

SAN JOAQUIN VALLEY UNIFIED AIR POLLUTION CONTROL DISTRICT MEMO

DATE: February 9, 2015 (Revised May 9, 2016)

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SUBJECT: Achieved in Practice Analysis for Emission Control Technologies
Used to Control VOC Emissions from Wine Fermentation Tanks

Introduction

The purpose of this analysis is to determine whether there is any control technologies that can be considered to be Achieved in Practice BACT for controlling fermentation VOC emissions from wine fermentation tanks. If determined to be achieved in practice, the San Joaquin Valley Air Pollution Control District (District) would require the use of such technology for wine fermentation tanks when BACT is triggered, without any consideration of the cost effectiveness of the control technology. The District's achieved in practice BACT is functionally equivalent to Federal EPA's Lowest Achievable Emission Rate requirements outlined in Federal Non-Attainment NSR documents.

LAER

The emission control requirement for new Major Sources and Federal Major Modifications in non-attainment areas is that the emission units meet the lowest achievable emission rate (LAER). LAER is the most stringent emission limitation from either of the following:

1. The most stringent emission limitation contained in the implementation plan of any State for such class and category of source; or
2. The most stringent emission limitation achieved in practice by such class or category of source.

In no event can the LAER requirement be less stringent than Federal New Source Performance Standards (NSPS), if there is an NSPS applicable to the type of source being evaluated.

In the case of wine fermentation tanks, the District did not identify any SIP that would require the use of add-on control systems. Therefore, add-on control

systems can only be required as LAER for wine fermentation if they are determined to be achieved in practice for the source category.

Achieved in Practice Criteria

The term "achieved in practice" appears to be subject to interpretation since it is not defined in the federal statutes or regulations. As a result, there are few objective regulatory criteria to constrain the form of an achieved in practice determination. The following discussion outlines the achieved in practice criteria that is used by the District for determining LAER.

In a February 28, 1989 memorandum titled "Guidance on Determining Lowest Achievable Emission Rate (LAER)", EPA provided the following guidance concerning the economic feasibility of LAER:

Traditionally, little weight has been given to economics in LAER determinations, and this continues to be the case. The extract in your memorandum from the record of the House and Senate discussion of the Clean Air Act (Act) contains the sentence:

"If the cost of a given control strategy is so great that a new major source could not be built or operated, then such a control would not be achievable and could not be required by the Administrator."

We interpret this statement in the record to be used in a generic sense. That is, that no new plants could be built in that industry if emission limits were based on levels achievable only with the subject control technology. However, if some other plant in the same (or comparable) industry uses that control technology, then such use constitutes de facto evidence that the economic cost to the industry of that technology control is not prohibitive. Thus, for a new source in that same industry, LAER costs should be considered only to the degree that they reflect unusual circumstances which, in some manner, differentiate the cost of control for that source from the costs of control for the rest of that industry. These unusual circumstances should be thoroughly analyzed to ensure that they really do represent compelling reasons for not requiring a level of control that similar sources are using. Therefore, when discussing costs, applicants should compare the cost of control for the proposed source to the costs for source(s) already using that level of control.

The statement "If some other plant in the same (or comparable) industry uses that control technology, then such use constitutes de facto evidence that the

economic cost to the industry of that technology control is not prohibitive" is only true if the plant using that control technology purchased or leased that control technology. Scenarios where the purchase/lease of the control technology was subsidized with grant money, or where the plant allowed the control vendor to operate and test their equipment on-site without actually purchasing/leasing the control technology do not constitute evidence that the economic cost to the industry due to use of that technology control is not prohibitive. Therefore, the District's historical position is that a control technology must have been purchased or leased by the plant in order for that installation of the control technology to be considered as achieved in practice.

EPA Region IX has previously stated that the successful operation of a new control technology for six months constitutes achieved in practice. This position was established in an August 25, 1997 letter from David Howekamp of US EPA Region IX to Moshen Nazemi of South Coast Air Quality Management District. This guidance is reflected in the South Coast Air Quality Management District's BACT Policy, which includes the following criteria for determining whether a control technology is achieved in practice:

Reliability: All control technologies must have been installed and operated reliably for at least six months. If the operator did not require the basic equipment to operate daily, then the equipment must have at least 183 cumulative days of operation. During this period, the basic equipment must have operated: 1) at a minimum of 50% design capacity; or 2) in a manner that is typical of the equipment in order to provide an expectation of continued reliability of the control technology.

