BEFORE THE HEARING BOARD OF THE

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

In The Matter Of SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT, Petitioner, vs. CHIQUITA CANYON, LLC a Delaware Corporation, [Facility ID No. 119219] Respondent.	**Case No. 6177-4** **DECLARATION OF BAITONG CHEN, PH.D. IN SUPPORT OF PROPOSED MODIFICATION OF AN ORDER FOR ABATEMENT** Health and Safety Code § 41700, and District Rules 402, 431.1, 3002, 203, 1150 Hearing Date: June 4 and 17, 2025 Time: 9:30 A.M. Place: Hearing Board South Coast Air Quality Management District 21865 Copley Drive Diamond Bar, CA 91765

I, Baitong Chen, Ph.D., declare as follows:

1. I am employed as an Air Quality Engineer II within the Public Services/Waste Management Group within the Engineering and Permitting Division at the South Coast Air Quality Management District ("South Coast AQMD"). I have been employed with the South Coast AQMD since July 2022 and have held my current position since January 2024.

2. I have a Bachelor of Science in Chemical Engineering, and Master of Science and Doctor of Philosophy in Agricultural and Biosystems Engineering. As part of my employment at South Coast AQMD I have received training specifically as an Air Quality Engineer, focusing on ensuring equipment and systems, including landfill gas collection and control equipment, are fully permitted and the permits are written to require operation in compliance with all applicable air quality rules and regulations.

3. Through my role with the South Coast AQMD, I am familiar with Chiquita Canyon Landfill ("Chiquita"), including the South Coast AQMD's enforcement actions to address an ongoing public nuisance. I have been involved in the review and development of conditions of the Order for Abatement ("Order"), particularly those relating to the facility's landfill gas collection and combustion systems, leachate collection and treatment systems, permitted equipment, and landfill gas emissions monitoring, among others. I am also familiar with the proposed new conditions submitted by the South Coast AQMD as proposed modifications for the status/modification hearing on June 4 and 17, 2025. I make this declaration in support of the South Coast AQMD's proposed modifications.

4. I have testified in this matter previously on multiple occasions, and discussed some of the challenges the subsurface reaction has created for collection and disposal of landfill gas and leachate, and the impacts on emissions of landfill gas.

Increases and Enhancements to Landfill Gas and Leachate Collection under the OA

5. During the course of the Order for Abatement, since September of 2023, multiple changes have been made to Chiquita's landfill gas combustion system, landfill gas collection system, leachate collection system and leachate treatment systems. Many of these changes were requirements of the Order for Abatement or have been required by other regulatory agencies for the purpose of abating the current violations occurring at Chiquita.

6. In general, the current subsurface reaction creates more landfill gas (different from typical landfill gas which is methane-rich) and more leachate than would normally be produced by the landfill. If the landfill gas is not collected and combusted, it would remain in the landfill, where the heat and the additional pressure has the potential to worsen the reaction, and/or it would escape the landfill below the surface (where subsurface boundary probes are installed to measure these emissions) and/or as a surface emission to atmosphere, where it causes odors and other harmful air contaminants getting into the air and potentially reaching nearby communities. If the leachate is not collected, it similarly would remain in the landfill where it could potentially worsen the reaction and/or escape the landfill as a seep or pressurized discharge (e.g. a geyser), where it

could release odors and other air contaminants. Additionally, leachate left in the landfill uncollected can clog the gas piping, preventing effective collection of landfill gas. Accordingly, a major strategy to abate the odor public nuisance violations, and ultimately to slow and stop the reaction, has been to expand collection of landfill gas and leachate, combustion capacity of landfill gas, and onsite treatment and offsite disposal of leachate. In the approximately 21 months since the Order for Abatement was first issued, Chiquita has been required to, and has, dramatically expanded its collection and control capacity for landfill gas and leachate.

7. Specifically, the Order for Abatement (Condition 15(b)) required Chiquita to install additional landfill gas collection wells. Chiquita is required to install wells to reach a density of three wells per acre across the reaction area (defined in Condition 9(a)), including a density of at least two wells per acre within any given one-acre square. Chiquita has installed more than 200 additional landfill gas wells inside the reaction area and more than 75 new gas wells outside the reaction area during this time. Although, because Chiquita was not able to drill many of the reaction area wells to desired depth, work under Condition 15 is still ongoing, Chiquita has completed the base number of wells to reach the well density required by the condition.

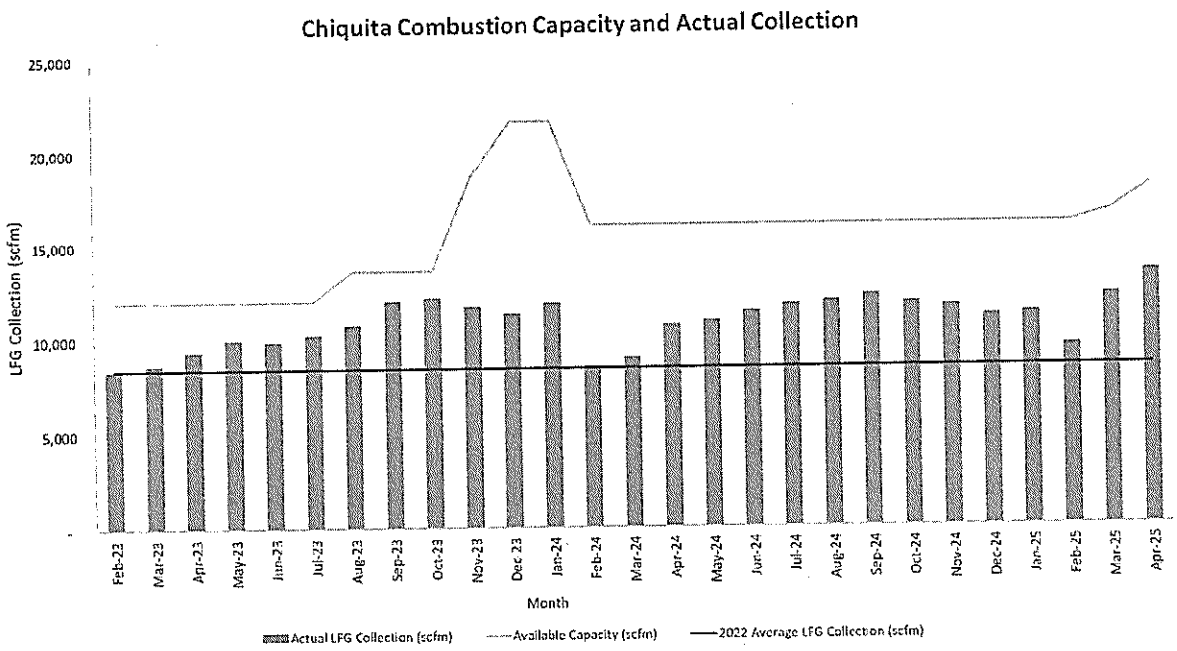
8. Additionally, the Order for Abatement (Condition 15(n)) requires Chiquita to ensure any new gas well installed in the reaction area is a dual-extraction well, able to extract both liquid and gas. Condition 17 further requires Chiquita to dewater the landfill, installing pumps on a minimum of 60% of the wells in the reaction area. Condition 18 required dewatering guidelines to ensure ongoing efforts to extract leachate from the landfill. Chiquita has installed more than 150 pumps.

9. Since September of 2023, Chiquita's landfill gas combustion system, has also been expanded to now include three permanent flares, and three portable combustion/control equipment, which Chiquita refers to as thermal oxidizers or TOx. During this same time period, Chiquita lost the combustion capacity from the shutdown of Ameresco Chiquita Energy (Facility ID No. 140373) in early 2024 due to the landfill gas becoming uncharacteristic and non-compliant, and has also voluntarily removed one portable combustion/control equipment. On net, these

changes have increased Chiquita's landfill gas combustion capacity, the total amount of gas they can combust and control, by around 6,000 standard cubic feet per minute ("scfm"). Chiquita's total landfill gas combustion capacity today is approximately 18,000 scfm.[1]

10. For a range of reasons, a landfill will rarely actually combust its total capacity for gas combustion. Thus, Chiquita's actual combustion over time is also an important metric. While daily combustion varies, Chiquita through the first four months of 2025 has averaged a landfill gas combustion rate (excluding leachate vapor flow) of around 11,000 scfm. These values are graphed in **Exhibit 87**, which is reproduced as **Figure 1** below. On this graph, the yellow line shows Chiquita's total combustion capacity, and the blue bars show the average monthly actual combustion. As a comparison, Chiquita's average actual combustion from 2022, the calendar year prior to when the Order for Abatement started, is shown as the red line, with an annual average of around 8,000 scfm.

Figure 1 / Exhibit 87 (Chiquita Landfill Gas Combustion Capacity and Collection)



[1] I understand from the testimony of Mr. Robert Dick on June 4, 2025 that Chiquita is planning to bring onsite an additional portable combustion/control device. As of the date of this declaration, no permit application for that equipment has been submitted to the South Coast AQMD, and thus I am unable to attest to the potential impact of that plan.

11. While it is clear that Chiquita's landfill gas collection has improved since 2022, the ultimate question is whether they are actually collecting all of the landfill gas being generated. Based on my review of the data, I believe that is not the case at Chiquita.

