

# **2020 MANDATORY GREENHOUSE GAS REPORT**

*Lebanon Regional Solid Waste Facility  
Lebanon, New Hampshire*

*Prepared for City of Lebanon  
File No. 3264.15  
March 2021*

Mr. Marc Morgan  
Lebanon Regional Solid Waste Facility  
193 Dartmouth College Highway  
Lebanon, NH 03766

March 31, 2021  
File No. 3264.15

Re: Mandatory Greenhouse Gas Reporting  
Lebanon Regional Solid Waste Facility  
Lebanon, New Hampshire

Dear Marc:

Sanborn, Head & Associates, Inc. (Sanborn Head) prepared this 2020 USEPA Mandatory Greenhouse Gas (GHG) Report on behalf of the City of Lebanon (City) for the Lebanon Regional Solid Waste Facility (Facility) in Lebanon, New Hampshire. As required, we prepared the report using an online registry, the Electronic Greenhouse Gas Reporting Tool (e-GGRT), which is used by the U.S. Environmental Protection Agency (USEPA) as a tool for reporting GHG emissions.

## **BACKGROUND**

According to 40 Code of Federal Regulations (40 CFR) Part 98, Subpart A, Mandatory Greenhouse Gas Reporting, any owner or operator of a municipal solid waste landfill that generates methane (CH<sub>4</sub>) in amounts equivalent to 25,000 metric tons of carbon dioxide equivalent (CO<sub>2</sub>e) or more per year must report GHG emissions.

## **PHYSICAL INVENTORY**

The following sources have been accounted for in the e-GGRT registry:

- Volume of collected landfill gas (LFG);
- Volume of fugitively emitted LFG;
- Oil Furnaces (2); and
- Propane Heaters/Furnaces (2).

## **EMISSIONS INVENTORY**

### **Subpart HH, Municipal Solid Waste Landfills**

In accordance with Subpart HH of the USEPA Mandatory Reporting Rule (MRR), Sanborn Head prepared estimates for the following using the appropriate Subpart HH equations within the e-GGRT system:

- Annual modeled CH<sub>4</sub> generation rate (equations HH-1 and HH-3);
- Annual CH<sub>4</sub> generation rate adjusted for oxidation in cover materials (equations HH-5 and HH-7);
- Annual quantity of recovered CH<sub>4</sub> (equation HH-4); and
- Annual CH<sub>4</sub> emission rate (equations HH-6 and HH-8).

Equation HH-2, which is used to estimate historical waste acceptance based on population data, was not required for this site.

The annual modeled CH<sub>4</sub> generation of the landfill was calculated within the e-GGRT system using historical waste acceptance data provided by the City, default values provided in the MRR, and Equation HH-1. For 2020, the average measured methane concentration was used for the methane fraction in the gas instead of a default value. The methane generation rate was corrected for oxidation in cover materials using an oxidation factor (based on Condition C3 in Table HH-4) provided in the MRR.

The calculations require waste quantities received on an annual basis. Waste quantities from 1971 through 2020 were input based on scale records provided by the City. For the years that GHG reporting has been required, (i.e., 2010-2020), the modified bulk waste characterization method was used, which separates the waste into two categories; modified bulk waste and construction and demolition (C&D) waste (see Table 1). Each of these waste types has a specific degradable organic carbon (DOC) fraction and rate of decay (k) factor, which were applied to the calculations for the specified years. Prior to 1971, we assumed an average yearly waste acceptance rate based upon data provided by the City in the December 23, 2009 Request for Proposals for Landfill Gas Development and Energy Recovery Project. Table 1 summarizes historical waste acceptance data from the landfill.

At the landfill, there is a separate cell that contains only C&D waste. Based on Part 98.340 (b) of the MRR, C&D waste landfills are not included as a source category for GHG emissions. Therefore, the C&D landfill cell was excluded as a source in our calculations.

The CH<sub>4</sub> recovery from the gas collection system at the landfill was calculated using monthly total LFG flow measurements, monthly average CH<sub>4</sub> concentrations, default values provided in the MRR, and Equation HH-4. Table 2 summarizes monthly flow and methane data from the landfill. Methane emissions were calculated in e-GGRT using this estimate for the quantity of recovered CH<sub>4</sub>, the modeled generation rate of CH<sub>4</sub> from equation HH-1, default values provided in the MRR, and Equation HH-6 which adjusts CH<sub>4</sub> emissions for oxidation in cover materials. The fraction of hours the destruction device was operating is based on the downtime of the on-site flare; as summarized in Table 2. We assumed the flare has a destruction efficiency of 98 percent.

The estimated annual CH<sub>4</sub> generation and emissions were also calculated in e-GGRT using the calculated CH<sub>4</sub> recovery, collection efficiency of the landfill, default values provided in the MRR, and Equations HH-7 and HH-8. The collection efficiency of the landfill was based on the classification of the cover materials and the associated gas collection efficiencies

included in the MRR. The fraction of hours the recovery system was operating is based on the downtime of the on-site flare; as summarized in Table 2.

The calculation spreadsheet for equation HH-4 is enclosed with this report; all other calculations were performed internally by the e-GGRT system. A summary of the values are included in the table below. Two methane emission values were calculated by e-GGRT, however, only the larger value is used by the e-GGRT system for reporting. For 2020, the emission rate calculated using the modeled generation rate of CH<sub>4</sub> and recovered CH<sub>4</sub> quantity (i.e., the estimate based on equation HH-6) was reported.

<b>Subpart HH Equations</b>	<b>CH<sub>4</sub> (metric tons)</b>
Modeled CH <sub>4</sub> Generation (Eq. HH-1)	2,538.4
Modeled CH <sub>4</sub> Generation, adjusted for oxidation (Eq. HH-5)	2,284.5
Measured CH <sub>4</sub> Recovery (Eq. HH-4)	1,092
Measured CH <sub>4</sub> Generation (Eq. HH-7)	1,258.1
<b>CH<sub>4</sub> Emissions (Eq. HH-6)</b>	<b>1,323.6</b>
CH <sub>4</sub> Emissions (Eq. HH-8)	297.2

### Subpart C, Stationary Fuel Combustion Sources

Four levels of emissions quantification methodologies can be used in the e-GGRT system for Subpart C calculations. They are Tier 1, Tier 2, Tier 3, and Tier 4, in order of increasing preference. In accordance with Subpart C of the MRR, Tier 1 may be used if the combustion unit has a maximum rated heat input capacity of 250 million metric British thermal units (MMBtu) per hour or less. Sanborn Head used Tier 1 to quantify GHG emissions from the furnaces and heaters as it was the highest tier of data accuracy possible based on the available data.

The total amount of fuel combusted during 2020 and default values for higher heat content and carbon dioxide (CO<sub>2</sub>), CH<sub>4</sub>, and nitrous oxide (N<sub>2</sub>O) emission factors were used in equations C-1 and C-8 of the MRR. Fuel usage volumes and fuel type (No. 2 fuel oil and propane) for 2020 were provided by the City. Calculation spreadsheets for equations C-1 and C-8 are enclosed with this report for the two fuel types. The resulting emission estimates are summarized below.

<b>Greenhouse Gas</b>	<b>Oil Furnaces CO<sub>2</sub>e Emissions (metric tons)</b>	<b>Propane Furnace/Heater CO<sub>2</sub>e Emissions (metric tons)</b>
CO <sub>2</sub>	67.8	15.4
CH <sub>4</sub>	0.07	0.02
N <sub>2</sub> O	0.16	0.04

### CONCLUSION

Estimated GHG emissions from the Facility during 2020 are shown below and in the attached 2020 USEPA Annual GHG Report generated by the e-GGRT system. The e-GGRT

system converts emissions into CO<sub>2</sub> equivalent (CO<sub>2</sub>e) emissions based on the following assumptions:

- The global warming potential (GWP) for CH<sub>4</sub> is 25 times greater than the GWP for CO<sub>2</sub>; and
- The GWP for N<sub>2</sub>O is 298 times greater than the GWP for CO<sub>2</sub>.