For wine fermentation tanks, the District has taken the position that successful operation of a control device for one full fermentation season is satisfactory for qualifying a control as achieved in practice. The requirement of one full fermentation season is considerably more conservative than the 6-month requirement, since the fermentation season typically lasts only two to three months.

The term "successful operation" is not tightly defined. The District considers the following when determining whether a control technology has been successfully operated for achieved in practice BACT determinations:

1. Was the control technology operated in the same manner that would be required by the District if the control technology was required for BACT?
2. How reliable has the control technology been over the life of its use?
3. Has the control technology been verified to perform effectively over the range of operation expected for that type of equipment? Was the effectiveness verified by performance test(s), when possible, or using other performance data?

Other typical considerations that the District considers when making an achieved in practice BACT determination include:

1. Is the control technology commercially available from at least one vendor?
2. On what class and category of source has the control technology been demonstrated?

In summary, the following criteria are used for determining whether a control technology is achieved in practice for wine fermentation:

1. Did the plant using the control technology purchase/lease the equipment? Was that purchase/lease subsidized?
2. Was the control technology operated for at least one fermentation season?
3. Was the control technology operated in the same manner that would be required by the District for BACT purposes?
4. How reliable has the control technology been during its use at the plant?
5. Has the control technology been verified to perform effectively over the range of operation expected for that type of equipment? Was the effectiveness verified by performance test(s), when possible, or other performance data?
6. Is the control technology commercially available from at least one vendor?
7. On what class and category of source has the control technology been demonstrated?

Achieved in Practice Analysis for Known Installations of Wine Fermentation Control Technologies

The following is an analysis of each known installation of an emission control technology to control VOC emissions from wine fermentation tanks and whether that installation can be considered achieved in practice.

Terravant Wine Company (2008 – Current)

Terravant Wine Company submitted an Authority to Construct application for a wine processing facility to the Santa Barbara County Air Pollution Control District (SBCAPCD) on September 20, 2007. The application was deemed complete on October 19, 2007. The fermentation tanks triggered BACT; however, the SBCAPCD evaluation determined BACT to be infeasible. However, this project also triggered offsets and Terravant Wine Company electively proposed to install a packed bed water scrubber with UV/hydrogen peroxide controls to control VOC emissions from the wine fermentation tanks. Proposing the control would reduce VOC emissions to a level below the SBCAPCD offset threshold. The control technology is only required to run sufficiently to reduce emissions to stay below the offset threshold – it is not required to be operated all of the time, as is BACT-required equipment.

The packed bed water scrubber was installed in 2008 and began operation in 2008, with a 95% control efficiency requirement on the Authority to Construct permit. However, in 2008, the unit failed to meet the 95% control efficiency requirement. Prior to the 2009 season, Terravant Wine Company was issued a revised Authority to Construct permit that reduced the control efficiency requirement to 75%. However, the unit has not been able to consistently demonstrate compliance with the 75% control efficiency requirement. The effectiveness of the packed bed scrubber has varied considerably over its life, and has been measured to be as low as 49% control efficiency. During discussions, SBCAPCD staff indicated that this facility has been issued a Notice of Violation for non-compliance with their permitted emission limits and they would not recommend that any wineries use this control technology for the control of fermentation tank emissions, as it has proven to be unreliable. Finally, the control technology used by Terravant Winery is custom designed, and is not a commercially available off-the-shelf type of unit.

The packed bed scrubber technology does not meet the achieved in practice criteria since this control technology has not been operating in compliance with its permit requirements, its effectiveness is highly variable, and the control technology is not commercially available.

EcoPAS, LLC (2009)

EcoPAS conducted testing of their passive alcohol system, which is condensation-based emission control system, at a winery located within the San Luis Obispo County Air Pollution Control District. The purpose of this installation was to conduct full-scale testing of the passive alcohol system on red wine fermentation tanks. The District was unable to verify whether the winery purchased the system.

Since the District could not verify that the winery purchased the control system, this installation doesn't meet the first criteria listed to be considered as achieved in practice. Furthermore, the unit was operated for experimental testing of the control device. In the District's experience, during experimental testing/trial runs, a control technology does not typically operate in the same manner as would be required by BACT, so the District has not historically considered experimental test/trial installations to constitute achieved in practice BACT.

Central Coast Wine Services (2009)

In 2009, Santa Barbara County Air Pollution Control District (SBCAPCD) determined that Central Coast Wine Services (CCWS) was operating without a permit. They required CCWS to submit an application for an Authority to Construct such that the winery would be in compliance with SBCAPCD Rules and Regulations. Based on the emission estimates for the facility, the facility was triggering Best Available Control Technology Requirements and Offsets. At that time, the SBCAPCD determined that BACT, while technologically feasible, was not cost effective. SBCAPCD issued an Authority to Construct/Permit to Operate on June 5, 2009 for the winery.

