# 2 SEMI-ANNUAL REPORT

In accordance with Title V Permit Standard Condition 1.F, BAAQMD Regulation 8-34-411, 40 CFR §60.757(f) in the NSPS, and 17 CCR §95470(b)(3), this report is a Combined Semi-Annual Title V Report, Partial 8-34, and Partial Methane Control Annual Report that is required to be submitted for the Central Disposal Site. The report contains monitoring data for the operation of the landfill gas collection and control system (GCCS). The operational records have been reviewed and summarized. The following table lists the rules and regulations that are required to be included in this Combined Report.

**Table 2-1: Semi-Annual Report Requirements**

| RULE | REQUIREMENT | LOCATION IN REPORT |
|---|---|---|
| 8-34-501.1 §60.757(f)(4), §95470(a)(1)(A) | All collection system downtime, including individual well shutdown times and the reason for the shutdown. | Section 2.1, Appendices B & C |
| 8-34-501.2 §60.757(f)(3), §95470(a)(1)(B) | All emission control system downtime and the reason for the shutdown. | Section 2.1 & 2.2, Appendices B, C, D & E |
| 8-34-501.3, 8-34-507, §60.757(f)(1), §95470(a)(1)(K) | Continuous temperature for all operating flares and any enclosed combustor. | Section 2.3, Appendices F & T |
| 8-34-501.5 | Monthly landfill gas flow rates and well concentration readings for facilities that operate under less than continuous operation. | Section 2.5 |
| 8-34-501.6, 8-34-503, 8-34-506, §60.757(f)(5), §95470(a)(1)(D) | For operations subject to component leak testing and surface emission monitoring, records of all monitoring dates, leaks in excess of the limits that are discovered by the operator, including the location of the leak, leak concentration in ppmv, date of discovery, wind speed, the action taken to repair the leak, date of the repair, date of any required re-monitoring, and the re-monitored concentration in ppmv. | Section 2.6 & 2.7, Appendices H & I |
| 8-34-501.7, §95470(a)(1)(F) | Annual waste acceptance rate and current amount of waste in-place. | Section 2.10, Appendix L |
| 8-34-501.8 | Records of the nature, location, amount, and date of deposition of non-degradable wastes, for any landfill areas excluded from the collection system requirement as documented in the Collection and Control Design Plan. | Section 2.11 |
| 8-34-501.9, 8-34-505, §60.757(f)(1), §95470(a)(1)(E) | For operations subject to wellhead monitoring, records of all monitoring dates and any excesses of the limits that are discovered by the operator, including well identification number, the measured excess, the action taken to repair the excess, and the date of repair. | Section 2.12, 2.12.1, Appendices N & O |

| RULE | REQUIREMENT | LOCATION IN REPORT |
|---|---|---|
| 8-34-501.10, 8-34-508, §60.757(f)(1), §95470(b)(3)(B), §95470(b)(3)(D) | Continuous gas flow rate records and heat input records. | Section 2.13, Appendices P & T |
| 8-34-501.11, 8-34-509, §95470(a)(1)(K) | Records of key emission control system-operating parameters. | Section 2.2.2, Appendix U |
| 8-34-501.12, §95470(a)(1) | The records required shall be made available and retained for a period of five years. | Section 1.2 |
| 8-34-510 | The surface shall be monitored for cover integrity on a monthly basis. | Section 2.4, Appendix G |
| §60.757(f)(2), §95470(b)(3)(G) | Description and duration of all periods when the gas stream is diverted from the control device through a bypass line or the indication of bypass flow. Type and amount of supplemental fuels burned in each device. | Section 2.2.1 |
| §60.757(f)(6), §95470(b)(3)(E) | The date of installation and the location of each well or collection system expansion added. | Section 2.14, Appendices A & C |
| §95470(b)(3)(H) | Total volume of landfill gas shipped off-site, the composition of the landfill gas collected, and the recipient of the gas. | Section 2.16 |
| §60.752(b)(2)(ii), §95470(a)(1)(C), | Expected gas generation flow rate. | Section 2.17, Appendix V |
| §60.10 (d)(5)(i) | Startup, Shutdown, Malfunction Events | Section 4, Appendices C, D & E |

## 2.1 COLLECTION SYSTEM OPERATION

The County has consistently installed, upgraded, and operated the GCCS since the system was initially constructed in 1987 with an enclosed flare (A-2). The A-2 flare was dismantled and replaced by a John Zink ZTOF® enclosed ground flare (A-3) in 2010. The current GCCS includes LFG collection devices (vertical extraction wells and horizontal collectors), collection piping, an LFG-to-electrical power generating (LFGTE) facility, an enclosed flare (A-3), and an LFG compression facility (S-15). The LFGTE was constructed in three separate phases. Phase I was constructed in 1993 consisting of Units 1 through 4 (Sources S-4 through S-7). Phase II was constructed in 1996 consisting of Units 5 through 8 (S-9 through S-12). Phase III was constructed in 2004 consisting of Units 9 and 10 (S-13 and S-14). Appendix A contains a current map of Central Disposal Site's existing GCCS.

The primary emission control devices for the landfill (source S-1) are the ten Caterpillar® 3516 IC engines within the LFGTE (S-4, S-5, S-6, S-7, S-9, S-10, S-11, S-12, S-13 and S-14). The enclosed A-3 backup flare is operated as necessary when one

or more IC engines are shut down and whenever flow of landfill gas exceeds the capacity of the IC engines.

