i^{th} year (decimal years, e.g., 3.2 years)

LandGEM is based on a first-order decomposition rate equation for quantifying emissions from the decomposition of landfilled waste in municipal solid waste (MSW) landfills. The software provides a relatively simple approach to estimating landfill gas emissions. Model defaults are based on empirical data from U.S. landfills. Field test data can also be used in place of model defaults when available. Further guidance on EPA test methods, Clean Air Act (CAA) regulations, and other guidance regarding landfill gas emissions and control technology requirements can be found at <http://www.epa.gov/ttnatw01/landfill/landflpg.html>.

LandGEM is considered a screening tool — the better the input data, the better the estimates. Often, there are limitations with the available data regarding waste quantity and composition, variation in design and operating practices over time, and changes occurring over time that impact the emissions potential. Changes to landfill operation, such as operating under wet conditions through leachate recirculation or other liquid additions, will result in generating more gas at a faster rate. Defaults for estimating emissions for this type of operation are being developed to include in LandGEM along with defaults for conventional landfills (no leachate or liquid additions) for developing emission inventories and determining CAA applicability. Refer to the Web site identified above for future updates.

Input Review

LANDFILL CHARACTERISTICS

Landfill Open Year
 Landfill Closure Year (with 80-year limit)
Actual Closure Year (without limit)
 Have Model Calculate Closure Year?
 Waste Design Capacity

1953
2032
2044
Yes
9,560,442 *short tons*

The 80-year waste acceptance limit of the model has been exceeded before the Waste Design Capacity was reached. The model will assume the 80th year of waste acceptance as the final year to estimate emissions. See Section 2.6 of the User's Manual.

MODEL PARAMETERS

Methane Generation Rate, k
 Potential Methane Generation Capacity, L₀
 NMOC Concentration
 Methane Content

0.020 *year⁻¹*
170 *m³/Mg*
278 *ppmv as hexane*
50 *% by volume*

GASES / POLLUTANTS SELECTED

Gas / Pollutant #1: **Total landfill gas**
 Gas / Pollutant #2: **Methane**
 Gas / Pollutant #3: **Carbon dioxide**
 Gas / Pollutant #4: **NMOC**

WASTE ACCEPTANCE RATES

Year	Waste Accepted		Waste-In-Place	
	(Mg/year)	(short tons/year)	(Mg)	(short tons)
1953	805	885	0	0
1954	1,610	1,771	805	885
1955	2,415	2,656	2,415	2,656
1956	3,220	3,542	4,830	5,312
1957	4,025	4,427	8,049	8,854
1958	4,830	5,312	12,074	13,281
1959	5,634	6,198	16,903	18,594
1960	6,439	7,083	22,538	24,791
1961	7,244	7,969	28,977	31,875
1962	8,049	8,854	36,221	39,843
1963	8,854	9,740	44,271	48,698
1964	9,659	10,625	53,125	58,437
1965	10,464	11,510	62,784	69,062
1966	11,269	12,396	73,248	80,572
1967	12,074	13,281	84,516	92,968
1968	12,879	14,167	96,590	106,249
1969	13,684	15,052	109,469	120,416
1970	14,489	15,937	123,152	135,468
1971	15,293	16,823	137,641	151,405
1972	16,098	17,708	152,934	168,228
1973	16,903	18,594	169,033	185,936
1974	17,708	19,479	185,936	204,530
1975	18,513	20,364	203,644	224,009
1976	19,318	21,250	222,157	244,373
1977	20,123	22,135	241,475	265,623
1978	20,928	23,021	261,598	287,758
1979	21,733	23,906	282,526	310,779
1980	22,538	24,791	304,259	334,685
1981	23,343	25,677	326,797	359,476
1982	24,148	26,562	350,139	385,153
1983	24,952	27,448	374,287	411,716
1984	25,757	28,333	399,239	439,163
1985	26,562	29,219	424,997	467,496
1986	27,367	30,104	451,559	496,715
1987	28,172	30,989	478,926	526,819
1988	28,977	31,875	507,098	557,808
1989	29,782	32,760	536,076	589,683
1990	30,587	33,646	565,857	622,443
1991	31,392	34,531	596,444	656,089
1992	32,197	35,416	627,836	690,620

WASTE ACCEPTANCE RATES (Continued)

Year	Waste Accepted		Waste-In-Place	
	(Mg/year)	(short tons/year)	(Mg)	(short tons)
1993	33,002	36,302	660,033	726,036
1994	44,023	48,425	693,035	762,338
1995	66,146	72,761	737,057	810,763
1996	61,464	67,610	803,204	883,524
1997	88,406	97,247	864,667	951,134
1998	105,211	115,732	953,074	1,048,381
1999	124,006	136,407	1,058,285	1,164,113
2000	111,252	122,377	1,182,291	1,300,520
2001	135,454	148,999	1,293,543	1,422,897
2002	112,523	123,775	1,428,996	1,571,896
2003	109,197	120,117	1,541,519	1,695,671
2004	113,869	125,256	1,650,716	1,815,788
2005	122,781	135,059	1,764,585	1,941,044
2006	125,202	137,723	1,887,366	2,076,103
2007	140,941	155,035	2,012,569	2,213,826
2008	131,104	144,214	2,153,509	2,368,860
2009	131,904	145,094	2,284,613	2,513,074
2010	118,438	130,282	2,416,517	2,658,168
2011	116,910	128,601	2,534,955	2,788,450
2012	122,335	134,568	2,651,865	2,917,051
2013	106,825	117,507	2,774,199	3,051,619
2014	127,957	140,753	2,881,024	3,169,126
2015	157,009	172,710	3,008,981	3,309,879
2016	149,468	164,415	3,165,990	3,482,589
2017	204,769	225,246	3,315,459	3,647,004
2018	243,017	267,319	3,520,228	3,872,250
2019	287,079	315,787	3,763,245	4,139,569
2020	257,385	283,124	4,050,324	4,455,356
2021	186,864	205,550	4,307,709	4,738,480
2022	186,864	205,550	4,494,573	4,944,030
2023	186,864	205,550	4,681,437	5,149,580
2024	186,864	205,550	4,868,300	5,355,130
2025	186,864	205,550	5,055,164	5,560,680
2026	186,864	205,550	5,242,028	5,766,230
2027	186,864	205,550	5,428,891	5,971,780
2028	186,864	205,550	5,615,755	6,177,330
2029	186,864	205,550	5,802,619	6,382,880
2030	186,864	205,550	5,989,482	6,588,430
2031	186,864	205,550	6,176,346	6,793,980
2032	186,864	205,550	6,363,209	6,999,530

