

## **Appendix F**

### **Economic Impact Analysis Methodology**



## Appendix F

### Economic Impact Analysis Methodology

#### A. Limitations and Scope of This Analysis

Landfills vary in size, geometry, deposited waste composition, type of cover, topography, surrounding area geological characteristics, and local climate. These factors and others act in dynamic combination to affect both the rate of landfill gas production and its duration.

Due to the complex interaction of the above-mentioned factors, comprehensive site assessments are performed as a preliminary step in developing a design plan for installation of a landfill gas collection and control system. A site assessment includes on-site measurement and analyses of the above-mentioned factors that influence collection and control system design. ARB staff acknowledges that these steps are critical in designing and implementing a collection and control system. When examining landfills as an entire statewide emission source category, ARB does not have the resources to perform individual site assessments and prepare comprehensive design plans for all of the affected landfills in order to develop cost estimates.

ARB cost estimates are based on average or typical costs for the operations or actions necessary to comply with the proposed regulation, with the caveats and limitations inherent in using average or typical cost information; it is acknowledged that the actual costs to an affected landfill may be lower or higher than estimated, but the total cost to all affected landfills is expected to be consistent with stated estimates.

The individual landfill compliance threshold trigger dates stated in this analysis are generated for cost estimation purposes only and are not intended to indicate actual compliance dates. Actual compliance dates for individual landfills should be determined by the methods specified in the proposed regulation.

It should be noted that this analysis assumes the scenario where the sole compliance control method used is enclosed flare technology. Many landfills, especially larger ones, successfully employ various alternative technologies to use the captured landfill gas to generate energy for use at the landfill or for other purposes. Due to the specialized nature and objectives of these projects and their costs, no attempt was made to include these projects in the cost analysis nor predict the future rate at which landfills operators may choose this compliance option. To the extent that these projects produce a profit, compliance costs may be reduced for those landfill operations that choose this type of compliance option.

The analysis approach method used for this proposed regulation is consistent with methodologies used for other air quality regulations, but differs from the traditional analysis approach typically used in engineering economic analyses. In traditional

engineering economic analyses, analysis methods are used to determine the point at which a selected parameter is maximized while the cost is minimized (highest cost/benefit ratio). This approach is not used in this analysis. For this and other air quality regulations, the setting of air quality standards or levels are primarily based upon technical feasibility determinations and maximizing public health protection, with compliance costs being a secondary concern.

This analysis is an estimate of the incremental cost of the proposed regulation to both businesses (private) and government agencies (local, State, federal, tribal, and military). Incremental costs are the costs (or savings) to an affected landfill resulting from compliance actions required by the proposed regulation. These costs do not include the normal cost of operation ("cost of doing business") encountered without the proposed regulations' requirements.

## **B. Methodology**

Using individual landfill data obtained from the California Integrated Waste Management Board (CIWMB) (CIWMB, 2009), the 218 affected California landfills were separated into two categories, those that are estimated to be subject to reporting requirements only, and those that would be subject to reporting requirements as well as monitoring and possibly control requirements. The data used to determine the appropriate cost category included: waste-in-place (WIP) in tons projected for the year 2020 (target year for emission reductions for this proposed regulation under the AB 32 guidelines), landfill opening and closing (projected if still open) dates, existing control type (if any), local air district location (used to determine appropriate monitoring costs), and design size (acres). Costs for these two categories were calculated separately.

Table F-1 (next page) shows the cost categories and the parameters that place landfills into those categories.

**Table F-1. Landfill Cost Categories  
(with > 450,000 Tons WIP and >= 3.0 MM Btu/hr)**

<b>Cost Category</b>	<b>Applicability</b>
Capital (initial)	- Uncontrolled Landfills - Landfills w/ Open Flares <sup>1</sup>
Operation and Maintenance	- Uncontrolled Landfills - Landfills w/ Open Flares
Monitoring	- Controlled Landfills - Uncontrolled Landfills - Landfills w/ Open Flares
Reporting	- All Affected Landfills

1. Treated as a separate category because these landfills are required to install enclosed flares (with associated costs) by 2018.

**C. Costs to Landfills Subject to Reporting Only Requirements**

For the landfills forecast to be subject only to the reporting requirements of the proposed regulation (72 landfills), the costs were determined based on forecast waste-in-place data and calculated annual gas heat capacity. This group of landfills was further divided into two subgroups, those expected to need to file waste-in-place reports only (32 landfills) and those expected to file both report types (40 landfills). Neither subgroup is projected to need to comply with the monitoring requirements nor install gas collection and control systems.

The cost calculations for both the waste-in-place and landfill gas heat input capacity reports are shown on Worksheet 3 (Cost Subtotals) under Items 1 and 2. The labor rates selected are the mean hourly rates from the United States Bureau of Labor Statistics, for the San Francisco-Oakland-Fremont, California area (highest cost area of California) (USDL, 2009a). Since these labor rates are the latest available (May 2007), they are adjusted to year 2008 dollars using Adjustment Factor 1 in Table F-2 on the next page. An adjustment for benefits, etc., is made using Adjustment Factor 2, an assumed 50 percent markup of labor costs to estimate the cost to an employer of an employee (USDL, 2009b). The markup was based on observed labor markup rates of 37 percent to 46 percent for federal, State, and local government employment, as well as for the private sector. The Adjusted Rates are used for hourly labor costs in this analysis.

**Table F-2. Adjusted Hourly Labor Rates**

<b>Occupation</b>	<b>Unadjusted Rate (\$/hr)</b>	<b>Adjustment Factor 1</b>	<b>Adjustment Factor 2</b>	<b>Adjusted Rate (\$/hr)</b>
Civil Engineer <sup>1</sup>	39.22	1.05	1.5	61.77
Civil Engineering Technician <sup>2</sup>	30.10	1.05	1.5	41.41
Secretaries, Exc. Legal, Medical, and Exec. <sup>1</sup>	27.84	1.05	1.5	43.85

1. These rates are used to calculate the reporting costs.
2. This rate is used to calculate monitoring costs.

For preparation and submittal of both types of reports, it is assumed that the services of both a Civil Engineer and a Secretary will be needed. The waste-in-place reports required by the proposed regulation are also required by CIWMB on a less frequent basis than ARB; it is expected that the same report (with suitable updating) can be submitted to satisfy the waste-in-place requirement.

The per-report cost is used along with the operational status (open or closed/inactive) data for the affected landfills to determine the total reporting cost per landfill and also by owner/operator status (private and government) categories.

**D. Costs to Landfills Subject to Reporting, Monitoring, and Control Requirements**

Affected landfills in this group are potentially subject to incur compliance costs in all four of the cost categories listed in Table F-1.

Each affected landfill is listed in Worksheet 2 (MSW-Accepting Landfills Forecast to be Subject to Control Requirements); under each listing are four rows, each corresponding to one of the cost categories. (Unit costs are itemized and calculated on Worksheet 3 (Cost Subtotals.)) These rows are used to calculate the cost for that category for the landfill, if it is expected to incur expenses in that category. These calculations are as follows:

**First Row:** Used to calculate lump-sum and uniform annual payments for capital expenditure for landfills that will: 1) Need to install collection/control systems (landfills with no existing controls or carbon adsorption control), or 2) Those that will need to install enclosed flares (those currently equipped with open flares) by 2018, per the proposed regulation's requirements. Landfills with existing combustion control systems are expected to meet the proposed regulation's control efficiency requirements without incurring any additional costs, so for these landfills this row is blank.

1) Collection and control system costs for landfills with no existing collection and control systems are calculated using the maximum waste footprint (expressed in acres) supplied by CIWMB and multiplied by a per-acre cost (USEPA, 2009). The per-acre

cost is adjusted to year 2008 dollars under Heading 5a (Installation of New Collection and Control System--Capital Cost Landfills) on Worksheet 3 (Cost Subtotals).

2) For landfills that will need to install enclosed flares, the predicted maximum heat input (in MMBtu/hr) is used to look up the appropriate enclosed flare cost information on Worksheet 3 under Heading 4, Upgrade of Existing Collection/Control System--Capital Cost. It should be noted that these costs are approximate, given the instability of material and labor costs, as well as site specific issues such as electrical service costs. It is assumed that none of the landfills with open flares will be able to continue operating them after the year 2018 (though under certain conditions it may be permissible to do so), and that all open flares will be replaced with enclosed flares in the year 2018.

For both control scenarios listed under 1) and 2) above, a 15-year amortization period is assumed, and the costs are expressed as a series of uniform payments starting in the compliance year. These costs are for the design, siting, and initial equipment costs only; annual operation and maintenance costs are discussed in the next section.

**Second Row:** Used to calculate annual operation and maintenance (O&M) costs. For landfills that will need to install collection and control systems or upgrade to an enclosed flare, operation and maintenance costs are considered a compliance cost. This is due to the assumption that these costs were either previously not incurred by the landfill or were at a significantly lower level, in the case of open flares. O&M costs are calculated as the product of the maximum waste footprint of the landfill (expressed in acres) multiplied by a per-acre cost (U.S. EPA, 2009) adjusted to year 2008 dollars. Also included in the total O&M cost is an allowance (\$25,000/yr) for an annual emissions source test, which is typically required by a local air district as a permit condition.

As with the capital costs discussed in the First Row above, landfills with existing combustion control systems are expected to meet the proposed regulation's control efficiency requirements without incurring any additional O&M costs, so for these landfills this row is labeled "Existing".

**Third Row:** This row is used to calculate monitoring costs. Costs for emission monitoring are calculated using the rates on Worksheet 3, under Item 3b, Surface Emissions/Control & Collection System Monitoring--Cost per Landfill-Acre. Emission monitoring work may be performed by landfill operations staff or outsourced. Due to the lack of data on the current extent of outsourced monitoring work as well as the recognition that the extent may change over time (as landfills decide to outsource the work or bring it in-house, or vice-versa), this analysis assumes that all landfills will perform their own monitoring work, and that the work will be performed by a Civil Engineering Technician (see Table F-2 for hourly rate).

Note that two different per-landfill acre rates are used, one for landfills located in the SCAQMD, and a second for all others. Different rates are used due to the differences in expected compliance actions.

Landfills in the SCAQMD are currently performing surface and collection/control equipment emission monitoring that is substantially equivalent to the requirements of the proposed regulation. Compliance for these SCAQMD landfills also includes landfill surface integrity repair work (landfill cover repairs) to mitigate emissions and meet the emission limits under SCAQMD Rule 1150.1. For these reasons, the additional or incremental cost for monitoring and surface integrity work to comply with the proposed regulation is expected to be significantly less than that for non-SCAQMD landfills.

The monitoring cost rate for non-SCAQMD landfills takes into account an increased amount of monitoring time per acre to meet a more stringent standard than either local air district (non-SCAQMD) or U.S. EPA standards. In addition to a higher monitoring cost rate, a \$50/acre average allowance for increased landfill surface integrity work (landfill cover repairs) is included. This allowance is included to account for increased landfill surface repair work necessary to meet the emission standards of the proposed regulation. It is an assumption based on landfill cover repair cost allowances submitted in selected reviewed landfill closure plans; there are several variables influencing the actual cost, which cannot be predicted with any degree of certainty. These variables include: availability of on-site heavy equipment such as loaders, graders, etc. (availability more common for open landfills); need to contract out surface repair work, i.e., bring in equipment and personnel to do work; availability of fill material; and present and future condition of the landfill cover.

Monitoring costs for all landfills include a one-time, upfront \$48,000 allowance for purchasing monitoring and related calibration equipment, though it is recognized that many landfills already subject to emission monitoring requirements may already possess monitoring equipment or have contracts in place for monitoring work.

**Fourth Row:** Used to calculate the reporting costs incurred by a landfill. The same methodology is used as for the landfills in the Reporting Only cost category, please see Section C above for an explanation of the calculation process.

The compliance costs in each of the four categories described above are summed by category at the bottom of Worksheet 2 for all affected landfills and also by ownership status (for businesses and government agencies).

## **E. Total Cost of Proposed Regulation to Businesses and Government Agencies**

The total cost of the proposed regulation (except for enforcement and related costs to ARB) to directly-affected businesses and government agencies is summarized in Worksheet 9.

Costs to State agencies (other than those related to compliance by affected landfills) are outlined and calculated in Sections 6a through 6e of Worksheet 3 (Cost Subtotals.) These non-landfill related State agency costs are only expected to be incurred by ARB



in activities related to the enforcement, monitoring, compliance, and outreach efforts related to the proposed regulation.