CCWS was allowed to exceed the offset thresholds during the fall 2009 harvest season in order to test potential control technologies. Three companies were invited to participate in testing of prototype emission control equipment, but only NohBell Corporation elected to install and test fugitive ethanol control equipment.

NohBell Corporation engineered and tested a full scale NoMoVo 1.0 system on a 50 ton tank at the CCWS plant. NoMoVo documents describe the equipment as successful, with full scale trials proceeding. After the 2009 season, NoMoVo documents indicate that CCWS decided to move the plant and equipment.

This installation does not meet the requirements to be considered achieved in practice. First, the facility does not appear to have purchased/leased the control system, nor did they intend to continue operating the system. This is evident by their decision to discontinue use of the system in the following year. Second, no data has been submitted to the District to demonstrate that the unit was continuously operated in the same manner that the District would require the system to operate if it were considered achieved in practice BACT. The purpose of this installation was to perform initial testing and trial runs of the control technology. In the District's experience, during experimental testing/trial runs, a control technology does not typically operate in the same manner as would be required by BACT, so the District has not historically considered experimental test/trial installations to constitute achieved in practice BACT. Furthermore, the type of records necessary to demonstrate continuous operation of the system was not required by the SBCAPCD permit. Finally, the SBCAPCD permit did not include testing requirements to sufficiently demonstrate the effectiveness of the system.

Kendall Jackson Oakville (2010)

Kendall Jackson Winery belongs to Jackson Family Wines Inc (JFW), and is located in Oakville, California. This winery is in Bay Area Air Quality Management District (BAAQMD). BAAQMD does not require permits for wine fermentation or storage operations. Their Regulation 2, Rule 1, 117.9 and 117.10 has exemptions for wine storage and fermentation operations.

In 2010, NohBell installed a NoMoVo 2.0 system at the Kendall Jackson Winery. The system was connected to a 10,000 gallon fermentation tank and operated on a trial basis during the 2010 crush season. Pursuant to Brian Kosi, Winemaker at Kendall-Jackson Oakville, JFW never purchased the NoMoVo technology. The NoMoVo slurry was treated by the facilities on-site wastewater treatment system.

This installation does not meet the requirements of achieved in practice BACT. First, the system was never owned/leased by the winery. Secondly, the unit was operated for the purposes of testing/trial runs to evaluate the control technology. In the District's experience, during experimental testing/trial runs, a control technology does not typically operate in the same manner as would be required by BACT, so the District has not historically considered experimental test/trial installations to constitute achieved in practice BACT. Furthermore, BAAQMD does not have any record of source tests occurring during the 2010 crush season; therefore, the effectiveness for this installation was not established.

Kendall Jackson Oakville (2011-2013)

In its 2010 clean air plan, the BAAQMD included a further study measure (FSM 14 – Winery Fermentation) to examine whether ethanol emissions from Bay Area wine production could be cost-effectively reduced. On 9/26/11, the BAAQMD signed a Research Sponsorship Agreement (Contract No. 2011-126) with NohBell to help develop its technology to capture volatile organic compounds emitted by wine fermentation tanks at Kendall Jackson Oakville. The contract states that *"District (BAAQMD) wishes to support NohBell's effort to demonstrate the technology at JFW winery and wishes to verify the function and cost-effectiveness of the technology and acquire data to help DISTRICT (BAAQMD) determine whether the equipment could be cost effectively employed more widely in the wine industry"*. NoMoVo submitted a project budget estimate of \$118,750 for its NoMoVo 2.0 upgrades, pump upgrades, and related work at the plant. The BAAQMD contract promised \$50,000 towards this effort, to be paid in installments directly to NohBell Corporation. Furthermore, Brian Kosi of Kendall-Jackson Oakville confirmed that the facility never purchased the NoMoVo system from NohBell and confirmed that the system has been removed from the site by NohBell.

For 2011, NohBell Corporation planned to conduct trials of the upgraded NoMoVo 2.0 system on 10 fermentation tanks. Six to eight trials were anticipated, operating on 4-6 day cycles. The trial runs were scheduled to be primarily conducted while fermenting red wines. The District was unable to obtain operational data for the 2012 and 2013 fermentation seasons for this equipment. Following the 2013 crush season, the equipment was removed and transferred to Constellation Wines in Monterey, CA.