### 2.1.1 Collection System Downtime

During the period covered in this report, the GCCS was not shut down for more than five consecutive days on any one occasion pursuant to BAAQMD Regulation 8-34-113 and 95470(a)(1)(A).

The total GCCS downtime for the 2011 calendar year (January 1, 2011 through December 31, 2011) is 25.6 hours (out of 240 hours allowed per year pursuant to BAAQMD Regulation 8-34-113). The GCCS Downtime Log is included in Appendix B. The Downtime Log for the backup flare is included in Appendix D. The individual IC Engine Downtime Logs are included in Appendix E.

### 2.1.2 Well Disconnection Log

Wells that have been disconnected from the LFG collection system during the reporting period and the applicable exemption from BAAQMD Regulation 8-34-305 have been recorded on the well disconnection log. A majority of these wells were shut off and isolated from the GCCS system due to maintenance activities.

Appendix C contains the Well Disconnection Log, including the individual well numbers, the shutdown times, the restart times, and reasons for the shutdowns. This well disconnection log comprises the Startup, Shutdown, Malfunction (SSM) Reports for the current reporting period. No wells were shut down for more than 24 hours, and no more than 5 wells were shut down at any one time.

During the reporting period 51 wellfield SSM events occurred for short durations as allowed by BAAQMD 8-34-117, Limited Exemption, Gas Collection System Components. The time and duration of each event are presented in the Wellfield SSM form contained in Appendix C.

No wells were decommissioned and no new wells were connected to the GCCS during the reporting period.

## 2.2 EMISSION CONTROL DEVICE DOWNTIME

The primary emission control devices for the landfill (source S-1) are the ten IC engines (S-4, S-5, S-6, S-7, S-9, S-10, S-11, S-12, S-13 and S-14). The enclosed A-3 backup flare is operated as necessary when one or more IC engines are shut down and whenever flow of landfill gas exceeds the capacity of the IC engines.

Landfill operations were temporarily suspended for 5 years and were resumed in September 2010, as described in Section 2.10, and the current gas generation projections predict a reduction in the landfill gas generation rate by about 125 standard cubic feet per minute (scfm) per year. This is evident by the decline of landfill gas flow

to the emission control devices. Currently there is not a sufficient flow of landfill gas to operate all 10 IC Engines therefore Engines No. 9 and 10 (S-13 and S-14) were put in long-term storage pursuant to BAAQMD Application No. 22513. Additionally, one or more engines maybe placed in standby mode and alternated into service based on maintenance cycles and GCCS demands.

The information contained in Appendix D includes the A-3 backup flare downtimes and the reason for each shutdown. Appendix E contains all downtimes and the reasons for the shutdowns for the IC engines.

The total downtime for each device during the reporting period is as follows:

**Table 2-2: Control Device Downtime**

| Emission Control Device | Total Downtime (Hours) |
|---|---|
| A-3 (Backup flare) | 4,402.1 |
| S-4 (IC Engine 1) | 772.3 |
| S-5 (IC Engine 2) | 1,666.7 |
| S-6 (IC Engine 3) | 396.2 |
| S-7 (IC Engine 4) | 702.7 |
| S-9 (IC Engine 5) | 886.4 |
| S-10 (IC Engine 6) | 111.3 |
| S-11 (IC Engine 7) | 1,073.8 |
| S-12 (IC Engine 8) | 233.8 |
| S-13 (IC Engine 9) | 4416 |
| S-14 (IC Engine 10) | 4416 |

### 2.2.1 LFG Bypass Operations and Supplemental Fuel

LFG cannot be diverted from the control equipment because no by-pass lines are installed at Central Disposal Site. Landfill gas is the only fuel burned in the IC Engines; no supplemental fuel is used. A small amount of propane is used to startup the backup flare.

### 2.2.2 Key Emission Control Operating Parameters

The IC engines (S-4, S-5, S-6, S-7, S-9, S-10, S-11, and S-12) are subject to key emission control system operating parameters. Pursuant to Permit to Operate (PTO) Condition 19933 Part 11, Central Disposal Site must operate each IC Engine at the fuel-to-air ratio established during the most recent complying source test. In addition, the exhaust oxygen concentration for each engine must be maintained within a range of 6.4 to 8.3 percent as established in Permit Application No. 9277. In order to demonstrate compliance with this requirement, the exhaust gas oxygen concentration for each engine is to be measured and recorded in a District approved log on at least a monthly basis.

Exhaust oxygen concentrations for all IC engines were in compliance with PTO Condition No. 19933 Part 11. The Monthly Exhaust Oxygen Content Log is included in Appendix U.

## 2.3 BACKUP FLARE TEMPERATURE MONITORING RESULTS

The A-3 flare combustion zone temperature while the flare is in operation must not drop below 1,400 degrees Fahrenheit (F) or 50 degrees F below the average combustion temperature during the most recent source test. Compliance with temperature limitations is determined on the basis of the 3-hour rolling average temperature.

The combustion zone temperature of the A-3 backup flare is continuously monitored during operation. The temperature is recorded by a Yokogawa data logger. Summaries of the backup flare temperature records review are noted in the Monthly Backup Flare Temperature Deviation Logs in Appendix F. The electronic files of backup flare temperature records are saved on a CD included in Appendix T of this report.