12. There is not an exact measure of how much landfill gas is being generated at Chiquita. For normal landfills, a mathematical model (known as LandGEM) is used to estimate landfill gas generation based on the amount of waste and the rate of waste decomposition, among other factors. The reaction is known to be increasing the amount of landfill gas being generated, but we do not know by precisely how much. The declaration of Patrick Sullivan, **Exhibit SSS,** contains a chart with the estimates of how much landfill gas is being generated. For discussion purposes, the chart Mr. Sullivan included at page 3 of his declaration is reproduced as **Figure 2** below.

Figure 2 / Exhibit SSS, p. 3 (Landfill Gas Generation Estimates at Chiquita)

Landfill Gas Generation and Control Capacity Chart

Year		2024	2025	2026	2027	2028	2029
LandGEM LFG Generation	(scfm)	14,770	15,370	15,070	14,770	14,480	14,190
LFG Generation (with reaction gas increase)	15%	16,986	17,676	17,331	16,986	16,652	16,319
LFG Generation (with 6000 scfm redundancy)		22,986	23,676	23,331	22,986	22,652	22,319
Flare 1 (FL-1995)[1]	(scfm)	4,000	4,000	4,000			
Flare 2 (FL-2009)		4,000	4,000	4,000	4,000	4,000	4,000
TOX (Zeeco)		2,000	2,000	2,000	2,000	2,000	2,000
Flare 3 (FL-2023)		6,000	6,000	6,000	6,000	6,000	6,000
Flare 4				6,000	6,000	6,000	6,000
TOX (Parnel)			2,000	2,000	2,000	2,000	2,000
Flare 5[2]					6,000	6,000	6,000
Flare/TOX Capacity	(scfm)	16,000	18,000	24,000	26,000	26,000	26,000
Total Capacity	(scfm)	16,000	18,000	24,000	26,000	26,000	26,000

[1]Flare 1 will likely continue into 2027 until Flare 5 has completed startup and is operating full time, after which Flare 1 will be taken offline.
[2]Flare 5 is current listed at a capacity of 6,000 scfm; however, with the landfill closure, a smaller capacity may be capable of meeting the redundancy criterion.

13. Row 1 of this chart shows the model estimation of landfill gas generated at Chiquita. Row 2 adds 15% to the total to account for the increase in landfill gas generation caused by the reaction. The amount of this increase is an estimate, and it is in part based on Chiquita's assumption that the reaction area has not changed in size since September 2023 when the Order for Abatement went into effect.

14. Even if Chiquita's assumption is correct that the reaction has not expanded, and its estimate that the reaction would increase landfill gas generation by no more than 15%, this would put the total landfill gas generation in 2025 at 17,676 scfm (Row 2, Column 4). While that amount is technically below Chiquita's current landfill gas combustion capacity (around 18,000 scfm), it far exceeds the amount of landfill gas Chiquita is actually collecting and combusting (around 11,000 scfm on average). The remaining gas being generated remains in the landfill, potentially worsening the reaction, and/or escaping the landfill as fugitive emissions, creating odors and other air contaminant emissions.

Measured Surface Emission Exceedances of Landfill Gas

15. Beyond the mathematical calculation showing that even under the best-case scenario Chiquita is generating more gas than it is collecting, the Order for Abatement also places a significant focus on directly measuring surface emissions. That data confirms not only that Chiquita is emitting significant quantities of fugitive landfill gas, but also that the significant efforts to increase landfill gas and leachate collection and combustion have not yet shown a measurable trend in lessening those emissions.

16. In general, landfill gas that is not collected will follow the path of least resistance. That means, if the landfill surface contains cracks or fissures, that may allow for an easy escape for landfill gas. The geosynthetic cover over the reaction area, required by Condition 31, was intended to prevent any easy pathway for escape of uncollected landfill gas. Tears or holes in that cover can create an easy pathway for gas to escape. An example of this was discussed by Supervising Inspector Israel's testimony in April 2025. He observed holes in the geosynthetic cover, **Exhibit 70**, page 2, and then measured gas emissions in excess of what is allowed in Rule 1150.1 at those tears, **Exhibit 69**. If part of the reaction area, which is generating additional gas, is not covered because the reaction area has expanded as Mr. Thalhamer believes, this could also be a pathway for emissions.

17. Landfill gas surface emissions are broadly measured in two ways: instantaneous or integrated. An instantaneous measurement is the concentration of gas (typically total organic

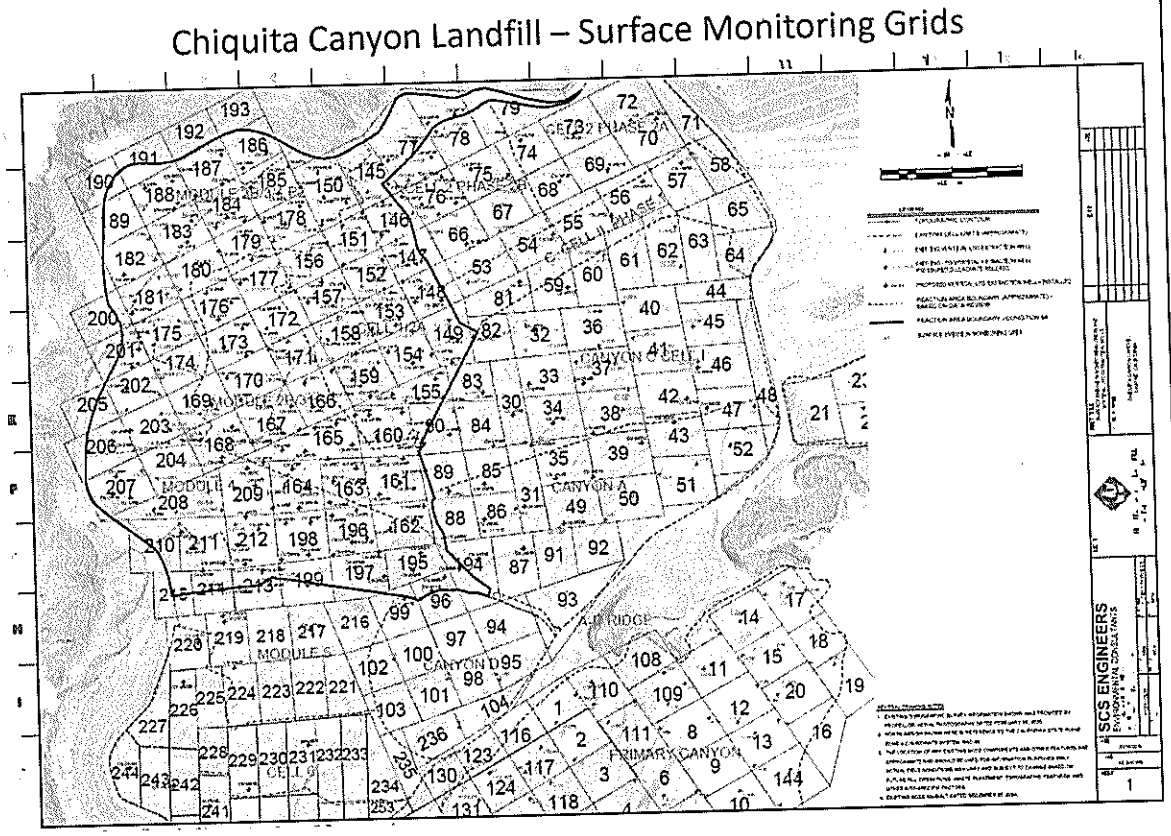
compounds measured as methane) in any given spot measured just above the landfill surface typically using an instrument like a portable flame ionization detector. An integrated measurement is a sample continuously collected from across a set area of the landfill, typically a 50,000 square foot grid. That sample is typically evaluated via laboratory analysis and the result represents an averaged value across that same grid area. An instantaneous measurement can spotlight hot-spots or particular areas with significant channeling issues. An integrated measurement can show on average the amount of emissions are released from the landfill in certain regions. Rule 1150.1 requires regular monitoring by both instantaneous and integrated measurements. The Order for Abatement (Conditions 9 and 10) enhances the monitoring required by Rule 1150.1 by increasing the frequency of the monitoring events. While Rule 1150.1 requires integrated monitoring at least once per month and instantaneous monitoring at least every quarter, the current Order for Abatement increases monitoring to 3 times per month in the reaction area, as defined in Condition 9(a), and 4 times per quarter outside of the reaction area. This frequency has increased over time under the Order for Abatement as part of modifications to the Order. In general, South Coast AQMD has sought to increase the frequency of monitoring over time based on review of the data, which has consistently shown high levels of emissions since the Order for Abatement went into effect.

18. Rule 1150.1 establishes maximum allowances for surface emissions measured on either an instantaneous or integrated basis. For an instantaneous measure, surface emissions shall not exceed 500 parts per million by volume ("ppmv") of total organic compounds ("TOC") measured as methane. For an integrated measure, surface emissions shall not exceed 25 ppmv of TOC measured as methane. Under Rule 1150.1 if surface emissions are observed above these levels, corrective action is required within 10 days. Under the Order for Abatement (Condition 15(b)) this corrective action must be taken within 2 calendar days. Corrective action can range from compacting soil in the area (to remove the path of least resistance for gas to escape) or tuning a well by increasing vacuum (to collect the gas into the collection system). Corrective action then

requires re-monitoring after action is taken to determine if this resolved the surface emission exceedance.

