



Date: April 12, 2016

To: Michael Goldman  
Engineering Division  
Santa Barbara County APCD  
260 N San Antonio Rd # A,  
Santa Barbara, CA 93110

From: Patrick Thompson, CEO  
EcoPAS, LLC  
3130 Skyway Dr., Suite 401B  
Santa Maria, CA 93455

**Re: Update on Winery Emissions Capture Technology**

Dear Michael,

Since 2009, EcoPAS has been developing and improving our PAS (Passive Alcohol System) technology for capturing fugitive ethanol vapors from winery fermentation operations. This technology is essentially a smart condensation system, with important innovations to optimize applicability to winery operations. The purpose of this letter is as follows:

- Provide information on recent improvements in both **capture efficiency and cost**
- Provide update on **full-scale system deployment** (2015 crush)
- Provide updates on **byproduct** value stream
- Request that you **contact us for specific proposals** for any pending NSR or planning developments (instead of using historical pricing information)

### **Capture Efficiency & System Cost**

The EcoPAS approach is not the only feasible control technology. However, when compared to competing approaches, the EcoPAS technology has inherent advantages in water use (zero), waste stream (zero), and energy efficiency. It is also modular and self cleaning, and new test data is available on these benefits. Besides these advantages, during the last two years we have also optimized and demonstrated improvements in size, cost, and capture efficiency. As a general guideline, base condenser costs are usually <\$10,000/ton (of captured VOCs), and complete costs are <\$15,000/ton.

## Full-scale System Deployment

For the 2015 crush, a paying customer installed a PAS-100 system (designed to capture from 100K+ gallons of red-wine fermentation). This system performed exceptionally, and the customer was able to take credit for all captured ethanol against their permitted daily emissions limits. The system operated from start of harvest through the entire crush (multiple turns, or fermentation cycles) without requiring maintenance of any sort. This is mostly due to the inherent self-cleaning nature of the system, in which the high-ethanol vapor content of the driving gas (CO<sub>2</sub>) creates an environment that is inhospitable to microbial growth of any sort. In fact, ATP<sup>1</sup> testing revealed zero evidence of microbial presence at the end of the harvest season— indicating no contamination within the manifold system.

We were disappointed that the 2015 ATC did not result in a BACT designation. Due to the lack of a directly applicable source test protocol, the customer requested direct mass balance measurement. The permitting District approved this request since the ethanol vapor removed from the atmosphere is well quantified (volume/concentration) and must be reported under our Treasury Dept. Distilled Spirit Plant (DSP) permit; however, the District deemed the absence of inlet-outlet source testing as an impediment to BACT designation. The EPA continues to support mass balance as *superior* performance testing (vs. inlet-outlet source testing), and we agree. However, we are also eager to assist in the development of improved inlet-outlet source test protocols, even if not necessary for performance testing, as such testing will continue to improve our collective understanding of winery emissions factors.

## Making Markets for Byproduct

We are continuing our efforts at making markets for the captured wine spirits. Under our current DSP, we have been able to provide samples to a variety of potential customers, and will continue to work diligently to build long-term demand for the byproduct. To the extent that value can be realized for this unique and sustainable California spirit, the cost/ton of VOC capture can be reduced dramatically, and perhaps eventually even become a profit center for adopting wineries.

## Please Contact Us

When designed properly, winery emissions capture can easily be <\$15,000/ton, even on relatively small scale wineries (25K cases+). For larger facilities (400K+ cases), cost effectivity can be even more attractive. If your District has any pending NSRs, or if you are researching future implementation plans, please contact us to provide the latest cost estimates.

It is our estimate that there are 1,500+ tons of annual VOC reductions to be had by adoption of active winery controls. Since this occurs almost exclusively during the summer/fall crush<sup>2</sup>, this equates to >16 tons per day. We are eager to help, and we believe that the majority of wineries are also eager to include air quality as part of their total sustainability framework. Even in the absence of urgent NSR/SIP work, please do not hesitate to call us if you'd like a briefing at your offices for engineering staff, etc.

Thanks and best regards,



Patrick Thompson

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<sup>1</sup> ATP adenosine triphosphate, is a high-energy molecule that is used by living cells as their primary source of energy

<sup>2</sup> Primarily during the months of August-October.