July 17, 2023
File No. 01204123.25, Task 10

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Subject: June 2023 Monthly Report for Regular Variance (Case No. 6177-3), Chiquita Canyon Landfill (Facility ID 119219), Castaic, California

To Whom It May Concern:

SCS Engineers (SCS), on behalf of Chiquita Canyon Landfill (CCL), hereby provides the South Coast Air Quality Management District (SCAQMD) with a monthly report per the Regular Variance (Case No. 6177-3) for the CCL in Castaic, California. The emergency variance was approved on February 8, 2023; the interim variance was approved on February 15, 2023; and the regular variance was approved on May 3, 2023.

This monthly report is covering the monthly period for June 2023. The regular variance was approved on May 3, 2023 and per the new Condition No. 6, monthly reports are submitted on the third Monday of each subsequent month. This June 2023 monthly report is to be submitted by July 17, 2023.

BACKGROUND

A lab analysis of landfill gas (LFG) samples from CCL, reported on February 1, 2023, showed total sulfur levels of 143 parts per million by volume (ppmv) with dimethyl sulfide contributing 117 ppmv. A breakdown report was called in to the SCAQMD that afternoon as required, and there was further communication between SCS and the SCAQMD clarifying the reason for the breakdown report, and the written breakdown was submitted on February 9, 2023 within the required 14-day period (500-N Form). The Ex Parte Emergency, Interim, and Regular Variance Application from the following rules/conditions was submitted to the SCAQMD Hearing Board on February 4, 2023:

- Title V permit, Facility Wide Conditions, Condition No. 3;
  (Rule 431.1);
- CCL's Rule 431.1 Alternative Monitoring Plan (Application No. 352929);
- Permit to Operate (PTO) G23473 (A/N 491442) Condition Nos. 16 and 17;
  (Rule 1303(a)(1) – BACT; Rule 1303(b)(1) and (b)(2) – Modeling and Offset; Rule 1401); and
- PTO G55163 (A/N 603249) Condition No. 11;
  (Rule 431.1)

The Ex Parte Emergency Variance was approved on February 8, 2023, subject to conditions. The hearing for an Interim Variance request was conducted on February 15, 2023 and was approved,

subject to revised conditions, which were issued in final on March 7, 2023. The Regular Variance was approved on May 3, 2023, which were issued in final on May 16, 2023. This monthly report is following the approved conditions for the regular variance.

Condition No. 6 of the Regular Variance required monthly reports to be submitted via email to Baitong Chen, Nathaniel Dickel, and Gerardo Vergara of the SCAQMD, which include the following information:

A. *The landfill gas sulfur compounds measurements and laboratory analysis with the time and date of each measurement or sample collection, as identified in Condition No. 3.*
B. *The landfill gas records and calculations identified in Condition No. 5, in a Microsoft Excel spreadsheet format.*
C. *The integrated landfill surface sample analysis and landfill surface monitoring readings identified in Conditions 7 and 8 (include the past 12 months in the Monthly Report due on June 19, 2023), in a Microsoft Excel spreadsheet format.*
D. *Estimated schedule for any replacement or refurbishment of granular activated carbon media in the Landfill Gas Treatment System (under Permit G55163, A/N 603249) identified in Condition No. 1.*
E. *Description of any problems or delays, if any, encountered or projected to occur pertinent to the execution of contracts, as well as the delivery, replacement, startup, and testing of any operation necessary to replenish and/or replace spent granular activated carbon media in the Landfill Gas Treatment System (under Permit G55163, A/N 603249).*
F. *Specifications of the equipment and materials used for the daily colorimetric tests (only if there is a change from the previously provided specifications of the colorimetric instrumentation or method used).*
G. *All wellhead temperature readings, lab analysis, and Draeger tube readings for landfill gas from the past month in a Microsoft Excel spreadsheet format.*
H. *Updates to the root cause analysis submitted on February 22, 2023, if any.*
I. *Updates on the investigation into the availability, viability, and utilization, including pilot testing if needed, of an alternative sulfur compound treatment system that controls, treats, or removes dimethyl sulfide and other sulfur compounds, if any.*
J. *The excess emissions calculation method, necessary supporting information, and results.*
K. *Petitioner shall check their records to see if there have been any previous violations or concerns of any possible design or operational issues regarding rainwater penetration into the landfill raised by other agencies, such as Cal Recycle or Regional Water Quality Control Board. In addition, petitioner shall conduct their own landfill design operations inspection for any design failures that may allow rainwater to penetrate the landfill. Petitioner shall summarize their findings and provide a report to the Clerk of the Board, (clerkofboard@aqmd.gov).*