19. I have reviewed the data of Chiquita's surface emissions, from 2022 to the present. For my testimony, I prepared and compiled several graphs of this data, as well as added an explanatory chart created by Chiquita, which have been submitted as **Exhibit 88**. Page 1 of **Exhibit 88** is reproduced below as **Figure 3**.

Figure 3 / Exhibit 88, p. 1 (Surface Monitoring Grids at Chiquita)

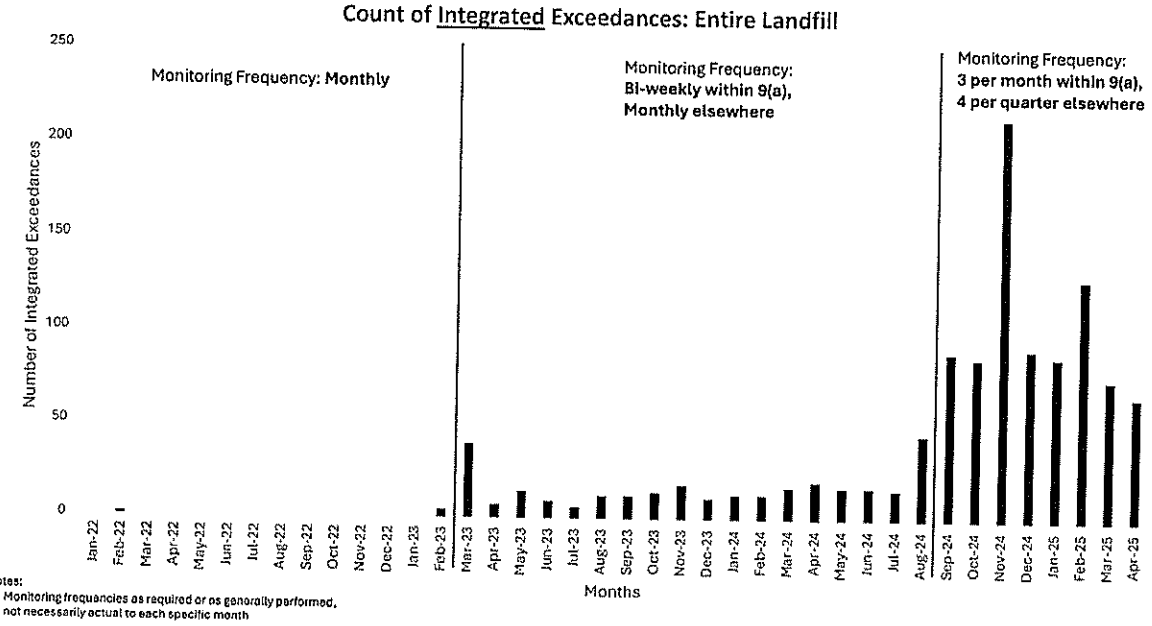


20. **Figure 3** shows the grids used for integrated measurements. Each numbered blue square is approximately 50,000 ft^2. The bold black outline shows the boundary of the reaction area defined by Condition 9a of the Order for Abatement. The pink/magenta dashed line within the black boundary shows the reaction area as determined by Chiquita's consultants.

21. **Exhibit 88**, page 2 is reproduced below as **Figure 4**. It shows the number of integrated exceedances (e.g. measurements above the Rule 1150.1 standard of 25 ppmv) counted

during monitoring events by month from 2022 to April 2025. 2022 is generally prior to when Chiquita experienced the most significant symptoms of the reaction, and February 2023 was when Chiquita first came to the Hearing Board relating to the reaction. The Order for Abatement was issued in September 2023.

Figure 4 / Exhibit 88, p. 2 (Count of Exceedance, Integrated)

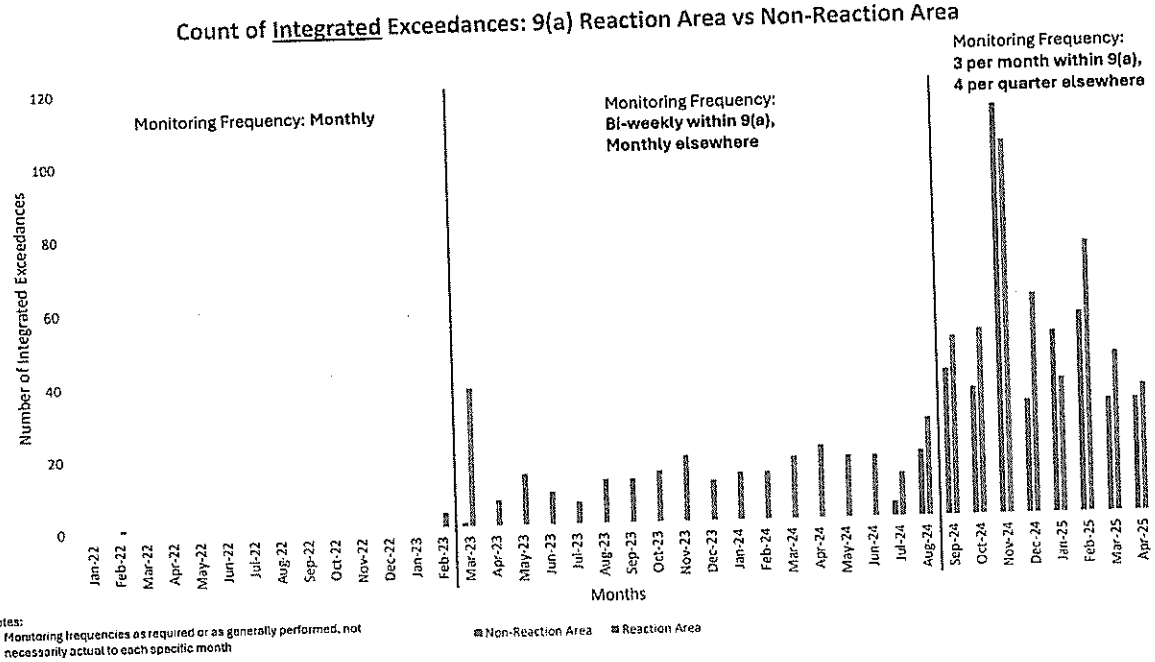


22. As depicted, in calendar year 2022, integrated exceedances were rare. Though they did conduct monitoring each month in 2022, only one month saw any exceedances, and that month (February 2022) saw a total of only one exceedance. As shown by the time periods separated by the green vertical lines, the monitoring frequency has increased over time and was most recently increased in September 2024. Chiquita has recorded at least six integrated exceedances every month since March 2023. The increased frequency of monitoring has provided more data on how regularly Chiquita has surface emissions above the Rule 1150.1 threshold. While we cannot say with certainty that the count of exceedances in 2023 would be higher if Chiquita had conducted monitoring more frequently, we can say that the number of exceedances being measured currently is extraordinarily high, even accounting for how frequently Chiquita monitors. In 2025 Chiquita

has detected more than 50 grids averaging above the emissions threshold every month. The highest count, November 2024, detected more than 200 grids averaging above the emission threshold.

23. **Exhibit 88**, page 3 is reproduced below as **Figure 5**. It breaks down the counts of integrated exceedances between the reaction area and the rest of the landfill.

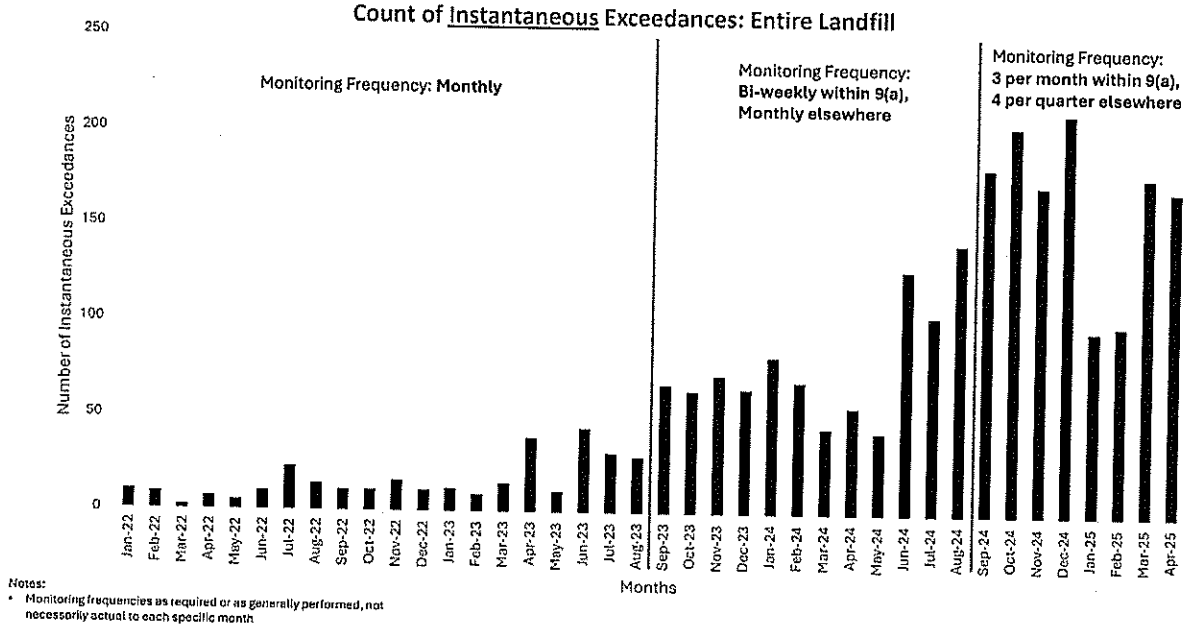
Figure 5 / Exhibit 88, p. 3 (Count, Integrated Exceedances: Reaction Area vs. Rest)



24. The orange bars on the graph show integrated exceedances across grids within the reaction area as defined in the Order for Abatement (the large black line on **Figure 3**). The blue bars show counts of integrated exceedances in grids outside of the reaction area. As you can see in **Figure 5**, while there are still many exceedances in the reaction area, the last several months (roughly since August 2024) have shown significant increases in surface emission exceedances outside the reaction area.