## References for Appendix F

- CIWMB, 2009. California Integrated Waste Management Board. Solid Waste Information System file downloaded from:  
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- Locke, 2009a. April 7, 2009 e-mail correspondence from Tim Locke, John Zink Company, to Jon Manji, ARB.
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- USDL, 2009b. United States Department of Labor, Bureau of Labor Statistics. News Release: Employer Costs for Employee Compensation--December 2008. USDL: 09-247. March 12, 2009.
- U.S. EPA, 2009. United States Environmental Protection Agency, Landfill Methane Outreach Program. LFG Energy Project Development Handbook, Chapter 4, Project Economics and Financing, pg. 4-3. Online Publication: Website Accessed, March 23, 2009. [http://epa.gov/lmop/res/pdf/pdh\\_chapter4.pdf](http://epa.gov/lmop/res/pdf/pdh_chapter4.pdf)

This Excel file with 5 spreadsheets, is part of Appendix F, STAFF REPORT: INITIAL STATEMENT OF REASONS FOR THE PROPOSED REGULATION TO REDUCE METHANE EMISSIONS FROM MUNICIPAL SOLID WASTE LANDFILLS

California Air Resources Board, Sacramento, CA

**Description of Terms and Columns (also see Excel comment boxes on worksheets)**

<b>Name</b>	<b>Description</b>
CO	County Number
AB	Air Basin Abbreviation
DIS	District Abbreviation
CIWMB SWIS File Number	California Integrated Waste Management Board (CIWMB) Solid Waste Information System (SWIS) ID
#	A number to indicate how many landfills are in that row (usually 1, but sometimes 2 or 3 may be grouped into a single row)
Facility/Site Name	From SWIS
Open Year	From SWIS or Survey, where it is red and in parenthesis, it means this was not available and ARB estimated it.
Close Year	From SWIS or Survey
1990 WIP (Tons)	Cumulative Waste-In-Place (WIP) for all years up to 1990 in short tons (Tons)
2005 WIP (Tons)	Cumulative Waste-In-Place (WIP) for all years up to 2005 in short tons (Tons)
"Current" 2006 Control Type	Type of control for captured LFG (based on the most current 2006 CIWMB data or Survey data)
2020 Reductions	Estimate of reductions from each landfill if they install gas collection with combustion as the control method
<u>File Index</u>	<u>(Worksheet Tab Name)/Worksheet Title</u>
	(Read Me)/This is the worksheet that you are now reading.
Worksheet 1	(Landfills_(All))/Total Number of CA MSW-Accepting Landfills
Worksheet 2	(Landfills_Controlled)/MSW-Accepting Landfills Forecast to be Subject to Control Requirements
Worksheet 3	(Cost_Subtotals)/Cost Subtotals
Worksheet 4	(Cost-Effectiveness)/Estimated Cost-Effectiveness
Worksheet 5	(Cost_Summary)/Cost Summary

Worksheet 1			Total Number of CA MSW-Accepting Landfills											
			3/19/2009											
Source: California Integrated Waste Management Board														
<b>Landfill Model CH4 Emissions (April 3, 2008)</b>														
CO	AB	DIS	CIWMB SWIS File Number	Count <sup>a</sup>	Facility/Site Name	Max. Waste Footprint (acres)	Open Year <sup>b</sup>	Close Year	1990 WIP (Tons)	2006 WIP (Tons)	2020 WIP (Tons)	Year LFG Capture	"Current" 2006 Control Type	
19	SC	SC	19-AK-0084	1	Paramount Dump	17.4	1921	1948	250,000	250,000	250,000	2004	Venting	
19	SC	SC	19-AA-0580	1	Blanchard Street Dump	20	1931	1958	250,000	250,000	250,000			
19	SC	SC	19-AQ-0005 19-AQ-0014	2	BKK Carson	300	1948	1959	500,000	500,000	500,000			
37	SD	SD	37-AA-0026	1	Mission Bay Landfill #1	115	1952	1959	750,000	750,000	750,000			
19	SC	SC	19-AA-0581	1	Cogen	28	1951	1959	750,000	750,000	750,000			
19	SC	SC	19-AQ-0010	1	Garden Valley 1 and 2	29	1932	1959	3,000,000	3,000,000	3,000,000			
36	SC	SC	36-CR-0059	1	Waterman LF	24	1933	1960	300,000	300,000	300,000	2006	Combustion	
30	SC	SC	30-AB-0356 30-AB-0359	2	Longsdon Pit	12	1957	1960	400,000	400,000	400,000			
19	SC	SC	19-AK-5004	1	City Dump & Salvage 2	8	1934	1961	75,000	75,000	75,000	2004	Venting	
19	SC	SC	19-AK-5017	1	City Dump & Salvage 4	9	1934	1961	80,000	80,000	80,000	2004	Venting	
30	SC	SC	30-AB-0166	1	Sparks-Rains LF	18	1934	1961	258,300	258,300	258,300	1999	Combustion	
19	SC	SC	19-AR-1199	1	Branford LF	160	1957	1961	435,000	435,000	435,000			
19	SC	SC	19-AK-5003	1	City Dump & Salvage 1 & 3	100	1940	1961	1,000,000	1,000,000	1,000,000	1995	Combustion	
37	SD	SD	37-AA-0027	1	Hillsborough	16	1935	1962	350,000	350,000	350,000	1996	Combustion	
30	SC	SC	30-AB-0014	1	Gothard Street Landfill	11	1956	1962	813,200	813,200	813,200	2000	Venting	
37	SD	SD	37-AA-0017	1	Duck Pond	2.5	1936	1963	25,000	25,000	25,000	1996	Combustion	
19	SC	SC	19-CR-5517	1	Gaffey St.	17	1955	1963	900,000	900,000	900,000	2000	Carbon	
19	SC	SC	19-AA-0778	1	Russell Moe Landfill	20	1937	1964	250,000	250,000	250,000			
30	SC	SC	30-CR-0063	1	Lane Road Disposal Station 21	106	1961	1964	584,000	584,000	584,000			
34	SV	SAC	34-CR-5047	1	Elvas Avenue DS	10	1938	1965	75,000	75,000	75,000			
19	SC	SC	19-AQ-0016	1	Gardena Valley #6 (Don Kott Ford)	7.7	1938	1965	165,000	165,000	165,000	2000	Combustion	
19	SC	SC	19-AR-5036	1	Gregg Pit/Pick-Your-Part	100	1938	1965	500,000	500,000	500,000	1993	Combustion	
19	SC	SC	19-AQ-0012	1	Cal Compact/Metro LF	157	1959	1965	3,000,000	3,000,000	3,000,000	2000	Combustion	
19	SC	SC	19-AA-5321	1	Torrance Municipal Dump	15	1939	1966	150,000	150,000	150,000			
30	SC	SC	30-CR-0020	1	Villa Park		1962	1966	200,000	200,000	200,000	1996	Combustion	
37	SD	SD	37-CR-0088	1	Bell Jr. High/Sweetwater II	9	1939	1966	250,000	250,000	250,000	1994	Combustion	
30	SC	SC	30-AB-0168	1	Newport Terrace LF	17	1940	1967	150,000	150,000	150,000	2004	Venting	
19	SC	SC	19-AQ-0009	1	Southwest Conservation District LF	24	1941	1968	400,000	400,000	400,000	1995	Combustion	
37	SD	SD	37-AO-0009	1	Old San Marcos	24	1941	1968	400,000	400,000	400,000			
42	SCC	SB	42-CR-0015	1	Ballard Canyon	10	1942	1969	50,000	50,000	50,000			
21	SF	BA	21-AA-0047	1	Horst Hanf Landfill/Bayview Park	13.5	1942	1969	50,000	50,000	50,000	2004	Venting	
37	SD	SD	37-AK-0006	1	Maxon St.	15	1942	1969	150,000	150,000	150,000	1990	Combustion	
37	SD	SD	37-AK-0001	1	Mission Ave. SLF	15	1942	1969	200,000	200,000	200,000	1990	Combustion	
30	SC	SC	30-CR-0096	1	Cannery Street Disposal Station #16	20	1957	1969	496,584	496,584	496,584			
19	SC	SC	19-AR-5068	1	Bishop Canyon LF	45	1966	1969	1,660,000	1,660,000	1,660,000	2004	Venting	
19	SC	SC	19-AA-5560	1	Industry Hills Sheraton Resort	101	1960	1969	3,500,000	3,500,000	3,500,000	1990	Combustion	
31	SV	PLA	31-AA-0624	1	Rocklin Pit	3.9	1943	1970	10,000	10,000	10,000	2004	Venting	
42	SCC	SB	42-CR-0014	1	Santa Ynez Airport LF	10	1943	1970	50,000	50,000	50,000	2006	Combustion	
43	SF	BA	43-AN-0011	1	Hellyer Park LF	16	1943	1970	400,000	400,000	400,000	1998	Combustion	
34	SV	SAC	34-AA-0023	1	Gerber Road LF	75	1944	1971	460,000	460,000	460,000			
56	SCC	VEN	56-AA-0125	1	Tierra Rejada	25	1945	1972	400,000	400,000	400,000			
41	SF	BA	41-AA-0003	1	Sierra Point	80	1945	1972	400,000	400,000	400,000	2004	Venting	

Landfill Model CH4 Emissions (April 3, 2008)													
CO	AB	DIS	CIWMB SWIS File Number	Count <sup>a</sup>	Facility/Site Name	Max. Waste Footprint (acres)	Open Year <sup>b</sup>	Close Year	1990 WIP (Tons)	2006 WIP (Tons)	2020 WIP (Tons)	Year LFG Capture	"Current" 2006 Control Type
9	LT	ED	09-CR-0015	1	Meyers LF	7.4	1946	1973	50,000	50,000	50,000		
34	SV	SAC	34-AA-0016	1	14th Avenue Landfill (East/West Pits)	27	1946	1973	250,000	250,000	250,000	2004	Venting
37	SD	SD	37-AA-0033	1	South Miramar Sanitary Landfill	122	1950	1973	3,000,000	3,000,000	3,000,000	1993	Combustion
37	SD	SD	37-AA-0429	1	Arizona St.	64	1952	1974	2,000,000	2,000,000	2,000,000	1993	Combustion
19	SC	SC	19-AA-0835	1	Sheldon-Arleta	42	1962	1974	5,500,000	5,500,000	5,500,000	1990	Combustion
21	SF	BA	21-AA-0049	1	Hamilton AFB Landfill #26	20	1948	1975	100,000	100,000	100,000	2004	Venting
37	SD	SD	37-AA-0018	1	Poway	12	1948	1975	165,000	165,000	165,000	1997	Combustion
37	SD	SD	37-AA-0019	1	Gillespie	12	1948	1975	165,000	165,000	165,000	1997	Combustion
19	SC	SC	19-AA-5350	1	City Of Santa Monica LF #2	15	1948	1975	200,000	200,000	200,000	1999	Carbon
37	SD	SD	37-AA-0434	1	Paradise Park/Sweetwater III	20	1948	1975	200,000	200,000	200,000		
37	SD	SD	37-AH-0002	1	Palomar Airport	70	1962	1975	1,000,000	1,000,000	1,000,000	1995	Combustion
31	SV	PLA	31-AA-0220	1	Lincoln Disposal Site	6.3	1949	1976	50,000	50,000	50,000		
30	SC	SC	30-AB-0366	1	Forster Canyon Landfill	50	1958	1976	1,350,000	1,350,000	1,350,000		
19	SC	SC	19-AA-0011	1	Compton Disposal Site	17.9	1950	1977	200,000	200,000	200,000		
12	NC	NCU	12-AA-0022	1	Table Bluff LF	20	1950	1977	200,000	200,000	200,000		
37	SD	SD	37-AA-0016	1	Encinitas	30	1967	1977	585,000	585,000	585,000	1997	Combustion
37	SD	SD	37-AA-0002	1	Valley Center	25	1951	1978	130,000	130,000	130,000	1998	Combustion
19	SC	SC	19-AA-0587	1	Longden Ave Disposal Site	54	1955	1978	1,000,000	1,000,000	1,000,000	1991	Venting
37	SD	SD	37-AA-0001	1	Jamacha	46	1960	1978	1,800,000	1,800,000	1,800,000	1998	Combustion
19	SC	SC	19-AA-5100	1	City of Duarte LF	17.2	1952	1979	200,000	200,000	200,000	1990	Combustion
36	SC	SC	36-AA-0005	1	Upland LF	34	1952	1979	550,000	550,000	550,000	1993	Combustion
55	MC	TUO	55-AA-0005	1	Sierra Conservation Center	8	1953	1980	50,000	50,000	50,000		
31	MC	PLA	31-AA-0520	1	Meadow Vista LF	15	1965	1980	100,000	100,000	100,000	1997	Combustion
36	SC	SC	36-AA-0312	1	Norton AFB LF	25	1953	1980	250,000	250,000	250,000	2002	Combustion
31	SV	PLA	31-AA-0110	1	Roseville LF	21	1953	1980	300,000	300,000	300,000	2004	Venting
31	SV	PLA	31-AA-0310	1	Auburn Sanitary Landfill	37	1953	1980	375,000	375,000	375,000		
34	SV	SAC	34-AA-0004	1	Elk Grove LF	37	1953	1980	450,000	450,000	450,000	1993	Combustion
31	SV	PLA	31-AA-0140	1	Loomis Landfill	25	1959	1980	500,000	500,000	500,000	1997	Combustion
1	SF	BA	01-AA-0006	1	Davis Street	194	1965	1980	4,800,000	4,800,000	4,800,000	1990	Combustion
19	SC	SC	19-AE-0001	1	Palos Verdes	291	1957	1980	23,600,000	23,600,000	23,600,000	1990	Combustion
19	SC	SC	19-AR-0003	1	Ascon Sanitary LF	62	1960	1981	2,000,000	2,000,000	2,000,000	1995	Combustion
37	SD	SD	37-AA-0022	1	South Chollas	120	1952	1981	3,000,000	3,000,000	3,000,000	1990	Combustion
19	SC	SC	19-AA-0821 19-AA-0822 19-AA-0823	3	Mission Canyon/ Mountaingate	375	1958	1981	26,800,000	26,800,000	26,800,000	1990	Combustion
30	SC	SC	30-AB-0026	1	City Of Huntington Beach Landfill	22	1955	1982	400,000	400,000	400,000	2004	Venting
31	MC	PLA	31-AA-0540	1	Foresthill Sanitary Landfill	4	1956	1983	50,000	50,000	50,000		
10	SJV	SJU	10-AA-0018	1	Rice Road Disposal Site	14.2	1956	1983	350,000	350,000	350,000	1998	Combustion
41	SF	BA	41-AA-0007	1	Junipero Serra Solid Waste DS	9	1956	1983	450,000	450,000	450,000	1991	Combustion
33	SC	SC	33-AA-0002	1	West Riverside	74	1965	1983	1,000,000	1,000,000	1,000,000	1990	Combustion
1	SF	BA	01-AC-0001	1	Berkeley LF/Waterfront Park	90	1960	1983	1,000,000	1,000,000	1,000,000	1990	Combustion
15	SJV	SJU	15-AA-0044	1	Bakersfield	115	1956	1983	2,000,000	2,000,000	2,000,000	2003	Combustion
37	SD	SD	37-AA-0901	1	Box Canyon LF	120	1957	1984	500,000	500,000	500,000		
1	SF	BA	01-AA-0011	1	Albany LF/East Shore Park	60	1964	1984	1,000,000	1,000,000	1,000,000	2000	Combustion
41	SF	BA	41-AA-0011 41-AA-0012	2	Marsh Road	146	1961	1984	3,500,000	3,500,000	3,500,000	1991	Combustion
19	SC	SC	19-AA-0836	1	Operating Industries (OII) (NPL Site)	190	1948	1984	22,000,000	22,000,000	22,000,000	1995	Combustion
33	SC	SC	33-AA-0001	1	Tequesquite/City of Riverside	120	1958	1985	2,400,000	2,400,000	2,400,000	1995	Combustion
19	SC	SC	19-AR-0006	1	Penrose Pit	72	1960	1985	9,000,000	9,000,000	9,000,000	1990	Combustion
1	SF	BA	01-AA-0001	1	Turk Island Landfill	66	1965	1986	1,200,000	1,200,000	1,200,000	1990	Combustion
33	SC	SC	33-AA-0005	1	Elsinore Landfill		1953	1986	1,900,000	1,900,000	1,900,000	1993	Combustion