MONTHLY REPORT

Section A – LFG Sulfur Compound Measurements during Reporting Period

The LFG sulfur compounds measurements and laboratory analysis with the time and date of each measurement or sample collection, as identified in Condition No. 3.

Condition No. 3: Petitioner shall sample, analyze, and record the landfill gas sulfur compounds combusted in each flare (as measured at sampling location FL-150 that is representative of the gas combusted in the flare under Permit G23473, A/N

491442) at least once each day using colorimetric tests for hydrogen sulfide (H2S) and at least once each day sample for analysis for total sulfur compounds as H2S using South Coast AQMD Method 307-91.

Petitioner shall record South Coast AQMD Method 307-91 analysis upon receipt of laboratory analysis report. Each recorded measurement or result shall be documented with the time and date of the measurement or sample collection was conducted, and initialed by the personnel that conducted the measurement or sample collection.

Sulfur compound readings and analysis shall be reported to South Coast AQMD pursuant to Condition No. 6.

The lab analyses performed and reports received for the reporting period are presented in **Attachment A**. This report includes analytical data sampled on or after June 1, 2023. Tedlar bag samples were collected and analyzed by SCAQMD Method 307.91 for hydrogen sulfide and reduced sulfur compounds. The laboratory reports were received on June 19 and 29, 2023 and July 1, 10 and 13, 2023.

Daily colorimetric tests (Draeger tube) were started on February 9, 2023, after the Emergency Variance was approved on February 8, 2023. Please note, per the SCAQMD request for clarification on April 14, 2023, there is only one shift per day. Therefore, only one Draeger tube sample collected per day. These colorimetric test samples are identified in **Attachment E**.

A summary of the colorimetric tests and laboratory analyses for landfill gas (LFG) sulfur analyses is provided in the table below, covering the period of June 2023:

Date of Sample	Draeger Tube H_2S (ppm)	SCAQMD Method 307.91 (Concentration in ppmv as H_2S) H_2S	DMS	TRS
6/1/23	10	11	127	175.3
6/2/23	10	10.5	124	177.8
6/3/23	13	12.8	130	183.9
6/4/23	8	9.11	131	186.0
6/5/23	15	16.2	122	175.5
6/6/23	16	16.4	139	196.8
6/7/23	19	18.8	143	204.1
6/8/23	18	18.6	138	194.5
6/9/23	9	9.82	111	155.3
6/10/23	10	10.2	129	181.6
6/11/23	10	9.02	153	194.0
6/12/23	9	9.83	140	184.4
6/13/23	9	8.79	148	191.9
6/14/23	11	10.6	144	188.0
6/15/23	7	7.64	165	210.8

Date of Sample	Draeger Tube H_2S (ppm)	SCAQMD Method 307.91 (Concentration in ppmv as H_2S) H_2S	DMS	TRS
6/16/23	9	8.67	145	196.1
6/17/23	7	7.81	145	201.5
6/18/23	5	6.81	170	235.5
6/19/23	11	11.1	167	225.9
6/20/23	10	10.4	170	229.0
6/21/23	12	11.9	174	235.2
6/22/23	10	12.1	163	231.2
6/23/23	11	12.7	162	244.2
6/24/23	17	16.5	169	238.4
6/25/23	14	16.9	180	259.0
6/26/23	17	17.5	174	242.2
6/27/23	14	14.5	182	257.9
6/28/23	16	16.3	170	242.2
6/29/23	10	13.9	158	222.1
6/30/23	17	16.2	159	229.0

*Above summarized Lab analysis are included in **Attachment E**.