25. In contrast to the integrated measures, **Exhibit 88**, page 4 shows the total number of instantaneous exceedances (that is instant readings measured above 500 ppmv) across the landfill at the landfill surface. This graph is reproduced below as **Figure 6**.

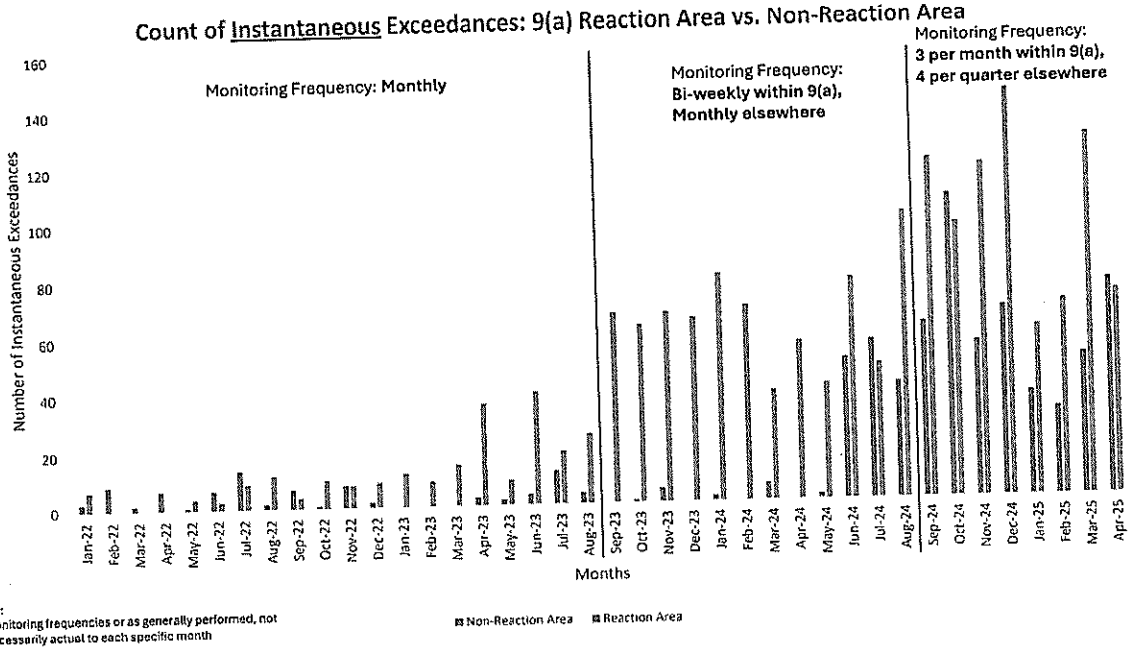
Figure 6 / Exhibit 88, p. 4 (Count of Exceedances, Instantaneous)



26. As you can see by looking at the months in calendar year 2022, which serves as a sort of pre-reaction baseline, an instantaneous exceedance was generally more common than integrated exceedances at Chiquita. Chiquita averaged around ten instantaneous exceedances per month during 2022. Beginning around mid to late spring 2023, the number of exceedances started increasing. Once monitoring became more frequent, the counts of exceedances only increased further. Notably, the trend in increasing emission exceedances started prior to when Chiquita was required to monitor more frequently. This is a reasonably clear indication that this is the onset of the major symptoms of the reaction. Unsurprisingly, the increase in emissions seen in April 2023 coincides with the time period Supervising Inspector Israel has testified to experiencing a significant increase in odor complaints from the nearby communities. While there is some variability month to month, there is not any discernable trend showing these exceedances lessening.

27. Like with the integrated counts of exceedances, the instantaneous exceedances can be broken down between exceedances measured in the reaction area vs. outside of the reaction area. **Exhibit 88**, page 5 shows such breakdown, and is reproduced as **Figure 7** below.

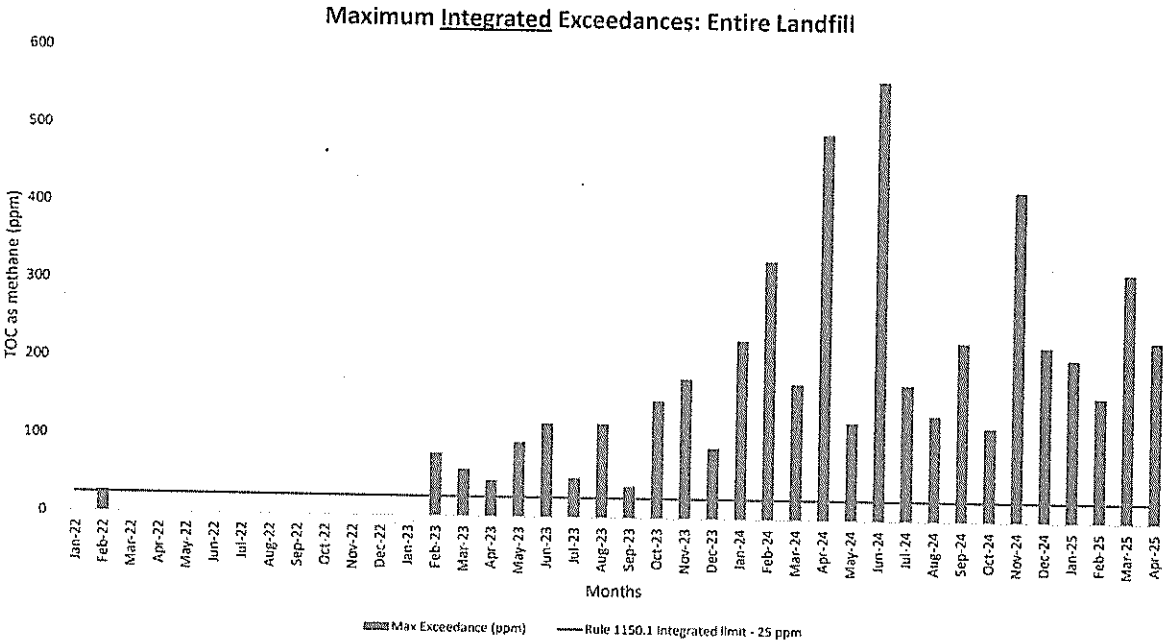
Figure 7 / Exhibit 88, p. 5 (Count, Instantaneous Exceedances: Reaction Area vs. Rest)



28. As with the integrated measure above, **Figure 7** shows an increasing trend of exceedances outside the reaction area, even while still showing high counts of exceedances within the reaction area.

29. Another way to evaluate surface emissions is to look at the magnitude. While the count of exceedances shows how often Chiquita is exceeding the landfill gas emissions threshold, the maximum exceedance value can show how much actual emissions are being put into the air at any given exceedance. These magnitudes can be compared to the exceedance thresholds in Rule 1150.1 (25 ppmv for integrated and 500 ppmv for instantaneous). **Exhibit 88**, page 6 charts the maximum integrated exceedances per month across the landfill from 2022 to April 2025, and is reproduced as **Figure 8** below.

