

December 1, 2023  
File No. 01204123.21

Mr. Baitong Chen, Air Quality Engineer  
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South Coast Air Quality Management District  
21865 Copley Drive  
Diamond Bar, California 91765

**Subject: Dimethyl Sulfide Continuous Monitoring Feasibility and Availability Report, Chiquita Canyon Landfill, Castaic, California**

Dear Mr. Chen, Mr. Dickel, and Ms. Ojeda:

This report has been prepared by **SCS Engineers (SCS)** on behalf of Chiquita Canyon, LLC (Chiquita) to serve as a report on the investigation of the feasibility and availability of implementing a continuous community emission monitoring system to monitor and estimate concentrations of dimethyl sulfide (DMS) in the community surrounding the Chiquita Canyon Landfill (Landfill).

This report fulfills Condition 12(b)(iii) from the September 6, 2023 Stipulated Order for Abatement (SOFA) between Chiquita and the South Coast Air Quality Management District (SCAQMD). Condition 12(b)(iii) of the SOFA requests that Chiquita perform:

*“An investigation and report on the feasibility and availability of a continuous community emission monitoring system to conduct continuous monitoring and provide estimates of DMS concentrations at the facility fenceline and within the affected community. By no later than December 1, 2023, Respondent shall submit to the South Coast AQMD . . . the feasibility and availability findings of this fenceline and community DMS monitoring program. The findings shall identify all companies, vendors, contractors, and consultants that were inquired regarding the feasibility and availability and the results for each inquiry, including an ultimate decision if monitoring is feasible.”*

SCS has completed the required investigation of the feasibility and availability of implementing a continuous community emission monitoring system by conducting a review of both sensor availability and surrogate monitoring capability reflected in this report. Based on SCS's investigation and experience, real-time monitoring for the estimation of DMS concentrations in the community and along the property fenceline is not feasible, as there are no real-time DMS ambient air monitoring sensors currently available commercially. In addition, our trial of surrogate monitoring proved unsuccessful. A summary of the data reviews completed to support this conclusion are provided below.

## **SENSOR AVAILABILITY REVIEW**

SCS performed online searches for potential sensor availability and reviewed the United States Environmental Protection Agency (EPA) Air Sensor Toolbox and the SCAQMD Air Quality Sensor



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Performance Evaluation center (AQ-SPEC) for potential monitoring methods and sensors. A summary of these reviews is presented below.

## EPA Air Sensor Toolbox

The [EPA Air Sensor Toolbox](#) (Toolbox) website is a compendium of information on the latest science on the performance, operation, and use of air sensor monitoring systems. The Toolbox is community-focused and emphasizes criteria pollutant monitoring. Review of the data on the Toolbox website did not identify any DMS-specific sensors. Several sensor manufacturers listed on the website were contacted by SCS for further inquiry.

## SCAQMD AQ-SPEC

The SCAQMD [AQ-SPEC](#) website provides a continuously updated listing of, “widely commercially available low-cost air quality sensors,” that have been evaluated by the SCAQMD. The AQ-SPEC website is focused primarily on volatile organic compound (VOC) sensors and criteria pollutant sensors. Of these, only Hydrogen Sulfide (H<sub>2</sub>S) and Sulfur Dioxide (SO<sub>2</sub>) were listed. Similar to the Toolkit website, several sensor manufacturers listed on the AQ-SPEC website were contacted by SCS for further inquiry.

## Vendor, Contractor, and Consultant Review

As a result of the review of the Toolbox and AQ-SPEC, as well as our industry knowledge of landfill air sampling and ambient air sampling in general, SCS contacted the following vendors, contractors, and consultants for air monitoring equipment for advice on the direct measurement of DMS.