Section B – LFG Records and Calculations

The LFG records and calculations identified in Condition No. 5, in a Microsoft Excel spreadsheet format.

Condition No. 5: Petitioner shall maintain a record of the following information, and provide such records to the South Coast AQMD pursuant to Condition No. 6:

A. The hourly and daily flow of landfill gas combusted, in standard cubic feet, in each flare (No. 1 & No. 2 under Permit G23473, A/N 491442) and the total amount of landfill gas combusted at the facility;

B. The daily flow of landfill gas not flared, in standard cubic feet, if applicable;

C. The results of the sulfur readings, sampling, and analyses, calculated as hydrogen sulfide (H2S) with the time and date when each measurement or sample collection was conducted;

D. Daily excess emissions in pounds (lbs) of sulfur oxides (SOx) per day for each flare (No. 1 and No. 2 under Permit G23473, A/N 491442) pursuant to Condition No. 9, including any assumptions and supporting information.

The above-mentioned lab analyses are included in **Attachment A** and calculations are available in **Attachment B**.

In accordance with Condition No. 5, Section A, the flow rates for each flare as standard cubic feet per minute (scfm), scf per hour, and scf per day are provided in the calculation tables available in **Attachment B**.

In accordance with Condition No. 5, Section B, the daily flow of LFG not flared is available in **Attachment B**. Ameresco applied for a variance to operate the LFG turbine plant under a variance order, and its variance was approved on February 15th. Ameresco restarted operations on February 16th, returning the LFG collection and control system at CCL to full capacity. Therefore, the daily flow of LFG not flared per Section B ended on February 17th, except for periods when the Ameresco Plant and/or the Flares are offline or processing less LFG for other reasons. There were no excess emissions in June, except for June 18, 19, and 21, 2023.

Please note, per the SCAQMD request for clarification on April 14, 2023, the following clarifies the baseline calculations. The excess emissions are found by comparing the daily total flow rate of the Ameresco Plant and Flares for each day of the variance to the average daily total flow rate of the Ameresco Plant and Flares from 2022. The 2022 average flow rate, which represents the total LFG flow collected at CCL, was used as the baseline normal operation against which excess emissions could be determined. The baseline flow rate can be found in **Attachment B**.

A summary of the total daily flow for Ameresco is provided in the table below. The total of the Flare 1, Flare 2 and the actual Ameresco LFG flow rate after restarting operations is greater than the calculated unflared amount while Ameresco was off-line as demonstrated in the calculations in **Attachment B,** except for unflared gas on June 18, 19 and 21st.

Date	Ameresco VOC Flare (scf)	Ameresco Turbine 1 (scf)	Ameresco Turbine 2 (scf)	Ameresco Total (scf)
6/1/2023	440,949	2,624,406	2,604,068	5,669,423
6/2/2023	504,025	2,564,142	2,545,954	5,614,121
6/3/2023	503,940	2,250,574	2,310,640	5,065,154
6/4/2023	503,990	2,058,385	1,906,828	4,469,203
6/5/2023	503,994	2,046,618	2,041,236	4,591,848
6/6/2023	504,028	2,361,115	2,361,167	5,226,310
6/7/2023	497,534	2,560,860	2,540,792	5,599,187
6/8/2023	503,986	2,480,862	2,458,216	5,443,064
6/9/2023	497,129	2,411,309	2,246,895	5,155,333
6/10/2023	503,988	2,329,915	2,330,531	5,164,434
6/11/2023	504,005	2,060,276	2,371,640	4,935,921
6/12/2023	503,946	0	2,609,292	3,113,238
6/13/2023	496,152	0	2,593,254	3,089,406
6/14/2023	503,964	510,430	2,396,143	3,410,537
6/15/2023	504,011	2,146,520	2,018,136	4,668,667
6/16/2023	503,990	2,124,378	2,062,488	4,690,856
6/17/2023	238,699	996,663	993,215	2,228,577