Landfill Model CH4 Emissions (April 3, 2008)													
CO	AB	DIS	CIWMB SWIS File Number	Count <sup>a</sup>	Facility/Site Name	Max. Waste Footprint (acres)	Open Year <sup>b</sup>	Close Year	1990 WIP (Tons)	2006 WIP (Tons)	2020 WIP (Tons)	Year LFG Capture	"Current" 2006 Control Type
19	SC	SC	19-AI-0001	1	Norwalk Dump	13	1959	1986	100,000	563,842	3,135,162	2004	Venting
33	SC	SC	33-AA-0004	1	Corona Disposal Site	95	1961	1986	4,000,000	4,000,000	4,000,000	1990	Combustion
19	SC	SC	19-AA-0819	1	Toyon	90	1957	1986	16,000,000	16,000,000	16,000,000	1990	Combustion
21	SF	BA	21-AA-0003	1	San Quentin Disposal Site	42	1960	1987	500,000	500,000	500,000	2004	Venting
48	SF	BA	48-AA-0001	1	Solano Garbage Company	36	1960	1987	750,000	750,000	750,000		
10	SJV	SJU	10-AA-0005	1	City of Fresno LF	145	1937	1987	4,700,000	4,700,000	4,700,000	2000	Combustion
16	SJV	SJU	16-AA-0011	1	Corcoran LF	21	1961	1988	300,000	300,000	300,000		
40	SCC	SLO	40-AA-0009	1	Camp San Luis Obispo	8	1962	1989	50,000	50,000	50,000		
41	SF	BA	41-AA-0010	1	San Mateo Composting (3rd Ave.)	44	1962	1989	400,000	400,000	400,000		
54	SJV	SJU	54-AA-0002	1	Exeter DS	34	1962	1989	400,000	400,000	400,000		
56	SCC	VEN	56-AA-0004	1	Coastal LF (including Santa Clara LF)	120	1962	1989	4,000,000	4,000,000	4,000,000	1991	Combustion
31	MC	PLA	31-AA-0530	1	Clipper Creek LF	2	1963	1990	10,000	10,000	10,000		
5	MC	CAL	05-AA-0014	1	Red Hill SLF	15	1963	1990	100,000	100,000	100,000		
45	SV	SHA	45-AA-0021	1	Simpson Paper Company	20	1963	1990	400,000	400,000	400,000	2004	Venting
50	SJV	SJU	50-AA-0002	1	Geer Road LF	144	1963	1990	500,000	500,000	500,000	1991	Combustion
10	SJV	SJU	10-AA-0011	1	Sourtheast Regional	67	1970	1990	1,300,000	1,300,000	1,300,000	1998	Combustion
30	SC	SC	30-AB-0017	1	Coyote Canyon SLF	325	1963	1990	27,000,000	27,000,000	27,000,000	1990	Combustion
36	MD	MOJ	36-AA-0318	1	Mountain Pass Mine and Mill	4	1964	1991	20,000	20,000	20,000		
27	NCC	MBU	27-AA-0012	1	Lake San Antonio South Shore LF	5.5	1964	1991	25,000	25,000	25,000		
36	MD	MOJ	36-AA-0039	1	Newberry	4	1964	1991	25,000	25,000	25,000		
56	SCC	VEN	56-AA-0008	1	Pacific Missile TC LF	6	1964	1991	50,000	50,000	50,000		
15	SJV	SJU	15-AA-0056	1	Lebec LF	14.2	1987	1991	59,064	75,000	75,000	2004	Venting
50	SJV	SJU	50-AA-0003	1	Bonzi LF	35	1951	1991	536,258	773,200	966,220	1995	Combustion
19	SC	SC	19-AA-0013	1	Azusa LF (Zone I)	77	1958	1991	4,980,097	5,331,470	7,167,957	1990	Combustion
18	NEP	LAS	18-AA-0003	1	Bieber LF	8	1951	1992	49,815	50,000	50,000		
28	SF	BA	28-AA-0003	1	Berryessa Garbage	7	1951	1992	47,955	50,000	50,000		
31	SV	PLA	31-AA-0120	1	Berry Street Mall LF	13	1965	1992	100,000	100,000	100,000		
48	SV	YS	48-AA-0004	1	Rio Vista	12	1951	1992	92,103	100,000	100,000		
7	SF	BA	07-AA-0003	1	Contra Costa SLF (aka GBF LF)	74	1943	1992	656,050	897,051	897,051	1995	Combustion
15	SJV	SJU	15-AA-0063	1	McFarland-Delano LF	40	1971	1992	918,766	1,000,000	1,000,000	2005	Combustion
15	SJV	SJU	15-AA-0048	1	China Grade SLF	58	1978	1992	1,561,931	2,000,000	2,000,000	2002	Combustion
25	NEP	MOD	25-AA-0002	1	Eagleville	1.56	1966	1993	10,000	10,000	10,000		
25	NEP	MOD	25-AA-0003	1	Fort Bidwell	0.8	1966	1993	10,000	10,000	10,000		
25	NEP	MOD	25-AA-0004	1	Lake City	2.83	1966	1993	10,000	10,000	10,000		
25	NEP	MOD	25-AA-0021	1	Cedarville	2.09	1966	1993	10,000	10,000	10,000		
45	SV	SHA	45-AA-0022	1	Intermountain LF	4	1987	1993	13,466	25,000	25,000		
36	MD	MOJ	36-AA-0062	1	Lucerne Vily	6	1977	1993	39,582	50,000	50,000		
19	SC	SC	19-AA-0057	1	Pitchess Detention Cntr	15	1975	1993	57,060	75,000	75,000		
36	MD	MOJ	36-AA-0026	1	Oro Grande	5	1966	1993	100,000	100,000	100,000		
49	NC	NS	49-AA-0004	1	Healdsburg	27	1966	1993	400,000	400,000	400,000	1994	Combustion
43	SF	BA	43-AO-0001	1	All Purpose LF	25	1965	1993	1,637,887	2,000,000	2,000,000	1990	Combustion
43	SF	BA	43-AA-0006	1	Shoreline-Mtn. View (Vista)	150	1968	1993	1,973,885	2,000,000	2,000,000	1990	Combustion
47	NEP	SIS	47-AA-0030	1	Cecilville LF	1	1967	1994	10,000	10,000	10,000		
47	NEP	SIS	47-AA-0045	1	Hotelling Gulch LF	3	1967	1994	10,000	10,000	10,000		
47	NEP	SIS	47-AA-0029	1	Kelly Gulch LF	1	1967	1994	10,000	10,000	10,000		
47	NEP	SIS	47-AA-0044	1	Rogers Creek LF	1	1967	1994	10,000	10,000	10,000		
36	MD	MOJ	36-AA-0059	1	Needles Sanitary LF	50	1964	1994	83,646	100,000	100,000		
23	NC	MEN	23-AA-0003	1	Casper Refuse DF	16	1964	1994	136,365	150,000	150,000	2004	Venting
31	MC	PLA	31-AA-0560	1	Eastern Regional LF	36	1978	1994	341,816	500,000	500,000	1994	Combustion
45	SV	SHA	45-AA-0019	1	Redding SLF (Benton)	71	1967	1994	750,000	750,000	750,000	1994	Combustion
44	NCC	MBU	44-AA-0003	1	Ben Lomond WDS	24	1942	1994	580,311	750,000	750,000	1994	Combustion
10	SJV	SJU	10-AA-0025	1	Chestnut Ave DS	32	1969	1994	670,038	1,000,000	1,000,000	1998	Combustion

Landfill Model CH4 Emissions (April 3, 2008)													
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41	SF	BA	41-AA-0009	1	Burlingham LF	41	1960	1994	1,000,000	1,000,000	1,000,000	1991	Combustion
39	SJV	SJU	39-AA-0003	1	Harney Lane LF	97	1948	1994	1,902,280	2,000,000	2,000,000	1993	Combustion
43	SF	BA	43-AA-0007	1	Sunnyvale LF	92	1960	1994	1,889,967	2,300,000	2,300,000	1991	Combustion
34	SV	SAC	34-AA-0018	1	Sacramento City LF	130	1960	1994	3,410,394	4,000,000	4,000,000	1991	Combustion
47	NEP	SIS	47-AA-0031	1	Lava Beds LF	1.24	1968	1995	10,000	10,000	10,000		
47	NEP	SIS	47-AA-0019	1	Weed SWDS	6.2	1987	1995	11,144	25,000	25,000		
19	SC	SC	19-AA-0062	1	Two Harbors LF	2	1951	1995	24,975	25,000	25,000		
47	NEP	SIS	47-AA-0035	1	New Tenant SWDS	10	1968	1995	50,000	50,000	50,000		
47	NEP	SIS	47-AA-0001	1	McCloud	12.5	1951	1995	45,733	50,000	50,000		
15	SJV	SJU	15-AA-0051	1	Glennville LF	4	1951	1995	49,238	50,000	50,000		
49	NC	NS	49-AA-0002	1	Annapolis LF	5	1951	1995	64,663	75,000	75,000		
58	SV	FR	58-AA-0002	1	Ponderosa SLF	10	1951	1995	73,069	75,000	75,000		
6	SV	COL	06-AA-0001	1	Evans Rd LF-P1	14	1979	1995	153,269	200,000	200,000		
39	SJV	SJU	39-AA-0005	1	Corral Hollow	43	1983	1995	435,764	750,000	750,000	2003	Combustion
33	SC	SC	33-AA-0008	1	Double Butte DS	100	1973	1995	2,732,052	3,000,000	3,000,000	1994	Combustion
47	NEP	SIS	47-AA-0026	1	Happy Camp SWDS	3.4	1969	1996	10,000	10,000	10,000		
14	GBV	GBU	14-AA-0016	1	Furnace Creek	9.5	1951	1996	42,277	50,000	50,000		
18	NEP	LAS	18-AA-0011	1	Herlong DF	8	1951	1996	47,133	50,000	50,000	1996	Venting
36	MD	MOJ	36-AA-0058	1	Morongo DS	11.55	1982	1996	52,945	100,000	100,000		
36	MD	MOJ	36-AA-0041	1	Trona Angus LF	22	1951	1996	167,271	200,000	200,000		
55	MC	TUO	55-AA-0002	1	Tuolumne Central (Jamestown)	16	1951	1996	650,370	750,000	750,000	1996	Venting
10	SJV	SJU	10-AA-0002	1	Chateau Fresno LF	75	1950	1996	2,132,332	3,800,000	3,800,000	1993	Combustion
56	SCC	VEN	56-AA-0011	1	Bailard LF	120	1989	1996	1,879,583	4,000,000	4,000,000	1991	Combustion
30	SC	SC	30-AB-0018	1	Santiago Canyon SLF	130	1968	1996	8,936,769	13,284,221	13,284,221	1991	Combustion
19	SC	SC	19-AA-0820	1	Lopez Canyon LF	166	1975	1996	14,616,276	19,000,000	19,000,000	1990	Combustion
19	SC	SC	19-AF-0001	1	BKK West Covina (Class I and III LFs)	370	1962	1996	29,126,627	45,800,000	45,800,000	1990	Combustion
18	NEP	LAS	18-AA-0004	1	Madeline DF	1	1970	1997	10,000	10,000	10,000		
18	NEP	LAS	18-AA-0005	1	Ravendale DF	1	1970	1997	10,000	10,000	10,000		
40	SCC	SLO	40-AA-0014	1	California Valley LF	6	1970	1997	25,000	25,000	25,000		
42	SCC	SB	42-AA-0010	1	New Cuyama	5	1970	1997	50,000	50,000	50,000		
23	NC	MEN	23-AA-0008	1	Laytonville LF	7	1951	1997	49,309	50,000	50,000		
36	MD	MOJ	36-AA-0049	1	Baker RDS	10	1951	1997	74,727	75,000	75,000		
58	SV	FR	58-AA-0006	1	Yuba Sutter Disposal Area LF (YSDA)	12	1951	1997	139,306	150,000	150,000		
58	SV	FR	58-AA-0001	1	Beale AFB LF	88	1951	1997	178,392	200,000	200,000	2004	Venting
15	MD	KER	15-AA-0055	1	Kern Valley LF	31	1984	1997	115,494	250,000	250,000	2004	Combustion
23	NC	MEN	23-AA-0021	1	City of Willits DS	18.5	1980	1997	144,672	250,000	250,000	2004	Venting
36	MD	MOJ	36-AA-0061	1	Lenwood-Hinkley	54	1951	1997	194,800	250,000	250,000		
36	MD	MOJ	36-AA-0060	1	Twentynine Palms DS	44.26	1983	1997	140,531	300,000	300,000		
29	MC	NSI	29-AA-0001	1	McCourtney Rd LF	36	1972	1997	943,465	1,000,000	1,000,000	1991	Combustion
33	SS	SC	33-AA-0012	1	Coachella Valley DS	75	1972	1997	1,494,459	2,500,000	2,500,000	2000	Combustion
58	SV	FR	58-AA-0005	1	Yuba Sutter Disposal Inc. LF (YSDI)	33	1967	1997	909,422	2,500,000	2,500,000	1999	Combustion
33	SC	SC	33-AA-0009	1	Mead Valley DS	60	1974	1997	1,315,088	2,528,951	2,528,951	1995	Combustion
37	SD	SD	37-AA-0008	1	San Marcos LF	107	1979	1997	2,483,568	6,000,000	6,000,000	1990	Combustion
36	MD	MOJ	36-AA-0084	1	Echo Gold	7	1971	1998	25,000	25,000	25,000		
54	SJV	SJU	54-AA-0010	1	Balance Rock DS	10	1971	1998	100,000	100,000	100,000		
15	SJV	SJU	15-AA-0047	1	Buttonwillow SLF	8	1951	1998	78,478	100,000	100,000		
21	SF	BA	21-AA-0002	1	West Marin SLF	15	1980	1998	113,958	200,000	200,000		
54	SJV	SJU	54-AA-0001	1	Earlimart DS	16	1951	1998	149,620	200,000	200,000	2005	Combustion
16	SJV	SJU	16-AA-0009	1	Hanford LF	79	1973	1998	1,159,295	1,750,000	1,750,000	2000	Combustion
33	SC	SC	33-AA-0003	1	Highgrove LF	71	1947	1998	1,284,218	3,002,920	3,002,920	1997	Combustion