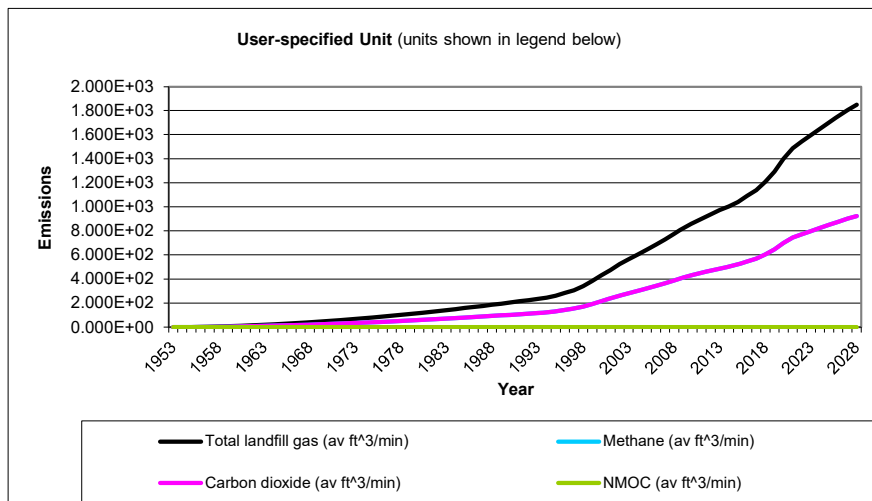
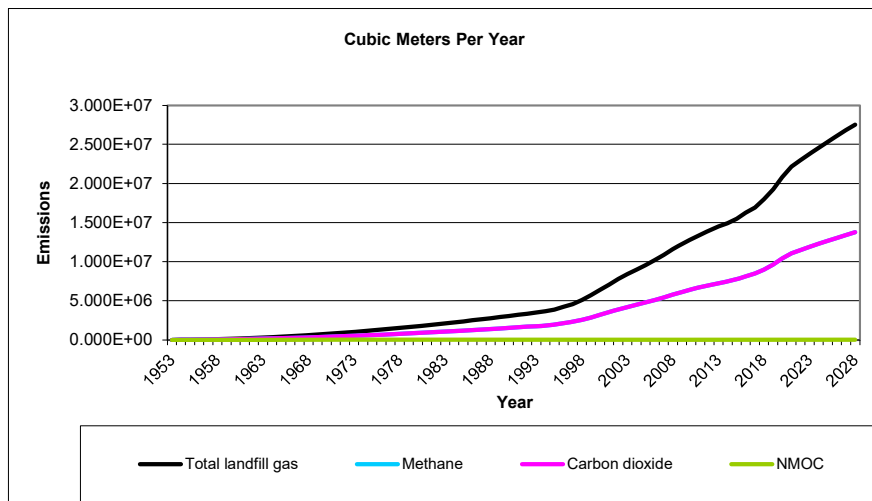
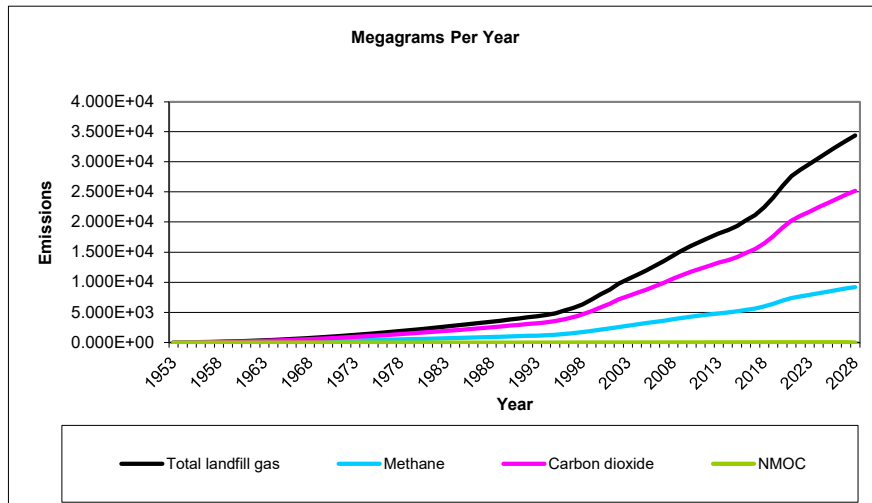
Pollutant Parameters