During the reporting period, the A-3 backup flare temperature was maintained within compliance.

## 2.4 MONTHLY COVER INTEGRITY MONITORING

The Cover Integrity Monitoring was performed on a monthly basis during the reporting period. The Monthly Cover Integrity Monitoring reports are included in Appendix G. The cover integrity monitoring was performed on the following dates:

- August 7, 2011;
- September 4, 2011;
- October 2, 2011;
- November 6, 2011;
- December 4, 2011; and
- January 1, 2012

Cracks in the interim cover of Landfill 1 were identified during September 4$^{th}$ monitoring. The cracks were filled with granular bentonite and covered with soil.

## 2.5 LESS THAN CONTINUOUS OPERATION

Central Disposal Site does not operate under "Less Than Continuous Operation."

## 2.6 SURFACE EMISSIONS MONITORING

A surface emissions monitoring plan (SEMP) was submitted as part of a Revised GCCS Design Plan, dated June 15, 2011, in accordance with the requirements of the NSPS, BAAQMD, and CARB. Monitoring methods include both Instantaneous and Integrated Surface Emissions Monitoring.

Surface emissions will be monitored quarterly or annually, as required by the regulations and as described in the SEMP. But in either case, both instantaneous and integrated monitoring were conducted concurrently. CARB approved the GCCS Design Plan (and subsequent SEMP) in a letter dated August 30, 2011. A copy of the CARB approval letter is included in Appendix Q. Monitoring events conducted during the reporting period occurred on the following dates:

- Third quarter, 2011 – August 26 to September 6, 2011; and
- Fourth quarter, October 24 to November 10, 2011.

Surface emission monitoring reports for both the instantaneous and integrated surface emission monitoring are included in Appendix H.

### 2.6.1 INSTANTANEOUS SURFACE EMISSION MONITORING

For instantaneous surface monitoring, the average methane level must be less than 500 ppmv at any location on the landfill surface as required in 8-34-303 and §95465(a)(1). A Surface Emission Monitor (SEM-500) manufactured by CES-Landtec is used to monitor the path along the landfill surface for the total organic compound concentrations according to the Landfill SEMP map. Immediately prior to monitoring events, the SEM-500 instrument was zeroed and calibrated in accordance with the manufactures' recommendations. Grids with instantaneous point sources greater than 200 ppmv have been identified and are listed in Appendix H.

There were four exceedances of the 500 ppm surface concentration standard identified during the third quarter surface monitoring event. In each case, corrective actions were completed, and no methane concentrations greater than 500 ppmv were detected during the 10-day (September 8, 2011) and 30-day (September 29, 2011) re-monitoring events.

There were four exceedances of the 500 ppm surface concentration standard identified during the fourth quarter surface monitoring event. In each case, corrective actions were completed, and no methane concentrations greater than 500 ppmv were detected during the 10-day (November 2, 2011) and 30-day (November 22, 2011) re-monitoring events.

### 2.6.2 INTEGRATED SURFACE EMISSION MONITORING

For integrated surface monitoring, the average methane level must be less than 25 ppmv for each grid as required in §95465(a)(2). When methane levels of 500 ppmv or greater were encountered, integrated monitoring was suspended and instantaneous monitoring was conducted to determine the areal extent and maximum concentration of the exceedance. Grids with an integrated sampling average greater than 25 ppmv were remediated and re-monitored within 10 calendar days of the initial exceedance.

Four grids exceeded the 25 ppm integrated standard during the third quarter surface monitoring event. In each case, corrective actions were completed, and the average methane concentration did not exceed the 25 ppmv standard detected during the 10-day re-monitoring events.

Five grids exceeded the 25 ppm integrated standard during the fourth quarter surface monitoring event. In each case, corrective actions were completed, and the average methane concentration did not exceed the 25 ppmv standard detected during the 10-day re-monitoring events.

## 2.7 COMPONENT LEAK TESTING

Pursuant to Section 8-34-301 of BAAQMD's Regulation 8, Rule 34, the regulatory limit for methane concentration at LFG components and connections is 1,000 parts per million by volume (ppmv). However, pursuant to requirements effective July 1, 2011, §95464(b)(1)(B) of CCR Title 17 establishes the regulatory limit at 500 ppmv methane for components and connections leaks at municipal landfills. The quarterly component leak monitoring data are presented in Appendix I. Pacific GeoScience performed component leak monitoring on the following dates:

- Fourth quarter, 2011 – October 21, 2011; and
- First quarter, 2012 – January 26 and 27, 2012;

There were no component leaks exceeding 500 ppmv methane identified during the fourth and first quarter component monitoring events.

## 2.8 SULFUR MONITORING RECORDS

The concentration of total reduced sulfur compounds in the LFG must not exceed 1,300 ppmv pursuant to Permit Condition 4044 Part 7. Total sulfur content in LFG was analyzed during the annual gas characterization tests, pursuant to Condition 4044 Part 18. The concentration of total reduced sulfur compounds in the LFG did not exceed 1,300 ppmv during the reporting period.

**Table 2-3: Sulfur Monitoring Records**

| | Date | Readings (ppmv) |
|---|---|---|
| Total Sulfur as $H_2S$ | 11/28/11 | 111.0 |

## 2.9 DUST SUPPRESSION RECORDS

Water was used as a dust suppressant pursuant to Permit Condition 4044 Part 19n. Dust Suppression Records Monthly dust suppression records are presented in Appendix K.