Landfill Model CH4 Emissions (April 3, 2008)													
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34	SV	SAC	34-AA-0007	1	Dixon Pit LF	29.75	1983	1999	42,893	100,000	100,000	2004	Combustion
33	SC	SC	33-AA-0013	1	Anza DS	20	1977	1999	55,456	100,000	100,000		
36	MD	MOJ	36-AA-0047	1	Yermo DS	12	1951	1999	83,254	100,000	100,000		
39	SJV	SJU	39-AA-0002	1	French Camp LF	60	1976	1999	230,325	517,575	517,575		
23	NC	MEN	23-AA-0018	1	South Coast Rd LF	5	1973	2000	28,186	50,000	50,000		
13	SS	IMP	13-AA-0012	1	Pichacho C&F	14	1951	2000	63,723	101,534	114,633		
28	SF	BA	28-AA-0001	1	American Canyon LF	97	1940	2000	1,667,136	2,500,000	2,500,000	1990	Combustion
19	SC	SC	19-AA-0015	1	Spadra LF	173	1957	2000	10,144,050	17,536,915	17,536,915	1990	Combustion
47	NEP	SIS	47-AA-0027	1	Tulelake SWDS	8.8	1951	2001	52,216	75,172	75,172		
36	MD	MOJ	36-AA-0056	1	Big Bear RDS	26	1988	2001	103,590	450,000	450,000		
42	SCC	SB	42-AA-0011	1	Foxen LF	18.4	1968	2001	430,090	750,000	750,000	2006	Combustion
36	MD	MOJ	36-AA-0050	1	Hesperia RDS	50	1980	2001	432,133	750,000	750,000	2005	Combustion
23	NC	MEN	23-AA-0019	1	City of Ukiah SWDS	40	1967	2001	466,712	750,000	750,000	2004	Venting
36	SC	SC	36-AA-0054	1	Milliken	140	1956	2001	8,339,070	12,011,629	12,011,629	1990	Combustion
55	MC	TUO	55-AA-0001	1	Big Oak Flat LF	5	1972	2002	15,153	25,000	25,000	2002	Venting
54	SJV	SJU	54-AA-0011	1	Kennedy Meadows DS	6	1975	2002	25,000	25,000	25,000		
31	MC	PLA	31-AA-0550	1	Colfax LF	3	1975	2002	25,000	25,000	25,000		
47	NEP	SIS	47-AA-0003	1	Black Butte SWDS	27	1979	2002	67,285	149,564	149,564		
8	NC	NCU	08-AA-0006	1	Crescent City LF	23	1969	2002	270,268	505,963	665,340	2004	Venting
26	GBV	GBU	26-AA-0002	1	Bridgeport SLF	36.5	1951	2003	95,584	100,377	103,036		
27	NCC	MBU	27-AA-0003	1	Lewis Rd. LF	14	1978	2003	236,855	501,122	501,122	1997	Combustion
7	SF	BA	07-AA-0002	1	Acme Sanitary LF	109	1954	2003	6,429,329	7,050,842	7,488,750	1991	Combustion
32	MC	NSI	32-AA-0007	1	Portola LF	8	1951	2004	62,497	75,000	75,000	2004	Venting
27	NCC	MBU	27-AA-0006	1	Jolon Rd LF	24	1979	2004	116,370	200,000	200,000		
36	MD	MOJ	36-AA-0048	1	Apple Valley DS	38	1987	2004	103,544	300,000	300,000		
36	MD	MOJ	36-AA-0044	1	Phelan RDS	30	1983	2004	143,007	300,000	300,000		
3	MC	AMA	03-AA-0001	1	Amador Co. LF	29	1967	2004	401,174	737,602	742,369	2002	Combustion
43	SF	BA	43-AA-0004	1	Pacheco Pass LF	91	1963	2004	862,677	2,064,554	2,581,707	1994	Combustion
13	SS	SC	33-AA-0011	1	Edom Hill DS	148	1967	2004	1,681,856	6,983,228	12,733,398	2001	Combustion
33	SS	IMP	13-AA-0005	1	Ocotillo C&F	5.3	1951	2005	19,588	25,000	25,006		
45	SV	SHA	45-AA-0058	1	Twin Bridges	21	1981	2005	88,291	200,000	200,000		
13	SS	IMP	13-AA-0008	1	Brawley LF	34.3	1984	2005	122,389	430,327	699,366		
43	SF	BA	43-AN-0007	1	Zanker Rd. LF	47.1	1956	2005	746,341	1,022,263	1,233,861	1995	Combustion
10	SJV	SJU	10-AA-0013	1	Orange Ave.	29	1941	2005	534,399	1,122,053	1,983,341	2006	Combustion
54	SJV	SJU	54-AA-0004	1	Teapot Dome DS	71	1972	2005	679,732	1,646,300	2,810,691	2005	Combustion
1	SF	BA	01-AA-0008	1	Tri-Cities LF	115	1968	2005	4,217,879	9,325,621	14,655,691	1990	Combustion
37	SD	SD	37-AA-0005	1	Ramona LF	46	1969	2006	791,182	1,642,804	2,883,292	1997	Combustion
19	MD	AV	19-AA-0009	1	Antelope Valley	57	1952	2006	269,364	3,743,346	9,607,924	2004	Combustion
36	SC	SC	36-AA-0051	1	Colton LF	82	1964	2006	1,587,376	6,062,952	11,840,853	2001	Combustion
7	SF	BA	07-AA-0001	1	W Contra Costa LF	160	1953	2006	4,483,715	9,410,067	15,665,749	1992	Combustion
36	MD	MOJ	36-AA-0067	1	USMC- 29 Palms	38.5	1951	2007	94,772	163,838	273,517		
12	NC	NCU	12-AA-0005	1	Cummings Road LF	38	1969	2007	750,650	1,500,177	1,500,955	1997	Combustion
15	MD	KER	15-AA-0062	1	Tehachapi SLF	32	1973	2007	526,883	1,115,907	2,030,714		
36	MD	MOJ	36-AA-0046	1	Barstow RDS	47	1963	2007	835,445	1,645,120	2,949,622		
19	SC	SC	19-AR-0008	1	Bradley Ave East & West	171	1959	2007	12,983,834	33,518,023	38,729,613	1990	Combustion
13	SS	IMP	13-AA-0009	1	Niland C&F	13.9	1951	2008	46,552	51,211	60,735		
15	SJV	SJU	15-AA-0050	1	Arvin SLF	143	1971	2008	1,669,202	3,519,658	3,520,296	2001	Combustion
19	SC	SC	19-AR-0002	1	Sunshine Canyon City (Inactive Unit and Unit 2-I)	289	1958	2008	802,887	2,865,249	11,819,433	1992	Combustion
19	SC	SC	19-AA-0853	1	Sunshine Canyon Extension	215	1996	2008	0	12,656,411	36,856,158	1992	Combustion
24	SJV	SJU	24-AA-0002	1	Billy Wright LF	40	1973	2009	274,746	1,124,901	2,158,303		
27	NCC	MBU	27-AA-0007	1	Crazy Horse LF	72	1960	2009	1,189,474	4,000,135	7,943,988	1993	Combustion
41	SF	BA	41-AA-0008	1	Hillside LF	43	1968	2010	864,199	1,794,183	2,252,899	2002	Combustion



Landfill Model CH4 Emissions (April 3, 2008)													
CO	AB	DIS	CIWMB SWIS File Number	Count <sup>a</sup>	Facility/Site Name	Max. Waste Footprint (acres)	Open Year <sup>b</sup>	Close Year	1990 WIP (Tons)	2006 WIP (Tons)	2020 WIP (Tons)	Year LFG Capture	"Current" 2006 Control Type
13	SS	IMP	13-AA-0019	1	Republic-Imperial	73	1971	2010	279,924	1,856,219	4,708,951		
33	MD	SC	33-AA-0016	1	Desert Center DS	7	1951	2011	136,083	150,088	150,817		
33	SS	SC	33-AA-0071	1	Mecca Landfill II	19	1983	2011	65,942	205,591	252,464		
43	SF	BA	43-AM-0001	1	Palo Alto RDS	126	1954	2011	893,847	1,548,051	1,913,153	1993	Combustion
37	SD	SD	37-AA-0020	1	Miramar SWLF	470	1959	2011	6,156,512	27,951,838	52,513,559	1995	Combustion
13	SS	IMP	13-AA-0006	1	Holtville DS	24.5	1951	2012	100,652	150,014	150,358		
15	MD	KER	15-AA-0059	1	Ridgecrest SLF	91	1968	2012	734,267	1,632,378	2,660,395	2002	Combustion
40	SCC	SLO	40-AA-0004	1	Cold Canyon	88	1965	2012	1,321,918	3,827,673	6,599,415	1994	Combustion
19	MD	AV	19-AA-0050	1	Lancaster Waste Mgt.	209	1954	2012	1,253,944	4,921,267	12,577,703	1993	Combustion
15	MD	KER	15-AA-0045	1	Boron SLF	14	1965	2013	115,269	206,829	261,924		
36	MD	MOJ	36-AA-0057	1	Landers DS	42	1986	2013	201,694	936,892	2,324,132		
45	SV	SHA	45-AA-0043	1	West Central (Phase 2)	100	1990	2013	106,919	2,101,253	4,581,004		
34	SV	SAC	34-AA-0020	1	L & D LF	157	1977	2013	1,239,834	3,565,900	7,739,980	2004	Venting
30	SC	SC	30-AB-0035	1	Olinda Alpha SLF	420	1960	2013	14,557,799	45,305,372	86,102,427	1990	Combustion
19	SC	SC	19-AA-0053	1	Puente Hills LF	640	1957	2013	55,110,679	116,141,687	185,036,763	1990	Combustion
15	MD	KER	15-AA-0058	1	Mojave-Rosamond SLF	27	1967	2014	279,771	521,676	689,218		
19	SC	SC	19-AA-0012	1	Scholl Canyon LF	440	1961	2014	19,443,400	27,791,673	36,374,233	1990	Combustion
40	SCC	SLO	40-AA-0002	1	Camp Roberts SWDS	11.7	1951	2015	67,395	100,000	100,000		
9	MC	ED	09-AA-0003	1	Union Mine DS	21.8	1962	2015	1,101,623	1,502,320	1,523,377	1997	Combustion
32	MC	NSI	32-AA-0008	1	Gopher Hill LF	13	1974	2016	43,553	75,000	75,000		
36	SC	SC	36-AA-0087	1	San Timoteo SWDS	114	1978	2016	773,034	3,200,222	6,832,341	2000	Combustion
1	SF	BA	01-AA-0010	1	Vasco Road LF	222	1962	2016	3,990,878	11,845,745	21,368,916	1996	Combustion
43	SF	BA	43-AN-0003	1	Newby Island	313.2	1932	2016	2,409,383	15,746,481	28,339,271	1992	Combustion
37	SD	SD	37-AA-0023	1	Sycamore SW LF	324	1976	2016	2,984,513	14,111,841	31,614,977	1999	Combustion
42	SCC	SB	42-AA-0016	1	City of Santa Maria LF	245	1940	2017	1,217,394	3,247,271	5,338,263	1998	Combustion
33	SC	SC	33-AA-0006	1	Badlands DS	150	1966	2018	674,139	6,768,638	19,976,773	2001	Combustion
13	SS	IMP	13-AA-0011	1	Salton City C&F	7.8	1951	2019	47,770	50,740	61,849		
33	SS	SC	33-AA-0015	1	Oasis DS	26	1951	2019	61,554	100,005	100,056		
50	SJV	SJU	50-AA-0001	1	Fink Rd LF	216	1973	2019	706,220	2,793,994	5,158,987	2004	Combustion
49	SF	BA	49-AA-0001	1	Central LF	172	1972	2019	4,585,243	11,192,029	14,126,201	1990	Combustion
19	SC	SC	19-AA-0052	1	Chiquita Canyon	257	1972	2019	4,310,480	22,074,046	50,973,493	1995	Combustion
28	SF	BA	28-AA-0002	1	Clover Flat LF	44	1984	2020	226,887	836,580	1,589,315		
16	SJV	SJU	16-AA-0004	1	Avenal LF	123.2	1980	2020	341,069	1,136,419	4,003,699		
43	SF	BA	43-AN-0015	1	Guadalupe SLF	115	1929	2020	1,034,929	4,469,114	7,922,634	1990	Combustion
42	SCC	SB	42-AA-0015	1	Tajiguas LF	118	1967	2020	2,654,471	6,235,959	10,283,897	1996	Combustion
39	SJV	SJU	39-AA-0015	1	Forward LF (+ Austin Rd LF -0001)	354.5	1973	2020	1,973,144	15,264,704	37,950,388	1991	Combustion
37	SD	SD	37-AA-0006	1	Borrego Springs LF	29	1951	2021	195,604	264,301	373,372		
15	MD	KER	15-AA-0150	1	Edwards AFB Main LF	64	1978	2021	127,252	319,450	476,764		
11	SV	GLE	11-AA-0001	1	Glenn County LF	50	1976	2021	342,393	797,154	1,189,403		
44	NCC	MBU	44-AA-0004	1	Buena Vista DS	61	1966	2021	1,321,475	3,250,261	5,415,161	1991	Combustion
37	SD	SD	37-AA-0010	1	Otay SWLF	230	1963	2021	7,065,578	21,650,229	50,092,469	1991	Combustion
13	SS	IMP	13-AA-0001	1	Imperial SWS	18	1951	2022	96,720	152,424	172,869		
13	SS	IMP	13-AA-0004	1	Calexico DS	38	1951	2022	344,144	502,436	524,483		
56	SCC	VEN	56-AA-0007	1	Simi Valley LF	185.61	1970	2022	4,946,498	13,739,823	27,823,257	1991	Combustion
30	SC	SC	30-AB-0360	1	Frank R. Bowerman	341	1989	2022	6,541,179	36,445,683	75,897,049	1993	Combustion
26	GBV	GBU	26-AA-0004	1	Benton Crossing	71.51	1988	2023	58,764	382,077	1,005,138		
44	NCC	MBU	44-AA-0002	1	City of Watsonville	31	1962	2023	583,714	1,080,517	1,734,443	1997	Combustion
52	SV	TEH	52-AA-0001	1	Red Bluff LF	33.6	1956	2023	400,561	1,111,250	2,013,981	2005	Combustion
16	SJV	SJU	16-AA-0021	1	Kettleman Hills SLF	43	1998	2023	0	1,685,025	5,488,215	2005	Combustion
33	SC	SC	33-AA-0007	1	Lamb Canyon DS	144.6	1970	2023	1,350,362	5,092,563	14,048,887	2002	Combustion
41	SF	BA	41-AA-0002	1	Corinda Los Trancos LF (Ox Mtn)	191	1976	2023	3,102,621	16,593,446	29,255,388	1991	Combustion
35	NCC	MBU	35-AA-0001	1	John Smith Road SWDS	44	1968	2024	712,443	1,667,101	2,905,134	1998	Combustion
54	SJV	SJU	54-AA-0009	1	Visalia DS	247	1952	2024	786,444	2,967,791	4,782,022	2004	Combustion

