

Technical & Business Systems

environmental research associates

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12 March 2020

Mr. Marc Chytilo
Law Office of Marc Chytilo
P.O. Box 92233
Santa Barbara, CA 93190

Subject: Busy Bee

Dear Mr. Chytilo:

At your request, I am reviewing the odor assessment study and the associated odor abatement plan for the Busy Bee Organic's in the vicinity of 1180 West Highway 246 in Buellton, CA.

I am an American Meteorological Society (AMS) Certified Consulting Meteorologist (#466) (CCM) with almost 40 years of experience. I taught in the Department of Meteorology at Florida State University in Tallahassee, Florida courses on atmospheric dynamics, atmospheric thermodynamics, atmospheric turbulence and atmospheric remote sensing on both the undergraduate and graduate levels. I designed and developed ground based remote sensing instrumentation to study atmospheric boundary layer processes responsible for the transport and dispersion of material and atmospheric properties such as refractive index fluctuations. I have used this instrument coupled with conventional meteorological instrumentation to measure pollutant transport and dispersion, the siting of wind energy turbines and their operational use, aircraft wake vortex detection, characterization and monitoring, sound propagation and most recently for the characterization of sonic boom propagation through convective atmospheres. Currently, I am an employee of Technical and Business Systems and an adjunct professor at the Antelope Valley College in Lancaster, CA where I teach atmospheric dynamics and thermodynamics to the upper division students in the AVC 4 year bachelor degree program on airframe technologies. These students are employed in work study employment by the local aerospace companies among which are SpaceX, Northrop Grumman and Lockheed Martin Corporation. I am currently engaged in meteorological support for the AeroVironment, Inc. solar-powered high-altitude platform station (HAPS).

You presented me with the following four documents:

1. Odor Assessment Study by Bosarge Environmental, LLC. (dated 30 July 2019)
2. Busy Bee's Organics: SYVCP Odor Abatement Plan 18:LUP-00000-00496; 1180 Highway 246;099-240-072.
3. Odor Assessment Study by Bosarge Environmental, LLC (dated 18 October 2019)
4. Cannabis Odor Modelling report, SESPE Consulting (dated 18 October 2019).

In the following text, I will provide you with my observations as an atmospheric boundary layer meteorologist.

Document #1: Odor Assessment Study dated 30 July 2019

This document reports on the findings of Bosarge Environmental, LLC that was engaged as a third party odor expert to design, develop and conduct ambient odor surveys on the three days of July 22-24, 2019. According to the document, this time period was selected because the cannabis plants within the facility were in their full flowering stage. This stage was identified as that time period during which the terpene odor should be the greatest and thereby being a “worst-case-scenario” of odor production for the facility.

Measurements were taken with the Nasal Ranger Olfactometer which is a state-of-the-art odor sampler and measurement instrument manufactured by St. Croix Sensory, Inc.

According to the document, the survey commenced in the afternoon of 22 July 2019 during which position were mapped and the corresponding meteorological conditions recorded but no odor measurements were taken the odor was not detected with the “naked nose”. In fact it is stated that no odors were detected past the perimeter of the property. However the actual positions and the corresponding meteorological conditions were not included in this document.

I was confused that even at the source no odor was detected using the “naked nose” test which meant that no olfactometer measurements were attempted but the meteorological conditions and locations were recorded.

With no formal report on the “naked nose” sampling locations and associated atmospheric conditions, I assembled local meteorological data from two independent private sources. One source was upwind of the property and the other source close to the property. From these measurements, I learned that the hour averaged wind speed and directions during those 3 afternoons were observed to be:

Relative location to property	7/22/2019	7/23/2019	7/24/2019
Upwind	4 to 7 mph @ 240°	4 to 6 mph @ 240°	4 to 6 mph @ 250°
Displaced perpendicular	8 to 14 mph @ 270°	5 to 12 mph @ 270°	7 to 13 mph @ 270°

Additionally the outdoor temperatures were in the 75°F to 85°F range during the three afternoons indicating that the outside conditions were sunny with significant solar heating at the surface.

These data tell me that the sampling was undertaken at exactly the wrong time of the day because the convective upward movement of the air minimizes the ground level concentrations or odors. Convection reduces the surface concentrations immediately and the higher wind speeds (> 2 m/s) carry the odors quickly away from the source.

A more convincing study would have considered the low wind speed periods (before 10 am) on these 3 days which also corresponds to periods of low convective reduction of the surface concentrations or odors.

A stronger study would have sampled during a more diverse set of environmental and meteorological (e.g. early morning, late morning, afternoon and early evening) conditions. The odor detection study could have been designed to include a subset of the population utilizing the “naked nose” test coupled with selected locations employing the Nasal Ranger with all of them sampling at the same time.