## 2.10 WASTE ACCEPTANCE RECORDS

Pursuant to Condition 4044 Part 1, the total amount of solid waste received at the S-1 landfill must not exceed 2,500 tons per day (tpd), or 897,500 tons per year (tpy).

Monthly waste tonnage acceptance records are provided in Appendix L. Table 2-4 summarizes the monthly waste acceptance rate during the report period. The County temporarily suspended landfill operations on September 30, 2005, however, operation of the landfill resumed on September 8, 2010.

**Table 2-4: Waste Disposal Records Summary**

| Month | Quantity (tons) | Daily Avg. (tons) |
|---|---|---|
| August 2011 | 12,826 | 475 |
| September 2011 | 12,743 | 490 |
| October 2011 | 12,505 | 481 |
| November 2011 | 12,328 | 474 |
| December 2011 | 11,353 | 437 |
| January 2012 | 11,466 | 441 |
| **Semi-Annual Total** | **73,221** | - |

Pursuant to Condition 4044 Part 1, the total cumulative amount of all wastes and cover materials placed in the landfill shall not exceed 19.59 million tons, daily waste acceptance shall not exceed 2,500 tons, and annual waste acceptance shall not exceed 897,500 tons. The total waste in place is 14.0 million tons.

Pursuant to Condition 4044 Part 17c, the 12-month waste acceptance total for the preceding 12-month period (February 1, 2011 through January 31, 2012) was 148,064 tons. Daily waste acceptance did not exceed 2,500 tons as required by Condition 4044 Part 1.

### 2.10.1 Low-VOC Content Soil Acceptance Records

Pursuant to Permit Condition 4044 Part 21, the amount of volatile organic compound (VOC) laden soil disposed of in the landfill must be limited so that no more than 15 pounds per day (lbs/day) of total carbon could be emitted to the atmosphere per day. VOC laden soil is soil that contains VOC in concentrations that are less than 50 parts per million by weight (ppmw) threshold for contaminated soil. The amount and VOC concentrations of all VOC laden soils must be recorded on a daily basis.

VOC laden soil was accepted at the Central Disposal Site during the reporting period. There were no days during the reporting period when potential carbon emissions from the low VOC soil exceeded the 15 lbs/day limit. Records of the amount of low VOC soil are provided in Appendix M.

No VOC contaminated (greater than 50 ppmw) soil was accepted during the reporting period.

## 2.11 NON-DEGRADABLE WASTE ACCEPTANCE RECORDS

The Collection and Control System Design Plan for Central Disposal Site does not indicate non-degradable waste areas that are excluded from the collection system.

## 2.12 WELLHEAD MONITORING DATA

Wellhead monitoring was performed on a monthly basis. The Monthly Well Monitoring Records for the reporting period are provided in Appendix N. Each well was monitored for the following:

- Each wellhead shall operate under a vacuum; and
- The landfill gas temperature in each wellhead shall be less than 55°C (131°F); and
- The oxygen concentration in each wellhead shall be less than 5 percent by volume.

The County requested exemption from BAAQMD Rule 8-34 wellhead standards and alternate wellhead monitoring limits for 11 extraction wells. BAAQMD approved the alternate wellhead monitoring limits for these extraction wells, Authority to Construct No. 16582. Permit Condition 4044 Part 5b was added to the Permit to Operate allowing up to 15 percent oxygen in gas extraction wells V-58, V-61, V-62, V-117, EC-9.1, EC-15, EC-19, EC-24, EC-25, EC-26, and EC-26.1. However, wells EC-9.1, EC-25, EC-26, and EC-26.1 failed and were decommissioned in December 2009, pursuant to Authority to Construct Application No. 16497.

### 2.12.1 Wellhead Deviations

The wells that deviated from BAAQMD Regulation 8-34-305, Permit Condition 4044 Part 5b, and 17 CCR §95469(c) limits were repaired pursuant to the regulations. The Well Deviation Logs for the reporting period are provided in Appendix O. The Well Deviation Log includes the well identification number, parameter exceedance, date of initial exceedance, corrective actions taken, date of follow-up monitoring, compliance status, and summarizes the gas collection wells that exceeded applicable limits.

## 2.13 LFG FLOW MONITORING RESULTS

Continuous IC engine gas flow readings and backup flare combustion temperature and gas flow readings are recorded by a Yokogawa data logger. The total amount of LFG combusted in each control device is provided in Appendix P. The monthly total and daily average LFG flow records and heat input for the A-3 backup flare and the IC engines are provided in Appendix P. The Electronic Files of the Yokogawa IC Engines Flow Records and Backup Flare Temperature and Flow Records are provided in Appendix T.