Landfill Model CH4 Emissions (April 3, 2008)					Max. Waste Footprint (acres)	Open Year <sup>b</sup>	Close Year	1990 WIP (Tons)	2006 WIP (Tons)	2020 WIP (Tons)	Year LFG Capture	"Current" 2006 Control Type	
CO	AB	DIS	CIWMB SWIS File Number	Count <sup>a</sup>	Facility/Site Name								
43	SF	BA	43-AN-0008	1	Kirby Canyon LF	311	1986	2025	1,775,249	6,608,275	11,149,364	1996	Combustion
40	SCC	SLO	40-AA-0008	1	Chicago Grade	36.25	1986	2026	203,666	920,660	2,305,490	2006	Combustion
54	SJV	SJU	54-AA-0008	1	Woodville DS	153	1970	2026	1,258,544	2,644,186	3,755,863	2004	Combustion
13	SS	IMP	13-AA-0010	1	Hot Spa C&F	6	1951	2027	45,381	50,699	56,431		
18	NEP	LAS	18-AA-0010	1	Westwood DF	9	1951	2027	38,440	52,494	78,294		
17	LC	LAK	17-AA-0001	1	Eastlake SLF	35	1960	2027	364,723	1,104,817	1,935,182		
15	SJV	SJU	15-AA-0057	1	Shafter-Wasco SLF	135	1972	2027	1,141,979	3,043,121	5,665,322	2002	Combustion
56	SCC	VEN	56-AA-0005	1	Toland Rd. LF	92	1970	2027	675,668	4,692,098	11,982,793	1997	Combustion
25	NEP	MOD	25-AA-0001	1	Alturas	27.5	1984	2028	46,952	100,000	100,000		
18	NEP	LAS	18-AA-0009	1	Bass Hill LF	32	1986	2028	79,828	348,082	737,637		
19	SC	SC	19-AA-0056	1	Calabamas LF	416	1961	2028	13,172,817	22,479,153	31,874,338	1990	Combustion
1	SF	BA	01-AA-0009	1	Altamont LF	443	1980	2028	14,967,744	39,772,442	63,607,251	1990	Combustion
13	SS	IMP	13-AA-0007	1	Palo Verde C& F	9.4	1951	2029	49,728	50,010	50,132		
10	SJV	SJU	10-AA-0006	1	Coalinga DS	52	1970	2029	270,061	525,688	758,692		
10	SJV	SJU	10-AA-0004	1	Clovis LF	50	1969	2029	454,816	1,102,938	1,934,418	2006	Combustion
33	SC	SC	33-AA-0217	1	El Sobrante SWLF	495	1983	2030	1,619,035	19,711,183	59,173,030	1994	Combustion
40	SCC	SLO	40-AA-0001	1	Paso Robles LF	66	1970	2031	974,622	1,597,969	2,416,280	1997	Combustion
36	SC	SC	36-AA-0017	1	California St. LF	106	1963	2031	760,853	1,627,494	2,670,268	2001	Combustion
10	SJV	SJU	10-AA-0009	1	American Ave.	361	1971	2031	2,260,008	8,990,687	16,983,923	2000	Combustion
19	SC	SC	19-AA-0063	1	US Navy LF (San Clemente Island)	13	1951	2032	35,407	51,662	64,244		
18	NEP	LAS	18-AA-0013	1	Sierra Army Depot	32	1951	2032	78,230	100,000	100,000		
46	MC	NSI	46-AA-0001	1	Loyalton LF	29	1974	2032	37,536	82,007	134,022		
57	SV	YS	57-AA-0004	1	UC Davis LF	53	1974	2032	149,286	325,625	539,213	1996	Combustion
5	MC	CAL	05-AA-0023	1	Rock Creek LF	57	1990	2032	5,326	576,705	1,452,714		
19	SC	SC	19-AA-0061	1	Pebbly Beach	5.6	1982	2033	17,751	56,903	113,846		
33	MD	MOJ	33-AA-0017	1	Blythe DS	78	1969	2033	415,345	795,266	1,190,551	1997	Combustion
20	SJV	SJU	20-AA-0002	1	Fairmead LF	77	1958	2033	661,128	2,309,543	4,781,653	1998	Combustion
39	SJV	SJU	39-AA-0022	1	North County LF	185	1990	2033	94,996	2,161,867	5,090,525		
4	SV	BUT	04-AA-0002	1	Neal RD LF	140	1970	2033	493,221	3,100,082	6,086,556	2002	Combustion
36	SC	SC	36-AA-0055	1	Fontana RDS (Mid-Valley)	408	1958	2033	2,466,265	9,786,714	25,197,761	1995	Combustion
34	SV	SAC	34-AA-0001	1	Kiefer LF	667	1967	2035	4,882,713	17,499,572	30,055,405	1994	Combustion
26	GBV	GBU	26-AA-0003	1	Pumice Valley	20	1951	2036	123,153	150,755	156,182		
31	SV	PLA	31-AA-0210	1	Western Regional LF	231	1980	2036	1,201,867	4,538,046	9,086,821	1993	Combustion
44	NCC	MBU	44-AA-0001	1	City of Santa Cruz LF	57.5	1966	2037	793,897	1,869,373	2,844,784	1991	Combustion
7	SF	BA	07-AA-0032	1	Keller Canyon LF	244	1992	2037	0	7,678,238	22,690,827	1993	Combustion
15	SJV	SJU	15-AA-0052	1	Lost Hills SLF	25	1951	2038	72,069	100,000	100,000		
14	GBV	GBU	14-AA-0004	1	Independence DS	18.42	1951	2038	91,998	104,469	131,998		
15	SJV	SJU	15-AA-0273	1	Bakersfield SLF (Bena)	229	1992	2038	0	4,757,447	13,408,350	2000	Combustion
19	SC	SC	19-AH-0001	1	Whittier- Savage Canyon	132	1963	2039	3,027,749	6,176,012	7,618,193	1993	Combustion
21	SF	BA	21-AA-0001	1	Redwood SLF	195	1958	2039	1,960,908	8,286,636	15,476,521	1990	Combustion
27	NCC	MBU	27-AA-0005	1	Johnson Cnyn LF	80	1976	2043	148,946	993,345	2,254,724	2000	Combustion
24	SJV	SJU	24-AA-0001	1	Hwy 59 DS	255	1972	2043	1,322,411	3,973,714	7,847,858		
32	MC	NSI	32-AA-0009	1	Chester LF	28	1973	2045	27,272	50,221	52,389		
57	SV	YS	57-AA-0001	1	Yolo Co. Central LF	473	1975	2045	2,777,248	5,833,578	9,244,718	1992	Combustion
42	SCC	SB	42-AA-0017	1	Lompoc LF	39	1962	2047	259,256	1,119,417	2,068,142	2002	Combustion
45	SV	SHA	45-AA-0020	1	Anderson LF	165	1976	2049	550,274	2,063,459	4,647,695	2006	Combustion
14	GBV	GBU	14-AA-0007	1	Tecopa DS	9.3	1978	2050	50,000	50,000	50,000		
53	NC	NCU	53-AA-0013	1	Weaverville LF	16.6	1976	2050	85,831	150,000	150,000		
14	GBV	GBU	14-AA-0006	1	Shoshone DS	4.7	1978	2052	25,000	25,000	25,000		
19	SC	SC	19-AA-0040	1	Burbank LF #3	49	1971	2053	611,532	1,330,610	2,003,218	1995	Combustion
14	GBV	GBU	14-AA-0005	1	Bishop Sunland	69.2	1983	2054	82,061	299,731	597,518		
39	SJV	SJU	39-AA-0004	1	Foothill LF	50	1965	2054	551,014	4,123,926	9,158,468		
36	MD	MOJ	36-AA-0045	1	Victorville RDS	341	1955	2059	1,067,804	4,348,479	10,626,492	2003	Combustion

**Landfill Model CH4 Emissions (April 3, 2008)**

CO	AB	DIS	CIWMB SWIS File Number	Count <sup>a</sup>	Facility/Site Name	Max. Waste Footprint (acres)	Open Year <sup>b</sup>	Close Year	1990 WIP (Tons)	2006 WIP (Tons)	2020 WIP (Tons)	Year LFG Capture	"Current" 2006 Control Type
48	SF	BA	48-AA-0075	1	Potrero Hills	190	1986	2059	574,163	8,521,148	24,710,972	1993	Combustion
6	SV	COL	06-AA-0002	1	Stonyford LF	3.3	<b>1951</b>	2064	9,381	10,788	17,296		
47	NEP	SIS	47-AA-0002	1	Yreka LF	52	<b>1984</b>	2065	65,086	231,038	451,072		
58	SV	FR	58-AA-0011	1	Ostrom Road SLF	225	1995	2066	0	1,663,897	6,125,580	2003	Combustion
30	SC	SC	30-AB-0019	1	Prima Descha SLF	699	1976	2067	12,035,917	21,893,121	36,376,606	1991	Combustion
48	SV	YS	48-AA-0002	1	B & J Drop Box	260	1964	2070	1,529,609	3,911,141	7,168,617		
22	MC	MPA	22-AA-0001	1	Mariposa Co. SLF	40	<b>1974</b>	2081	149,274	330,547	562,699		
42	SCC	SB	42-AA-0012	1	Vandenburg AFB	172	<b>1978</b>	2084	133,140	340,242	480,687		
27	NCC	MBU	27-AA-0010	1	Monterey Peninsula LF	315	1966	2084	3,981,093	7,517,740	11,570,780	1990	Combustion
14	GBV	GBU	14-AA-0003	1	Lone Pine DS	26.6	<b>1951</b>	2087	69,767	107,801	164,761		
15	SJV	SJU	15-AA-0061	1	Taft SLF	85	1972	2123	568,630	1,083,515	1,644,864	2005	Combustion
26	GBV	GBU	26-AA-0005	1	Chalfant SLF	6.6	<b>1951</b>	2155	49,934	50,000	50,000		
26	GBV	GBU	26-AA-0001	1	Walker SLF	38.4	<b>1951</b>	2162	45,942	50,324	52,343		
37	SD	SD	37-AA-0903	1	Las Pulgas LF	88.7	<b>1979</b>	2184	321,545	833,131	1,486,508		
26	GBV	GBU	26-AA-0006	1	Benton SLF	7.4	<b>1978</b>	2212	77,607	100,000	100,000		
37	SD	SD	37-AA-0902	1	San Onofre LF	31	<b>1951</b>	2257	100,406	151,309	158,618		
36	MD	MOJ	36-AA-0068	1	Fort Irwin	467	<b>1970</b>	2405	137,707	264,636	383,515		
			<b>Total CA MSW Landfills by SWIS #</b>	<b>372</b>		<b>367</b>	<b>Landfills by Facility/Site Name</b>		<b>618,564,139</b>	<b>1,231,428,174</b>	<b>1,970,372,763</b>		
<sup>a</sup> Some facilities are composed of more that one SWIS # and were evaluated as a single facility for emission inventory and cost analysis purposes.													
<sup>b</sup> Open Year in <b>Bold</b> Indicates ARB Estimate													



