<b>Emission Source</b>	<b>CO<sub>2</sub>e (metric tons)</b>
Landfill Gas (uncollected)	33,089.3
Furnaces	83.5
Total	33,173

We received a confirmation email from the USEPA stating that the 2020 USEPA GHG Report for the Facility was submitted by the City before the reporting deadline, using the e-GGRT system. A copy of the report generated by the e-GGRT system is enclosed. To satisfy the requirements of the USEPA GHG reporting regulation (40 CFR Subpart 98), a copy of this letter and the attached records should be retained at the Facility.

For next year, the 2021 USEPA GHG Report should be submitted using the e-GGRT system by March 31, 2022.

Thank you for the opportunity to prepare this report. We look forward to working with you on future projects. Please contact us with any questions.

Sincerely,  
SANBORN, HEAD & ASSOCIATES, INC.



Lisa Damiano, PE  
Senior Project Manager



David E. Adams, PE  
Senior Vice President/Principal

LLD/HHL/DEA: lld

- Encl. Table 1 - Waste Acceptance Rates  
Table 2 - Monthly Landfill Gas Flow and Methane Concentration Data  
2020 USEPA Greenhouse Gas Report  
USEPA Subpart C: Equations C-1 and C-8 Calculation Spreadsheets  
USEPA Subpart HH: Equation HH-4 Calculation Spreadsheet

## TABLES

Table 1  
Waste Acceptance Rates

Lebanon Regional Solid Waste Facility  
Lebanon, New Hampshire

Closed MSW Landfill				Phases I and II Landfill						
Year	Bulk MSW k = 0.038, DOC = 0.2			Total Waste Acceptance (Bulk MSW) k = 0.038, DOC = 0.2		Modified Bulk MSW k = 0.039, DOC = 0.31		C&D Waste k = 0.03, DOC = 0.08		
	Total Waste Acceptance Rate (ton)	Average Waste Acceptance Rate (tons)	Total Waste Acceptance Rate (Mg)	(tons)	(megagrams) (Mg)	(Mg)	Fraction of Total Waste	(Mg)	Fraction of Total Waste	
1950	8,000	9,822	8,909	1993	31,804	28,846	--	--	--	--
1951	8,160	9,822	8,909	1994	34,404	31,204	--	--	--	--
1952	8,323	9,822	8,909	1995	33,856	30,707	--	--	--	--
1953	8,490	9,822	8,909	1996	36,424	33,037	--	--	--	--
1954	8,659	9,822	8,909	1997	34,496	31,288	--	--	--	--
1955	8,833	9,822	8,909	1998	39,004	35,377	--	--	--	--
1956	9,009	9,822	8,909	1999	41,809	37,921	--	--	--	--
1957	9,189	9,822	8,909	2000	44,871	40,698	--	--	--	--
1958	9,373	9,822	8,909	2001	48,754	44,220	--	--	--	--
1959	9,561	9,822	8,909	2002	49,086	44,521	--	--	--	--
1960	9,752	9,822	8,909	2003	50,773	46,051	--	--	--	--
1961	9,947	9,822	8,909	2004	50,940	46,203	--	--	--	--
1962	10,146	9,822	8,909	2005	49,637	45,021	--	--	--	--
1963	10,349	9,822	8,909	2006	49,716	45,092	--	--	--	--
1964	10,556	9,822	8,909	2007	48,029	43,562	--	--	--	--
1965	10,767	9,822	8,909	2008	46,568	42,237	--	--	--	--
1966	10,982	9,822	8,909	2009	50,146	45,482	--	--	--	--
1967	11,202	9,822	8,909							
1968	11,426	9,822	8,909	2010	49,203	44,627	36,371	0.815	8,256	0.185
1969	11,654	9,822	8,909	2011	55,698	50,519	35,717	0.707	14,802	0.293
1970	11,888	9,822	8,909	2012	55,811	50,621	38,118	0.753	12,503	0.247
1971	12,125	--	10,997	2013	56,277	51,044	36,905	0.723	14,139	0.277
1972	15,637	--	14,183	2014	61,466	55,750	36,795	0.660	18,955	0.340
1973	16,340	--	14,820	2015	59,970	54,392	37,476	0.689	16,916	0.311
1974	17,105	--	15,514	2016	61,419	55,707	38,772	0.696	16,935	0.304
1975	18,798	--	17,050	2017	58,347	52,921	38,950	0.736	13,971	0.264
1976	19,654	--	17,826	2018	60,915	55,250	39,614	0.717	15,636	0.283
1977	20,655	--	18,734	2019	55,808	50,618	37,407	0.739	13,211	0.261
1978	20,985	--	19,033	2020	52,642	47,747	33,852	0.709	13,894	0.291
1979	21,105	--	19,142	<b>Total</b>	<b>1,367,875</b>	<b>1,240,663</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>
1980	21,328	--	19,344							
1981	21,940	--	19,900							
1982	22,930	--	20,798							
1983	23,657	--	21,457							
1984	24,500	--	22,222							
1985	25,074	--	22,742							
1986	27,680	--	25,106							
1987	27,418	--	24,868							
1988	25,469	--	23,100							
1989	26,152	--	23,720							
1990	27,255	--	24,720							
1991	17,003	--	15,422							
1992	17,396	--	15,778							
<b>Total</b>	<b>--</b>	<b>--</b>	<b>613,561</b>							

Notes:

- Annual waste acceptance from 1950 to 1992 was provided by the City of Lebanon and pertains to the closed municipal solid waste (MSW) landfill. No waste composition was recorded; therefore, we assumed that the waste was bulk MSW.
  - Based on the uncertainty of the methods used in recorded waste acceptance tonnage from 1950 to 1970, an average yearly waste acceptance was calculated based on the waste in place through 1970.
  - Based on discussions with the City of Lebanon and analysis of waste acceptance data, the estimated date that a landfill scale was installed on site is 1971.
- Annual waste acceptance from 1993 through 2020 was provided by the City of Lebanon and pertains to the lined landfill (i.e., Phases I and II). The assumed waste type from 1993 through 2009 is bulk MSW.
- The waste category of sludge was excluded from waste accepted in 2010 and 2011 because the sludge was segregated and composted for use as daily cover soil. Composting was suspended in 2012; therefore, sludge was included in the bulk MSW category for 2012 through 2020.
- For the reporting years 2010 through 2020, the waste was separated into two categories under the modified bulk waste option: modified bulk MSW and construction and demolition (C&D) debris. The C&D category includes waste designated as alternate daily cover. Separate DOC and k values were applied for the modified bulk MSW and the C&D debris.

Table 2  
Monthly Landfill Gas Flow and Methane Concentration Data

Lebanon Regional Solid Waste Facility  
Lebanon, New Hampshire

<b>Date</b>	<b>Flare Downtime (hrs)</b>	<b>Operating Hours of Flare (hrs)</b>	<b>Total Flow (scf/month)</b>	<b>Methane (%)</b>
January	87.7	656.3	8,405,681	31.0
February	3.2	692.8	8,993,027	44.6
March	0.0	744.0	11,437,787	47.5
April	1.0	719.0	10,270,074	50.3
May	2.0	742.0	10,813,792	46.4
June	3.3	716.7	11,423,310	42.5
July	0.8	743.2	11,670,611	47.5
August	9.3	734.7	11,980,214	45.3
September	150.5	569.5	9,230,461	45.7
October	64.2	679.8	10,475,566	45.7
November	25.7	694.3	10,842,996	45.7
December	4.8	739.2	10,517,247	46.1
<b>2020 Total</b>	<b>353</b>	<b>8,432</b>	<b>126,060,766</b>	<b>-</b>
<b>2020 Average</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>44.9</b>

Notes:

1. We assumed that the GCCS was operating for the same number of hours each month as the flare.
2. Monthly volumes of LFG delivered to the flare are based on data recorder readings from the LFG flow meter/totalizer.
3. The methane content of LFG delivered to the flare is based on monthly readings using a GEM-2000 or GEM-5000.