**Table 2-5: Total Flow**

| Month | A-3 Backup Flare (total scf) | Phase I (S-4, S-5, S-6 and S-7) (total scf) | Phase II (S-9, S-10, S-11 and S-12) (total scf) | Phase III (S-13 and S-14) (total scf) | All (total scf) |
|---|---|---|---|---|---|
| August 2011 | 0 | 37,992,051 | 36,154,365 | 0 | 74,146,416 |
| September 2011 | 1,022,250 | 33,351,715 | 41,593,208 | 0 | 75,967,173 |
| October 2011 | 0 | 32,460,566 | 41,984,758 | 0 | 74,445,324 |
| November 2011 | 174,224 | 27,749,593 | 38,693,985 | 0 | 66,617,802 |
| December 2011 | 0 | 32,460,566 | 41,984,758 | 0 | 74,445,324 |
| January 2012 | 0 | 38,768,672 | 26,920,771 | 0 | 65,689,643 |
| **Period Total:** | **1,196,474** | **202,783,363** | **227,331,845** | **0** | **431,311,682** |

**Table 2-6: Total Heat Input**

| Month | A-3 Backup flare (MMBtu) | Phase I (S-4, S-5, S-6 and S-7) (total MMBtu per unit) | Phase II (S-9, S-10, S-11 and S-12) (total MMBtu per unit) | Phase III (S-13 and S-14) (total MMBtu per unit) | All (total MMBtu) |
|---|---|---|---|---|---|
| August 2011 | 0 | 6,280 | 6,065 | 0 | 37,760 |
| September 2011 | 583 | 6,340 | 6,242 | 0 | 38,708 |
| October 2011 | 0 | 6,171 | 6,301 | 0 | 37,933 |
| November 2011 | 99 | 5,275 | 5,807 | 0 | 33,944 |
| December 2011 | 0 | 6,490 | 5,881 | 0 | 37,933 |
| January 2012 | 0 | 5,745 | 5,585 | 0 | 34,070 |
| **Period Total:** | **682** | **36,302** | **35,882** | **0** | **220,369** |

Permit Condition 4044 Part 13 applies to the A-3 backup flare, the heat input to the A-3 flare shall not exceed 547,680 million BTU per year (MMBtu/yr) and shall be summarized monthly. For the reporting period, the A-3 backup flare remained in compliance and did not exceed the annual heat input limit set by Permit conditions.

Pursuant to Permit Condition 19933 Part 10, the heat input to each IC engine shall not exceed 252.6 MMBtu/day, or 92,199 MMBtu/year, and shall be summarized monthly. Phase I, Phase II, and Phase III LFG daily flow records are divided by the number of engines that operated to calculate heat input per engine per day (MMBtu/unit). During the reporting period none of the IC engines exceeded the daily or annual heat input limits set by Permit Conditions.

## 2.14 DATE OF INSTALLATION AND LOCATION OF EACH COLLECTOR

On July 8, 2011, the County notified BAAQMD of the startup of five replacement wells within new waste cells of Landfill 2. Initial test results of the five wells indicated poor quality LFG, indicating the wells had not yet become entirely anaerobic due to the relatively recent placement of waste (<7 months). The County will continue to test the wells and extract LFG as the waste becomes anaerobic. Refer to the GCCS Design

Plan for the Central Disposal Site, Amended and Restated June 15, 2011, for a complete description of the installation and operation of the GCCS.

## 2.15 NOTICES OF VIOLATION ISSUED BY THE BAAQMD

Central Disposal Site received no Notices of Violation (NOVs) during the reporting period.

## 2.16 VOLUME OF LANDFILL GAS CONVERTED IN S-15

The landfill gas compression plant (S-15) is a pilot scale unit designed to operate as a closed loop system with all waste gases vented to either the flare or IC engines pursuant to Permit Condition 23087. The unit was completed in February 2009. Compressed natural gas (CNG) produced at the Central Disposal Site is currently used to fuel select vehicles in the Sonoma County Transit bus fleet. During the reporting period, 236,610 scf of CNG was produced. The average methane and carbon dioxide concentrations in the landfill gas were 50 and 41 percent by volume, respectively. The methane concentration in the CNG averages about 90 percent by volume.

## 2.17 EXPECTED GAS GENERATION FLOW RATE

The USEPA LandGEM, Version 3.02, generation model was used to estimate the site's maximum LFG generation rate in accordance with 40 CFR Section 60.755(a)(1). Following the method described in 40 CFR 60.755(a)(1), LandGEM calculated a LFG generation estimate for 2011 of approximately 2,900 scfm. Using the USEPA-recognized default GCCS collection efficiency of 75 percent as published in AP-42, the estimated 2011 LFG extraction rate was estimated to be 2,175 scfm. A summary table of the LandGEM gas generation modeling is included in Appendix V along with the model input and results report.

As required in §95471(e), the expected gas generation flow rate was determined as prescribed in the 2006 Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories using a recover rate of 75 percent. The 2011 LFG extraction rate was estimated to be 1,800 scfm. A summary table of the IPCC gas generation modeling is included in Appendix V along with the model inputs and results.

As represented in the summary tables for both the LandGEM and IPCC models in Appendix V, the LFG generation rate peaked in 2005 when the CDS suspended landfilling operations. As a result, LFG generation at the CDS has been in a state of steady decline. The current actual and modeled LFG generation and extraction estimates, as well as the modeled projections for 2020 and 2030 are presented below in Table 2.7.

**Table 2.7: LFG Generation and Extraction Estimates**

| Year | USEPA LandGEM Generation at (75%Recovery) (scfm) | 2006 IPCC GHG Methodology (75% Extraction) (scfm) | Actual Extraction (scfm) | Existing Capacity (scfm) |
|---|---|---|---|---|
| 2010 | 2,240 | 1,920 | 1,725 | 4,375 |
| 2011 | 2,175 | 1,800 | 1,616 | 4,375 |
| 2020 | 1,640 | 1,065 | N/A | - |
| 2030 | 1,120 | 580 | N/A | - |

The total LFG treatment capacity of the LFGTE facility is approximately 2,875 standard cubic feet per minute (scfm). The enclosed flare (A-3) has a design capacity of 1,500 scfm. The flare is a back up device to the LFGTE facility; however it is permitted for continuous operation when sufficient LFG is available. The flare can be operated parallel and simultaneously with all ten engines to sustain a maximum LFG extraction rate of approximately 4,375 scfm.