Gas / Pollutant Default Parameters:				User-specified Pollutant Parameters:	
	Compound	Concentration (ppmv)	Molecular Weight	Concentration (ppmv)	Molecular Weight
Gases	Total landfill gas		0.00		
	Methane		16.04		
	Carbon dioxide		44.01		
	NMOC	4,000	86.18		
Pollutants	1,1,1-Trichloroethane (methyl chloroform) - HAP	0.48	133.41		
	1,1,2,2-Tetrachloroethane - HAP/VOC	1.1	167.85		
	1,1-Dichloroethane (ethylidene dichloride) - HAP/VOC	2.4	98.97		
	1,1-Dichloroethene (vinylidene chloride) - HAP/VOC	0.20	96.94		
	1,2-Dichloroethane (ethylene dichloride) - HAP/VOC	0.41	98.96		
	1,2-Dichloropropane (propylene dichloride) - HAP/VOC	0.18	112.99		
	2-Propanol (isopropyl alcohol) - VOC	50	60.11		
	Acetone	7.0	58.08		
	Acrylonitrile - HAP/VOC	6.3	53.06		
	Benzene - No or Unknown Co-disposal - HAP/VOC	1.9	78.11		
	Benzene - Co-disposal - HAP/VOC	11	78.11		
	Bromodichloromethane - VOC	3.1	163.83		
	Butane - VOC	5.0	58.12		
	Carbon disulfide - HAP/VOC	0.58	76.13		
	Carbon monoxide	140	28.01		
	Carbon tetrachloride - HAP/VOC	4.0E-03	153.84		
	Carbonyl sulfide - HAP/VOC	0.49	60.07		
	Chlorobenzene - HAP/VOC	0.25	112.56		
	Chlorodifluoromethane	1.3	86.47		
	Chloroethane (ethyl chloride) - HAP/VOC	1.3	64.52		
	Chloroform - HAP/VOC	0.03	119.39		
	Chloromethane - VOC	1.2	50.49		
	Dichlorobenzene - (HAP for para isomer/VOC)	0.21	147		
	Dichlorodifluoromethane	16	120.91		
	Dichlorofluoromethane - VOC	2.6	102.92		
	Dichloromethane (methylene chloride) - HAP	14	84.94		
	Dimethyl sulfide (methyl sulfide) - VOC	7.8	62.13		
	Ethane	890	30.07		
	Ethanol - VOC	27	46.08		

Pollutant Parameters (Continued)

<i>Gas / Pollutant Default Parameters:</i>				<i>User-specified Pollutant Parameters:</i>	
	Compound	Concentration (ppmv)	Molecular Weight	Concentration (ppmv)	Molecular Weight
Pollutants	Ethyl mercaptan (ethanethiol) - VOC	2.3	62.13		
	Ethylbenzene - HAP/VOC	4.6	106.16		
	Ethylene dibromide - HAP/VOC	1.0E-03	187.88		
	Fluorotrichloromethane - VOC	0.76	137.38		
	Hexane - HAP/VOC	6.6	86.18		
	Hydrogen sulfide	36	34.08		
	Mercury (total) - HAP	2.9E-04	200.61		
	Methyl ethyl ketone - HAP/VOC	7.1	72.11		
	Methyl isobutyl ketone - HAP/VOC	1.9	100.16		
	Methyl mercaptan - VOC	2.5	48.11		
	Pentane - VOC	3.3	72.15		
	Perchloroethylene (tetrachloroethylene) - HAP	3.7	165.83		
	Propane - VOC	11	44.09		
	t-1,2-Dichloroethene - VOC	2.8	96.94		
	Toluene - No or Unknown Co-disposal - HAP/VOC	39	92.13		
	Toluene - Co-disposal - HAP/VOC	170	92.13		
	Trichloroethylene (trichloroethene) - HAP/VOC	2.8	131.40		
	Vinyl chloride - HAP/VOC	7.3	62.50		
	Xylenes - HAP/VOC	12	106.16		

Graphs



Results

Year	Total landfill gas			Methane		
	(Mg/year)	(m ³ /year)	(av ft ³ /min)	(Mg/year)	(m ³ /year)	(av ft ³ /min)
1953	0	0	0	0	0	0
1954	6.774E+00	5.424E+03	3.645E-01	1.809E+00	2.712E+03	1.822E-01
1955	2.019E+01	1.617E+04	1.086E+00	5.393E+00	8.083E+03	5.431E-01
1956	4.011E+01	3.212E+04	2.158E+00	1.071E+01	1.606E+04	1.079E+00
1957	6.641E+01	5.318E+04	3.573E+00	1.774E+01	2.659E+04	1.787E+00
1958	9.897E+01	7.925E+04	5.325E+00	2.644E+01	3.963E+04	2.662E+00
1959	1.377E+02	1.102E+05	7.406E+00	3.677E+01	5.511E+04	3.703E+00
1960	1.823E+02	1.460E+05	9.811E+00	4.871E+01	7.301E+04	4.905E+00
1961	2.329E+02	1.865E+05	1.253E+01	6.222E+01	9.326E+04	6.266E+00
1962	2.893E+02	2.316E+05	1.556E+01	7.727E+01	1.158E+05	7.782E+00
1963	3.513E+02	2.813E+05	1.890E+01	9.384E+01	1.407E+05	9.450E+00
1964	4.189E+02	3.354E+05	2.254E+01	1.119E+02	1.677E+05	1.127E+01
1965	4.919E+02	3.939E+05	2.646E+01	1.314E+02	1.969E+05	1.323E+01
1966	5.702E+02	4.566E+05	3.068E+01	1.523E+02	2.283E+05	1.534E+01
1967	6.537E+02	5.235E+05	3.517E+01	1.746E+02	2.617E+05	1.759E+01
1968	7.424E+02	5.945E+05	3.994E+01	1.983E+02	2.972E+05	1.997E+01
1969	8.361E+02	6.695E+05	4.498E+01	2.233E+02	3.348E+05	2.249E+01
1970	9.347E+02	7.485E+05	5.029E+01	2.497E+02	3.742E+05	2.514E+01
1971	1.038E+03	8.313E+05	5.585E+01	2.773E+02	4.156E+05	2.793E+01
1972	1.146E+03	9.179E+05	6.167E+01	3.062E+02	4.589E+05	3.084E+01
1973	1.259E+03	1.008E+06	6.774E+01	3.363E+02	5.041E+05	3.387E+01
1974	1.376E+03	1.102E+06	7.405E+01	3.676E+02	5.511E+05	3.703E+01
1975	1.498E+03	1.200E+06	8.061E+01	4.002E+02	5.998E+05	4.030E+01
1976	1.624E+03	1.301E+06	8.739E+01	4.339E+02	6.503E+05	4.370E+01
1977	1.755E+03	1.405E+06	9.441E+01	4.687E+02	7.026E+05	4.720E+01
1978	1.889E+03	1.513E+06	1.017E+02	5.047E+02	7.564E+05	5.083E+01
1979	2.028E+03	1.624E+06	1.091E+02	5.417E+02	8.120E+05	5.456E+01
1980	2.171E+03	1.738E+06	1.168E+02	5.798E+02	8.691E+05	5.840E+01
1981	2.318E+03	1.856E+06	1.247E+02	6.190E+02	9.279E+05	6.234E+01
1982	2.468E+03	1.976E+06	1.328E+02	6.592E+02	9.882E+05	6.639E+01
1983	2.622E+03	2.100E+06	1.411E+02	7.005E+02	1.050E+06	7.055E+01
1984	2.780E+03	2.226E+06	1.496E+02	7.427E+02	1.113E+06	7.480E+01
1985	2.942E+03	2.356E+06	1.583E+02	7.859E+02	1.178E+06	7.915E+01
1986	3.108E+03	2.488E+06	1.672E+02	8.300E+02	1.244E+06	8.360E+01
1987	3.276E+03	2.624E+06	1.763E+02	8.751E+02	1.312E+06	8.814E+01
1988	3.449E+03	2.761E+06	1.855E+02	9.211E+02	1.381E+06	9.277E+01
1989	3.624E+03	2.902E+06	1.950E+02	9.680E+02	1.451E+06	9.749E+01
1990	3.803E+03	3.045E+06	2.046E+02	1.016E+03	1.523E+06	1.023E+02
1991	3.985E+03	3.191E+06	2.144E+02	1.064E+03	1.596E+06	1.072E+02
1992	4.170E+03	3.339E+06	2.244E+02	1.114E+03	1.670E+06	1.122E+02
1993	4.359E+03	3.490E+06	2.345E+02	1.164E+03	1.745E+06	1.173E+02
1994	4.550E+03	3.644E+06	2.448E+02	1.215E+03	1.822E+06	1.224E+02
1995	4.831E+03	3.868E+06	2.599E+02	1.290E+03	1.934E+06	1.299E+02
1996	5.292E+03	4.237E+06	2.847E+02	1.413E+03	2.119E+06	1.424E+02
1997	5.704E+03	4.568E+06	3.069E+02	1.524E+03	2.284E+06	1.534E+02
1998	6.335E+03	5.073E+06	3.409E+02	1.692E+03	2.536E+06	1.704E+02
1999	7.095E+03	5.682E+06	3.817E+02	1.895E+03	2.841E+06	1.909E+02
2000	7.998E+03	6.405E+06	4.303E+02	2.136E+03	3.202E+06	2.152E+02
2001	8.776E+03	7.028E+06	4.722E+02	2.344E+03	3.514E+06	2.361E+02
2002	9.743E+03	7.801E+06	5.242E+02	2.602E+03	3.901E+06	2.621E+02