Figure 8 / Exhibit 88, p. 6 (Maximum Monthly Emission Exceedance, Integrated)

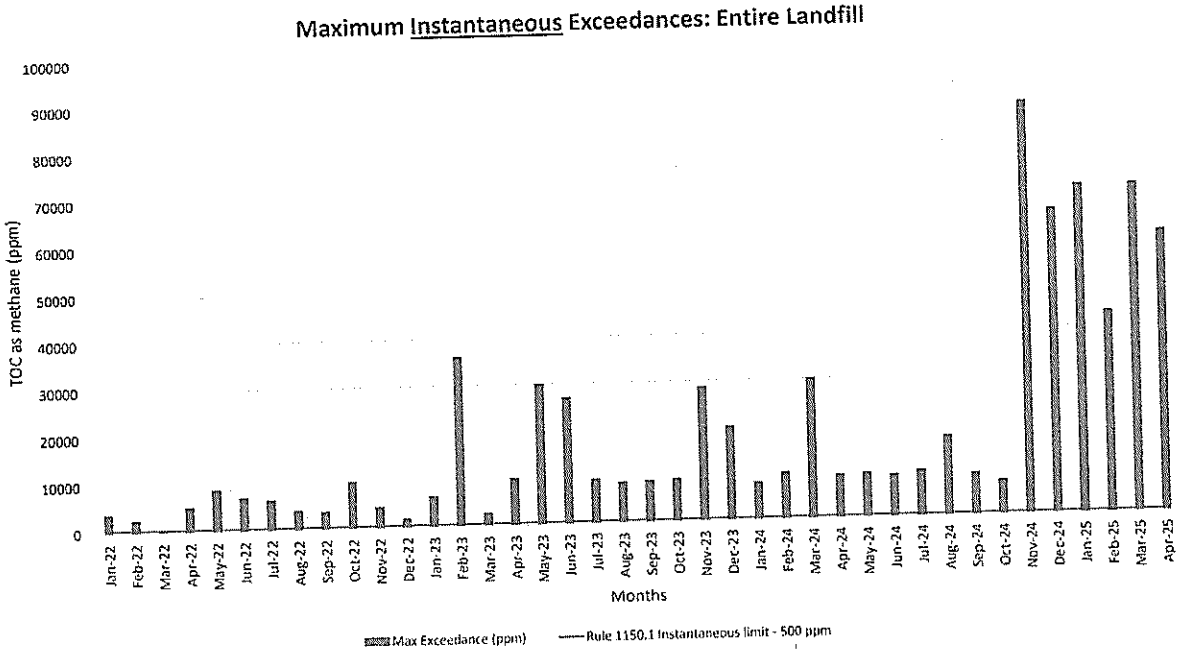


30. As I discussed above, integrated exceedances in general are less common for a normal landfill, demonstrated by Chiquita's 2022 data. But to compare the amount of emissions from the exceedances, we can look to February 2022, which showed a maximum exceedance of 27 ppmv. As depicted in **Figure 8**, this is just slightly above the blue line, which shows the Rule 1150.1 threshold of 25 ppmv. As you can see since February 2023, there have been exceedances, but also the magnitude of emission concentration has dramatically increased. In fact, the maximum exceedance has not dropped below 100 ppmv, which is four times the Rule 1150.1 threshold, since December 2023. Because this is an integrated measure, the maximum shown here is averaged across a 50,000 ft^2 grid. There is variability in the magnitude from month to month, but there is not any discernable trend in reduction of maximum emissions and the increase since early 2023 with elevated readings since then is the only clear trend.

31. **Exhibit 88**, page 7 likewise shows the breakdown in these maximum emissions between the reaction area and the rest of the landfill.

32. **Exhibit 88**, page 8 shows the maximum instantaneous exceedances across the landfill, and is reproduced here as **Figure 9**.

Figure 9 / Exhibit 88, p. 8 (Maximum Monthly Emission Exceedance, Instantaneous)



33. As with the integrated graphs discussed above, this graph shows the Rule 1150.1 exceedance threshold (500 ppmv) as a blue line along the bottom of the graph. As with the integrated measures, the instantaneous exceedances do not show any clear trend in decreased quantities of surface emissions. Here, the primary trend is a dramatic increase in the magnitude of excess emissions since late 2024. It is possible this increase is attributable to the completion of the geosynthetic cover over the reaction area, which may limit some pathways to gas escape and concentrate gas emissions in fewer areas. If that is the explanation, it would indicate that the cover is likely not sufficiently preventing surface emissions, but is more effectively channeling them to other areas of the landfill surface.

34. **Exhibit 88**, page 9 likewise breaks down these instantaneous maximum emissions between the reaction area and the rest of the landfill.

Trends in Surface Emissions

35. Thorough review of the measured surface emissions over the last several years does not support a conclusion that landfill gas emissions have decreased. In general, given variability from month to month, I would be cautious about drawing a trend based on just a few months' time. I believe the clearest conclusion that can be drawn from this data is that the reaction caused a

significant increase in surface emissions beginning around 2023. Since that time, Chiquita has not returned to that pre-reaction baseline, and to date excess emissions of landfill gas remain elevated and by some measures are increasing. The elevated amounts of surface emissions are likely tied to the continuing reports of odors in the community. Landfill gas, even gas not associated with any subsurface reaction, is a well-known source of odors.

36. I am aware that Chiquita has publicly announced its conclusion that surface emissions are decreasing, and has published a State of the Landfill Report (Exhibit LLL) and accompanying Technical Addendum to the State of the Landfill Report (Exhibit MMM), to discuss that conclusion. I have read Section II of the Technical Addendum to the State of the Landfill Report entitled, "Landfill Gas Surface Emissions are Decreasing and Off-Site Air Quality is Improving." (Exhibit MMM, page 4.) In that section, Chiquita states that the data trends "demonstrate the Landfill's overall fugitive landfill gas surface emissions are decreasing." (*Ibid.*)

37. As an initial matter, neither the State of the Landfill Report nor the Technical Addendum to the State of the Landfill Report discuss or mention the measured surface emissions of landfill gas that I discuss above. I believe this omission weakens any conclusion that can be drawn about surface emissions because this data is 1) directly measuring the surface emissions and 2) is the most robust dataset because surface emissions are required to be measured under Rule 1150.1 (so there is data even from prior to the reaction) and the monitoring frequency has only increased since the reaction under the Order for Abatement, such that this surface monitoring is the most frequently gathered data on landfill gas emissions.

38. Chiquita bases its conclusion of decreasing surface emissions on two sources of data: 1) flux chamber studies and 2) aerial methane surveillance monitoring via drone.

39. A flux chamber study is, at its most basic, a screening tool to estimate total mass surface emissions across the landfill over a year. A flux study measures the flow of emissions by placing a small dome (about 0.13 m^2, or a about 1.5 ft^2) over several parts of the landfill and measures emissions in that area. The flux study then extrapolates that emission amount across the whole landfill by extrapolating the rate of emissions collected during the study to calculate the

total amount of emissions that the landfill would emit in a year across the whole landfill surface. In Chiquita's specific case, each flux study uses a dome with an area of 0.13 m^2 and measures about a total of 43 times (includes replications) . The total measured landfill surface is estimated at about 6 m^2 (roughly 64.5 ft^2). This data is then extrapolated across the whole landfill surface, about 1,100,000 m^2 (just under half a square mile), and calculated on an annual basis. Under the Order for Abatement (Condition 12(i)) Chiquita conducts these studies once every four months. An initial flux chamber study was conducted in August 2023, and additional flux studies were conducted in March 2024, November 2024, and March 2025.[2]

40. Chiquita's Technical Addendum to the State of the Landfill cites Table 5.5 of the November 2024 flux study to support its conclusion of decreased surface emissions. (Exhibit MMM, p. 6.) This table shows the total extrapolated annual emission estimates from each of the August 2023, March 2024, and November 2024 flux studies. (*Ibid.*) Chiquita concludes that "the November 2024 data demonstrate a substantial reduction in site-wide surface emission rates[.]" (*Id.* at p. 5.) However, the data from the November 2024 flux study presented was miscalculated. Specifically, following the release of the November 2024 flux study report, I asked South Coast AQMD's Source Testing Evaluation department to review and evaluate the report. Source Testing Evaluation sent me a report of their evaluation in March 2025 (after the date the Technical Addendum was released). A true and correct copy of this report was submitted as **Exhibit 89**. Source Testing Evaluation determined that the flux study was "conditionally acceptable" but that "speciated organics (methane) emissions, as reported, should <u>not</u> be used for compliance determinations and/or emission calculations" unless adjusted as described. (Exhibit 89, p. 1 [emphasis in original].) I reviewed this report and note that every miscalculation of emissions cited by Source Testing Evaluation was undercounted (meaning the values were reported lower than the actual test showed). I provided an emailed copy of Source Testing Evaluation's report to Chiquita

[2] The State of the Landfill Report and Technical Addendum were released prior to the completion of the March 2025 flux chamber study and thus do not discuss results of that event. This most recent flux study is discussed in the declaration of Patrick Sullivan, Exhibit SSS.

through its technical consultant, Mr. Patrick Sullivan. I also verified that in the subsequent flux study report, Chiquita had updated Table 5.5 to show revised calculations from the November 2024 report. An excerpt of the most recent flux study report showing Table 5.5 (the summary results comparing all prior flux studies) is included as **Exhibit 90**. I have also submitted the latest flux study report to Source Testing Evaluation for a similar review. That review is not completed as of the date of this declaration.