# 3 PERFORMANCE TEST REPORT

In accordance with BAAQMD Regulation 8-34-413, 40 CFR §60.757(g), and 17 CCR 95464(b)(4), a Performance (Source) Test Report is required to be submitted from facilities containing performance and monitoring data for the operation of the GCCS. The operational records have been reviewed and summarized. The following table lists the rules and regulations that are included in this Combined Report.

**Table 3-1: Performance Test Requirements**

| Rule | Requirement | Location in Report |
|---|---|---|
| 8-34-412, §60.8, §60.752(b)(2)(iii)(B), §60.754(d), §95470(a)(1)(H), §95470(b)(3)(C), §95470(b)(3)(F) | Compliance Demonstration (Source) Test | Section 3.1 Appendix R |
| §60.757(g)(1), §95470(b)(3)(I) | A topographic map of the collection system showing collection system positioning including all wells, horizontal collectors, surface collectors, or other gas extraction devices, including the locations of any areas excluded from collection and the proposed sites for future collection system expansion, and areas of final cover. | Section 3.2, Appendix A |
| §60.757(g)(2) | The data upon which the sufficient density of wells, horizontal collectors, surface collectors, or other gas extraction devices and the gas mover equipment sizing are based. | Section 3.3 |
| §60.757(g)(3) §95470(a)(1)(G) | The documentation of the presence of asbestos or non-degradable material for each area from which collection wells have been excluded based on the presence of asbestos or non-degradable material. | Section 3.4 |
| §60.757(g)(4) | The sum of the gas generation flow rates for all areas from which collection wells have been excluded based on non-productivity and the calculations of gas generation flow rate for each excluded area. | Section 3.5 |
| §60.757(g)(5) | The provisions for increasing gas mover equipment capacity with increased gas generation flow rate, if the present gas mover equipment is inadequate to move the maximum flow rate expected over the life of the landfill. | Section 3.6 |
| §60.757(g)(6) | The provisions for the control of off-site migration | Section 3.7 Appendix S |

## 3.1 SOURCE TEST RESULTS

The Compliance Demonstration (Source) Test was performed on the A-3 backup flare on November 28, 2011, and on eight of the IC engines on November 8-9 and 28, 2011, pursuant to BAAQMD Regulation 8-34-412 and CARB 17 CCR 95464(b)(4). A copy of

the complete source test (including backup flare test results; eight IC engines test results, and LFG characterization results) is included in Appendix R.

Two BAAQMD Source Tests were performed during the reporting period. A copy of the completed source test reports is included in Appendix R. The results of the source tests are summarized below.

BAAQMD source test No. 12058 was performed on October 28, 2011. This source test indicated that S-4 (Engine 1) was in compliance with all permit conditions and regulations.

BAAQMD source test No. 12103 was performed on January 24, 2012. This source test indicated that S-12 (Engine 8) was in compliance with all permit conditions and regulations.

### 3.1.1 Backup Flare (A-3) Source Test Results

The results of the source test for the A-3 backup flare from November 28, 2011, indicate that the backup flare is in compliance with BAAQMD Regulation 8-34-301.3 and CARB 17 CCR 95464(b)(2)(A) requirements. This source test also satisfies the requirements of BAAQMD Regulation 8-34-412. As required by BAAQMD Regulation 8-34-301.3, A-3 meets a NMOC emission rate of less than 120 ppmv or exceeded the minimum destruction efficiency of NMOC of 98 percent. As required by CARB 17 CCR 95464(b)(2)(A)(1), A-3 meets the methane destruction efficiency of at least 99 percent.

The table below summarizes the results of the A-3 backup flare source test. The results presented below in Table 3-2 are an average of the 3 test runs performed during the source test.

**Table 3-2: Backup Flare Source Test Results Summary**

| Condition | Regulation Limit | Backup flare (A-3) Average Result |
|---|---|---|
| Average Temperature (°F) | >1,400 [1] | 1,524 |
| $NO_x$ (lbs/mmBTU) | 0.05 [1] | 0.042 |
| CO (lbs/mmBTU) | 0.20 [1] | 0.020 |
| TOC (%Removal Efficiency) | >98 [2] | >99.998 |
| NMOC (ppm@3%$O_2$ as $CH_4$) | <30 [2] | <1.7 |
| $CH_4$ Destruction Efficiency (% Removal Efficiency) | ≥99 [3] | >99.998 |

Notes: $NO_x$ (nitrogen oxides), CO (carbon monoxide), TOC (total organic carbon as methane), NMOC (non-methane organic compounds), $CH_4$ (methane)

1 Permit to Operate Limit
2 Regulation 8-34 Limit
3 17 CCR §95464 Limit

### 3.1.2 IC Engines Source Test Results

The table below summarizes the source test results for eight IC engines. IC engines S-13 and S-14 were put in long term storage and not tested pursuant to BAAQMD Application No. 22513. The results presented below in Table 3-3 are an average of the 3 test runs performed during the source tests.