This installation does not pass the first criteria of LAER, since the facility never owned the system and since the installation and operation of the control technology by NohBell was subsidized by a Research Sponsorship Agreement with BAAQMD. Furthermore, operation of the control technology at this facility was for trials/testing of the effectiveness of the control technology. In the District's experience, during experimental testing/trial runs, a control technology does not typically operate in the same manner as would be required by BACT, so the District has not historically considered experimental test/trial installations to constitute achieved in practice BACT. Finally, the unit was removed, which indicates that this wasn't intended as a permanent installation. For these reasons, the District does not consider this installation to be achieved in practice.

J. Lohr Vineyard and Winery (2013)

NohBell Corporation has indicated that they operated a NoMoVo system at J. Lohr Winery in Paso Robles during 2013 crush season. The District contacted J. Lohr Winery to obtain more information regarding this installation. J. Lohr Winery personnel stated that they considered this to be a pilot type testing operation. J. Lohr Winery did not purchase or lease the system. The unit operated during the 2013 crush season on fermentation tanks that were processing red wine. After the 2013 crush season, the system was removed and no longer operates at this site. San Luis Obispo Air Pollution Control District (SLOAPCD) had no knowledge that this unit was installed at this winery and no Authority to Construct or permit exemption was issued for this equipment.

This installation does not pass the first criteria of LAER, since the facility never purchased/leased the equipment. Furthermore, operation of the control technology at this facility was for trials/testing of the effectiveness of the control technology at this facility. In the District's experience, during experimental testing/trial runs, a control technology does not typically operate in the same manner as would be required by BACT, so the District has not historically considered experimental test/trial installations to constitute achieved in practice BACT. Finally, the unit was removed, which indicates that this wasn't intended as a permanent installation. For these reasons, the District does not consider this installation to be achieved in practice.

Constellation Winery dba Gonzales Winery (2013)

During the 2013 crush season, a NoMoVo unit was installed on a 39,000 gallon fermentation tank at Constellation Brands U.S. Operations, Inc. dba Gonzales Winery in Monterey, CA. The control technology was installed and operated as a "pilot operation". Monterey Bay Unified Air Pollution Control District (MBUAPCD) compliance staff noticed the NoMoVo unit operating on-site without authorization from MBUAPCD and issued a notice of violation. Gonzales Winery submitted an Authority to Construct application; however, prior to processing that application, the facility notified MBUAPCD that the equipment had been removed from the site. The equipment operated at the site for a partial season for pilot testing purposes. MBUAPCD could not verify whether Gonzales Winery purchased or leased the equipment.

The District was unable to verify whether Gonzales Winery purchased or leased the NoMoVo unit. Furthermore, operation of the control technology at this facility was for trials/testing of the effectiveness of the control technology at this facility. In the District's experience, during experimental testing/trial runs, a control technology does not typically operate in the same manner as would be required by BACT, so the District has not historically considered experimental test/trial installations to constitute achieved in practice BACT. Finally, the unit was removed, which indicates that this wasn't intended as a permanent installation. For these reasons, the District does not consider this installation to be achieved in practice.

Vinwood Cellars Kenwood (2013)

The District has found documents indicating that a NoMoVo system was installed on four 15,000 gallon fermentation tanks at Vinwood Cellars Kenwood in Sonoma county, and the system was operated during the 2013 season. District staff attempted to contact Vinwood Cellars; however, the staff at Vinwood Cellars was unable to verify information for this installation. BAAQMD had no knowledge of this installation, as they do not require permits for wine tanks, so they were unable to verify this installation. Furthermore, since this installation was not subject to permit requirements, BAAQMD has no operational history or test data for this site. While BAAQMD administered source tests at Kendall Jackson Oakville winery, they have no records of any source testing of the NoMoVo system at Vinwood Cellars Kenwood.

This installation has not met the requirements of achieved in practice. First, it has yet to be confirmed that the winery actually purchased the NoMoVo system. Second, BAAQMD has no test records to verify the effectiveness of the NoMoVo system at this site. Finally, the operational history of the unit at this site is not available to determine whether it was operated in the same manner as a unit would be if it were installed as BACT.

Central Coast Wine Services (2013)

On August 5, 2013, CCWS electively applied to install a NoMoVo wine emission capture and control system to control ethanol emissions from fermentation activities at their wine center. The existing fermentation tanks at the facility ranged in capacity from 350 gallons to 20,887 gallons. On September 23, 2013, a final ATC (ATC 14257) was issued for the installation of the NoMoVo system, and the unit began operation in September 27, 2013. The installation of this unit allowed CCWS to increase daily wine fermentation while remaining under their existing daily and annual facility-wide VOC emission limits. A Permit to Operate (PTO 14257) was issued on December 13, 2013.