41. Separate from the correction to the data, I believe Chiquita's Technical Addendum to the State of the Landfill Report omits some key limitations to the flux studies conducted here, and because of those limitations the flux studies should not be taken as a conclusive indicator of emission reductions. First, as noted above, a flux study by its nature requires significant extrapolation to calculate the amount of emissions. In a canyon-style landfill like Chiquita, the rate of emissions typically varies considerably because of the varying depth of waste deposited. Added to that is the current conditions at Chiquita, including that only a portion of the landfill is experiencing the reaction, that the reaction is generating enormous amounts of liquid that are blocking some gas wells, and that a portion of the landfill is currently covered by a geosynthetic cover which likely blocks emissions at least in areas not torn or ripped. This combines to make Chiquita currently an incredibly heterogenous surface. The more heterogeneous the surface, the less reliable the extrapolation of measured emissions is. As an example, the flux studies place some domes to measure emissions atop the geosynthetic cover. As Supervising Inspector Israel has testified to, rips and tears are somewhat frequent and emission exceedances have been measured at these tears. If the dome is placed on a portion of the cover that is not torn, it is likely that area would report very low, if any, emissions. However, if the dome is placed over a torn part of the cover, emissions would likely be fairly high. Either result would bias the calculated emissions because the dome would not account for the fact that the cover is heterogeneous, with some areas preventing emissions and others allowing emissions to escape in levels that exceed the Rule 1150.1 thresholds. Mr. Sullivan's declaration, (Exhibit SSS) discusses how the covered vs uncovered portions of the reaction area cannot be combined for calculating results and mentions

proposing changes to the method to try and address this better. (Exhibit SSS, p. 5, ¶ 12.) But his declaration does not address the torn vs. good condition cover difference.

42. I don't think it is accurate to draw a conclusion on surface emission trends based solely on the flux study data set. For example, Mr. Sullivan, in his declaration states, nearly identically to the Technical Addendum to the State of the Landfill report, that the "downward trend [in flux study total annual emissions] is likely attributable to Chiquita's [*sic*] improvements in gas recovery and cover systems." (Exhibit SSS, p. 5, ¶ 11; see also Exhibit MMM, p. 5.) In my opinion, this conclusion cannot be drawn without thoroughly evaluating the limitations of this data set. Moreover, in my opinion, any conclusions about trends in surface emissions should evaluate all available data, including the directly measured surface emissions. That data set remains the most reliable as a direct measurement (rather than extrapolation) of the TOC concentrations across nearly the entire surface of the landfill and the most robust as having the highest frequency of measurements over the longest time. The Technical Addendum to the State of the Landfill Report (though not Mr. Sullivan's declaration) does discuss at least one other data set, methane emissions monitored by drones. For the reasons that follow, I don't consider this data to be a valid substitute for the measured surface emissions, and also question the way this data is presented.

43. According to Chiquita, it has conducted aerial surveillance "twice monthly" since "late 2023." (Exhibit MMM, p. 4.) Aerial surveillance monitoring uses a drone equipped with a portable analyzer to fly over the site to collect instantaneous readings. Traditional instantaneous readings, like those discussed and graphed above, are done by a technician walking the surface of the landfill with a portable analyzer. Traditional integrated monitoring is done by using a tedlar bag to collect a continuous sample while a technician walks the grid of the landfill. It is my understanding that aerial surveillance can be comparable to instantaneous monitoring. The US EPA has approved a drone-based sampling method as equivalent to traditional instantaneous surface monitoring, but only where the alternative method requires walking the landfill (e.g. the traditional method) as a follow-up to any emission exceedances detected. To date the State of California has not approved any drone monitoring method as equivalent to traditional

instantaneous monitoring. To the best of my knowledge, no regulatory agency has ever approved drone-based monitoring under any methodology as equivalent to integrated sampling. Further, review of the website of the vendor Chiquita cites (Sniffer Robotics) indicates that while they offer several types of drone-based monitoring, none claim to be equivalent to traditional integrated monitoring and only one is approved by US EPA, as equivalent to traditional instantaneous monitoring.

44. Chiquita's Technical Addendum does not state what methodology the drone-surveillance was using, so it is not possible to directly compare it to the traditional instantaneous monitoring data discussed above. Chiquita also only presents the data in a single chart, showing the average of the mean and average of the median, with standard deviation across the whole of the landfill. (See Exhibit MMM, p. 5, Figure 1.) The graph also shows a linear trend line. The linear trend does appear to show a decreasing trend between November 2023 and January 2025. (*Ibid.*) South Coast AQMD has not been provided with the raw data results of this monitoring, so I cannot analyze this data outside of the way Chiquita presented it.

45. I don't believe this graph alone supports a conclusion that surface emissions are decreasing at Chiquita. First, I note this data set only starts well after the onset of the reaction and its major symptoms, roughly two months after the Order for Abatement was issued and about five months after the South Coast AQMD began issuing notices of violation for public nuisance based on Supervising Inspector Israel's testimony. Second, showing an average across the whole landfill is likely too large an area to draw meaningful conclusions, particularly here where only one portion of the landfill is experiencing the reaction. Traditional integrated monitoring required by Rule 1150.1 does use averages, but the average is across each 50,000 ft^2 grid (and there are hundreds of grids in the entire landfill, as depicted in **Figure 3 / Exhibit 88**, p. 1). Rule 1150.1 also requires instantaneous monitoring, which does not average values. Between the two measures, they provide a reasonable overview of the larger aggregate picture and a spotlight on the biggest areas of concern. Drone-based monitoring should be closer to the instantaneous readings, providing a snapshot of the areas of highest concern, or 'hotspots' where the landfill is leaking

landfill gas. Averaging these values across the whole landfill can distort the picture. As an example, you might consider the landfill as a large ballon filled with helium. If you prick the balloon, helium will rush out from the spot that was pricked. In fact, enough helium can escape from that one prick to deflate the entire balloon. But if you measured the helium coming off the surface of the balloon, only that one spot would show high levels of helium escaping. If you averaged this helium escape amount across the whole surface area of the balloon, the average helium loss would be incredibly low, because only one spot was pricked. Thus, the more useful measure is to know the one spot that has the leak. This is part of why both Rule 1150.1 instantaneous monitoring and the US EPA approved version of drone monitoring require follow-up corrective action via a technician walking the surface of the landfill. The monitoring (either technician walking the surface or the drone flying over with an analyzer) shows the location of concern, then the landfill must take action to correct it. Presenting the data as only an average across the landfill doesn't really indicate how many spots had leaks, or how much landfill gas was leaking from any individual spot. Showing a decrease in that average over time also doesn't necessarily mean that less total landfill gas is escaping into the air.

46. Overall, I don't believe a conclusion regarding trends in Chiquita's surface emissions can be derived solely looking at either just flux studies, or flux studies and drone-measured emissions. In my opinion, the directly monitored surface emissions, which are conducted by a fully approved method and do not extrapolate results from a small sample, are the best data set we have currently. This data set is the most representative across nearly the entirety of the landfill surface, and in drawing conclusions should be weighted higher than the flux studies which are only measuring emissions at the specific areas where a dome is placed. While flux studies certainly are valuable tools, they should not be used in isolation, and certainly cannot be used to refute the directly monitored emissions across the landfill surface. The data set of directly monitored surface emissions does not support a conclusion that surface emissions are decreasing, and generally supports the opposite, that emissions trends are at best relatively static at an elevated level or at worst are showing signs of increases and potential reaction expansion.

47. In my opinion, all the data should be evaluated together. Notably, that includes considering not only the data on surface emissions itself, but also the data on odor complaints and public nuisances. Surface emissions of landfill gas are known to cause odors. In my opinion, one of the leading sources of the odors complained of at Chiquita is the landfill gas escaping the surface. Looking at all of the data paints a more complex picture, where its likely not discernable that emissions overall are decreasing. To the extent there are downward trends across some data sets, such as the decrease in extrapolated annual emissions rates across successive flux studies, those trends are very narrowly focused. The larger picture, which uses both more data, but also data that extends back in time to prior to the reaction's influence on the landfill, and incorporates odor complaint data, leads to the conclusion that Chiquita is currently still experiencing extremely high landfill gas emissions and the mitigation that has been implemented is not sufficient to return Chiquita either to its pre-reaction baseline or ultimately to compliance with prohibitions on causing a nuisance. Further, to the extent that there is potentially differing trends that could be observed, they point ultimately at the need for more data to be able to draw conclusions from any trend. The modifications South Coast AQMD is proposing in both Conditions 75 and 77 would provide exactly that – additional data and information about the landfill and its operations.

Aerial Drone Surveillance Monitoring (Condition 77)

48. In my opinion, these conclusions support modifying the Order for Abatement to further enhance surface emissions monitoring. In past modifications of the Order for Abatement, South Coast AQMD has proposed, and the Hearing Board ultimately adopted, increases to the frequency of surface monitoring. The South Coast AQMD currently proposes, in Condition 77, not to increase the frequency of monitoring, but rather require the drone-based instantaneous monitoring as a new data set to help reach conclusions on surface emissions. The benefit of doing instantaneous monitoring via drone is that it can reduce the time it takes to complete the initial monitoring to discern the location of hotspots that need corrective action. For example, Sniffer Robotics, the company Chiquita used for this monitoring, mentions on its website that traditional instantaneous monitoring for a 100-acre landfill would require the technician to walk more than 20

miles to perform a single monitoring event, typically taking several days.[3] By contrast, a drone may be able to monitor the same area in a matter of hours. I agree that this type of monitoring can be a benefit to Chiquita, and if used, it may help Chiquita find hotspots where landfill gas is leaking faster, allowing for faster corrective action, and ideally less surface emissions.