**Table 3-3: IC Engines Source Test Results Summary**

| Condition | Reg Limit | S-4 Average Result | S-5 Average Result | S-6 Average Result | S-7 Average Result | S-9 Average Result | S-10 Average Result | S-11 Average Result | S-12 Average Result |
|---|---|---|---|---|---|---|---|---|---|
| $NO_x$ (gm/Bhp-hr) | 0.8 | 0.2 | 0.4 | 0.1 | 0.3 | 0.3 | 0.3 | 0.5 | 0.3 |
| CO (gm/Bhp-hr) | 2.1 | 1.8 | 1.1 | 1.8 | 1.5 | 2.0 | 2.0 | 2.1 | 2.0 |
| POC (ppm @15%$O_2$) | 126 | <30.7 | <29.4 | <32.4 | <30.1 | <33.0 | <32.9 | <32.3 | <32.2 |
| NMOC (ppm @3%$O_2$) | 120 | <93.2 | <89.2 | <98.4 | <91.4 | <100.2 | <99.8 | <98.1 | <97.7 |
| TOC (% Removal Efficiency) | 90 | 97.1 | 98.0 | 96.9 | 98.1 | 96.0 | 96.3 | 97.0 | 96.8 |
| $CH_4$ (ppm @15% O2 dry) | 3,000 | 886 | 613 | 921 | 564 | 1,211 | 1,099 | 914 | 961 |

Notes: $NO_x$ (nitrogen oxides)
CO (carbon monoxide)
POC (precursor organic compounds)
NMOC (non-methane organic compounds)
TOC (total organic carbon as methane)
$CH_4$ Methane

All source test results show that the sources comply with the current regulatory limits included in the table.

### 3.1.3 LFG Characterization Results

The results of the LFG characterization test performed November 28, 2011, indicate that the LFG is in compliance with Title V Permit Condition No. 4044, Part 18. The LFG meets the ppmv concentration limits permitted. Table 3-4 shows the results of the LFG characterization test.

### 3.1.4 Average Composition of LFG

The composition of the LFG is collected most every day when the facility is manned. The results shown below in Table 3-5 are monthly averages of methane and carbon dioxide in percent by volume.

## Table 3-4: LFG Characterization Results

| Constituent | Concentration | Units | Permit Limit | Units | Compliance Status |
|---|---|---|---|---|---|
| Oxygen | 1.5 | % | | | |
| Nitrogen | 12.1 | % | | | |
| Methane | 51.2 | % | | | |
| Carbon Dioxide | 35.5 | % | | | |
| Benzene | 1,020 | ppb | 2,500 | ppb | In Compliance |
| Methylene Chloride | ND | ppb | 20,000 | ppb | In Compliance |
| Perchloroethylene | 125 | ppb | 3,000 | ppb | In Compliance |
| Trichloroethylene | 59 | ppb | 3,000 | ppb | In Compliance |
| Vinyl Chloride | 116 | ppb | 2,500 | ppb | In Compliance |
| 1,4-Dichlorobenzene | 700 | ppb | | | |
| 2-Propanol | 9,740 | ppb | | | |
| Butane | 5.8 | ppm | | | |
| Carbon Disulfide | 202 | ppb | | | |
| Chlorodifluoromethane | 324 | ppb | | | |
| Dichlorodifluoromethane | 562 | ppb | | | |
| Dichlorofluoromethane | ND | ppb | | | |
| Ethanol | 59.8 | ppm | | | |
| Ethyl Benzene | 4,270 | ppb | | | |
| Hexane | 522 | ppb | | | |
| Hydrogen Sulfide | 107 | ppm | | | |
| 2-Butanone (MEK) | 10,600 | ppb | | | |
| m,p-Xylene | 8,130 | ppb | | | |
| o-Xylene | 2,600 | ppb | | | |
| Reduced Sulfur Compounds (TRS) | 111.0 | ppm | 1,300 | ppm | In Compliance |

Notes: ND = Not Detected; TRS includes all detected sulfur compounds;

**Table 3-5: Average Composition of LFG over the Reporting Period**

| | Methane | Carbon Dioxide |
|---|---|---|
| August 2011 | 51.8 | 42.6 |
| September 2011 | 50.0 | 40.9 |
| October 2011 | 50.2 | 41.7 |
| November 2011 | 49.7 | 40.6 |
| December 2011 | 48.7 | 38.6 |
| January 2012 | 49.3 | 40.3 |
| **6-Month Average** | **50.0** | **40.8** |

Notes: Values are percent by volume

## 3.2 TOPOGRAPHIC MAP

A topographic map dated January 31, 2012, with the LFG collection system showing the positioning of all vertical wells, horizontal collectors, and other LFG extraction devices is included in Appendix A. To date, no final cover has been installed on the Central Disposal Site.

## 3.3 SUFFICIENT DENSITY AND SIZING OF GCCS COMPONENTS

In general, the sufficient capacities of the GCCS collection components will be based on establishing, maintaining, and documenting compliance with the emission and wellhead performance standards. The sufficient capacities of the control devices will be based on establishing, maintaining, and documenting compliance within the maximum heat input limits of the control devices. Over the monitoring period covered by this semi-annual report, the sufficiency of the GCCS components was based as follows:

The existing GCCS has historically provided LFG wells and collectors spaced in accordance with standard industry practices. The installed density appears more than adequate for controlling surface emissions, based on continuous compliance and operational experience. This installation density also provides sufficient methane quality and flows to sustain the energy generating control devices. Additional LFG collectors have been permitted for possible future installation, as required to maintain compliance and provide maximum available LFG extraction for fueling the energy generating control devices.