Results (Continued)

Year	Total landfill gas			Methane		
	(Mg/year)	(m ³ /year)	(av ft ³ /min)	(Mg/year)	(m ³ /year)	(av ft ³ /min)
2003	1.050E+04	8.405E+06	5.647E+02	2.804E+03	4.203E+06	2.824E+02
2004	1.121E+04	8.975E+06	6.030E+02	2.994E+03	4.487E+06	3.015E+02
2005	1.194E+04	9.564E+06	6.426E+02	3.190E+03	4.782E+06	3.213E+02
2006	1.274E+04	1.020E+07	6.855E+02	3.403E+03	5.101E+06	3.427E+02
2007	1.354E+04	1.084E+07	7.286E+02	3.617E+03	5.422E+06	3.643E+02
2008	1.446E+04	1.158E+07	7.780E+02	3.863E+03	5.790E+06	3.890E+02
2009	1.528E+04	1.223E+07	8.220E+02	4.081E+03	6.117E+06	4.110E+02
2010	1.609E+04	1.288E+07	8.654E+02	4.296E+03	6.440E+06	4.327E+02
2011	1.676E+04	1.342E+07	9.019E+02	4.478E+03	6.712E+06	4.510E+02
2012	1.742E+04	1.395E+07	9.370E+02	4.652E+03	6.973E+06	4.685E+02
2013	1.810E+04	1.449E+07	9.738E+02	4.835E+03	7.247E+06	4.869E+02
2014	1.864E+04	1.493E+07	1.003E+03	4.979E+03	7.463E+06	5.015E+02
2015	1.935E+04	1.549E+07	1.041E+03	5.168E+03	7.747E+06	5.205E+02
2016	2.029E+04	1.624E+07	1.091E+03	5.419E+03	8.122E+06	5.457E+02
2017	2.114E+04	1.693E+07	1.138E+03	5.648E+03	8.465E+06	5.688E+02
2018	2.245E+04	1.798E+07	1.208E+03	5.996E+03	8.988E+06	6.039E+02
2019	2.405E+04	1.926E+07	1.294E+03	6.424E+03	9.628E+06	6.469E+02
2020	2.599E+04	2.081E+07	1.398E+03	6.942E+03	1.041E+07	6.991E+02
2021	2.764E+04	2.213E+07	1.487E+03	7.383E+03	1.107E+07	7.435E+02
2022	2.867E+04	2.295E+07	1.542E+03	7.657E+03	1.148E+07	7.711E+02
2023	2.967E+04	2.376E+07	1.596E+03	7.925E+03	1.188E+07	7.982E+02
2024	3.066E+04	2.455E+07	1.649E+03	8.188E+03	1.227E+07	8.247E+02
2025	3.162E+04	2.532E+07	1.701E+03	8.446E+03	1.266E+07	8.506E+02
2026	3.257E+04	2.608E+07	1.752E+03	8.699E+03	1.304E+07	8.761E+02
2027	3.350E+04	2.682E+07	1.802E+03	8.947E+03	1.341E+07	9.011E+02
2028	3.440E+04	2.755E+07	1.851E+03	9.190E+03	1.377E+07	9.255E+02
2029	3.530E+04	2.826E+07	1.899E+03	9.428E+03	1.413E+07	9.495E+02
2030	3.617E+04	2.896E+07	1.946E+03	9.661E+03	1.448E+07	9.730E+02
2031	3.703E+04	2.965E+07	1.992E+03	9.890E+03	1.482E+07	9.961E+02
2032	3.787E+04	3.032E+07	2.037E+03	1.011E+04	1.516E+07	1.019E+03
2033	3.869E+04	3.098E+07	2.082E+03	1.033E+04	1.549E+07	1.041E+03
2034	3.792E+04	3.037E+07	2.040E+03	1.013E+04	1.518E+07	1.020E+03
2035	3.717E+04	2.977E+07	2.000E+03	9.929E+03	1.488E+07	1.000E+03
2036	3.644E+04	2.918E+07	1.960E+03	9.732E+03	1.459E+07	9.802E+02
2037	3.571E+04	2.860E+07	1.922E+03	9.540E+03	1.430E+07	9.608E+02
2038	3.501E+04	2.803E+07	1.883E+03	9.351E+03	1.402E+07	9.417E+02
2039	3.431E+04	2.748E+07	1.846E+03	9.166E+03	1.374E+07	9.231E+02
2040	3.363E+04	2.693E+07	1.810E+03	8.984E+03	1.347E+07	9.048E+02
2041	3.297E+04	2.640E+07	1.774E+03	8.806E+03	1.320E+07	8.869E+02
2042	3.232E+04	2.588E+07	1.739E+03	8.632E+03	1.294E+07	8.693E+02
2043	3.168E+04	2.536E+07	1.704E+03	8.461E+03	1.268E+07	8.521E+02
2044	3.105E+04	2.486E+07	1.670E+03	8.293E+03	1.243E+07	8.352E+02
2045	3.043E+04	2.437E+07	1.637E+03	8.129E+03	1.218E+07	8.187E+02
2046	2.983E+04	2.389E+07	1.605E+03	7.968E+03	1.194E+07	8.025E+02
2047	2.924E+04	2.341E+07	1.573E+03	7.810E+03	1.171E+07	7.866E+02
2048	2.866E+04	2.295E+07	1.542E+03	7.656E+03	1.148E+07	7.710E+02
2049	2.809E+04	2.250E+07	1.512E+03	7.504E+03	1.125E+07	7.558E+02
2050	2.754E+04	2.205E+07	1.482E+03	7.356E+03	1.103E+07	7.408E+02
2051	2.699E+04	2.161E+07	1.452E+03	7.210E+03	1.081E+07	7.261E+02
2052	2.646E+04	2.119E+07	1.423E+03	7.067E+03	1.059E+07	7.117E+02
2053	2.593E+04	2.077E+07	1.395E+03	6.927E+03	1.038E+07	6.977E+02