Date	Ameresco VOC Flare (scf)	Ameresco Turbine 1 (scf)	Ameresco Turbine 2 (scf)	Ameresco Total (scf)
6/18/2023	251,723	0	1,114,249	1,365,972
6/19/2023	337,868	297,945	1,645,329	2,281,142
6/20/2023	367,354	69,055	1,565,307	2,001,716
6/21/2023	483,212	1,069,554	2,118,822	3,671,588
6/22/2023	504,155	2,076,675	2,007,375	4,588,204
6/23/2023	493,614	2,081,256	2,005,659	4,580,529
6/24/2023	503,937	1,824,463	1,763,784	4,092,184
6/25/2023	503,970	1,748,534	1,724,860	3,977,363
6/26/2023	503,975	1,703,853	1,679,266	3,887,094
6/27/2023	503,968	1,657,312	1,633,680	3,794,959
6/28/2023	489,375	1,551,324	1,526,078	3,566,777
6/29/2023	503,995	1,473,984	1,448,949	3,426,928
6/30/2023	503,958	1,467,712	1,442,650	3,414,320

Per Condition No. 9, the excess emissions in pounds of sulfur oxides (SOx) per day for each flare are calculated using the following assumptions and calculations, found in **Attachment B**:

Equation no. 1: SOx Excess Emissions for each flare (lb/day) = [1.69 x 10^{-7} (lb/scf) x [TRS – 150] (ppmv) x flare LFG flowrate (scf/day)]

Equation no. 2: SOx Excess Emissions for each flare (lb/day) = [[1.69 x 10^{-7} (lb/scf) x TRS (ppmv) x flare LFG flowrate (scf/day)] – [2.5 lb/hr (Permit Limit per flare) x Daily operating hours (hr/day)]]

Inputs and units:

- TRS: Total reduced sulfur concentrations calculated as H2S using South Coast AQMD Method 307 – 91
- lb/scf: pounds per standard cubic feet
- scf/day: standard cubic feet per day
- LFG: landfill gas
- SOx: oxides of sulfur expressed as sulfur dioxide
- 1.69 x 10^{-7} lb/scf: calculated based on SO_2 molecular weight as 64 lb/lb-mol and molecular volume of 379 scf/lb-mole. (= 64 / 10^6 / 379)

<u>Section C – Surface Emissions Monitoring</u>

The integrated landfill surface sample analysis and landfill surface monitoring readings identified in Conditions 7 and 8 (include the past 12 months in the Monthly Report due on June 19, 2023), in a Microsoft Excel spreadsheet format.

7. Petitioner shall continue to collect integrated landfill surface samples for analysis at least every two weeks as specified in Rule 1150.1 Attachment A 2.0, the first round

of which shall begin no later than 14 days after the variance is granted. In the event the Petitioner is unable to sample the landfill surface area or grid due to inaccessibility or dangerous conditions for a technician, Petitioner shall document the date and the conditions that do not allow the sampling of the area or grid.

8. Petitioner shall continue to conduct instantaneous landfill surface monitoring at least monthly as specified in Rule 1150.1, Attachment A 3.0, the first round of which shall begin no later than May 31, 2023. In the event the Petitioner is unable to monitor the landfill surface area or grid due to inaccessibility or dangerous conditions for a technician, Petitioner shall document the date and the conditions that do not allow the monitoring of the area or grid.

The integrated landfill surface sampling was completed three times in the month of May: May 1 and 2, May 15 and 17, and May 30 and 31, 2023. The 10-day Corrective Action and follow-up monitoring was completed on May 10, 26, and June 9, respectively, and showed compliant readings. The instantaneous landfill surface monitoring was completed on May 30, 2023. The 10-day Corrective Action and follow-up monitoring was competed on June 9 and showed compliant readings.

The integrated landfill surface sample analysis and landfill surface monitoring readings are included in **Attachment C**. The integrated landfill surface sampling was completed on June 13 and June 27, 2023. The 10-day Corrective Action and follow-up monitoring was completed on June 22 and July 7, respectively, and showed compliant readings. The instantaneous landfill surface monitoring was completed on June 1 and 29, 2023. The 10-day Corrective Action and follow-up monitoring was completed on June 9 and July 7, respectively, and showed compliant readings except for four (4) events on July 7. The 2nd 10-day Corrective Action and follow-up monitoring was completed on July 14 and showed compliant readings for all four (4) events.

