Exhibit 1

LATE DIST

Good Science Makes Good Neighbors

Impacts of cannabis volatiles on vineyards

Alex Guenther

Hi, I am Dr. Alex Guenther, Chief Research Officer at Pacific Environmental Analytics. In this month's Better Business Column, we are taking a closer look at the tension facing rural communities trying to reconcile traditional agriculture with newly legalized cannabis cultivation.

Many modern communities have a diverse mix of residents with a range of livelihoods and motivations for where they work and reside. One outcome of this for rural communities is a struggle to develop strategies that allow inhabitants seeking clean country solitude to coexist with their neighbors living off their land in working farms that generate odors, dust, noise, pesticide use, road congestion and other issues. Even among neighboring farmers there are activities that require some compromises. For example, "pesticide drift" from vintners applying chemicals to protect their valuable grape crops can decimate the value of adjacent cannabis fields if the deposited pesticides exceed allowable limits. Conversely, there is concern that natural emissions of cannabis plant volatiles, such as terpenes, could taint grapes in nearby vineyards. While pesticide drift has been relatively well studied, and impacts are unambiguously determined by mandatory pesticide testing, characterizing the impact of cannabis volatiles on grapes is considerably more difficult and substantially less understood and yet there has been almost no research focused on this timely and important topic.

Scientific understanding is the key to resolving disputes in an equitable manner and enabling all members of a community to live together. In the case of potential impacts of cannabis volatiles on vineyards, it is essential to fully understand and quantify each of the core controlling processes including cannabis emission rates for individual strains as well as the transport and dispersion factors, deposition rates and chemical transformations that determine the amounts that can be taken up by grapes. In addition, it is necessary to ascertain the ultimate impact of each cannabis volatile by determining an objective odor/flavor detection threshold in wine along with the perception levels since many volatiles can have a negative (taint), neutral (no impact) or even positive (improvement) effect on the wine aroma profile depending on the amount present.

A comprehensive analysis of the interaction between cannabis cultivation and vineyards requires considering not only site-specific data and analysis of the cannabis operation (e.g., direct quantification of complex emission profiles of individual cannabis strains using leaf and bud enclosure measurement systems and atmospheric modeling to estimate deposition to grapes) but also input from the neighboring vineyard (e.g., measuring miniscule quantities of a wide range of odor molecules (hundreds of compounds including terpenes, thiols, amines, and oxygenated compounds) using headspace analysis of grapes and wine). Together these analyses deliver a complete picture of the collision of these two agricultural industries and provide critical data and insights needed to objectively detect problems and identify solutions. The ultimate outcome of collaboration is a fair and effective approach for alleviating community concerns and moving forward with mutual benefit.

As you can see, there are a variety of factors that must be considered and evaluated in order to ascertain the impact, if any, of cannabis cultivation operations on nearby vineyards. In order to have full and complete answers to the most difficult questions, further research is necessary and that will clearly require collaboration between cannabis cultivators and vintners. Only once both sides have put down their swords and put their heads together can science step in to help both be good neighbors.

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Exhibit 2

The Current Approach to Cannabis Emissions Regulation Stinks

Understanding the Importance of Odor Detection Thresholds

Sarah Zelasky

Hi, I am Sarah Zelasky, Research Team Lead at Pacific Environmental Analytics (PEA). Last month, we discussed the critical role science can and should play in protecting and improving the delicate relationship between new neighbors, commercial Cannabis and wine. In this month's Better Business Column, we are going to look at the importance of understanding odor thresholds and their relevance to the timely issue of Cannabis emissions regulations.

Whether it's body odor or rotting leftovers in your fridge, an unpleasant odor is something we've all experienced from time to time. But what exactly causes odor, and how do we perceive it? Odor can be defined as the subjective experience humans have when our olfactory organs are stimulated by individual volatile organic compounds (VOCs) that have been emitted into the nearby air. And due to the subjectivity of the olfaction process, the VOCs that one person finds objectionable, another may find desirable. There are many types of VOCs that cause us to experience an odor (good or bad) – acetates, aldehydes, sulfurs, amines, and most common to Cannabis, terpenes. Further, just because one of these odor-causing VOCs is being emitted doesn't necessarily mean that we will even experience an odor at all. This is due to a little-discussed phenomenon known as Odor Detection Thresholds.