49. Condition 77 as proposed by South Coast AQMD would require Chiquita to use the drone-based method that has been approved by US EPA, including doing the walked surface follow-up for ground-level monitoring in that method. South Coast AQMD's proposal would be to supplement the existing monitoring with the drone-based monitoring and not reduce or replace the existing monitoring with drone-based monitoring. In my opinion, the aggregate of all data sources – measured surface emissions (integrated and instantaneous), drone monitoring, flux studies – supports a conclusion that the emissions at Chiquita are both incredibly complex, but also much higher than would be at a normally operating landfill. The emissions data combined with odor complaint data collected by South Coast AQMD's Office of Compliance and Enforcement support a conclusion that the emissions from Chiquita are causing odors and those odors are causing impacts to nearby communities. Condition 77 would increase total monitoring, but do so by using a different method than is currently required under the Order for Abatement. This has the benefit of getting varied data sets, each with its own advantages and disadvantages, which is needed here where the existing data shows a complex picture. It is also likely much less time intensive to add this type of monitoring, since it is much more efficient than the traditional surface monitoring.

50. Chiquita proposed an alternative to Condition 77. It differs from South Coast AQMD's proposal in two important respects: 1) it lessens the frequency of monitoring to monthly, and makes no distinction between the reaction or non-reaction area; and 2) Chiquita proposes to use the drone-method results from three monthly monitoring events to decide if this method is equivalent to both the traditional instantaneous monitoring and the traditional integrated

[3] See Aerial Drone Technologies and Methods for Landfill Methane Emissions Monitoring, Sniffer Robotics, https://www.snifferrobotics.com/post/aerial-drone-technologies-and-methods-for-landfill-methane-emissions-monitoring (last accessed June 11, 2025.)

monitoring. If Chiquita determines the methods are equivalent, it would conduct future surface monitoring under the Order for Abatement (Conditions 9 and 10) only via the drone-method, and if Chiquita determines the methods are not equivalent, Chiquita would halt monitoring via the drone method.

51. I oppose Chiquita's proposed alternative for several reasons. First, I do not agree that Chiquita, even through its paid consultants, is the appropriate decision-maker to establish method equivalency. That is a function done by regulatory agencies like the US EPA or CARB for California, not a regulated entity. As a comparable example, Rule 1150.1 does allow the possibility of using alternative methods for data collection. But Rule 1150.1(i) requires a compliance plan submitted to South Coast AQMD and subject to South Coast AQMD approval. Thus, even if Chiquita determined the methods were equivalent, this drone-method would not be usable for compliance with Rule 1150.1 (unless Chiquita sought and obtained approval by South Coast AQMD for an alternative from that rule requirement). I also note that Chiquita's language for this condition does not include any standard or metric by which it would evaluate equivalency. Particularly as to the potential for replacing the integrated surface monitoring with drone-based monitoring, Chiquita should provide a base method as to how it proposes to replicate sample collection that is typically done via a tedlar bag collecting an average air sample with a drone that is not equipped to actually collect a sample, but rather is equipped with an analyzer. As I noted above, I am unaware of any regulatory agency approving a drone-based monitoring method as equivalent to integrated surface monitoring. In my opinion, Chiquita's proposal risks muddying the best data set we have on surface emissions by proposing to determine equivalency with a never-before-approved drone method for integrated surface monitoring. That Chiquita is proposing to unilaterally decide equivalency, without announcing the criteria for what it will evaluate and without any input from any regulatory agency only heightens this risk.

52. Moreover, Chiquita's proposal to, after three months, lessen the monitoring (halting either the drone-method or land-based surface monitoring under the Order) is not supportable based on the data. Even if Chiquita determines the drone-method is not equivalent to the ground-

monitored surface emissions, there is still value in having the data from the drone-method. As noted above, the drone-method monitoring has a faster timeline to detect and correct surface exceedances, which would serve as an additional tool to supplement, rather than to reduce or replace the existing surface monitoring.

Remote Monitoring and Control System (Condition 75)

53. In addition to the aerial monitoring, South Coast AQMD is also proposing to require Chiquita to install a Remote Monitoring and Control System (RMCS) on 21 wells just outside of the reaction area. I helped develop this condition. I also listened to Mr. Robert Dick's testimony on June 4, 2025 explaining his opposition to this condition. I believe Mr. Dick, and Chiquita, have misinterpreted what this condition requires, and a significant part of Mr. Dick's stated reasons for opposing this condition are based on this misunderstanding.

Remote Control vs. Automation

54. The main misunderstanding in this condition is about remote control vs. automation. Condition 75 proposes a RMCS, a system which remotely monitors, and remotely controls the specified landfill gas wells. However, Condition 75 does **not** propose a system that automates operation of the gas wells. The difference is akin to the difference between an RC Car and a Roomba®. An RC Car is a toy that allows an operator to drive a small car by pushing controls on a remote, and without the need to physically push or touch the small car. A Roomba® is a programable robot vacuum cleaner. Once set, it automatically moves about the space it's in and vacuums with no further input from anyone. Condition 75 is the RC Car in this example. The system includes a remote, which, when operated by a technician, would control the landfill gas well.

55. Mr. Dick in his June 4, 2025 testimony put significant emphasis on the language in Condition 75 that requires "controller units" to suggest this implies a computer/algorithm deciding landfill gas well tuning. But control is not the same as automation. The language used in Condition 75 does accurately describe the component as South Coast AQMD intends it. As another example, most TVs come with a remote control, but that device is not expected to automatically select what

volume or channel the TV operates on. Those decisions are made by the user, often using the remote control to avoid having to physically adjust the TV itself.

56. Condition 75 operates the same as the TV example. Instead of the benefit of not walking across a living room to change the TV volume, the RMCS has the benefit of the technician not having to traverse across the whole landfill, including conditions like surface cracks, fissures, leachate geysers, construction, etc. that might make accessing the physical well unsafe. Such remote operation is thus potentially safer, but also leads to much faster adjustments.

57. Traditionally, well tuning is performed as needed based on measured data. The landfill can increase how frequently it monitors, and then adjust the frequency of well tuning based on the monitoring frequency. But these are subject to some limitations on manpower and time. It takes time to sample a well and time to review the data, determine tuning in response, and physically go to the well to implement the adjustment. This time and manpower limit is compounded at Chiquita, where the Order for Abatement has required installation of hundreds of new wells, and imposed significant additional monitoring and mitigation measures. The idea of an RMCS is to allow both more frequent monitoring and more frequent adjustment based on data than is possible by manual monitoring and manual adjustment.

58. For example, the data South Coast AQMD has suggests that at the most frequently monitored gas wells, sampling is done once or twice per week with well adjustment or tuning on a similar frequency as necessary. The RMCS proposed would increase the monitoring frequency of the selected wells to once every three hours. Adjustment or tuning, as necessary based on this data, could follow the same frequency. Though no longer manual, there is nothing in the condition that would require the well to adjust or tune itself based on pre-set logic. Operation of the wells, as it is currently, would be done by a trained operator.

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Purpose of and Need for the RMCS

59. South Coast AQMD believes the RMCS is needed under the current circumstances at Chiquita. Chiquita is currently having issues with fugitive gas emissions, and odor complaints. Despite multiple upgrades to its collection and combustion system, Chiquita also still has insufficient gas collection. A RMCS is designed to optimize gas collection by real-time monitoring and remote well tuning, which should allow Chiquita to maximize landfill gas extraction, more quickly regulate the system, while also providing additional valuable data. Ultimately, an RMCS would allow Chiquita to have a better understanding of their wellfield operation and enable quicker response to issues that arise. Optimizing the wellfield could include both maximizing extraction but also limiting excess oxygen intrusion which can cause subsurface events as Mr. Thalhamer discussed in his testimony.

60. As Mr. Thalhamer discussed, multiple regulatory agencies have concluded that the reaction is expanding. The data available to South Coast AQMD does not give the agency a basis to refute those agencies' findings. If the reaction is expanding, further efforts to address the landfill gas system (beyond the expansion of the system already required under the Order for Abatement) will be needed. If the reaction is not expanding, additional monitoring is needed to understand why some wells outside the reaction area are exhibiting some indicators of a subsurface reaction. An RMCS system, with 19 units on wells outside the reaction area of concern, would provide both additional data to further evaluate the boundary of the reaction area, and optimization and better enhancement of the gas collection system as a further mitigation measure for the reaction.

61. Condition 75 was developed to require a system that is both feasible and readily available. In developing this condition, I met with multiple manufacturers of these systems as well as a landfill operator who employs this type of system. This Condition builds on the information learned from other conditions in the Order for Abatement, especially Condition 66, which required Chiquita to conduct a feasibility study on this type of system. That condition required evaluating a remote monitoring system in the reaction area, specifically including wells with high temperature

and pressure issues. Condition 75 puts an RMCS only on wells outside of the reaction area and only on wells that are within the temperature specs recommended by leading manufacturers.

62. The condition as proposed requires the RMCS at 21 individual wells. This number was selected to balance the cost with the benefit. More monitor/control units would cost more, but also give more data. The number of wells selected was calculated to provide data on high priority wells and have the system installed on a sufficient number of wells adequate monitoring network to allow for meaningful optimization of the wells, giving consideration to the relative cost. If the RMCS proves successful, it could be expanded at a future date.