# 2020 USEPA GREENHOUSE GAS REPORT

**Certification Statement:**

The designated representative or alternate designated representative must sign (i.e., agree to) this certification statement. If you are an agent and you click on "SUBMIT", you are not agreeing to the certification statement, but are submitting the certification statement on behalf of the designated representative or alternate designated representative who is agreeing to the certification statement. An agent is only authorized to make the electronic submission on behalf of the designated representative, not to sign (i.e., agree to) the certification statement.

**Facility Name:**LEBANON LANDFILL AND RECYCLING CENTER

**Facility Identifier:**529899

**Facility Reporting Year:**2020

**Facility Location:**

Address: 370 PLAINFIELD ROAD, RTE 12-A

City: WEST LEBANON

State: NH

Postal Code: 03784

**Facility Site Details:**

**CO2 equivalent emissions from facility subparts C-II, SS, and TT (metric tons):**33,172.7

**CO2 equivalent emissions from supplier subparts LL-QQ (metric tons):**0

**Biogenic CO2 emissions from facility subparts C-II, SS, and TT (metric tons):**0

**Cogeneration Unit Emissions Indicator:**N

**GHG Report Start Date:**2020-01-01

**GHG Report End Date:**2020-12-31

**Description of Changes to Calculation Methodology:**

**Plant Code Indicator:**N

**Primary NAICS Code:**562212

**Second Primary NAICS Code:**

**Parent Company Details:**

**Parent Company Name:**CITY OF LEBANON

**Address:**370 Plainfield Road, West Lebanon, NH 03784

**Percent Ownership Interest:**100

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## Subpart C: General Stationary Fuel Combustion

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**Gas Information Details**

<b>Gas Name</b>	Carbon Dioxide
<b>Gas Quantity</b>	83.2 (Metric Tons)
<b>Own Result?</b>	

<b>Gas Name</b>	Biogenic Carbon dioxide
<b>Gas Quantity</b>	0 (Metric Tons)
<b>Own Result?</b>	

<b>Gas Name</b>	Methane
<b>Gas Quantity</b>	0 (Metric Tons)
<b>Own Result?</b>	

Gas Name	Nitrous Oxide
Gas Quantity	0.001 (Metric Tons)
Own Result?	

**Unit Details:**

**Unit Name :** GP-Furnace/Heater

**Unit Type :** OCS (Other combustion source)

**Unit Description :** (1) Rinnai EX22C Direct Vent Wall Furnace, (1) Sunstar Infrared Gas Heater

**Other Unit Name :**

**Small Unit Aggregation Details:**

**Use Ivt Indicator:** N

**Highest Maximum Rated Heat Input Capacity:** 0.15

**Cumulative Maximum Rated Heat Input Capacity:**

**Emission Details:**

**Annual Biogenic CO2 Emissions:** 0 (metric tons)

**Annual Fossil fuel based CO2 Emissions:** 15.4 (metric tons)

**Tier Fuel Details:**

**Fuel :** Propane

**Tier Name :** Tier 1 (Equation C-1)

**Tier Methodology Start Date :** 2020-01-01

**Tier Methodology End Date :** 2020-12-31

**Fuel Emission Details :**

Total CO2 emissions	Total CH4 emissions	Total N2O emissions	Total CH4 emissions CO2e	Total N2O emissions CO2e
15.4 (Metric Tons)	0.00 (Metric Tons)	0.000 (Metric Tons)	0 (Metric Tons)	0 (Metric Tons)

**Equation C1/C8 Inputs :**

**Fuel Quantity :** 2696 (gallons/year)

**Unit Name :** GP-Boiler and Furnace

**Unit Type :** OCS (Other combustion source)

**Unit Description :** (1) Weil Mclain hot water boiler and (1) Williamson Temp-O-Matic Hi Boy, Model No. 1167-18

**Other Unit Name :**

**Small Unit Aggregation Details:**

**Use Ivt Indicator:** N

**Highest Maximum Rated Heat Input Capacity:** 0.886

**Cumulative Maximum Rated Heat Input Capacity:**

**Emission Details:**

**Annual Biogenic CO2 Emissions:** 0 (metric tons)

**Annual Fossil fuel based CO2 Emissions:** 67.8 (metric tons)

**Tier Fuel Details:**

**Fuel :** Distillate Fuel Oil No. 2

**Tier Name :** Tier 1 (Equation C-1)

**Tier Methodology Start Date :** 2020-01-01

**Tier Methodology End Date :** 2020-12-31

**Fuel Emission Details :**

Total CO2 emissions	Total CH4 emissions	Total N2O emissions	Total CH4 emissions CO2e	Total N2O emissions CO2e
67.8 (Metric Tons)	0.00 (Metric Tons)	0.001 (Metric Tons)	0.1 (Metric Tons)	0.2 (Metric Tons)

**Equation C1/C8 Inputs :**

Fuel Quantity : 6642 (gallons/year)

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## Subpart HH: Municipal Solid Waste Landfills

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**Gas Information Details**

Gas Name	Methane
Gas Quantity	1,323.57 (Metric Tons)
Own Result?	

**Landfill Details**

Is the landfill open?	Y
Estimated Year LandFill Closure	2027
Starting Year for Accepting Waste	1950
First year of emissions reporting	2010
Leachate recirculation was used during the reporting year	N
Typical frequency of use for leachate recirculation system	Not used for the past 10 years
Scales are present at the landfill in the reporting year	Y
Does the landfill have a landfill gas collection system?	Y
Passive vents and/or flares are present	N
Landfill Capacity	2335174 ( Metric Tons )
Total surface area of the landfill containing waste	172924 ( Square Meters )
Covertypes Details	Other soil mixture ( )

**Aeration Details**

Aeration Blower Capacity	( )
Landfill Fraction Affected by Aeration	( )
Aeration Blower Operations Hours	( )
Other MCF Factors	
Additional Description	

**Current Waste Disposal Quantity Determination Details****First Year to Current Year Annual Waste Quantity Method**

Reporting Year	2020
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Total Annual Waste Disposal Quantity	47747 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	47747 (Metric Tons)
<b>Reporting Year</b>	<b>2019</b>
Total Annual Waste Disposal Quantity	50618 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	50618 (Metric Tons)
<b>Reporting Year</b>	<b>2018</b>
Total Annual Waste Disposal Quantity	55250 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	55250 (Metric Tons)
<b>Reporting Year</b>	<b>2017</b>
Total Annual Waste Disposal Quantity	52921 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	52921 (Metric Tons)
<b>Reporting Year</b>	<b>2016</b>
Total Annual Waste Disposal Quantity	55707 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	55707 (Metric Tons)
<b>Reporting Year</b>	<b>2015</b>
Total Annual Waste Disposal Quantity	54392 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	54392 (Metric Tons)
<b>Reporting Year</b>	<b>2014</b>
Total Annual Waste Disposal Quantity	55750 (Metric Tons)

Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	55750 (Metric Tons)
<b>Reporting Year</b>	<b>2013</b>
Total Annual Waste Disposal Quantity	51044 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	51044 (Metric Tons)
<b>Reporting Year</b>	<b>2012</b>
Total Annual Waste Disposal Quantity	50621 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	50621 (Metric Tons)
<b>Reporting Year</b>	<b>2011</b>
Total Annual Waste Disposal Quantity	50519 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	50519 (Metric Tons)
<b>Reporting Year</b>	<b>2010</b>
Total Annual Waste Disposal Quantity	44627 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	44627 (Metric Tons)

#### Waste Type Details

<b>Year Waste Disposed</b>	<b>2020</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
		bulk MSW waste	0.709	0.31	0.5	0.039

	Modified bulk MSW	(excluding inerts and C&D waste)				
	Modified bulk MSW	bulk C&D waste	0.291	0.08	0.5	0.03
<b>Year Waste Disposed</b>	<b>2019</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Modified bulk MSW	bulk MSW waste (excluding inerts and C&D waste)	0.739	0.31	0.5	0.039
	Modified bulk MSW	bulk C&D waste	0.261	0.08	0.5	0.03
<b>Year Waste Disposed</b>	<b>2018</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Modified bulk MSW	bulk MSW waste (excluding inerts and C&D waste)	0.717	0.31	0.5	0.039
	Modified bulk MSW	bulk C&D waste	0.283	0.08	0.5	0.03
<b>Year Waste Disposed</b>	<b>2017</b>					
Missing data procedure used?	N					
Number of Times Substituted	0					

Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Modified bulk MSW	bulk MSW waste (excluding inerts and C&D waste)	0.736	0.31	0.5	0.039
	Modified bulk MSW	bulk C&D waste	0.264	0.08	0.5	0.03
<b>Year Waste Disposed</b>	<b>2016</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Modified bulk MSW	bulk MSW waste (excluding inerts and C&D waste)	0.696	0.31	0.5	0.039
	Modified bulk MSW	bulk C&D waste	0.304	0.08	0.5	0.03
<b>Year Waste Disposed</b>	<b>2015</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Modified bulk MSW	bulk MSW waste (excluding inerts and C&D waste)	0.689	0.31	0.5	0.039
	Modified bulk MSW	bulk C&D waste	0.311	0.08	0.5	0.03
<b>Year Waste Disposed</b>	<b>2014</b>					
	N					



Missing data procedure used?						
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Modified bulk MSW	bulk MSW waste (excluding inerts and C&D waste)	0.660	0.31	0.5	0.039
	Modified bulk MSW	bulk C&D waste	0.340	0.08	0.5	0.03
<b>Year Waste Disposed</b>	<b>2013</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Modified bulk MSW	bulk MSW waste (excluding inerts and C&D waste)	0.723	0.31	0.5	0.039
	Modified bulk MSW	bulk C&D waste	0.277	0.08	0.5	0.03
<b>Year Waste Disposed</b>	<b>2012</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Modified bulk MSW	bulk MSW waste (excluding inerts and C&D waste)	0.753	0.31	0.5	0.039

	Modified bulk MSW	bulk C&D waste	0.247	0.08	0.5	0.03
<b>Year Waste Disposed</b>	<b>2011</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Modified bulk MSW	bulk MSW waste (excluding inerts and C&D waste)	0.707	0.31	0.5	0.039
	Modified bulk MSW	bulk C&D waste	0.293	0.08	0.5	0.03
<b>Year Waste Disposed</b>	<b>2010</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Modified bulk MSW	bulk MSW waste (excluding inerts and C&D waste)	0.815	0.31	0.5	0.039
	Modified bulk MSW	bulk C&D waste	0.185	0.08	0.5	0.03

### Historical Waste Disposal Quantity Estimation Details

#### Method used to determine the annual waste quantity for any prior years

Were scales used to determine the annual waste quantity	Y
Start Year	1971
End Year	2009

#### Prior Year Annual Waste Quantity Method

<b>Reporting Year</b>	<b>2009</b>
	45482 (Metric Tons)

Total Annual Waste Disposal Quantity	
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	45482 (Metric Tons)
<b>Reporting Year</b>	<b>2008</b>
Total Annual Waste Disposal Quantity	42237 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	42237 (Metric Tons)
<b>Reporting Year</b>	<b>2007</b>
Total Annual Waste Disposal Quantity	43562 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	43562 (Metric Tons)
<b>Reporting Year</b>	<b>2006</b>
Total Annual Waste Disposal Quantity	45092 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	45092 (Metric Tons)
<b>Reporting Year</b>	<b>2005</b>
Total Annual Waste Disposal Quantity	45021 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	45021 (Metric Tons)
<b>Reporting Year</b>	<b>2004</b>
Total Annual Waste Disposal Quantity	46203 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	46203 (Metric Tons)
<b>Reporting Year</b>	<b>2003</b>
Total Annual Waste Disposal Quantity	46051 (Metric Tons)

Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	46051 (Metric Tons)
<b>Reporting Year</b>	<b>2002</b>
Total Annual Waste Disposal Quantity	44521 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	44521 (Metric Tons)
<b>Reporting Year</b>	<b>2001</b>
Total Annual Waste Disposal Quantity	44220 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	44220 (Metric Tons)
<b>Reporting Year</b>	<b>2000</b>
Total Annual Waste Disposal Quantity	40698 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	40698 (Metric Tons)
<b>Reporting Year</b>	<b>1999</b>
Total Annual Waste Disposal Quantity	37921 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	37921 (Metric Tons)
<b>Reporting Year</b>	<b>1998</b>
Total Annual Waste Disposal Quantity	35377 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	35377 (Metric Tons)
<b>Reporting Year</b>	<b>1997</b>
Total Annual Waste Disposal Quantity	31288 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights

Annual Waste Disposal Quantity	31288 (Metric Tons)
<b>Reporting Year</b>	<b>1996</b>
Total Annual Waste Disposal Quantity	33037 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	33037 (Metric Tons)
<b>Reporting Year</b>	<b>1995</b>
Total Annual Waste Disposal Quantity	30707 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	30707 (Metric Tons)
<b>Reporting Year</b>	<b>1994</b>
Total Annual Waste Disposal Quantity	31204 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	31204 (Metric Tons)
<b>Reporting Year</b>	<b>1993</b>
Total Annual Waste Disposal Quantity	28846 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	28846 (Metric Tons)
<b>Reporting Year</b>	<b>1992</b>
Total Annual Waste Disposal Quantity	15778 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	15778 (Metric Tons)
<b>Reporting Year</b>	<b>1991</b>
Total Annual Waste Disposal Quantity	15422 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	15422 (Metric Tons)
<b>Reporting Year</b>	<b>1990</b>

Total Annual Waste Disposal Quantity	24720 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	24720 (Metric Tons)
<b>Reporting Year</b>	<b>1989</b>
Total Annual Waste Disposal Quantity	23720 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	23720 (Metric Tons)
<b>Reporting Year</b>	<b>1988</b>
Total Annual Waste Disposal Quantity	23100 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	23100 (Metric Tons)
<b>Reporting Year</b>	<b>1987</b>
Total Annual Waste Disposal Quantity	24868 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	24868 (Metric Tons)
<b>Reporting Year</b>	<b>1986</b>
Total Annual Waste Disposal Quantity	25106 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	25106 (Metric Tons)
<b>Reporting Year</b>	<b>1985</b>
Total Annual Waste Disposal Quantity	22742 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	22742 (Metric Tons)
<b>Reporting Year</b>	<b>1984</b>
Total Annual Waste Disposal Quantity	22222 (Metric Tons)

Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	22222 (Metric Tons)
<b>Reporting Year</b>	<b>1983</b>
Total Annual Waste Disposal Quantity	21457 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	21457 (Metric Tons)
<b>Reporting Year</b>	<b>1982</b>
Total Annual Waste Disposal Quantity	20798 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	20798 (Metric Tons)
<b>Reporting Year</b>	<b>1981</b>
Total Annual Waste Disposal Quantity	19900 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	19900 (Metric Tons)
<b>Reporting Year</b>	<b>1980</b>
Total Annual Waste Disposal Quantity	19344 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	19344 (Metric Tons)
<b>Reporting Year</b>	<b>1979</b>
Total Annual Waste Disposal Quantity	19142 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	19142 (Metric Tons)
<b>Reporting Year</b>	<b>1978</b>
Total Annual Waste Disposal Quantity	19033 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights

Annual Waste Disposal Quantity	19033 (Metric Tons)
<b>Reporting Year</b>	<b>1977</b>
Total Annual Waste Disposal Quantity	18734 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	18734 (Metric Tons)
<b>Reporting Year</b>	<b>1976</b>
Total Annual Waste Disposal Quantity	17826 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	17826 (Metric Tons)
<b>Reporting Year</b>	<b>1975</b>
Total Annual Waste Disposal Quantity	17050 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	17050 (Metric Tons)
<b>Reporting Year</b>	<b>1974</b>
Total Annual Waste Disposal Quantity	15514 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	15514 (Metric Tons)
<b>Reporting Year</b>	<b>1973</b>
Total Annual Waste Disposal Quantity	14820 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	14820 (Metric Tons)
<b>Reporting Year</b>	<b>1972</b>
Total Annual Waste Disposal Quantity	14183 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	14183 (Metric Tons)
<b>Reporting Year</b>	<b>1971</b>



Total Annual Waste Disposal Quantity	10997 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	10997 (Metric Tons)
<b>Reporting Year</b>	<b>1970</b>
Total Annual Waste Disposal Quantity	8909 (Metric Tons)
Method Used to Determine Quantity	other
Annual Waste Disposal Quantity	8909 (Metric Tons)
<b>Reporting Year</b>	<b>1969</b>
Total Annual Waste Disposal Quantity	8909 (Metric Tons)
Method Used to Determine Quantity	other
Annual Waste Disposal Quantity	8909 (Metric Tons)
<b>Reporting Year</b>	<b>1968</b>
Total Annual Waste Disposal Quantity	8909 (Metric Tons)
Method Used to Determine Quantity	other
Annual Waste Disposal Quantity	8909 (Metric Tons)
<b>Reporting Year</b>	<b>1967</b>
Total Annual Waste Disposal Quantity	8909 (Metric Tons)
Method Used to Determine Quantity	other
Annual Waste Disposal Quantity	8909 (Metric Tons)
<b>Reporting Year</b>	<b>1966</b>
Total Annual Waste Disposal Quantity	8909 (Metric Tons)
Method Used to Determine Quantity	other
Annual Waste Disposal Quantity	8909 (Metric Tons)
<b>Reporting Year</b>	<b>1965</b>
Total Annual Waste Disposal Quantity	8909 (Metric Tons)
Method Used to Determine Quantity	other
Annual Waste Disposal Quantity	8909 (Metric Tons)
<b>Reporting Year</b>	<b>1964</b>
	8909 (Metric Tons)

Total Annual Waste Disposal Quantity	
Method Used to Determine Quantity	other
Annual Waste Disposal Quantity	8909 (Metric Tons)
<b>Reporting Year</b>	<b>1963</b>
Total Annual Waste Disposal Quantity	8909 (Metric Tons)
Method Used to Determine Quantity	other
Annual Waste Disposal Quantity	8909 (Metric Tons)
<b>Reporting Year</b>	<b>1962</b>
Total Annual Waste Disposal Quantity	8909 (Metric Tons)
Method Used to Determine Quantity	other
Annual Waste Disposal Quantity	8909 (Metric Tons)
<b>Reporting Year</b>	<b>1961</b>
Total Annual Waste Disposal Quantity	8909 (Metric Tons)
Method Used to Determine Quantity	other
Annual Waste Disposal Quantity	8909 (Metric Tons)
<b>Reporting Year</b>	<b>1960</b>
Total Annual Waste Disposal Quantity	8909 (Metric Tons)
Method Used to Determine Quantity	other
Annual Waste Disposal Quantity	8909 (Metric Tons)
<b>Reporting Year</b>	<b>1959</b>
Total Annual Waste Disposal Quantity	8909 (Metric Tons)
Method Used to Determine Quantity	other
Annual Waste Disposal Quantity	8909 (Metric Tons)
<b>Reporting Year</b>	<b>1958</b>
Total Annual Waste Disposal Quantity	8909 (Metric Tons)
Method Used to Determine Quantity	other
Annual Waste Disposal Quantity	8909 (Metric Tons)
<b>Reporting Year</b>	<b>1957</b>
Total Annual Waste Disposal Quantity	8909 (Metric Tons)

Method Used to Determine Quantity	other
Annual Waste Disposal Quantity	8909 (Metric Tons)
<b>Reporting Year</b>	<b>1956</b>
Total Annual Waste Disposal Quantity	8909 (Metric Tons)
Method Used to Determine Quantity	other
Annual Waste Disposal Quantity	8909 (Metric Tons)
<b>Reporting Year</b>	<b>1955</b>
Total Annual Waste Disposal Quantity	8909 (Metric Tons)
Method Used to Determine Quantity	other
Annual Waste Disposal Quantity	8909 (Metric Tons)
<b>Reporting Year</b>	<b>1954</b>
Total Annual Waste Disposal Quantity	8909 (Metric Tons)
Method Used to Determine Quantity	other
Annual Waste Disposal Quantity	8909 (Metric Tons)
<b>Reporting Year</b>	<b>1953</b>
Total Annual Waste Disposal Quantity	8909 (Metric Tons)
Method Used to Determine Quantity	other
Annual Waste Disposal Quantity	8909 (Metric Tons)
<b>Reporting Year</b>	<b>1952</b>
Total Annual Waste Disposal Quantity	8909 (Metric Tons)
Method Used to Determine Quantity	other
Annual Waste Disposal Quantity	8909 (Metric Tons)
<b>Reporting Year</b>	<b>1951</b>
Total Annual Waste Disposal Quantity	8909 (Metric Tons)
Method Used to Determine Quantity	other
Annual Waste Disposal Quantity	8909 (Metric Tons)
<b>Reporting Year</b>	<b>1950</b>
Total Annual Waste Disposal Quantity	8909 (Metric Tons)
Method Used to Determine Quantity	other

Annual Waste Disposal Quantity	8909 (Metric Tons)
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**Waste Type Details**

<b>Year Waste Disposed</b>	<b>2009</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	<b>2008</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	<b>2007</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	<b>2006</b>					
Missing data procedure used?	N					
Number of Times Substituted						

Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	2005					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	2004					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	2003					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	2002					
Missing data procedure used?	N					

Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	<b>2001</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	<b>2000</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	<b>1999</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	<b>1998</b>					
	N					

Missing data procedure used?						
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	<b>1997</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	<b>1996</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	<b>1995</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	<b>1994</b>					

<b>Year Waste Disposed</b>						
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	<b>1993</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	<b>1992</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	<b>1991</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
			1	0.2	0.5	0.038



	Bulk Waste	Bulk waste				
<b>Year Waste Disposed</b>	<b>1990</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	<b>1989</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	<b>1988</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	<b>1987</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight		Fraction Of DOC Dissimilated	Decay Rate

				Degradable Organic Carbon Value		
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	<b>1986</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	<b>1985</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	<b>1984</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	<b>1983</b>					
Missing data procedure used?	N					

Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	<b>1982</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	<b>1981</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	<b>1980</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	<b>1979</b>					
	N					

Missing data procedure used?						
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	<b>1978</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	<b>1977</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	<b>1976</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	<b>1975</b>					