Monitoring Costs			LF Gas Heat Calc. Reporting Cost										Costs per Landfill								
Fed Govt.	Tribal Govt.	Military	Subtotal	Private	Local Govt.	State Govt.	Fed Govt.	Tribal Govt.	Military	Subtotal	Private	Local Govt.	State Govt.	Fed Govt.	Tribal Govt.	Military		Number of Reports	Review By ARB?	ARB LEA Acres	ARB Reviewed Reports
			\$427,238		\$427,238					\$127		\$127						1	Yes	40	1
																	\$5,994,520	1	No		
			\$691,125	\$691,125						\$127	\$127						\$691,253	1	No		
			\$326,108	\$326,108						\$127	\$127						\$326,236	1	No		
			\$404,326		\$404,326					\$127		\$127					\$404,454	1	Yes	36	
			\$360,872		\$360,872					\$127		\$127					\$360,999	1	No		1
			\$502,296		\$502,296					\$1,530		\$1,530					\$7,074,991	12	No		
			\$756,702		\$756,702					\$3,060		\$3,060					\$759,762	24	No		
			\$647,671	\$647,671						\$127	\$127						\$647,798	1	No		
			\$475,947	\$475,947						\$127	\$127						\$476,074	1	No		
			\$656,757		\$656,757					\$127		\$127					\$656,884	1	Yes	57	
			\$588,415		\$588,415					\$2,932		\$2,932					\$8,264,819	23	No		23
		\$8,745,880	\$853,921						\$853,921	\$3,060						\$3,060	\$12,060,576	24	Yes	38	
			\$378,253		\$378,253					\$127		\$127					\$378,381	1	Yes	21.8	1
			\$254,685		\$254,685					\$765		\$765					\$255,450	6	No		6
			\$447,780	\$447,780						\$1,402	\$1,402						\$6,302,142	11	No		
			\$820,303		\$820,303					\$3,060		\$3,060					\$823,363	24	No		
			\$341,910		\$341,910					\$1,785		\$1,785					\$343,695	14	No		
			\$765,788		\$765,788					\$127		\$127					\$765,915	1	No		
			\$465,952		\$465,952					\$127		\$127					\$466,080	1	No		
			\$146,690		\$146,690					\$127		\$127					\$146,818	1	No		
			\$1,192,828		\$1,192,828					\$255		\$255					\$1,193,081	2	No		
			\$502,296		\$502,296					\$2,550		\$2,550					\$504,846	20	No		
			\$366,007		\$366,007					\$2,295		\$2,295					\$5,143,951	18	No		
			\$311,492	\$311,492						\$127	\$127						\$311,619	1	No		
			\$181,017	\$181,017						\$127	\$127						\$181,145	1	No		
			\$1,138,310		\$1,138,310					\$127		\$127					\$1,138,438	1	No		



Monitoring Costs									LF Gas Heat Calc. Reporting Cost					Costs per Landfill							
Fed Govt.	Tribal Govt.	Military	Subtotal	Private	Local Govt.	State Govt.	Fed Govt.	Tribal Govt.	Military	Subtotal	Private	Local Govt.	State Govt.	Fed Govt.	Tribal Govt.	Military		Number of Reports	Review By ARB?	ARB LEA Acres	ARB Reviewed Reports
			\$552,071		\$552,071																
										\$127		\$127						1			
																	\$552,199		No		
			\$275,148		\$275,148													1			
										\$127		\$127					\$275,275		No		
			\$1,410,888		\$1,410,888													1			
										\$127		\$127					\$1,411,015		No		
			\$891,015		\$891,015													1			
										\$127		\$127					\$891,143		No		
			\$162,684		\$162,684													24		No	
										\$3,060		\$3,060					\$165,743		No		
			\$353,287		\$353,287													14		No	
										\$1,785		\$1,785					\$355,072		No		
			\$262,902		\$262,902													1			
										\$127		\$127					\$3,224,520		No		
			\$417,757		\$417,757													24		No	
										\$3,060		\$3,060					\$420,817		No		
			\$427,238		\$427,238													1		No	
										\$127		\$127					\$5,994,520		No		
			\$421,708	\$421,708							\$127							1		No	
																	\$421,835		No		
			\$806,477		\$806,477													24		No	
										\$3,060		\$3,060					\$809,537		No		
			\$883,905		\$883,905													1		No	
										\$127		\$127					\$884,032		No		
			\$391,685	\$391,685														17		No	
										\$2,167	\$2,167						\$393,852		No		
			\$429,609		\$429,609													4		No	
										\$510		\$510					\$6,043,675		No		
			\$328,858		\$328,858													1		No	
										\$127		\$127					\$328,985		No		
			\$647,671		\$647,671													22		No	
										\$2,805		\$2,805					\$650,476		No		
			\$223,536		\$223,536													1		No	
										\$127		\$127					\$223,663		No		
			\$360,872	\$360,872							\$127							1		No	
																	\$360,999		No		
			\$967,653		\$967,653													1		No	
										\$127		\$127					\$967,781		No		
			\$188,429		\$188,429													1		No	
										\$127		\$127					\$188,556		No		
			\$910,767	\$910,767														1		No	
										\$127	\$127						\$910,895		No		
			\$285,754		\$285,754													22		No	
										\$2,805		\$2,805					\$288,559		No		
			\$665,052		\$665,052													1		No	
										\$127		\$127					\$665,180		No		
			\$593,155		\$593,155													24		No	
										\$3,060		\$3,060					\$596,215		No		
			\$465,952	\$465,952														1		No	
										\$127	\$127						\$466,080		No		
			\$465,162		\$465,162													15		No	
										\$1,912		\$1,912					\$467,075		No		
			\$456,471		\$456,471													1		No	
										\$127		\$127					\$6,446,261		No		

Monitoring Costs									LF Gas Heat Calc. Reporting Cost				Costs per Landfill							
Fed Govt.	Tribal Govt.	Military	Subtotal	Private	Local Govt.	State Govt.	Fed Govt.	Tribal Govt.	Military	Subtotal	Private	Local Govt.	State Govt.	Fed Govt.	Tribal Govt.	Military	Number of Reports	Review By ARB?	ARB LEA Acres	ARB Reviewed Reports
			\$1,090,906		\$1,090,906					\$127		\$127					1	No		
																	\$1,091,033			
			\$282,048		\$282,048					\$127		\$127					1	No		
																	\$282,175			
			\$207,250		\$207,250					\$127		\$127					1	No		
																	\$207,378			
			\$1,316,868		\$1,316,868					\$127		\$127					1	No		
																	\$1,316,996			
			\$1,008,342		\$1,008,342					\$127		\$127					1	No		
																	\$11,429,160			
			\$1,438,146		\$1,438,146					\$2,167		\$2,167					17	No		
																	\$1,440,313			
			\$699,816	\$699,816						\$127	\$127						1	No		
																	\$699,943			
			\$251,817		\$251,817					\$127		\$127					1	No		
																	\$251,944			
			\$1,185,715		\$1,185,715					\$127		\$127					1	No		
																	\$1,185,843			
			\$1,229,170		\$1,229,170					\$127		\$127					1	No		
																	\$1,229,297			
			\$1,090,906		\$1,090,906					\$127		\$127					1	No		
																	\$1,091,033			
			\$1,216,054		\$1,216,054					\$1,402		\$1,402					11	No		
																	\$17,093,179			
			\$956,592		\$956,592					\$510		\$510					4	No		
																	\$13,513,319			
			\$1,547,177	\$1,547,177						\$3,060	\$3,060						24	No		
																	\$1,550,237			
			\$1,422,739		\$1,422,739					\$127		\$127					1	Yes	73	
																	\$1,422,867			
			\$711,272	\$711,272						\$127	\$127						1	No		1
																	\$10,035,689			
			\$747,616		\$747,616					\$3,060		\$3,060					24	No		
																	\$750,676			
			\$2,292,222		\$2,292,222					\$1,912		\$1,912					15	No		
																	\$2,294,135			
			\$1,810,668		\$1,810,668					\$127		\$127					1	No		
																	\$1,810,796			
			\$1,728,895		\$1,728,895					\$3,060		\$3,060					24	No		
																	\$1,731,955			
			\$2,095,887		\$2,095,887					\$1,275		\$1,275					10	No		
																	\$2,097,162			
			\$2,370,835		\$2,370,835					\$1,020		\$1,020					8	No		
																	\$2,371,855			
			\$626,339		\$626,339					\$1,530		\$1,530					12	No		
																	\$627,868			
			\$455,681	\$455,681						\$1,785	\$1,785						14	No		
																	\$457,466			
			\$1,274,599		\$1,274,599					\$2,295		\$2,295					18	No		
																	\$1,276,894			
			\$1,020,193		\$1,020,193					\$127		\$127					1	No		
																	\$1,020,321			
			\$1,375,334		\$1,375,334					\$3,060		\$3,060					24	No		
																	\$1,378,394			

Monitoring Costs									LF Gas Heat Calc. Reporting Cost					Costs per Landfill							
Fed Govt.	Tribal Govt.	Military	Subtotal	Private	Local Govt.	State Govt.	Fed Govt.	Tribal Govt.	Military	Subtotal	Private	Local Govt.	State Govt.	Fed Govt.	Tribal Govt.	Military		Number of Reports	Review By ARB?	ARB LEA Acres	ARB Reviewed Reports
			\$1,559,028	\$1,559,028						\$3,060	\$3,060							24			
																		\$17,617,158	No		
			\$847,561	\$847,561						\$382	\$382							3	No		
																		\$847,943			
			\$303,697		\$303,697					\$892		\$892						7	No		
																		\$304,590			
			\$213,199	\$213,199						\$127	\$127							1	No		
																		\$213,326			
			\$2,410,339	\$2,410,339						\$3,060	\$3,060							24	No		
																		\$2,413,399			
			\$1,038,365	\$1,038,365						\$127	\$127							1	No		
																		\$1,038,493			
			\$344,071		\$344,071					\$3,060		\$3,060						24	No		
																		\$347,130			
			\$1,536,511	\$1,536,511						\$510	\$510							4	No		
																		\$21,600,598			
			\$2,364,910		\$2,364,910					\$3,060		\$3,060						24	No		
																		\$26,982,470			
			\$1,138,310	\$1,138,310						\$1,402	\$1,402							11	No		
																		\$1,139,713			
			\$730,629		\$730,629					\$127		\$127						1	No		
																		\$730,757			
			\$209,493	\$209,493						\$127	\$127							1	No		
																		\$209,621			
			\$2,238,102		\$2,238,102					\$3,060		\$3,060						24	No		
																		\$2,241,162			
			\$383,784		\$383,784					\$3,060		\$3,060						24	No		
																		\$4,649,344			
			\$4,532,494		\$4,532,494					\$3,060		\$3,060						24	No		
																		\$4,535,554			
			\$543,380	\$543,380						\$127	\$127							1	No		
																		\$543,508			
			\$1,166,753		\$1,166,753					\$1,402		\$1,402						11	No		
																		\$1,168,156			
			\$3,281,007		\$3,281,007					\$3,060		\$3,060						24	No		
																		\$3,284,067			
			\$2,873,721	\$2,873,721						\$2,040	\$2,040							16	No		
																		\$2,875,761			
			\$3,034,502		\$3,034,502					\$3,060		\$3,060						24	No		
																		\$3,037,562			
			\$696,215	\$696,215						\$127	\$127							1	No		
																		\$696,343			
			\$231,923		\$231,923					\$127		\$127						1	No		
																		\$232,050			
			\$920,248		\$920,248					\$2,295		\$2,295						18	No		
																		\$922,543			
			\$375,667		\$375,667					\$127		\$127						1	No		
																		\$375,795			
			\$2,029,521	\$2,029,521						\$382	\$382							3	No		
																		\$2,029,903			
			\$394,391		\$394,391					\$127		\$127						1	No		
																		\$394,519			
			\$326,907	\$326,907						\$127	\$127							1	No		
																		\$327,035			

Monitoring Costs									LF Gas Heat Calc. Reporting Cost				Costs per Landfill								
Fed Govt.	Tribal Govt.	Military	Subtotal	Private	Local Govt.	State Govt.	Fed Govt.	Tribal Govt.	Military	Subtotal	Private	Local Govt.	State Govt.	Fed Govt.	Tribal Govt.	Military		Number of Reports	Review By ARB?	ARB LEA Acres	ARB Reviewed Reports
			\$2,128,676		\$2,128,676													24			
										\$3,060		\$3,060						\$2,131,735	No		
			\$386,433		\$386,433					\$1,785		\$1,785						\$388,218	14	No	
			\$1,678,725		\$1,678,725					\$1,275		\$1,275						\$1,680,000	10	No	
			\$1,047,451	\$1,047,451						\$127	\$127							\$1,047,579	1	No	
			\$1,896,787	\$1,896,787						\$3,060	\$3,060							\$1,899,847	24	No	
			\$1,501,747	\$1,501,747						\$127	\$127							\$1,501,875	1	No	
			\$249,866		\$249,866					\$127		\$127						\$249,994	1	No	
			\$3,470,627		\$3,470,627					\$2,805		\$2,805						\$3,473,431	22	No	
			\$419,161			\$419,161				\$127			\$127					\$419,289	1	No	
			\$420,331		\$420,331					\$127		\$127						\$420,459	1	No	
			\$399,072		\$399,072					\$1,147		\$1,147						\$400,219	9	No	
			\$2,065,074	\$2,065,074						\$892	\$892							\$2,065,967	7	No	
			\$492,691	\$492,691						\$127	\$127							\$492,819	1	No	
			\$2,361,354	\$2,361,354						\$3,060	\$3,060							\$2,364,414	24	No	
			\$729,080		\$729,080					\$127		\$127						\$729,207	1	No	
			\$1,849,382	\$1,849,382						\$3,060	\$3,060							\$1,852,442	24	No	
			\$1,002,916		\$1,002,916					\$3,060		\$3,060						\$1,005,976	24	No	
			\$925,680		\$925,680					\$127		\$127						\$925,807	1	No	
			\$745,268	\$745,268						\$127	\$127							\$745,395	1	No	
			\$1,807,761	\$1,807,761						\$1,657	\$1,657							\$1,809,418	13	No	
			\$3,017,437	\$3,017,437						\$892	\$892							\$3,018,329	7	No	
			\$1,858,863	\$1,858,863						\$1,785	\$1,785							\$1,860,648	14	No	
			\$6,371,800		\$6,371,800					\$3,060		\$3,060						\$6,374,860	24	No	
			\$3,119,831	\$3,119,831						\$892	\$892							\$3,120,723	7	No	
			\$1,021,640		\$1,021,640					\$2,422		\$2,422						\$1,024,062	19	No	
			\$1,034,902		\$1,034,902					\$637		\$637						\$1,035,540	5	No	
			\$1,615,829		\$1,615,829					\$3,060		\$3,060						\$1,618,889	24	No	

Monitoring Costs					LF Gas Heat Calc. Reporting Cost					Costs per Landfill												
Fed Govt.	Tribal Govt.	Military	Subtotal	Private	Local Govt.	State Govt.	Fed Govt.	Tribal Govt.	Military	Subtotal	Private	Local Govt.	State Govt.	Fed Govt.	Tribal Govt.	Military		Number of Reports	Review By ARB?	ARB LEA Acres	ARB Reviewed Reports	
			\$530,236	\$530,236														1	No			
										\$127	\$127							\$530,364	No			
			\$3,409,000	\$3,409,000						\$1,402	\$1,402							\$3,410,403	11	No		
			\$431,546	\$431,546						\$127	\$127							\$431,674	1	No		
			\$913,978	\$913,978						\$127	\$127							\$914,105	1	No		
			\$2,228,621	\$2,228,621						\$1,530	\$1,530							\$2,230,151	12	No		
			\$649,503	\$649,503						\$1,275	\$1,275							\$650,778	10	No		
\$0			\$4,504,051					\$4,504,051		\$255						\$255		\$4,504,306	2	No		
			\$1,158,265	\$1,158,265						\$2,677	\$2,677							\$1,160,942	21	No		
			\$4,073,063	\$4,073,063						\$2,422	\$2,422							\$4,075,485	19	No		
			\$812,849		\$812,849					\$1,657		\$1,657						\$814,507	13	No		
			\$990,043		\$990,043					\$510		\$510						\$990,553	4	No		
			\$1,483,494		\$1,483,494					\$510		\$510						\$1,484,004	4	1321	265.8	33
																		\$335,348,090				
																		\$26,962,470		6 # for ARB Review		
																		\$146,818		140 # for District Review		
			\$160,231,250							\$168,414								\$335,487,268		Per-Category Subtotals (all sectors)		
			\$59,626,482		\$94,827,634					\$47,044		\$117,928						\$110,979,519		Private Sector		
						\$419,161												\$207,482,492		Local Govt. Sector		
																		\$423,058		State Govt. Sector		
																		\$12,641		Fed. Govt. Sector		
\$0	\$0							\$0										\$0		Tribal Govt. Sector		
		\$8,745,880						\$0	\$5,357,972							\$0		\$3,315		Military Sector		
																		\$335,487,268		Total Reg. Cost		

**Cost Subtotals**

5/7/2009

Note: See staff report (Appendix F) for additional discussion and more detailed information (including reference citations.)