Results (Continued)

Year	Total landfill gas			Methane		
	(Mg/year)	(m ³ /year)	(av ft ³ /min)	(Mg/year)	(m ³ /year)	(av ft ³ /min)
2054	2.542E+04	2.036E+07	1.368E+03	6.790E+03	1.018E+07	6.838E+02
2055	2.492E+04	1.995E+07	1.341E+03	6.656E+03	9.976E+06	6.703E+02
2056	2.442E+04	1.956E+07	1.314E+03	6.524E+03	9.779E+06	6.570E+02
2057	2.394E+04	1.917E+07	1.288E+03	6.395E+03	9.585E+06	6.440E+02
2058	2.347E+04	1.879E+07	1.263E+03	6.268E+03	9.395E+06	6.313E+02
2059	2.300E+04	1.842E+07	1.238E+03	6.144E+03	9.209E+06	6.188E+02
2060	2.255E+04	1.805E+07	1.213E+03	6.022E+03	9.027E+06	6.065E+02
2061	2.210E+04	1.770E+07	1.189E+03	5.903E+03	8.848E+06	5.945E+02
2062	2.166E+04	1.735E+07	1.165E+03	5.786E+03	8.673E+06	5.827E+02
2063	2.123E+04	1.700E+07	1.142E+03	5.672E+03	8.501E+06	5.712E+02
2064	2.081E+04	1.667E+07	1.120E+03	5.559E+03	8.333E+06	5.599E+02
2065	2.040E+04	1.634E+07	1.098E+03	5.449E+03	8.168E+06	5.488E+02
2066	2.000E+04	1.601E+07	1.076E+03	5.341E+03	8.006E+06	5.379E+02
2067	1.960E+04	1.570E+07	1.055E+03	5.235E+03	7.848E+06	5.273E+02
2068	1.921E+04	1.538E+07	1.034E+03	5.132E+03	7.692E+06	5.168E+02
2069	1.883E+04	1.508E+07	1.013E+03	5.030E+03	7.540E+06	5.066E+02
2070	1.846E+04	1.478E+07	9.931E+02	4.931E+03	7.391E+06	4.966E+02
2071	1.809E+04	1.449E+07	9.735E+02	4.833E+03	7.244E+06	4.867E+02
2072	1.774E+04	1.420E+07	9.542E+02	4.737E+03	7.101E+06	4.771E+02
2073	1.738E+04	1.392E+07	9.353E+02	4.643E+03	6.960E+06	4.676E+02
2074	1.704E+04	1.364E+07	9.168E+02	4.551E+03	6.822E+06	4.584E+02
2075	1.670E+04	1.337E+07	8.986E+02	4.461E+03	6.687E+06	4.493E+02
2076	1.637E+04	1.311E+07	8.808E+02	4.373E+03	6.555E+06	4.404E+02
2077	1.605E+04	1.285E+07	8.634E+02	4.286E+03	6.425E+06	4.317E+02
2078	1.573E+04	1.260E+07	8.463E+02	4.202E+03	6.298E+06	4.231E+02
2079	1.542E+04	1.235E+07	8.295E+02	4.118E+03	6.173E+06	4.148E+02
2080	1.511E+04	1.210E+07	8.131E+02	4.037E+03	6.051E+06	4.066E+02
2081	1.481E+04	1.186E+07	7.970E+02	3.957E+03	5.931E+06	3.985E+02
2082	1.452E+04	1.163E+07	7.812E+02	3.879E+03	5.814E+06	3.906E+02
2083	1.423E+04	1.140E+07	7.658E+02	3.802E+03	5.698E+06	3.829E+02
2084	1.395E+04	1.117E+07	7.506E+02	3.726E+03	5.586E+06	3.753E+02
2085	1.367E+04	1.095E+07	7.357E+02	3.653E+03	5.475E+06	3.679E+02
2086	1.340E+04	1.073E+07	7.212E+02	3.580E+03	5.367E+06	3.606E+02
2087	1.314E+04	1.052E+07	7.069E+02	3.509E+03	5.260E+06	3.534E+02
2088	1.288E+04	1.031E+07	6.929E+02	3.440E+03	5.156E+06	3.464E+02
2089	1.262E+04	1.011E+07	6.792E+02	3.372E+03	5.054E+06	3.396E+02
2090	1.237E+04	9.908E+06	6.657E+02	3.305E+03	4.954E+06	3.329E+02
2091	1.213E+04	9.712E+06	6.525E+02	3.240E+03	4.856E+06	3.263E+02
2092	1.189E+04	9.520E+06	6.396E+02	3.175E+03	4.760E+06	3.198E+02
2093	1.165E+04	9.331E+06	6.270E+02	3.113E+03	4.666E+06	3.135E+02