<b>Year Waste Disposed</b>						
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	<b>1974</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	<b>1973</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	<b>1972</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
			1	0.2	0.5	0.038

	Bulk Waste	Bulk waste				
<b>Year Waste Disposed</b>	<b>1971</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	<b>1970</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	<b>1969</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	<b>1968</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight		Fraction Of DOC Dissimilated	Decay Rate

				Degradable Organic Carbon Value		
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	<b>1967</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	<b>1966</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	<b>1965</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	<b>1964</b>					
Missing data procedure used?	N					

Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	<b>1963</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	<b>1962</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	<b>1961</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	<b>1960</b>					
	N					



Missing data procedure used?						
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	<b>1959</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	<b>1958</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	<b>1957</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	<b>1956</b>					

<b>Year Waste Disposed</b>						
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	<b>1955</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	<b>1954</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	<b>1953</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
			1	0.2	0.5	0.038

	Bulk Waste	Bulk waste				
<b>Year Waste Disposed</b>	<b>1952</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	<b>1951</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038
<b>Year Waste Disposed</b>	<b>1950</b>					
Missing data procedure used?	N					
Number of Times Substituted						
Waste Type Details	Option	Waste Type	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste	1	0.2	0.5	0.038

**Working Capacity Details**

Were working capacities used to determine waste disposal quantities	N
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**Tipping Receipt Details**

Were tipping receipts or company records used to determine waste disposal quantities	N
--	---

**Method used for estimating all annual waste quantities that are not determined with the methods above**

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Method	Method #3: Use the landfill capacity or, for operating landfills, the amount of waste-in-place to estimate a constant average waste disposal quantity (Equation HH-3).
--------	--

Method Start Year	1950
Method End Year	1970

### Historical Estimation Population Details

Historical landfill Capacity	187084Metric Tons
Reason	Best Available Method

### Methane Generation and Emissions for Landfills with LFG Collection Systems

#### Gas Collection System Information

System Manufacturer	John Zinc Co. LLC
System Capacity	700 ( acfm )
Number of Wells	52

#### Methane Oxidation Fractions

Methane Oxidation Fraction HH-5	0.10
Methane Oxidation Fraction HH-6	0.10
Methane Oxidation Fraction HH-7	0.10
Methane Oxidation Fraction HH-8	0.10

#### Measurement Locations

<b>Name</b>	<b>Utility Flare</b>		
Description			
Annual Operating Hours	8432 (Hours)		
Quantity of Recovered Methane	1091.9924 (Metric Tons)		
Destruction Devices	Name	Annual Operating Hours	Destruction Efficiency
	Utility Flare	8432 (Hours)	0.98 (fraction (number between 0 and 1))

#### Methane Generation and Emissions values

Estimated Gas Collection Efficiency HH3	0.81 ( decimal fraction )
Is Override Indicator?	N
Methane Generation Equation HH5	2284.53 ( Metric Tons )
Is Override Indicator?	N
Methane Emissions Equation HH6	1323.57 ( Metric Tons )
Is Override Indicator?	N
Methane Generation Equation HH7	1258.12 ( Metric Tons )
Is Override Indicator?	N
Basis for Input Methane Generation Value	Equation HH-1
Methane Emission from Equation HH8	297.17 ( Metric Tons )
Is Override Indicator?	N

#### Gas Collection Systems details

	Measured Value	126060766 ( scf )
--	----------------	-------------------

Annual Volume FG Collected Gas Volumetric Flow		
	Is Substituted Indicator?	N
	Number of Times Substituted	
Annual Average Methane Concentration	Measured Value	44.9 ( Number (between 0 and 100) )
	Is Substituted Indicator?	N
	Number of Days Substituted	
	Number of Weeks Substituted	
	Number of Months Substituted	
	Number of Times Substituted	
Temperature Incorporated Indicator	Y	
Pressure Incorporated Indicator	Y	
LFG Flow Wet Basis Indicator	Y	
Methane Concentration Wet Basis Indicator	Y	
Site Destruction Location	On-site	
Annual Quantity Of Recovered Methane <sub>HH4</sub>	1091.99 ( Metric Tons )	

#### Waste Depth Details

Area Type	Waste Depth	Surface Area
A1	0 ( Meters )	0 ( Square Meters )
A2	0 ( Meters )	0 ( Square Meters )
A3	23.8 ( Meters )	21722 ( Square Meters )
A4	31.1 ( Meters )	79587 ( Square Meters )
A5	23.5 ( Meters )	71340 ( Square Meters )

#### Equation HH-1 Details:

The fraction of CH <sub>4</sub> in landfill gas (F), is it based on a measured value or default value	default
Fraction by volume of CH <sub>4</sub> in landfill gas	0.5
An MCF value other than the default of 1 was used	N
Annual MCF Value	1.0
Annual Modeled Methane Generation	2538.36 ( Metric Tons )
Annual Modeled Methane Generation User Overridden value?	N

**USEPA SUBPART C**

**EQUATIONS C-1 AND C-8**

**CALCULATION SPREADSHEETS**

**Subpart C - General Stationary Fuel Combustion - Tier 1 Calculation Methodology Using Equations C-1 and C-8**

**OPTIONAL SPREADSHEET FOR FACILITY RECORDKEEPING PURPOSES**

Version e-GGRT RY2013.R.01  
 Today's date 3/26/2021

**Use one spreadsheet for each fuel. Make additional copies as needed.**

This spreadsheet is protected and contains locked cells to ensure that you do not inadvertently alter any of the included formulas and/or calculations. To remove this protection and alter this spreadsheet, right-click the "worksheet" tab near the bottom of the screen and select "Unprotect Sheet." When prompted for the password, type "GHG" and click "OK." Please note that making changes to an unprotected sheet could result in incorrect calculations and that you are responsible for the accuracy of the data you report to EPA. For additional help, visit the Microsoft Excel Support website (<http://office.microsoft.com/en-us/excel-help>).

Equation C-1:

$$CO_2 = 1 \times 10^{-3} * Fuel * HHV * EF$$

Equation C-8:

$$CH_4 \text{ or } N_2O = 1 \times 10^{-3} * Fuel * HHV * EF$$

Facility Name:	Lebanon Regional Solid Waste Facility
Reporter Name:	City of Lebanon, New Hampshire
Unit or Group Name/ ID:	Furnaces-Maintenance Building
Configuration Type:	Type #3: aggregation of small units
Fuel/ Fuel Type:	No. 2 Fuel Oil
Reporting Period:	January through December 2020
Comments:	Prepared by Sanborn Head and Associates, Inc.
Unit Type:	General Stationary Fuel Combustion

**Fuel Input Data**

<b>[Fuel]</b> = Mass or volume of fuel combusted per year, from company records as defined in §98.6 (express mass in short tons for solid fuel, volume in standard cubic feet for gaseous fuel, and volume in gallons for liquid fuel)	6,642.
<b>[HHV]</b> = Default High heat value of the fuel, from Table C-1 (mmBtu/mass or mmBtu/volume)	0.138

**Constants**

<b>[1 x 10<sup>-3</sup>]</b> = Conversion Factor from kg to metric tons (constant)	0.001
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**Annual CO<sub>2</sub> Mass Emissions For the Specific Fuel Type (metric tons) from Equation C-1**

<b>[EF]</b> = Fuel-Specific Default CO <sub>2</sub> Emission Factor, from Table C-1 (kg CO <sub>2</sub> /mmBtu)	73.96
<b>[CO<sub>2</sub>]</b> = Annual CO <sub>2</sub> emissions from combustion of the specified fuel (metric tons)	67.7914402

 Enter this value in e-GGRT

**Annual CH<sub>4</sub> Mass Emissions For the Specific Fuel Type (metric tons) from Equation C-8**

**Subpart C - General Stationary Fuel Combustion - Tier 1 Calculation Methodology Using Equations C-1 and C-8**

**OPTIONAL SPREADSHEET FOR FACILITY RECORDKEEPING PURPOSES**

Version e-GGRT RY2013.R.01  
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[EF] = Fuel-Specific Default Emission Factor for CH <sub>4</sub> , from Table C-2 (kg CH <sub>4</sub> /mmBtu)	0.003
[CH <sub>4</sub> ] = Annual CH <sub>4</sub> emissions from combustion of the specified fuel (metric tons)	0.0027498

Note: If you are reporting CH<sub>4</sub> emissions from a pulp mill lime kiln located at a kraft or soda facility under subpart AA, you are required to use the emission factors in Table AA-2 per 98.273(c)(2).