Document #2: SYVCP Odor Abatement Plan

My presentation here is to discuss the basic structure of the plan and identify some data collection modifications that would enable a better understanding of any reported odor events.

T&B Systems provides quality assurance services to the meteorological monitoring community. We do these services well because we are experts in meteorological monitoring and are independent from the organization for whom these services are provided.

To introduce objectivity into the abatement plan process, the person responsible for receiving and recording the complaints should be independent of the operations and empowered to just record the time, the complaint and location from which the complaint is originated. The process should allow for anonymity to the person supplying the report.

The meteorological conditions should be monitored at the facility so that the source conditions can be catalogued for the diagnostic efforts. I would also recommend that a similar EPA standard meteorological monitoring tower be installed in the Buellton area so as to provide continuous monitoring of the most likely receptor area. The data from these instruments should be automatically reported to a public website so that the population can be made aware of the prevailing meteorological conditions.

It was also noted that odor reports included an investigation process that would occur within 72 hours of the report. The reality is that the investigation to be instructive needs to be started and completed during the transient atmospheric events associated with the complaint.

The submission also states that “the Santa Ynez Valley has a naturally occurring strong and constant ocean breeze that blows 365 days of the year” and it is often referred to locally as the

‘air conditioner’. This statement is true only during the strong afternoon winds from the WSW to WNW directions that are driven by the land – ocean temperature difference as a consequence of the increased solar insolation in the early afternoon and the lower heat capacity of land as compared to that of the ocean. Earlier and later in the day when the solar insolation is diminished due to the position of the sun in the sky, the land mass begins to cool driving a local mountain valley wind regime resulting in lower wind speeds and often different wind directions. It is during these time periods that the odor from the cannabis farming activities would be more detectable. I previously described a process that would enable these meteorological conditions and associated odors to be evaluated.

Sea breeze conditions exist at this location about one-quarter to one-third of the time. And these sea breeze conditions result in a high ventilation factor with effective the dispersion processes.

The non-sea breeze periods are those with low ventilation factors and are not associated with effective dispersion processes. These are often stagnation conditions. According to local measurements, these stagnation conditions occur about 15% to 25% of the time.

Document #3: Odor Assessment Study by Bosarge Environmental, LLC (dated 18 October 2019)

This document as supplied to me appeared to be a resubmission of document #1. I have no further comments on it.

Document #4: Cannabis Odor Modelling report, SESPE Consulting (dated 18 October 2019)

This document was addressed previously. The wind rose used by SESPE consulting for the modelling effort was obtained from the Santa Maria ASOS system. However this instrument suite is not suitable for modelling dispersion in the Santa Ynez valley. This deficiency was correctly identified by SESPE consulting.

To address this deficiency a high resolution (time and space) model MM5 was initialized with data from Santa Maria (surface data) and Vandenburg Air Force Base (upper air data) to generate a wind field within the Santa Ynez Valley. The MM5 is designed to incorporate the local terrain and include as much as possible the atmospheric processes that distribute the winds at upper levels and extrapolate those wind to the surface using parameterizations of the relevant physical processes. These extrapolations are good in simple terrain situations and have been utilized for the identification of sites for wind energy generation. But these parameterizations of the physical processes are much less effective in complex terrain conditions such as the terrain in the Santa Rita Valley.

The wind rose associated with this MM5 generated wind field for the Busy Bee location has two important features:

1. The predominant wind directions are from the Northwest;
2. The percentage of low wind speeds is less than 1%. These wind speeds were used to define stagnation conditions.

The conclusions presented in the SESPE report are fully dependent upon the validity of those wind statistics.

The actual wind rose data measured by local meteorological instruments (within a few miles of Busy Bee) do not support the MM5 modeled wind statistics or wind rose. The actual wind rose contradicts the MM5 generated version. The actual wind rose shows that:

1. The predominant wind direction is WSW to WNW;
2. Low wind speeds associated with stagnation conditions occur much more frequently. These stagnation conditions occur on the order of 5% to 15% of the time.

Consequently, the conclusions of the SESPE report cannot be viewed as descriptive of the dispersion within the Santa Rita Valley nor should it be used to design effective mitigation methods if they exist and are effective.

Summary

The meteorological conditions as presented in these reports were not adequately studied and addressed by the documents, and as a result, the conclusions are illusory. The project operations will have impacts to the local airshed and as such require informational measurements that lead to the understanding of the local atmospheric processes directly affecting planning, operations and their impact nearby. These considerations are common for commercial operations that may have a significant impact locally. In the absence of local, and ideally site-specific meteorological data, projections of the magnitude of odor episodes from the project are speculative and, in my professional opinion, not reliable.

Sincerely,



Kenneth H. Underwood, Ph.D., C.C.M.

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