Results (Continued)

Year	Carbon dioxide			NMOC		
	(Mg/year)	(m ³ /year)	(av ft ³ /min)	(Mg/year)	(m ³ /year)	(av ft ³ /min)
1953	0	0	0	0	0	0
1954	4.965E+00	2.712E+03	1.822E-01	5.402E-03	1.507E+00	1.013E-04
1955	1.480E+01	8.083E+03	5.431E-01	1.610E-02	4.491E+00	3.017E-04
1956	2.940E+01	1.606E+04	1.079E+00	3.198E-02	8.923E+00	5.995E-04
1957	4.867E+01	2.659E+04	1.787E+00	5.296E-02	1.477E+01	9.926E-04
1958	7.253E+01	3.963E+04	2.662E+00	7.892E-02	2.202E+01	1.479E-03
1959	1.009E+02	5.511E+04	3.703E+00	1.098E-01	3.062E+01	2.057E-03
1960	1.336E+02	7.301E+04	4.905E+00	1.454E-01	4.056E+01	2.725E-03
1961	1.707E+02	9.326E+04	6.266E+00	1.857E-01	5.182E+01	3.481E-03
1962	2.120E+02	1.158E+05	7.782E+00	2.307E-01	6.435E+01	4.324E-03
1963	2.575E+02	1.407E+05	9.450E+00	2.801E-01	7.815E+01	5.251E-03
1964	3.070E+02	1.677E+05	1.127E+01	3.340E-01	9.318E+01	6.260E-03
1965	3.605E+02	1.969E+05	1.323E+01	3.922E-01	1.094E+02	7.352E-03
1966	4.179E+02	2.283E+05	1.534E+01	4.546E-01	1.268E+02	8.522E-03
1967	4.791E+02	2.617E+05	1.759E+01	5.213E-01	1.454E+02	9.771E-03
1968	5.441E+02	2.972E+05	1.997E+01	5.920E-01	1.651E+02	1.110E-02
1969	6.128E+02	3.348E+05	2.249E+01	6.667E-01	1.860E+02	1.250E-02
1970	6.850E+02	3.742E+05	2.514E+01	7.453E-01	2.079E+02	1.397E-02
1971	7.608E+02	4.156E+05	2.793E+01	8.278E-01	2.309E+02	1.552E-02
1972	8.401E+02	4.589E+05	3.084E+01	9.140E-01	2.550E+02	1.713E-02
1973	9.228E+02	5.041E+05	3.387E+01	1.004E+00	2.801E+02	1.882E-02
1974	1.009E+03	5.511E+05	3.703E+01	1.097E+00	3.062E+02	2.057E-02
1975	1.098E+03	5.998E+05	4.030E+01	1.195E+00	3.333E+02	2.239E-02
1976	1.190E+03	6.503E+05	4.370E+01	1.295E+00	3.613E+02	2.428E-02
1977	1.286E+03	7.026E+05	4.720E+01	1.399E+00	3.903E+02	2.623E-02
1978	1.385E+03	7.564E+05	5.083E+01	1.506E+00	4.203E+02	2.824E-02
1979	1.486E+03	8.120E+05	5.456E+01	1.617E+00	4.511E+02	3.031E-02
1980	1.591E+03	8.691E+05	5.840E+01	1.731E+00	4.829E+02	3.245E-02
1981	1.698E+03	9.279E+05	6.234E+01	1.848E+00	5.155E+02	3.464E-02
1982	1.809E+03	9.882E+05	6.639E+01	1.968E+00	5.490E+02	3.689E-02
1983	1.922E+03	1.050E+06	7.055E+01	2.091E+00	5.834E+02	3.920E-02
1984	2.038E+03	1.113E+06	7.480E+01	2.217E+00	6.185E+02	4.156E-02
1985	2.156E+03	1.178E+06	7.915E+01	2.346E+00	6.545E+02	4.398E-02
1986	2.277E+03	1.244E+06	8.360E+01	2.478E+00	6.913E+02	4.645E-02
1987	2.401E+03	1.312E+06	8.814E+01	2.612E+00	7.288E+02	4.897E-02
1988	2.527E+03	1.381E+06	9.277E+01	2.750E+00	7.671E+02	5.154E-02
1989	2.656E+03	1.451E+06	9.749E+01	2.890E+00	8.062E+02	5.417E-02
1990	2.787E+03	1.523E+06	1.023E+02	3.032E+00	8.460E+02	5.684E-02
1991	2.921E+03	1.596E+06	1.072E+02	3.178E+00	8.865E+02	5.956E-02
1992	3.056E+03	1.670E+06	1.122E+02	3.325E+00	9.277E+02	6.233E-02
1993	3.195E+03	1.745E+06	1.173E+02	3.476E+00	9.696E+02	6.515E-02
1994	3.335E+03	1.822E+06	1.224E+02	3.628E+00	1.012E+03	6.801E-02
1995	3.540E+03	1.934E+06	1.299E+02	3.852E+00	1.075E+03	7.220E-02
1996	3.878E+03	2.119E+06	1.424E+02	4.219E+00	1.177E+03	7.909E-02
1997	4.181E+03	2.284E+06	1.534E+02	4.548E+00	1.269E+03	8.526E-02
1998	4.643E+03	2.536E+06	1.704E+02	5.051E+00	1.409E+03	9.469E-02
1999	5.200E+03	2.841E+06	1.909E+02	5.657E+00	1.578E+03	1.060E-01
2000	5.862E+03	3.202E+06	2.152E+02	6.378E+00	1.779E+03	1.195E-01
2001	6.432E+03	3.514E+06	2.361E+02	6.998E+00	1.952E+03	1.312E-01
2002	7.140E+03	3.901E+06	2.621E+02	7.768E+00	2.167E+03	1.456E-01