Enter this value in e-GGRT

**Annual N<sub>2</sub>O Mass Emissions For the Specific Fuel Type (metric tons) from Equation C-8**

[EF] = Fuel-Specific Default Emission Factor for N <sub>2</sub> O, from Table C-2 (kg N <sub>2</sub> O/mmBtu)	0.0006
[N <sub>2</sub> O] = Annual N <sub>2</sub> O emissions from combustion of the specified fuel (metric tons)	0.0005500

Note: If you are reporting N<sub>2</sub>O emissions from a pulp mill lime kiln located at a kraft or soda facility under subpart AA, you are required to use the emission factors in Table AA-2 per 98.273(c)(2).

Enter this value in e-GGRT

**INFORMATION ONLY: Annual CH<sub>4</sub> Mass Emissions For the Specific Fuel Type Converted to Carbon Dioxide Equivalent (metric tons CO<sub>2</sub>e)**

[GWP <sub>CH<sub>4</sub></sub> ] = Global Warming Potential for CH <sub>4</sub>	25
[CH <sub>4</sub> ] = Annual CH <sub>4</sub> emissions from combustion of the specified fuel (metric tons CO <sub>2</sub> e)	0.0687447

Note: 25 is the GWP effective 1/1/14. The new GWP will affect reports for the 2013 reporting year (submitted to EPA by March 2014) with the exception of reporters who are newly required to report to the GHGRP due to changes to the GWP. Prior to this date, the GWP to use is 21.

**INFORMATION ONLY: Annual N<sub>2</sub>O Mass Emissions For the Specific Fuel Type Converted to Carbon Dioxide Equivalent (metric tons CO<sub>2</sub>e)**

[GWP <sub>N<sub>2</sub>O</sub> ] = Global Warming Potential for N <sub>2</sub> O	298
[N <sub>2</sub> O] = Annual N <sub>2</sub> O emissions from combustion of the specified fuel (metric tons CO <sub>2</sub> e)	0.163887365

Note: 298 is the GWP effective 1/1/14. The new GWP will affect reports for the 2013 reporting year (submitted to EPA by March 2014) with the exception of reporters who are newly required to report to the GHGRP due to changes to the GWP. Prior to this date, the GWP to use is 310.



**Subpart C - General Stationary Fuel Combustion - Tier 1 Calculation Methodology Using Equations C-1 and C-8**

**OPTIONAL SPREADSHEET FOR FACILITY RECORDKEEPING PURPOSES**

Version e-GGRT RY2013.R.01  
 Today's date 3/26/2021

**Use one spreadsheet for each fuel. Make additional copies as needed.**

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Equation C-1:

$$CO_2 = 1 \times 10^{-3} * Fuel * HHV * EF$$

Equation C-8:

$$CH_4 \text{ or } N_2O = 1 \times 10^{-3} * Fuel * HHV * EF$$

Facility Name:	Lebanon Regional Solid Waste Facility
Reporter Name:	City of Lebanon, New Hampshire
Unit or Group Name/ ID:	Furnace and Heater-Recycling Building
Configuration Type:	Type #3: aggregation of small units
Fuel/ Fuel Type:	Propane
Reporting Period:	January through December 2020
Comments:	Prepared by Sanborn Head and Associates, Inc.
Unit Type:	General Stationary Fuel Combustion

**Fuel Input Data**

<b>[Fuel]</b> = Mass or volume of fuel combusted per year, from company records as defined in §98.6 (express mass in short tons for solid fuel, volume in standard cubic feet for gaseous fuel, and volume in gallons for liquid fuel)	2,696.
<b>[HHV]</b> = Default High heat value of the fuel, from Table C-1 (mmBtu/mass or mmBtu/volume)	0.091

**Constants**

<b>[1 x 10<sup>-3</sup>]</b> = Conversion Factor from kg to metric tons (constant)	0.001
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**Annual CO<sub>2</sub> Mass Emissions For the Specific Fuel Type (metric tons) from Equation C-1**

<b>[EF]</b> = Fuel-Specific Default CO <sub>2</sub> Emission Factor, from Table C-1 (kg CO <sub>2</sub> /mmBtu)	62.87
<b>[CO<sub>2</sub>]</b> = Annual CO <sub>2</sub> emissions from combustion of the specified fuel (metric tons)	15.4242743

 Enter this value in e-GGRT

**Annual CH<sub>4</sub> Mass Emissions For the Specific Fuel Type (metric tons) from Equation C-8**

**Subpart C - General Stationary Fuel Combustion - Tier 1 Calculation Methodology Using Equations C-1 and C-8**

**OPTIONAL SPREADSHEET FOR FACILITY RECORDKEEPING PURPOSES**

Version e-GGRT RY2013.R.01  
 Today's date 3/26/2021

[EF] = Fuel-Specific Default Emission Factor for CH <sub>4</sub> , from Table C-2 (kg CH <sub>4</sub> /mmBtu)	0.003
[CH <sub>4</sub> ] = Annual CH <sub>4</sub> emissions from combustion of the specified fuel (metric tons)	0.0007360

Note: If you are reporting CH<sub>4</sub> emissions from a pulp mill lime kiln located at a kraft or soda facility under subpart AA, you are required to use the emission factors in Table AA-2 per 98.273(c)(2).

Enter this value in e-GGRT

**Annual N<sub>2</sub>O Mass Emissions For the Specific Fuel Type (metric tons) from Equation C-8**

[EF] = Fuel-Specific Default Emission Factor for N <sub>2</sub> O, from Table C-2 (kg N <sub>2</sub> O/mmBtu)	0.0006
[N <sub>2</sub> O] = Annual N <sub>2</sub> O emissions from combustion of the specified fuel (metric tons)	0.0001472

Note: If you are reporting N<sub>2</sub>O emissions from a pulp mill lime kiln located at a kraft or soda facility under subpart AA, you are required to use the emission factors in Table AA-2 per 98.273(c)(2).

Enter this value in e-GGRT

**INFORMATION ONLY: Annual CH<sub>4</sub> Mass Emissions For the Specific Fuel Type Converted to Carbon Dioxide Equivalent (metric tons CO<sub>2</sub>e)**

[GWP <sub>CH<sub>4</sub></sub> ] = Global Warming Potential for CH <sub>4</sub>	25
[CH <sub>4</sub> ] = Annual CH <sub>4</sub> emissions from combustion of the specified fuel (metric tons CO <sub>2</sub> e)	0.0184002

Note: 25 is the GWP effective 1/1/14. The new GWP will affect reports for the 2013 reporting year (submitted to EPA by March 2014) with the exception of reporters who are newly required to report to the GHGRP due to changes to the GWP. Prior to this date, the GWP to use is 21.