Commonly referred to as ODTs, odor detection thresholds are a scientific name for the concentration at which a VOC's odor will first be detectable by the average human nose. In the Cannabis world, scientists have attempted to quantify the ODTs of some of the major VOCs that are emitted from Cannabis plants. For example, a-pinene was found to have an ODT of ~0.018 ppm (parts per million), and limonene had an ODT of ~0.038 ppm (Abraham et al., 2011). When looking at these values, it is important to note that while these thresholds are both relatively low, they are not the same – a-pinene has a lower ODT than limonene. This means that a-pinene will produce noticeable odors at smaller concentrations than limonene. In other words, a-pinene is more potent than limonene. Therefore, if a cultivator were to measure that one of their Cannabis plants emits 0.019 ppm of a-pinene and 0.037 ppm of limonene, we would smell the a-pinene (because 0.019 > ODT of 0.018) but we would not smell the limonene (because 0.037 < ODT of 0.038) despite limonene being present in a higher quantity than a-pinene.

While many may believe that the Cannabis VOCs emitted in the largest amounts must be responsible for the majority of odor being perceived, the example between a-pinene and limonene shows that this is not necessarily true. It is possible that some compounds present in large quantities may have no odor; whereas, other compounds present in smaller quantities may have a very strong odor. Furthermore, recent PEA client-projects have yielded interesting findings supporting one potential hypothesis that compounds present in smaller quantities in the plant may actually be more responsible for the pervasive odor. Because of this, it is important for cultivators and regulatory bodies not to conflate the mere presence of VOCs with the existence of an odor. Rather, it is necessary to measure the emission rates of individual VOCs and compare them to published ODTs in order to properly assess if an odor-causing compound is actually causing an odor. Only then can proper regulations of both odor and emissions be based on applicable standards that treat odor-causing VOCs individually with regard to their odor potency.

The story of Cannabis odor is a complicated one due to its inherent subjectivity and relatively low thresholds for detection. To fight this uncertainty and ensure that Cannabis emissions regulations target those VOCs that are actually the odor culprits, we need solutions that take away the subjective nature of odor and equip regulators with critical information to aid in the careful crafting of regulations. The importance of ODTs in objectively quantifying odor cannot be overstated. Only through the use of chemical-specific ODTs and predicted gas phase emissions concentrations from specific Cannabis strains can accurate odor monitoring and compliance be assured.

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End Notes

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Exhibit 6

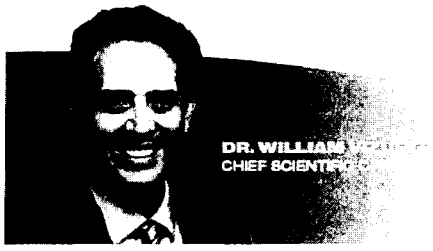
The Overlooked Elephant In The Greenhouse-Design Room

HI, I AM DR. WILLIAM VIZUETE, CHIEF SCIENTIFIC OFFICER AT PACIFIC ENVIRONMENTAL ANALYTICS. In last month's Better Business Column, we explored how cannabis cultivation potentially affects air quality and ways to measure that impact. This month, we are focusing on greenhouse design and shining a light on a too often overlooked but critical consideration.

In the process of conducting our research, we've visited multiple types of cannabis cultivation facilities. In Denver, we've found cultivators in warehouse space and ex-business parks. In New Jersey, we've observed modular rooms being built within the footprint of existing defunct greenhouses. In California, we've seen plans for so-called "cannabis campuses". However, the standard growing approach is of course greenhouses. Though they come in many "flavors"—traditional Venlo style, hoop, side-venting, roof-venting, side-fan venting and so on—the fact remains that greenhouse-style cultivation is, and will likely remain, the most popular form of cultivation due to its inherent benefits: lower-cost energy, weather and climate control, year-round cultivation and light control. We've also read within the pages of Cannabis Business Times numerous extremely helpful articles on cannabis greenhouse design and maintenance.

But what's missing in the conversation? What two-syllable word (that happens to be one of the most likely reasons to lose a cultivation permit) is not raised? ODOR.

Greenhouse builders, designers and engineers do a fantastic job of drafting creative plans to meet cultivator requirements for air flow, irrigation, lighting and other variables. But it has become evident that odor control is not considered an important design requirement. This is a critical mistake that others can learn from. We've observed that attention is given only after-the-fact when odor and emissions complaints start to roll in and the cultivator is scrambling to retrofit the facility to address these issues. Unfortunately, this is often a case of too little too late as numerous cultivators have lost permits due to unaddressed or insufficiently addressed odor issues. Rather than retrofitting a greenhouse, and committing unbudgeted resources, proven and effective odor control measures should be engineered into original design plans. When done properly, a robust odor control system can be integrated into greenhouse design and control systems, making the entire process more streamlined, efficient and effective while protecting your investment by addressing a critical compliance concern.



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