**1. Waste-in-Place (WIP) Report Preparation & Submittal**

## Assumptions:

- 1) Landfills are currently required to submit periodic WIP reports to the California Integrated Waste Management Board.
- 2) This cost estimate assumes that a recent CIWMB report will either be updated or copied and submitted to ARB.
- 3) No allowance is given for office overhead, supplies, etc., since these are minimal cost items given the short duration and scope of this work assignment.

Cost:			
Engineering Staff Time:	2 hours @	61.77 \$/hr. =	\$124
Clerical Staff Time:	1 hours @	43.85 \$/hr. =	\$44
WIP Report Preparation & Submittal Cost:			<u>\$167</u>

Ref.: USDL, 2009b

**2. Calculation of Landfill Gas Heat Input Capacity**

## Assumptions:

- 1) Time needed to prepare and submit Calculation as outlined in proposed regulation.
- 2) No allowance is given for office overhead, supplies, etc., since these are minimal cost items given the short duration and scope of this work assignment.

Cost:			
Engineering Staff Time:	1.5 hours @	65.14 \$/hr. =	\$98
Clerical Staff Time:	1 hours @	29.78 \$/hr. =	\$30
Calculation of Landfill Gas Heat Input Capacity Cost:			<u>\$127</u>

Ref.: USDL, 2009b

**3a. Surface Emissions/Contol & Collection System Monitoring--Capital Cost**

## Assumptions:

Monitoring equipment to be used by landfills will be the same as used by ARB for reg. enforcement.

Monitoring Equipment Capital Cost:	\$48,000	<b>\$48,000</b>
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## Includes the following:

(3) Portable Organic Vapor Analyzers	@	\$5,000 ea. =	\$15,000
(1) Calibration System	@	\$3,000 ea. =	\$3,000
(3) Vacuum Measuring Devices	@	\$1,000 ea. =	\$3,000
(3) Portable Oxygen Analyzers	@	\$3,500 ea. =	\$10,500
Spare Parts		\$500 =	\$500
Tools		\$1,000 =	\$1,000
(3) Datalogging Systems	@	\$5,000 =	<u>\$15,000</u>
			<b>\$48,000</b>

**3b. Surface Emissions/Contol & Collection System Monitoring--Cost per Landfill-Acre**

## Assumptions:

Includes calibration of monitor and downloading of monitoring data from datalogger.

Increased Monitoring Cost (SCAQMD only):	Engrg. Tech. Staff Time:	0.5 hours @	48.76	\$/hr. =	<b>\$24 Per-Acre Cost:</b>
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Monitoring Cost + Surface Maintenance Allowance (non-SCAQMD landfills):	Engrg. Tech. Staff Time:	1 hours @	48.76	\$/hr. =	\$49 Per-Acre Cost:
	Improved Surface Maintenance Cost Allowance:		50	\$/AC =	<u>\$50</u>
					<b>\$99 Total Per-Acre Cost</b>

Ref.: USDL, 2009b

4. Upgrade of Existing Collection/Control System--Capital Cost

Assumptions:

For landfills with existing open flare systems, work to be performed will consist of changeout of existing control device to a new enclosed flare.

Ref.: John Zink Co. "ZTOP" model

Enclosed Flare Cost Lookup Table <sup>6</sup>							Delivered Flare Cost Construction Table					
Flare Size (MM Btu/Hr.)	Delivered Flare Cost <sup>1</sup>	Flare Installation <sup>2</sup>	Permits <sup>3</sup>	Start-up Source Test <sup>4</sup>	Misc. <sup>5</sup>	Total Cost	Flare Stack & Controls	Propane Pilot Gas System	Blower Skid	Tranportation To Site	Delivered Flare Cost	
3.0	\$174,590	\$30,000	\$5,000	\$25,000	\$50,000	<b>\$284,590</b>	3	\$75,000	\$1,000	\$75,000	\$10,000	\$174,590
6.1	\$189,405	\$33,462	\$6,000	\$25,000	\$50,000	<b>\$303,867</b>	6	\$80,000	\$1,000	\$80,769	\$13,077	\$189,405
10.6	\$207,490	\$36,924	\$7,000	\$25,000	\$50,000	<b>\$326,414</b>	11	\$88,000	\$1,000	\$86,538	\$16,154	\$207,490
18.2	\$224,486	\$40,386	\$8,000	\$25,000	\$50,000	<b>\$347,872</b>	18	\$95,000	\$1,000	\$92,307	\$19,231	\$224,486
27.3	\$242,571	\$43,848	\$9,000	\$25,000	\$50,000	<b>\$370,419</b>	27	\$103,000	\$1,000	\$98,076	\$22,308	\$242,571
39.5	\$265,016	\$47,310	\$10,000	\$25,000	\$50,000	<b>\$397,326</b>	39	\$115,000	\$1,000	\$103,845	\$25,385	\$265,016
51.6	\$285,281	\$50,772	\$15,000	\$25,000	\$50,000	<b>\$426,053</b>	52	\$125,000	\$1,000	\$109,614	\$28,462	\$285,281
66.8	\$305,546	\$54,234	\$20,000	\$25,000	\$50,000	<b>\$454,780</b>	67	\$135,000	\$1,000	\$115,383	\$31,539	\$305,546
81.9	\$325,812	\$57,696	\$25,000	\$25,000	\$50,000	<b>\$483,508</b>	82	\$145,000	\$1,000	\$121,152	\$34,616	\$325,812
100.2	\$346,077	\$61,158	\$30,000	\$25,000	\$50,000	<b>\$512,235</b>	100	\$155,000	\$1,000	\$126,921	\$37,693	\$346,077
115.4	\$366,342	\$64,620	\$35,000	\$25,000	\$50,000	<b>\$540,962</b>	115	\$165,000	\$1,000	\$132,690	\$40,770	\$366,342
136.6	\$386,607	\$68,082	\$40,000	\$25,000	\$50,000	<b>\$569,689</b>	137	\$175,000	\$1,000	\$138,459	\$43,847	\$386,607
182.1	\$596,090	\$71,544	\$45,000	\$25,000	\$50,000	<b>\$787,634</b>	182	\$350,000	\$1,000	\$150,000	\$50,000	\$596,090
364.3	\$1,001,430	\$75,000	\$50,000	\$25,000	\$50,000	<b>\$1,201,430</b>	364	\$525,000	\$2,000	\$300,000	\$100,000	\$1,001,430
546.5	\$1,001,430	\$150,000	\$55,000	\$50,000	\$50,000	<b>\$1,306,430</b>	546	\$700,000	\$3,000	\$450,000	\$150,000	\$1,406,770
728.6	\$1,406,770	\$225,000	\$60,000	\$75,000	\$50,000	<b>\$1,816,770</b>	728	\$875,000	\$4,000	\$600,000	\$200,000	\$1,812,110
910.8	\$1,812,110	\$300,000	\$65,000	\$100,000	\$50,000	<b>\$2,327,110</b>	911	\$1,050,000	\$5,000	\$750,000	\$250,000	\$2,217,450
	\$2,217,450	\$375,000	\$70,000	\$125,000	\$50,000	<b>\$2,837,450</b>		\$1,050,000	\$6,000	\$900,000	\$300,000	\$2,432,040

<sup>1</sup> Includes the following: enclosed flare cost (includes stack ,control panel, flame arrester, safety shutoff valve, flow meter, and chart recorder), \$1,000 for propane pilot gas system, tranportation to CA (not taxed), and 9% sales tax.

<sup>2</sup> Includes site evaluation, application engineering, and actual installation work.

<sup>3</sup> Includes air district (application & authority-to-construct fees) and building permits.

<sup>4</sup> Source test for criteria pollutants and CH4 (EPA Method 18) to ensure permit compliance.

<sup>5</sup> Allowance for electrical service work, including line extension and service drop work, etc.

<sup>6</sup> 182 MM Btu/Hr. (about 6,000 SCFM) is the largest stock single enclosed flare size; larger sizes assume using multiple flares as required for control.

Ref.: Locke, 2009a, Locke 2009b

5a. Installation of New Collection and Control System--Capital Cost

Assumptions:

includes site assessment, design and installation of collection and control systems (enclosed flare assumed as control technology choice)

2007 \$	2008 \$		
\$18,000	\$18,900	Cost/ LF acre:	<b>\$18,900</b>
		Source Test:	<b>\$25,000</b>

Ref.: U.S. EPA, 2009

5b. Annual Operation & Maintenance Cost of New Collection and Control System

2007 \$	2008 \$		
4,000	4,200	Cost/ LF acre:	<b>\$4,200</b>
		Source Test	<b>\$25,000</b>
		Misc..	\$0

Ref.: U.S. EPA, 2009

6. Costs to ARB for Enforcement and Outreach Activities

Note: Items 6a through 6e are used to calculate the low end of the cost range, 6f through 6j are used to calculate the high end of the cost range.

Calculation of ARB Loaded Labor Rate Used for Estimation Purposes (includes benefits, overhead, etc.):  
 ARB Annual Employee Loaded Cost = \$170,000<sup>1</sup>      Number of Employee Production Hours/Yr.: 1,904  
 \$170,000/1,904 = \$89.29/hr.

Ref.: Ford, 2009<sup>1</sup>

6a. ARB Enforcement--Site Inspections & Associated Work (low end of cost range)

Assumptions:

- 1) Six landfills located in local air districts w/o delegated LEA authority from ARB will be inspected annually by ARB for enforcement purposes.
- 2) Three of the six landfills are remotely located, requiring additional travel time beyond that for a typical inspection.
- 3) A typical inspection is a one-day trip w/o overnight lodging, but includes limited (4hrs.) O/T. O/T = 1.5x normal pay rate.
- 4) A remote inspection includes two nights' lodging expenses + per-diem and two days for travel.
- 5) Landfill population is relatively stable over time-- no large increases in the number of landfills.

	# of Landfills	Travel (unit cost)	Travel Cost Subtotal	Labor (hrs./insp.)	Labor Cost Subtotal	Monitoring Equipment \$48,000	One-Time Eq. Cost \$48,000
Typical Inspection:	3	\$80	\$240	14	\$3,750		
Remote Inspection:	3	\$520	\$1,560	24	\$6,429		
			\$1,800		\$10,179		
						<b>\$1,800</b>	<b>\$10,179</b>

6b. ARB Enforcement--Design Plan Reviews (low end of cost range)

Assumptions:

- 1) Each initial Design Plan review by ARB staff includes 12 hrs. for a site visit.
- 2) 25% of Design Plans submitted will be updated and resubmitted annually.
- 3) Landfill population is relatively stable over time-- no large increases in the number of landfills.

Initial Design Plan Review <sup>1</sup> :	30 hours @	89.29 \$/hr. =	\$2,679
	Travel Costs (avg.):		\$240
		Total:	\$2,919

Updated Design Plan Review <sup>1</sup> :	8 hours @	89.29 \$/hr. =	\$714
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Cost Calculation:	# of Affected Landfills	Labor Cost/Review	Review Cost Subtotal	One-Time Travel Cost	One-Time Labor Cost
Initial Review:	5	\$2,679	\$13,394	\$1,200	\$13,394
Update Review:	1	\$714	\$714		
					Annual Labor Cost \$714

Ref.: Judge, 2009<sup>1</sup>

6c. ARB Enforcement--Monitoring Data Review (low end of cost range)

Assumptions:

- 1) Monitoring data review includes staff time to receive, review, and archive data.
- 2) Four monitoring reports per year are reviewed.
- 3) Landfill population is relatively stable over time-- no large increases in the number of landfills.
- 4) Report review workload is constant over the 23-year analysis period.

Review Cost per Reporting Cycle (expressed on a per-acre basis):	0.1 hours @	89.29 \$/hr. =	\$9	Annual
	Number of Affected Landfill:	Review Cost (\$/acre)	Cost Subtotal	Labor Cost
Report Review:	266	\$9	\$2,373	\$9,493



6d. ARB Enforcement--Review of WIP and Heat Calculation Reports (low end of cost range)

Assumptions:

- 1) Report review workload is constant over the 23-year analysis period.
- 2) Landfill population is relatively stable over time-- no large increases in the number of landfills.