Section D – Schedule for Replacement or Refurbishment of Granular Activated Carbon Media

Estimated schedule for any replacement or refurbishment of granular activated carbon media in the Landfill Gas Treatment System (under Permit G55163, A/N 603249) identified in Condition No. 1.

1. *Petitioner shall expedite, to the maximum extent feasible, replacement of granular activated carbon media in the Landfill Gas Treatment System (under Permit G55163, A/N 603249), including the execution of contracts, as well as the delivery, replacement, startup, and testing of any operation necessary to replenish and/or replace spent granular activated carbon media in the Landfill Gas Treatment System. Petitioner shall ensure adequate stock of all odor control products and supplies are maintained on site.*

The Landfill Gas Treatment System (LFGTS) currently consists of four carbon adsorber vessels. Only three of the four vessels are online during normal operations with one vessel offline awaiting servicing to replace spent media or on standby with fresh granular activated carbon media. A vessel is typically serviced every 4 to 8 weeks. Colorimetric tests are performed on the outlet of the operating vessels approximately weekly to determine if a vessel may require an adjustment to the flow or schedule service to replace the media.

H2S vessels will be changed out at a lower concentration. At the start of the reporting period (June 1, 2023), three vessels (ST-1, ST-2 and ST-4) were online processing the landfill gas. On June 1, 2023, the spent media was removed from Vessel ST-3 and fresh BG1 media was installed June 5, 2023. Vessel ST-3 was placed into service at partial load on June 7, 2023 and fully opened on June 14, 2023. Vessel ST-2 was taken offline on June 12, 2023 and the media (mixed bed of CU 50 and COL-IPN60 media) replaced on June 19 and 20, 2023. The next media replacement service has been scheduled for July 13 and 14, 2023.

As indicated in prior reports, SCS is currently investigating the use of a different, specialized granular activated carbon media than what is currently used in the treatment vessels to see if it is more effective in reducing dimethyl sulfide. Vessel ST-2 now contains a mixed bed of media consisting of 10,500 lb of CU 50 and 19,500 lb of COL-IPN60 granular activated carbon media, instead of the Norit BG1 media that has been in use. Data sheets for the media were included in Attachment C of the April 24, 2023 status report. Preliminary analysis suggests that the CU 50 media is not effective in reducing DMS concentration after limited use. Assessment of this granular activated carbon media is still ongoing. Subsequent monthly reports will include analytical results on the media in Vessel ST-2, and information on the potential use of any additional granular activated carbon media.

Section E – Description of Problems or Delays

> **Description of any problems or delays, if any, encountered or projected to occur pertinent to the execution of contracts, as well as the delivery, replacement, startup, and testing of any operation necessary to replenish and/or replace spent granular activated carbon media in the Landfill Gas Treatment System (under Permit G55163, A/N 603249).**

There have been no problems or delays with any operation necessary to replenish and/or replace spent granular activated carbon media in the LFGTS.

Section F – Specifications of Equipment and Materials for Daily Colorimetric Tests

> **Specifications of the equipment and materials used for the daily colorimetric tests (only if there is a change from the previously provided specifications of the colorimetric instrumentation or method used).**

The daily colorimetric tests are completed with the Draeger Accuro 64000 bellows hand pump with either Draeger hydrogen sulfide colorimetric tubes Model 6728821 (2 to 20 ppm) or Model CH29801 (5 to 60 ppm). The specifications of the equipment and materials used for the daily colorimetric test was included in the initial weekly report provided on February 13, 2023, as required under the emergency variance. There has been no change in the specifications since the previous report.

Section G – Wellhead Temperature Readings

> **All wellhead temperature readings, lab analysis, and Draeger tube readings for landfill gas from the past month in a Microsoft Excel spreadsheet format**

Wellhead temperature readings for the past month are included in **Attachment D**. Lab analysis and Draeger tube readings for the past month are included in **Attachment E**.

Section H – Status of Root Cause Analysis

Updates to the root cause analysis submitted on February 22, 2023, if any.

The preliminary analysis was submitted to the SCAQMD personnel on February 22, 2023. There has been no update to this analysis as of the end of the current reporting period.