**INFORMATION ONLY: Annual N<sub>2</sub>O Mass Emissions For the Specific Fuel Type Converted to Carbon Dioxide Equivalent (metric tons CO<sub>2</sub>e)**

[GWP <sub>N<sub>2</sub>O</sub> ] = Global Warming Potential for N <sub>2</sub> O	298
[N <sub>2</sub> O] = Annual N <sub>2</sub> O emissions from combustion of the specified fuel (metric tons CO <sub>2</sub> e)	0.043866077

Note: 298 is the GWP effective 1/1/14. The new GWP will affect reports for the 2013 reporting year (submitted to EPA by March 2014) with the exception of reporters who are newly required to report to the GHGRP due to changes to the GWP. Prior to this date, the GWP to use is 310.

**USEPA SUBPART HH**

**EQUATION HH-4**

**CALCULATION SPREADSHEETS**

Subpart HH - Municipal Solid Waste Landfills - Calculating Methane Recovery Using Equation HH-4

OPTIONAL SPREADSHEET FOR FACILITY RECORDKEEPING PURPOSES

Version e-GGRT RY2013.R.01  
Today's date 3/26/2021

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Equation HH-4:

$$R = \sum_{n=1}^n (V)_n \times (K_{MC})_n \times \frac{(CH_4)_n}{100\%} \times 0.0423 \times \frac{520^\circ R}{(T)_n} \times \frac{(P)_n}{1 \text{ atm}} \times \frac{0.454}{1,000}$$

Facility Name:	Lebanon Regional Solid Waste Facility
Reporter Name:	City of Lebanon, New Hampshire
Unit Name/ ID:	Municipal Solid Waste Landfill
Reporting Period:	January through December 2020
Comments:	Prepared by Sanborn Head and Associates, Inc.
Unit Type:	Municipal Solid Waste Landfill

Input Data

Basis for (V) <sub>n</sub> (dry basis or wet basis)	Wet basis
Basis for (CH <sub>4</sub> ) <sub>n</sub> (dry basis or wet basis)	Wet basis
[n] = Total number of measurement periods in a year.  For daily sampling, use daily averaging periods for a continuous monitoring system and n = 365 (or n = 366 for leap years).  For monthly sampling, use n = 12 as provided in section 98.343(b)(2).	12.

[n] = Index for Measurement Period	[(V) <sub>n</sub> ] = Cumulative volumetric flow for the measurement period in actual cubic feet (acf).  Note: If the flow rate meter automatically corrects for temperature and pressure, replace "520°R/(T) <sub>n</sub> × (P) <sub>n</sub> /1 atm" with "1" (i.e., enter 520 for [(T) <sub>n</sub> ], and 1 for [(P) <sub>n</sub> ].	[(CH <sub>4</sub> ) <sub>n</sub> ] = Average CH <sub>4</sub> concentration of landfill gas for the measurement period (volume %)	[(T) <sub>n</sub> ] = Average temperature at which flow is measured for the measurement period (°R)  Note: If the flow rate meter automatically corrects for temperature and pressure, replace "520°R/(T) <sub>n</sub> × (P) <sub>n</sub> /1 atm" with "1" (i.e., enter 520 for [(T) <sub>n</sub> ], and 1 for [(P) <sub>n</sub> ].	[(P) <sub>n</sub> ] = Average pressure at which flow is measured for the measurement period (atm)  Note: If the flow rate meter automatically corrects for temperature and pressure, replace "520°R/(T) <sub>n</sub> × (P) <sub>n</sub> /1 atm" with "1" (i.e., enter 520 for [(T) <sub>n</sub> ], and 1 for [(P) <sub>n</sub> ].	[(f <sub>H2O</sub> ) <sub>n</sub> ] = Average moisture content of the landfill gas during the measurement period, volumetric basis (cubic feet water per cubic feet landfill gas).  Note: Values are only needed if the bases for determining (V) <sub>n</sub> and (CH <sub>4</sub> ) <sub>n</sub> are different (i.e., one is wet and the other is dry).	[(K <sub>MC</sub> ) <sub>n</sub> ] = Moisture correction term for the measurement period, volumetric basis, as follows: • (K <sub>MC</sub> ) <sub>n</sub> = 1 when (V) <sub>n</sub> and (CH <sub>4</sub> ) <sub>n</sub> are both measured on a dry basis or if both are measured on a wet basis; • (K <sub>MC</sub> ) <sub>n</sub> = [1 - (f <sub>H2O</sub> ) <sub>n</sub> ] when (V) <sub>n</sub> is measured on a wet basis and (CH <sub>4</sub> ) <sub>n</sub> is measured on a dry basis; • (K <sub>MC</sub> ) <sub>n</sub> = 1/[1 - (f <sub>H2O</sub> ) <sub>n</sub> ] when (V) <sub>n</sub> is measured on a dry basis and (CH <sub>4</sub> ) <sub>n</sub> is measured on a wet basis.	[R] = Equation value R for period n
1	8,405,681.	31.00%	520.	1.	1.00	50.042	
2	8,993,027.	44.60%	520.	1.	1.00	77.026	
3	11,437,787.	47.45%	520.	1.	1.00	104.226	
4	10,270,074.	50.30%	520.	1.	1.00	99.206	
5	10,813,792.	46.40%	520.	1.	1.00	96.359	
6	11,423,310.	42.50%	520.	1.	1.00	93.235	
7	11,670,611.	47.50%	520.	1.	1.00	106.459	
8	11,980,214.	45.30%	520.	1.	1.00	104.222	
9	9,230,461.	45.70%	520.	1.	1.00	81.009	
10	10,475,566.	45.70%	520.	1.	1.00	91.937	
11	10,842,996.	45.70%	520.	1.	1.00	95.162	
12	10,517,247.	46.10%	520.	1.	1.00	93.111	
13					1.00	0.000	
14					1.00	0.000	
15					1.00	0.000	
16					1.00	0.000	
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52					1.00	0.000	
53					1.00	0.000	
54					1.00	0.000	
55					1.00	0.000	

Subpart HH - Municipal Solid Waste Landfills - Calculating Methane Recovery Using Equation HH-4

OPTIONAL SPREADSHEET FOR FACILITY RECORDKEEPING PURPOSES

Version e-GGRT RY2013.R.01

Today's date 3/26/2021

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Subpart HH - Municipal Solid Waste Landfills - Calculating Methane Recovery Using Equation HH-4

OPTIONAL SPREADSHEET FOR FACILITY RECORDKEEPING PURPOSES

Version e-GGRT RY2013.R.01

Today's date 3/26/2021

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250						1.00	0.000
251						1.00	0.000

Subpart HH - Municipal Solid Waste Landfills - Calculating Methane Recovery Using Equation HH-4

OPTIONAL SPREADSHEET FOR FACILITY RECORDKEEPING PURPOSES

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345						1.00	0.000
346						1.00	0.000
347						1.00	0.000
348						1.00	0.000
349						1.00	0.000



**Subpart HH - Municipal Solid Waste Landfills - Calculating Methane Recovery Using Equation HH-4**

**OPTIONAL SPREADSHEET FOR FACILITY RECORDKEEPING PURPOSES**


Version e-GGRT RY2013.R.01

Today's date 3/26/2021

350						1.00	0.000
351						1.00	0.000
352						1.00	0.000
353						1.00	0.000
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358						1.00	0.000
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363						1.00	0.000
364						1.00	0.000
365						1.00	0.000
366						1.00	0.000

[100%] = Constant	100%
[0.0423] = Density of CH <sub>4</sub> lb/cf at 520°R or 60° Fahrenheit and 1 atm	0.0423
[520°R] = Constant	520
[1 atm] = Constant	1
[0.454/1000] = Conversion factor (metric ton/lb)	0.000454

[R] = Annual quantity of recovered CH <sub>4</sub> (metric tons CH <sub>4</sub> ).	1,091.9924100
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 Use this value in Equation HH-6, HH-7, HH-8