Results (Continued)

Year	Carbon dioxide			NMOC		
	(Mg/year)	(m ³ /year)	(av ft ³ /min)	(Mg/year)	(m ³ /year)	(av ft ³ /min)
2003	7.693E+03	4.203E+06	2.824E+02	8.370E+00	2.335E+03	1.569E-01
2004	8.214E+03	4.487E+06	3.015E+02	8.937E+00	2.493E+03	1.675E-01
2005	8.754E+03	4.782E+06	3.213E+02	9.524E+00	2.657E+03	1.785E-01
2006	9.338E+03	5.101E+06	3.427E+02	1.016E+01	2.834E+03	1.904E-01
2007	9.925E+03	5.422E+06	3.643E+02	1.080E+01	3.013E+03	2.024E-01
2008	1.060E+04	5.790E+06	3.890E+02	1.153E+01	3.217E+03	2.161E-01
2009	1.120E+04	6.117E+06	4.110E+02	1.218E+01	3.398E+03	2.283E-01
2010	1.179E+04	6.440E+06	4.327E+02	1.283E+01	3.578E+03	2.404E-01
2011	1.229E+04	6.712E+06	4.510E+02	1.337E+01	3.729E+03	2.506E-01
2012	1.276E+04	6.973E+06	4.685E+02	1.389E+01	3.874E+03	2.603E-01
2013	1.327E+04	7.247E+06	4.869E+02	1.443E+01	4.026E+03	2.705E-01
2014	1.366E+04	7.463E+06	5.015E+02	1.486E+01	4.147E+03	2.786E-01
2015	1.418E+04	7.747E+06	5.205E+02	1.543E+01	4.304E+03	2.892E-01
2016	1.487E+04	8.122E+06	5.457E+02	1.618E+01	4.513E+03	3.032E-01
2017	1.550E+04	8.465E+06	5.688E+02	1.686E+01	4.703E+03	3.160E-01
2018	1.645E+04	8.988E+06	6.039E+02	1.790E+01	4.993E+03	3.355E-01
2019	1.762E+04	9.628E+06	6.469E+02	1.918E+01	5.350E+03	3.594E-01
2020	1.905E+04	1.041E+07	6.991E+02	2.072E+01	5.781E+03	3.884E-01
2021	2.026E+04	1.107E+07	7.435E+02	2.204E+01	6.148E+03	4.131E-01
2022	2.101E+04	1.148E+07	7.711E+02	2.286E+01	6.377E+03	4.284E-01
2023	2.175E+04	1.188E+07	7.982E+02	2.366E+01	6.600E+03	4.435E-01
2024	2.247E+04	1.227E+07	8.247E+02	2.444E+01	6.819E+03	4.582E-01
2025	2.317E+04	1.266E+07	8.506E+02	2.521E+01	7.034E+03	4.726E-01
2026	2.387E+04	1.304E+07	8.761E+02	2.597E+01	7.245E+03	4.868E-01
2027	2.455E+04	1.341E+07	9.011E+02	2.671E+01	7.451E+03	5.006E-01
2028	2.521E+04	1.377E+07	9.255E+02	2.743E+01	7.653E+03	5.142E-01
2029	2.587E+04	1.413E+07	9.495E+02	2.814E+01	7.852E+03	5.275E-01
2030	2.651E+04	1.448E+07	9.730E+02	2.884E+01	8.046E+03	5.406E-01
2031	2.714E+04	1.482E+07	9.961E+02	2.952E+01	8.236E+03	5.534E-01
2032	2.775E+04	1.516E+07	1.019E+03	3.019E+01	8.423E+03	5.660E-01
2033	2.835E+04	1.549E+07	1.041E+03	3.085E+01	8.606E+03	5.783E-01
2034	2.779E+04	1.518E+07	1.020E+03	3.024E+01	8.436E+03	5.668E-01
2035	2.724E+04	1.488E+07	1.000E+03	2.964E+01	8.269E+03	5.556E-01
2036	2.670E+04	1.459E+07	9.802E+02	2.905E+01	8.105E+03	5.446E-01
2037	2.617E+04	1.430E+07	9.608E+02	2.848E+01	7.945E+03	5.338E-01
2038	2.566E+04	1.402E+07	9.417E+02	2.791E+01	7.787E+03	5.232E-01
2039	2.515E+04	1.374E+07	9.231E+02	2.736E+01	7.633E+03	5.129E-01
2040	2.465E+04	1.347E+07	9.048E+02	2.682E+01	7.482E+03	5.027E-01
2041	2.416E+04	1.320E+07	8.869E+02	2.629E+01	7.334E+03	4.928E-01
2042	2.368E+04	1.294E+07	8.693E+02	2.577E+01	7.189E+03	4.830E-01
2043	2.321E+04	1.268E+07	8.521E+02	2.526E+01	7.046E+03	4.734E-01
2044	2.276E+04	1.243E+07	8.352E+02	2.476E+01	6.907E+03	4.641E-01
2045	2.230E+04	1.218E+07	8.187E+02	2.427E+01	6.770E+03	4.549E-01
2046	2.186E+04	1.194E+07	8.025E+02	2.379E+01	6.636E+03	4.459E-01
2047	2.143E+04	1.171E+07	7.866E+02	2.332E+01	6.504E+03	4.370E-01
2048	2.101E+04	1.148E+07	7.710E+02	2.285E+01	6.376E+03	4.284E-01
2049	2.059E+04	1.125E+07	7.558E+02	2.240E+01	6.249E+03	4.199E-01
2050	2.018E+04	1.103E+07	7.408E+02	2.196E+01	6.126E+03	4.116E-01
2051	1.978E+04	1.081E+07	7.261E+02	2.152E+01	6.004E+03	4.034E-01
2052	1.939E+04	1.059E+07	7.117E+02	2.110E+01	5.885E+03	3.954E-01
2053	1.901E+04	1.038E+07	6.977E+02	2.068E+01	5.769E+03	3.876E-01