Section I – Status of Investigation for Alternate Sulfur Compound Treatment Systems

Updates on the investigation into the availability, viability, and utilization, including pilot testing if needed, of an alternatives sulfur compound treatment system that controls, treats, or removes dimethyl sulfide and other sulfur compounds, if any.

SCS investigated the availability and viability of alternative sulfur compound treatment systems that control, treat or remove dimethyl sulfide and other sulfur compounds. A preliminary list of alternative treatment systems is included below:

- Oxidation by Hypochlorite
- Oxidation by Peroxide
- Oxidation by Potassium Permanganate
- Bentonite or Zeolite Media Impregnated with Metal
- Reaction with Iron
- Reaction with Copper
- Biotreatment with Sulfur-Reducing Bacteria (SRBs)

A preliminary assessment of these treatment technologies was included in Attachment D of the February 27, 2023 status update report, submitted in compliance with the interim variance. These technologies will be further investigated and updates will be included in subsequent reports

In addition to the preliminary list of alternative treatment systems, SCS is investigating the use of a hydrogen re-former catalyst to convert all sulfur compounds to H_2S and oxidation by Sodium Hydroxide. A reaction with nickel alternative treatment has been investigated, but is not a preferred alternative as heat is required. Bench testing of stronger oxidation scrubbing solutions is ongoing to convert DMS to Dimethylsulfoxide (DMSO).

On March 30, 2023, SCS submitted to SCAQMD an application for operation of slip stream pilot tests to evaluate these alternative treatment systems. SCAQMD requested additional information on April 28, 2023 to be provided by May 5, 2023. As the Site is still in the process of gathering the necessary data and documentation from the various vendors, a request for an extension was submitted on May 1, 2023. An extension was granted by SCAQMD with the additional data to be provided by May 31, 2023. An online meeting was setup between the Site and SCS, and the SCAQMD on May 16, 2023 on further discussion of outstanding information needed. A request for extension was submitted on May 31, 2023, and an extension was granted by SCAQMD with the additional data to be provided by June 30, 2023. SCS has notified SCAQMD that additional time is needed and that the additional information will be provided when completed.

A separate application for the modification of the LFG treatment system and Title V Revision was submitted to the SCAQMD on February 27, 2023. SCAQMD requested additional information on March

30, 2023 to be provided by April 7, 2023. As the Site is still in the process of gathering the necessary data and documentation from the various vendors, a request for an extension was submitted on April 7, 2023 and was granted by the SCAQMD. The requested additional information was submitted to SCAQMD on April 21, 2023.

Section J – The Excess Emissions Calculation

The excess emissions calculation method, necessary supporting information, and results.

Excess emissions calculation, supporting information, and results pursuant to Condition No. 9 is included in **Attachment B**.

Section K – Record Review and Design Operations Inspection Re: Rainfall Penetration

Petitioner shall check their records to see if there have been any previous violations or concerns of any possible design or operational issues regarding rainwater penetration into the landfill raised by other agencies, such as Cal Recycle or Regional Water Quality Control Board. In addition, petitioner shall conduct their own landfill design operations inspection for any design failures that may allow rainwater to penetrate the landfill. Petitioner shall summarize their findings and provide a report to the Clerk of the Board, (clerkofboard@aqmd.gov).

A copy of the Record Review and Design Operations Inspection Report for the month of June is included in **Attachment F**.

CLOSING

If you have any questions or need any additional information, please contact Cornelius Fong of SCS Field Services at (562) 743-7895 or either of the undersigned at (800) 326-9544.

Sincerely,

James J. Kim
Senior Project Professional
SCS Engineers

Gabrielle F. Stephens
Project Director
SCS Engineers

JJK/GFS/PSS

cc: Cornelius Fong, SCS Engineers;
Steve Cassulo, Chiquita Canyon Landfill

Enclosures

Attachment A

Lab Analyses from the Reporting Period

Attachment B

Calculations

Attachment C

Surface Emissions Monitoring

Attachment D

Wellhead Temperature Data

Attachment E

Lab Analysis and Draeger Tube Readings

Attachment F

Condition 6K Report