Number of Reports Expected From Affected Landfills

Landfills Subject to Reporting Only:	567
Landfills Subject to Reporting, Monitoring, & Controls:	33
Total:	600 (over a 23-year period)

Estimated Review Time/Report

1 hour(s) @ 89.29 \$/hr. = \$89

Cost Calculation

	Number of			Annual
	<u>Reports</u>	<u>Cost/Review</u>	<u>Cost Subtotal</u>	<u>Labor Cost</u>
Report Review:	600	\$89	\$53,574	<b>\$2,329</b>

6e. ARB Implementation--Outreach and Compliance Assistance Activities (low end of cost range)

Assumptions:

- 1) Mailout audience is estimated at 218 x 1.25 = 273; this is the 218 potentially affected CA landfills plus 25% additional to include associated regulatory agencies (local air districts (35), CIWMB, RWCB, and EPA), equipment and service providers, and other interested parties.
- 2) Preparation of 75-page outreach document for landfills is performed.

Preparation of Outreach Materials

(1) 75-page outreach document

ARB Staff Time: 120 hours @ 89.29 \$/hr. = \$10,715

	(# of units)	(cost/unit)	Quantity	
Reproduction Costs:				
400 copies = 273 + 127 extras	75	\$0.04	400	\$1,200
Mailout:				
cover letter	2	\$0.04	273	\$22
envelope	1	\$0.72	273	\$197
postage (8 oz.) (after 5/09 rate increase)	1	\$2.07	273	\$565
				\$1,984

Informational Workshop(s)

(Outreach materials & staff time costs covered/absorbed in current budget allocation.)

Travel- one person/one week \$1,200

One-Time Non-	One-Time
<u>Labor Expenses</u>	<u>Travel Exp.</u>
<b>\$2,484</b>	<b>\$2,400</b>

Trade Show Attendance

(Staff time costs covered/absorbed in current budget allocation.)

Travel- one person/one week \$1,200

One-Time
<u>Labor Cost</u>
<b>\$10,715</b>

Registration Fees \$500

Low-End of Cost Range Summary

	Cost (\$)
Annual (Recurring) Costs:	
ARB Staff Time	\$22,716
Travel	\$1,800
	\$24,516
*Low-End Annual Costs to ARB are approximately \$24,500.*	
One-Time Costs:	
ARB Staff Time	\$24,108
Travel	\$3,600
Monitoring Equipment + Mailout Expenses	\$50,484
	\$78,192
*Low-End One-Time Costs to ARB are approximately \$78,000.*	

6f. ARB Enforcement--Site Inspections & Associated Work (high end of cost range)

Assumptions:

- 1) All California landfills will be inspected annually by ARB for enforcement purposes.
- 2) Landfill population is relatively stable over time-- no large increases in the number of landfills.

Labor Cost

8 hrs./insp. + 1.3 hrs. travel allowance = 10 hrs./inspection  
367 Landfills x 10 hrs. Staff Time/Landfill = 3,670 hrs.  
3,670 hrs./1,904 hrs. ~ 2 PYs  
2 PYs x \$170,000/PY<sup>1</sup> = \$340,000

Monitoring  
Equipment  
\$ 48,000

One-Time  
Eq. Cost  
\$ 48,000

Travel Cost

40% of Inspections on Per-Diem (~36.7 weeks/yr. for 2 PYs)

Travel Labor Cost  
\$44,040 \$ 340,000

Annual Annual  
Travel Cost Labor Cost  
\$44,040 \$340,000

Cost for One Week of Travel (5 days, 4 nights)

Lodging \$560  
Round-Trip Airfare \$240  
Car Rental (incl. gas.) \$200  
Food and Incidentals \$200  
-----  
\$1,200

36.7 Travel Weeks/yr. x \$1,200/week = \$44,040

Ref.: Ford, 2009<sup>1</sup>

6g. ARB Enforcement--Design Plan Reviews (high end of cost range)

Assumptions:

- 1) Each initial Design Plan review by ARB staff includes 12 hrs. for a site visit.
- 2) 25% of Design Plans submitted will be updated and resubmitted annually.
- 3) Landfill population is relatively stable over time-- no large increases in the number of landfills.

Initial Design Plan Review<sup>1</sup>:

30 hours @ 89.29 \$/hr. = \$2,679  
Travel Costs (avg.): \$240  
-----  
Total: \$2,919

Updated Design Plan Review<sup>1</sup>:

8 hours @ 89.29 \$/hr. = \$714

Cost Calculation:

	# of Affected Landfills	Labor Cost/Review	Review Cost Subtotal	One-Time Travel Cost	One-Time Labor Cost
Initial Review:	146	\$2,679	\$391,090	\$35,040	\$391,090
Update Review:	37	\$714	\$26,073		Annual Labor Cost \$26,073

Ref.: Judge, 2009<sup>1</sup>

6h. ARB Enforcement--Monitoring Data Review (high end of cost range)

Assumptions:

- 1) Monitoring data review includes staff time to receive, review, and archive data.
- 2) Four monitoring reports per year are reviewed.
- 3) Landfill population is relatively stable over time-- no large increases in the number of landfills.
- 4) Report review workload is constant over the 23-year analysis period.

Review Cost per Reporting Cycle (expressed on a per-acre basis):

0.1 hour(s) @ 89.29 \$/hr. = \$9

Annual

	Number of Affected Landfill- Acres	Review Cost (\$/acre)	Cost Subtotal	Labor Cost
Report Review:	23,247	\$9	\$207,573	\$830,292

6i. ARB Enforcement--Review of WIP and Heat Calculation Reports (high end of cost range)

Assumptions:

- 1) Report review workload is constant over the 23-year analysis period.
- 2) Landfill population is relatively stable over time-- no large increases in the number of landfills.

Number of Reports Expected From Affected Landfills

Landfills Subject to Reporting Only: 888  
 Landfills Subject to Reporting, Monitoring, & Controls: 1,321  
 Total: 2,209

Estimated Review Time/Report  
 1 hour(s) @ 89.29 \$/hr. = \$89

<u>Cost Calculation</u>	Number of			Annual
	Reports	Cost/Review	Cost Subtotal	Labor Cost
Report Review:	2,209	\$89	\$197,242	<b>\$8,576</b>

6j. ARB Implementation--Outreach and Compliance Assistance Activities (high end of cost range)

Assumptions:  
 1) Mailout audience is estimated at 372 x 1.25 = 465; this is all of the 372 potentially affected CA landfills plus 25% additional to include associated regulatory agencies (local air districts (35), CIWMB, RWCB, and EPA), equipment and service providers, and other interested parties.  
 2) Preparation of 75-page outreach document for landfills is performed.

Preparation of Outreach Materials

(1) 75-page outreach document  
 ARB Staff Time: 120 hour(s) @ 89.29 \$/hr. = \$10,715

	(# of units)	(cost/unit)	Quantity	
Reproduction Costs:				
500 copies = 465 + 35 extras	75	\$0.04	500	\$1,500
Mailout:				
cover letter	2	\$0.04	465	\$37
envelope	1	\$0.72	465	\$335
postage (8 oz.) (after 5/09 rate increase)	1	\$2.07	465	\$963
				<u>\$2,835</u>

Informational Workshop(s)  
 (Outreach materials & staff time costs covered/absorbed in current budget allocation.)  
 Travel- one person/one week \$1,200

Trade Show Attendance  
 (Staff time costs covered/absorbed in current budget allocation.)  
 Travel- one person/one week \$1,200  
 Registration Fees \$500

One-Time	One-Time Non-
<u>Travel Exp.</u>	<u>Labor Expenses</u>
<b>\$2,400</b>	<b>\$3,335</b>

One-Time  
Labor Cost  
**\$10,715**

High-End of Cost Range Summary

	Cost (\$)
Annual (Recurring) Costs:	
ARB Staff Time	\$1,204,940
Travel	<u>\$44,040</u>
	\$1,248,980

"High-End Annual Costs to ARB are approximately 1.2 million dollars."

One-Time Costs:	
ARB Staff Time	\$401,805
Travel	\$37,440
Monitoring Equipment + Mailout Expenses	<u>\$50,835</u>
	\$490,080

"High-End One-Time Costs to ARB are approximately \$490,000."

**Estimated Cost-Effectiveness**

(for the period 2010 to 2033, inclusive)

5/7/2009

This is the overall cost-effectiveness, where reporting requirement, collection and control system, and monitoring costs are summed and divided by the CO2 reductions attributable to the proposed regulation (emission benefits for landfills in the SCAQMD excluded from the emission reductions listed below.)

## 1) Cost-Effectiveness of Proposed Regulation

Year <sup>1</sup>	Annual Cost <sup>2</sup> (\$)	Emission Red. <sup>3</sup> (MTCO2E)	Cost-Effectiveness (\$/MTCO2E)
2010	\$6,404,217	1,163,439	<b>5.50 Low</b>
2011	\$11,356,839	1,198,633	9.47
2012	\$14,052,745	1,234,336	<b>11.38 High</b>
2013	\$13,306,546	1,270,563	10.47
2014	\$13,305,574	1,307,328	10.18
2015	\$13,305,151	1,344,646	9.89
2016	\$13,304,856	1,382,532	9.62
2017	\$13,673,947	1,421,002	9.62
2018	\$15,595,468	1,460,071	10.68
2019	\$15,595,341	1,499,756	10.40
2020	\$15,594,456	1,540,071	10.13
2021	\$15,593,819	1,581,034	9.86
2022	\$15,592,974	1,622,662	9.61
2023	\$15,592,424	1,664,971	9.36
2024	\$15,591,659	1,707,980	9.13
2025	\$15,591,404	1,751,704	8.90
2026	\$14,819,906	1,796,163	8.25
2027	\$13,981,754	1,841,375	7.59
2028	\$13,893,086	1,887,358	7.36
2029	\$13,892,536	1,934,132	7.18
2030	\$13,892,114	1,981,715	7.01
2031	\$13,891,986	2,030,127	6.84
2032	\$13,891,604	2,079,389	6.68
2033	\$13,766,863	2,129,520	6.46
	<b>\$335,487,268</b>	<b>38,830,509</b>	<b>8.64 Avg.</b>

<sup>1</sup> These are the individual years in the analysis period.

<sup>2</sup> Annual costs are the sum of the reporting, collection and control systems improvements, and monitoring costs for all affected CA landfills (including those in the SCAQMD.) Costs are from the Landfills\_Reporting\_Only and Landfills\_Controlled worksheets in this file.

<sup>3</sup> Emission reductions are for all affected CA landfills except for those in the SCAQMD.



2029	2030	2031	2032	2033	Totals
\$127	\$0	\$0	\$0	\$0	\$10,098
\$3,818	\$3,650	\$3,650	\$3,650	\$3,021	\$129,080
\$2,559	\$2,391	\$2,391	\$2,391	\$2,224	\$87,994
\$127	\$127	\$127	\$127	\$0	\$3,769
\$335	\$335	\$335	\$335	\$335	\$12,641
\$0	\$0	\$0	\$0	\$0	\$0
\$797	\$797	\$797	\$797	\$462	\$24,676
\$3,945	\$3,650	\$3,650	\$3,650	\$3,021	\$139,178
\$3,180	\$3,013	\$3,013	\$3,013	\$2,511	\$95,914
\$765	\$637	\$637	\$637	\$510	\$43,264
\$3,945	\$3,650	\$3,650	\$3,650	\$3,021	\$139,178

2029	2030	2031	2032	2033	Totals
\$35,671	\$35,671	\$35,671	\$35,671	\$0	\$8,123,895
\$2,195,800	\$2,195,800	\$2,195,800	\$2,195,800	\$2,195,800	\$43,172,000
\$2,469,230	\$2,469,230	\$2,469,230	\$2,469,230	\$2,469,230	\$59,626,482
\$892	\$892	\$765	\$765	\$765	\$47,044
\$4,701,594	\$4,701,594	\$4,701,466	\$4,701,466	\$4,665,795	\$110,969,421
\$88,312	\$88,312	\$88,312	\$88,312	\$0	\$19,194,131
\$4,982,180	\$4,982,180	\$4,982,180	\$4,982,180	\$4,982,180	\$104,458,400
\$4,113,190	\$4,113,190	\$4,113,190	\$4,113,190	\$4,113,190	\$100,604,768
\$3,315	\$3,187	\$3,187	\$2,805	\$2,677	\$121,370
\$9,186,997	\$9,186,869	\$9,186,869	\$9,186,487	\$9,098,047	\$224,378,669
\$13,764,607	\$13,764,480	\$13,764,352	\$13,763,970	\$13,763,842	\$308,030,064
\$123,983	\$123,983	\$123,983	\$123,983	\$0	\$27,318,026
\$123,983	\$123,983	\$123,983	\$123,983	\$0	\$27,318,026
\$7,177,980	\$7,177,980	\$7,177,980	\$7,177,980	\$7,177,980	\$147,630,400
\$6,582,420	\$6,582,420	\$6,582,420	\$6,582,420	\$6,582,420	\$160,231,250
\$4,207	\$4,080	\$3,952	\$3,570	\$3,442	\$168,414
\$13,888,591	\$13,888,463	\$13,888,336	\$13,887,953	\$13,763,842	\$335,348,090
					\$335,487,268

2029	2030	2031	2032	2033	Totals
\$127	\$0	\$0	\$0	\$0	\$10,098
\$3,818	\$3,650	\$3,650	\$3,650	\$3,021	\$129,080
\$3,945	\$3,650	\$3,650	\$3,650	\$3,021	\$139,178
\$892	\$892	\$765	\$765	\$765	\$47,044
\$3,315	\$3,187	\$3,187	\$2,805	\$2,677	\$121,370
\$4,207	\$4,080	\$3,952	\$3,570	\$3,442	\$168,414
\$8,153	\$7,730	\$7,603	\$7,220	\$6,463	\$307,593

\$123,983	\$123,983	\$123,983	\$123,983	\$0	\$27,318,026
\$7,177,980	\$7,177,980	\$7,177,980	\$7,177,980	\$7,177,980	\$147,630,400
\$6,582,420	\$6,582,420	\$6,582,420	\$6,582,420	\$6,582,420	\$160,231,250
\$4,207	\$4,080	\$3,952	\$3,570	\$3,442	\$307,593 (incl. reporting only LFs)
\$13,888,591	\$13,888,463	\$13,888,336	\$13,887,953	\$13,763,842	\$335,487,268