Results (Continued)

Year	Carbon dioxide			NMOC		
	(Mg/year)	(m ³ /year)	(av ft ³ /min)	(Mg/year)	(m ³ /year)	(av ft ³ /min)
2054	1.863E+04	1.018E+07	6.838E+02	2.027E+01	5.655E+03	3.799E-01
2055	1.826E+04	9.976E+06	6.703E+02	1.987E+01	5.543E+03	3.724E-01
2056	1.790E+04	9.779E+06	6.570E+02	1.947E+01	5.433E+03	3.650E-01
2057	1.755E+04	9.585E+06	6.440E+02	1.909E+01	5.325E+03	3.578E-01
2058	1.720E+04	9.395E+06	6.313E+02	1.871E+01	5.220E+03	3.507E-01
2059	1.686E+04	9.209E+06	6.188E+02	1.834E+01	5.117E+03	3.438E-01
2060	1.652E+04	9.027E+06	6.065E+02	1.798E+01	5.015E+03	3.370E-01
2061	1.620E+04	8.848E+06	5.945E+02	1.762E+01	4.916E+03	3.303E-01
2062	1.588E+04	8.673E+06	5.827E+02	1.727E+01	4.819E+03	3.238E-01
2063	1.556E+04	8.501E+06	5.712E+02	1.693E+01	4.723E+03	3.174E-01
2064	1.525E+04	8.333E+06	5.599E+02	1.659E+01	4.630E+03	3.111E-01
2065	1.495E+04	8.168E+06	5.488E+02	1.627E+01	4.538E+03	3.049E-01
2066	1.466E+04	8.006E+06	5.379E+02	1.594E+01	4.448E+03	2.989E-01
2067	1.436E+04	7.848E+06	5.273E+02	1.563E+01	4.360E+03	2.930E-01
2068	1.408E+04	7.692E+06	5.168E+02	1.532E+01	4.274E+03	2.872E-01
2069	1.380E+04	7.540E+06	5.066E+02	1.502E+01	4.189E+03	2.815E-01
2070	1.353E+04	7.391E+06	4.966E+02	1.472E+01	4.106E+03	2.759E-01
2071	1.326E+04	7.244E+06	4.867E+02	1.443E+01	4.025E+03	2.704E-01
2072	1.300E+04	7.101E+06	4.771E+02	1.414E+01	3.945E+03	2.651E-01
2073	1.274E+04	6.960E+06	4.676E+02	1.386E+01	3.867E+03	2.598E-01
2074	1.249E+04	6.822E+06	4.584E+02	1.359E+01	3.790E+03	2.547E-01
2075	1.224E+04	6.687E+06	4.493E+02	1.332E+01	3.715E+03	2.496E-01
2076	1.200E+04	6.555E+06	4.404E+02	1.305E+01	3.642E+03	2.447E-01
2077	1.176E+04	6.425E+06	4.317E+02	1.280E+01	3.570E+03	2.398E-01
2078	1.153E+04	6.298E+06	4.231E+02	1.254E+01	3.499E+03	2.351E-01
2079	1.130E+04	6.173E+06	4.148E+02	1.229E+01	3.430E+03	2.304E-01
2080	1.108E+04	6.051E+06	4.066E+02	1.205E+01	3.362E+03	2.259E-01
2081	1.086E+04	5.931E+06	3.985E+02	1.181E+01	3.295E+03	2.214E-01
2082	1.064E+04	5.814E+06	3.906E+02	1.158E+01	3.230E+03	2.170E-01
2083	1.043E+04	5.698E+06	3.829E+02	1.135E+01	3.166E+03	2.127E-01
2084	1.022E+04	5.586E+06	3.753E+02	1.112E+01	3.103E+03	2.085E-01
2085	1.002E+04	5.475E+06	3.679E+02	1.090E+01	3.042E+03	2.044E-01
2086	9.824E+03	5.367E+06	3.606E+02	1.069E+01	2.982E+03	2.003E-01
2087	9.629E+03	5.260E+06	3.534E+02	1.048E+01	2.923E+03	1.964E-01
2088	9.438E+03	5.156E+06	3.464E+02	1.027E+01	2.865E+03	1.925E-01
2089	9.251E+03	5.054E+06	3.396E+02	1.007E+01	2.808E+03	1.887E-01
2090	9.068E+03	4.954E+06	3.329E+02	9.866E+00	2.752E+03	1.849E-01
2091	8.889E+03	4.856E+06	3.263E+02	9.671E+00	2.698E+03	1.813E-01
2092	8.713E+03	4.760E+06	3.198E+02	9.479E+00	2.645E+03	1.777E-01
2093	8.540E+03	4.666E+06	3.135E+02	9.292E+00	2.592E+03	1.742E-01