Selection of Wells and Concerns of High Temperature

63. A second area where I believe Mr. Dick's testimony misconstrued South Coast AQMD's proposal is in the selection of wells. Mr. Dick pointed to a brochure from LoCI®, a manufacturer of RMCS, and explained that because these systems are rated to only 140°F, this system and this condition would not work at Chiquita. I agree that the LoCI® system is only rated to 140°F at the gas wellhead (where the unit is placed). In fact, I met with representatives from LoCI® (as well as other manufacturers and a landfill that employs an RMCS) in developing Condition 75, and one of the key features that came from our discussion was specifically selecting wells below this temperature threshold. In fact, Condition 75 lists 19 specific wells (and two wellheads) for this system. I personally verified the wellhead temperature of each of these wellheads to ensure the temperature was below the maximum rated temperature of the LoCI® system based on wellhead data provided by the landfill at the time of selection. Further, to allow for the possibility that temperatures are increasing across the landfill, Condition 75 expressly included language saying:

> In the case that the Reaction boundary expands beyond the existing data determined reaction boundary (per Condition 9(b)) as of October 31, 2025, which results in or is expected to result in higher temperatures or other unfavorable conditions which may damage the controller equipment, the

controller unit(s) may be relocated to well(s) in the immediate vicinity outside the boundary of the revised data determined Reaction boundary.

(Exhibit 74, p. 3, Condition 75(b)(iv).)

64. In addition to this language, that same provision also, immediately after specifying the wells, allows changes to the wellheads selected "as recommended by Respondent and its vendor/distributor." (*Ibid.*) Notably, Condition 75 also requires installation of these controller units at the wellhead, not down well. In general, temperatures are hotter down well where influenced by the reaction, because the reaction is occurring subsurface. Thus, the condition fully accounts for the temperature rating of systems like this to ensure it can be used at Chiquita, and that Chiquita has flexibility to adapt to future changed conditions.

65. While the maximum temperature rating does largely mean that this system is not suitable for the worst portions of the reaction area, there is still good reason to enhance the monitoring and tuning of these specifically selected wells. The wells selected are right outside the currently marked reaction area as set by Chiquita. A map of the wells selected was submitted as **Exhibit 83**, and is reproduced as **Figure 11** below. The red circles indicate the wells selected for inclusion in Condition 75.

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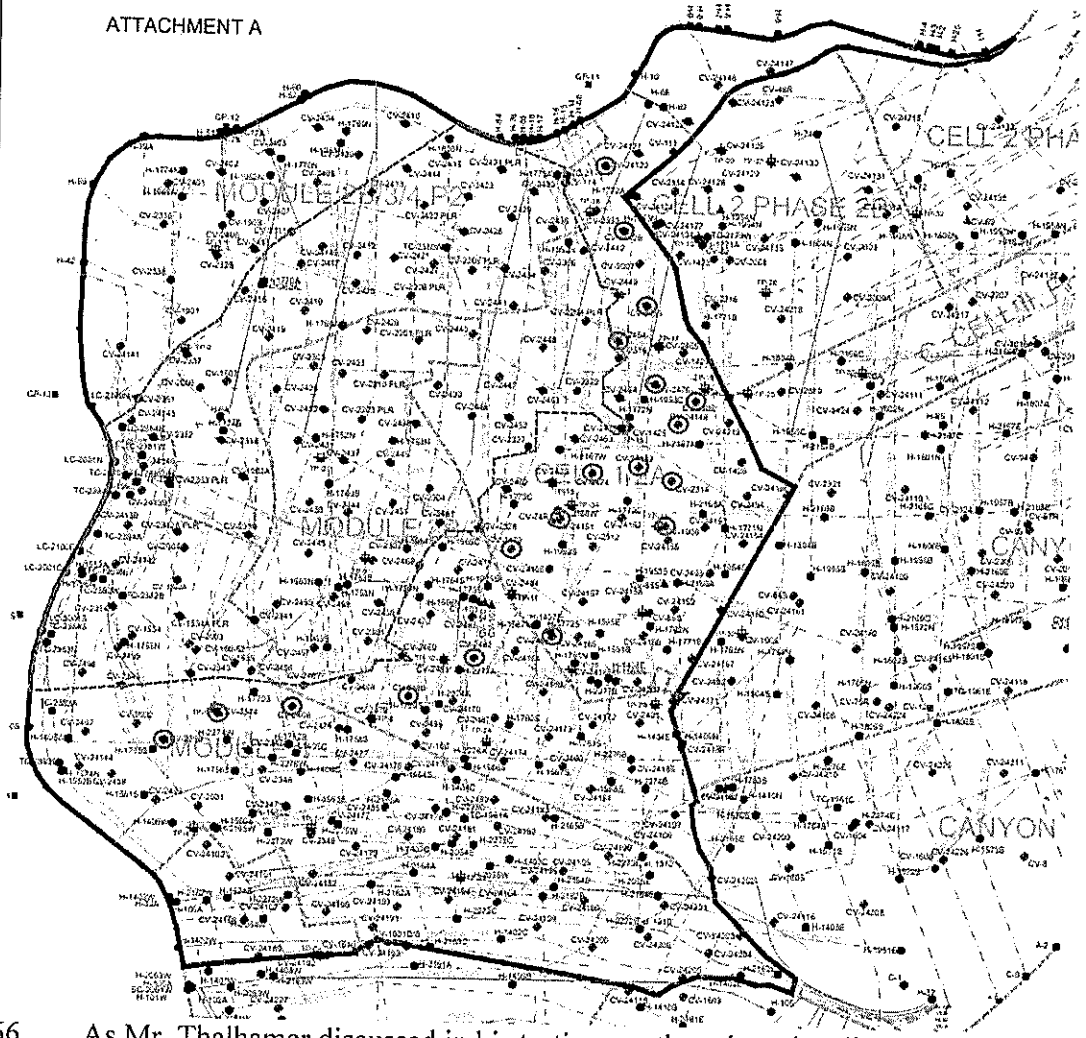
Figure 11 / Exhibit 83 (Selected Wells for RMCS)



66. As Mr. Thalhamer discussed in his testimony, the selected wells are in the transition zone and can be viewed as sort of warning wells. As Mr. Dick conceded in his testimony, most of these wells have at least one indicator that suggests they are influenced by the reaction. But none of the wells have all indicators, and none of them yet have temperatures exceeding 140°F. I agree with Mr. Dick that these wells would warrant additional monitoring. The RMCS is designed to do exactly that.

67. Mr. Thalhamer in his testimony discussed why he and other landfill subsurface temperature event experts believe the reaction is expanded beyond the pink/magenta dashed line set by Chiquita. Mr. Dick testified why he disagrees with Mr. Thalhamer and other experts and thinks the

reaction area boundary should not be changed. As a practical matter, the difference between any given well being included in the reaction area, for the purposes of the Order for Abatement, is the amount of monitoring and other mitigation required at and surrounding that well. For example, the reaction area has surface monitoring three times per month, vs four times per quarter for the rest. South Coast AQMD does not propose to change the boundary of the reaction area, even if it agrees with the findings of other regulatory experts like Mr. Thalhamer. Rather, South Coast AQMD proposes to increase the monitoring and optimize the operation of these wells which are at least disputed as to whether they indicate the reaction occurring.

Operation Based on a Written Policy

68. The last important component of Condition 75 is the requirement that Chiquita adopt a written policy for how to optimize its gas collection system. This requirement too seems to have been the source of some confusion from Chiquita.

69. To be clear, the written policy is to be written by Chiquita (with or through its consultants like Mr. Dick). Condition 75(c)(iv) requires Chiquita to develop this policy "giving due consideration and priority to, at minimum" a list of five criteria. (Exhibit 74, p. 5-6.) These five criteria include general best practices for maximizing landfill gas extraction and well performance at a normal landfill. The intent for the specified criteria was to require Chiquita to evaluate these criteria in developing a policy and provide a written approach explaining when/how it might deviate from the normal standards for these criteria. Mr. Dick expressed his opinion that the condition would permit South Coast AQMD to reject Chiquita's preferred criteria and substitute these exact criteria as the written policy. While Condition 75 does include a review and approval process from South Coast AQMD, this is intended to be in the form of the agency's normal oversight role of subject facilities. South Coast AQMD routinely requires prior agency approval for compliance plans, source testing methods, alternative operating procedures and the like. South Coast AQMD does not draft such plans in the first instance and oversight approval does not imply that the agency will re-write the plan were it to disapprove a facility's submission. The language in Condition 75 merely requires Chiquita to consider the listed factors and in no way

prohibits Chiquita from altering or deviating from those factors (or considering additional factors) in its policy.

70. Having a written policy is particularly helpful here, specifically because the reaction may alter how the gas collection system is optimized. Chiquita's landfill gas collection system is operated by trained technicians, but it is not certain (nor expected) that all of those technicians would be experts in subsurface reactions. Having a written policy would allow the technicians to be on the watch for indicators that Chiquita's designated experts might recognize as part of a reaction but which might otherwise be unremarkable for a normal landfill. The policy would further ensure that Chiquita's experts' knowledge and expertise is actually being put into practice in the direct day-to-day operation of the landfill. Last, a written policy allows for certainty and clarity in both the operation and in reviewing performance of Chiquita's operation.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Executed on this 13th day of June, 2025, at Diamond Bar, California.

s/ Baitong Chen
Baitong Chen, Ph.D.