The total capacity of the LFG mover equipment exceeds both historic and projected LFG generation and extraction rates (expected gas generation flow rates are presented in Appendix V). Sufficient LFG control device and mover capacity is provided such that the A-3 backup flare is operated as necessary when one or more IC engines are shutdown and whenever flow of landfill gas exceeds the capacity of the IC engines.
The Landfill operator will conduct routine monitoring in accordance with the requirements. If the GCCS at the Landfill does not meet the measures of performance set forth, the GCCS will be adjusted or modified in accordance with the NSPS requirements.

Compliance is maintained by performing a quarterly surface emissions monitoring. Refer to Section 2.6, Surface Emissions Monitoring, in this Combined Report for information pertaining to the surface emissions monitoring results.

## 3.4 ASBESTOS AND NON-DEGRADABLE WASTE AREAS

The Collection and Control System Design Plan for Central Disposal Site does not include asbestos or non-degradable waste areas that are excluded from the collection system.

## 3.5 NON-PRODUCTIVE AREAS

The Collection and Control System Design Plan for the County does not include areas from which wells have been excluded based on non-productivity.

## 3.6 PROVISIONS FOR INCREASING GAS MOVER EQUIPMENT CAPACITY

The present LFG mover equipment capacity is adequate to move the maximum flow rate expected over the life of the landfill as discussed in Section 2.17.

## 3.7 CONTROL OF OFF-SITE MIGRATION

In order to comply with 40 CFR §60.752(b)(2)(ii)(A)(3) and (4), the GCCS has been designed to extract LFG at a rate that allows for the minimization of subsurface lateral migration and surface emissions of LFG. This has been achieved by sizing and installing sufficient gas collection elements, transmission piping, blower(s), and control devices for the estimated maximum rate of LFG generation. The GCCS will be operated to collect LFG at a sufficient rate by maintaining a negative gauge pressure (vacuum) at all wellheads. Vacuum will be applied and maintained at pressures sufficient to extract a total LFG flow rate to maintain compliance.

Compliance is maintained by performing quarterly LFG migration monitoring. The LFG migration monitoring is performed pursuant to the LFG Migration Monitoring Plan for the County. The quarterly LFG migration monitoring events during the reporting period were performed on the following dates:

- Fourth quarter, 2011 – October 20, 2011; and
- First quarter, 2012 – January 26, 2012;

The records are included in Appendix S. The LFG monitoring reports show that there were no perimeter compliance locations with detections above the 5 percent methane by volume limit as stated in the Subtitle D (40 CFR 258.23) and California Code of Regulations Title 27, Division 2, Section 20919.5. The structure monitoring reports shows compliance in the on-site structures.

# 4 STARTUP, SHUTDOWN, MALFUNCTION PLAN REPORT

The National Emission Standards for Hazardous Air Pollutants (NESHAPS), contained in 40 CFR Part 63, Subpart AAAA for Municipal Solid Waste (MSW) landfills to control hazardous air pollutants, include regulatory requirements for submittal of a semi-annual report (under 40 CFR §63.10(d)(5) of the general provisions) if an SSMP event occurred during the reporting period. The reports required by 40 CFR §63.1980(a) of the NESHAP and 40 CFR §60.757(f) of the NSPS summarize the GCCS exceedances. These two semi-annual reports contain similar information and have been combined as allowed by 40 CFR §63.10(d)(5)(i) of the General Provisions.

NESHAP 40 CFR Part 63, Subpart AAAA became effective on January 16, 2004. SSM events that occurred between August 1, 2011 and January 31, 2012 are included in this Combined Semi-Annual Report.

- During the reporting period, two flare SSM events occurred. The backup LFG control device (A-3 flare) was started and shut down during this period to combust LFG when the power plant was off line for PG&E scheduled maintenance and annual source testing of A-3. The time and duration of the events are presented in the A-3 Flare Downtime Log contained in Appendix D.
- During the reporting period 51 Wellfield SSM events occurred for short durations as allowed by BAAQMD 8-34-117, Limited Exemption, Gas Collection System Components. The time and duration of each event are presented in the Wellfield SSM form contained in Appendix C. No wells were decommissioned and no new wells were connected to the GCCS during the reporting period.
- During the reporting period 25 SSM events occurred for IC Engine S-4, 25 for S-5, 32 for S-6, 17 for S-7, 28 for S-9, 21 for S-10, 36 for S-11, 27 for S-12, 0 for S-13, and 0 for S-14. The time and duration of each SSM event for each of the IC Engines is presented in the IC Engines SSM forms contained in Appendix E. No SSM events occurred for IC Engines S-13 and S-14; these units are placed in long-term storage until further notice due to the lack of landfill gas production.
- Automatic systems and operator actions were consistent with the standard operating procedures contained in the site's SSM Plan.
- No exceedances of any applicable emission limitation in the landfills NESHAP (63.10(d)(5)(i)) occurred.
- Revisions of the SSM Plan to correct deficiencies in the landfill operations or procedures were neither required, nor prepared (§63.6(e)(3)(viii)).