1. **Teledyne API.** Teledyne specializes in air quality and process gas monitoring instrumentation. Sulfur compound instrumentation available includes H<sub>2</sub>S, SO<sub>2</sub>, Total Reduced Sulfur (TRS), and Total Sulfur (TS).
2. **Thermo Fisher Scientific.** Thermo Fisher Scientific is a provider of laboratory-grade analytical instrumentation and field instrumentation. Ambient air monitoring capabilities for sulfur compounds include only SO<sub>2</sub>.
3. **Aeroqual LTD.** Aeroqual provides real-time air monitoring solutions for multiple constituents. Ambient air monitoring capabilities for sulfur compounds are limited to H<sub>2</sub>S and SO<sub>2</sub>.
4. **Specto Technology.** Specto Technology provides hardware and software solutions for the geotechnical, structural, and environmental industries. Ambient air monitoring capabilities are limited to SO<sub>2</sub>.
5. **Met One Instruments.** Met One Instruments is a provider of ambient air quality monitoring equipment. Ambient air monitoring capabilities for sulfur compounds include H<sub>2</sub>S, SO<sub>2</sub>, and TRS.
6. **Applied Analytics.** Applied Analytics specializes in industrial process analysis instrumentation. Air monitoring capabilities for sulfur compounds include carbon disulfide (CS<sub>2</sub>), H<sub>2</sub>S, carbonyl sulfide (COS), SO<sub>2</sub>, and ethanethiol (CH<sub>3</sub>CH<sub>2</sub>SH), or ethyl mercaptan.

Of the vendors, contractors, and consultants contacted, none had an ambient air monitor that could be used specifically for continuous DMS detection. Most were focused on either H<sub>2</sub>S, SO<sub>2</sub>, or TRS analysis in ambient air. Applied Analytics had sensors capable of detecting the most diverse range of sulfur compounds, but none had DMS detection capabilities.

## **SURROGATE MONITORING**

Because we were unable to identify any instruments that were capable of directly monitoring for DMS on a continuous basis, we considered whether it would be feasible to conduct continuous monitoring for a surrogate compound and, using that surrogate, estimate the quantity of DMS in the air (if any) on a continuous basis. TRS is used to detect any reduced sulfur compounds, such as DMS, and can therefore be a surrogate for monitoring DMS. Absence of TRS detections suggests there is no DMS in the environment above the detection limit. However, detectable levels of TRS are not always indicative of DMS, since other reduced sulfur compounds could be causing those detections.

In September 2023, SCS initiated weekly sampling for DMS and TRS at the twelve ambient air monitoring stations located around the perimeter of the Landfill and in the community around the Landfill. SCS also co-located continuous TRS sensors at two of the existing air monitoring stations; one at the Landfill perimeter (MS-04, located on the northwestern area of the Landfill), and one in the Val Verde community (MS-12). These stations were selected for co-location of TRS monitors since they have exhibited the highest H<sub>2</sub>S concentrations historically as part of the Community Air Monitoring Program (CAMP), which is implemented pursuant to Chiquita's Conditional Use Permit (CUP). These TRS monitors are located within the same enclosure as the two existing air monitoring stations used for the CAMP.

The goal of the installation was to attempt to determine if a correlation factor could be identified for DMS laboratory analytical from the weekly sampling at MS-04 and MS-12 to TRS continuous monitoring data at MS-04 and MS-12. To this end, SCS has collected a total of 22 weekly grab samples (eleven samples from each monitoring station) between September 1, 2023 and November 21, 2023. In addition, a total of 11, 24-hour composited samples were collected from off-site monitoring station MS-12, for a total of 33 samples collected. Samples collected were analyzed for TRS and sulfur compounds via SCAQMD Method 307.91.

Out of the 33 samples analyzed, DMS was not detected in any sample. Therefore, given the absence of detectable DMS in air samples, a correlation analysis between DMS and TRS could not be conducted.. Copies of the analytical data are included in **Attachment A**.

## **CONCLUSIONS**

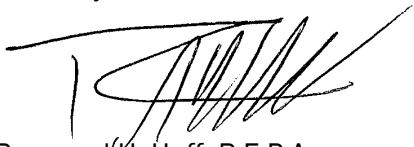
Based upon SCS's research on the availability of implementing a continuous community emission monitoring system for DMS and vast experience with conducting air and odor assessment projects, it is our opinion that real-time monitoring for the estimation of DMS concentrations in the community and along the property fenceline is not feasible due to the following factors:

- The lack of real-time sensors and monitoring methods for the direct measurement of DMS.
- Lack of detectible DMS in analytical air samples collected across the community and fenceline locations prevents the calculation of a correlation factor between DMS and TRS. We cannot establish a correlation to non-detected compounds.

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If you have any questions in regard to this submittal, please contact either of the undersigned at (562) 426-9544.

Sincerely,



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cc: Steve Cassulo, Chiquita Canyon Landfill