PTO 14257 states: "*The NoMoVo system is optional and may be used at CCWS' discretion*". Thus, the permit does not require continuous operation of the NoMoVo system. The NoMoVo system is portable. The system can be attached to four or five fermentation tanks at a time via flexible hoses. The facility is allowed to move the NoMoVo system around, as desired, to capture emissions from the tanks where fermentation is taking place. However, there is no requirement to keep the NoMoVo system attached to a tank and operate it for the full fermentation cycle of that tank. Thus, the District was unable to confirm that the unit was operated in the continuous manner that would be required if the District considered NoMoVo to be achieved in practice BACT.

SBCAPCD PTO 14257 does not include a control efficiency requirement, does not include any source testing requirements to verify the control effectiveness of the control system. The effectiveness of the control has only been estimated using the density change of the NoMoVo slurry to estimate the quantity of ethanol capture, and using a theoretical calculation of the quantity of ethanol that would be emitted if the tanks were uncontrolled. Inlet and outlet air quality testing has not been performed for this particular installation.

Finally, the disposal of the NoMoVo slurry is an important consideration when determining the effectiveness of the control system. If the slurry is disposed of in a manner that re-emits the ethanol into the atmosphere, then the effectiveness of the control is diminished. Until August 2014, the CCWS facility disposed of the NoMoVo slurry in their on-site wastewater treatment facility. On August 21, 2014, SBCAPCD sent a letter to CCWS informing them that they have concerns over the treatment of the NoMoVo slurry. Specifically, SBAPCD was concerned about the potential for stripping of ethanol to the atmosphere during the on-site waste water treatment process. The SBCAPCD letter states "*In conclusion, after August 29, 2014, the District will not recognize emission reductions claimed based on the use of any of your NoMoVo systems (existing or new) at the facility until CCWS has a District-approved on-site or off-site ethanol disposal method in place*". On August 27th, 2014, SBCAPCD approved the disposal of the NoMoVo slurry at Southern California Waste Water, an off-site facility in Santa Paula, California. In November, 2014, a vacuum truck carrying toxic chemicals from an unrelated facility exploded spreading about 1200 gallons of chemical waste including sulfuric acid and highly combustible organic peroxide. Since that incident, Southern California Waste Water has discontinued the acceptance of waste from all of their clients, so this disposal option is no longer available for the waste generated by CCWS.

The waste is now shipped to a distillery, which distills the ethanol and converts it into vehicle fuel. SBCAPCD has yet to approve the disposal of the NoMoVo slurry to the on-site wastewater facility. Consequently, the overall effectiveness of the system, including any ethanol re-emitted into the atmosphere during disposal, has yet to be sufficiently determined.

Since the control technology has not been demonstrated to operate in a manner that would be required by BACT and the overall effectiveness of the control technology has yet to be sufficiently determined, the District does not consider this installation to be achieved in practice.

Central Coast Wine Services (2014/2015)

In 2014, CCWS submitted an Authority to Construct application for the installation of 40 new tanks, ranging in capacity from 7,407 gallons to 20,628 gallons. The proposal triggered BACT. CCWS decided to forego the normal BACT Analysis, and electively proposed to install six NoMoVo systems to control VOC emissions from the tanks, when the tanks were fermenting wine. A final ATC, (ATC 14350) was issued on July 28, 2014 and the tanks were installed for the 2014 season.

Unlike the previous installations of NoMoVo at this facility, the ATC requires use of the NoMoVo system on these tanks while fermentation is taking place, the permit requires a minimum capture and control efficiency, and the permit requires source testing to verify the effectiveness of the NoMoVo system. However, these tanks have yet to be used for fermentation and the effectiveness has yet to be determined for this installation of the NoMoVo system. An email from Richard Mather of CCWS to David Harris of SBCAPCD, dated September 16, 2014, states:

We won't be using the new tanks for fermentation this year, but since our ATC permit only gives us until August 1, 2015 to fulfill the source test plan, we will need to conduct the test this fall before our last fermentation. It would be highly unlikely that we would be conducting fermentation next year before August 1. Since harvest is progressing rapidly, we probably only have several weeks of fermentation left this year.

Prior to the 2015 season, CCWS received another Authority to Construct for the 40 new tanks that allowed the use of either NoMoVo or EcoPAS control systems. The new Authority to Construct continued to require inlet/outlet testing of the control system. However, that Authority to Construct was later cancelled due to both technology vendors objecting to perform the required source tests to demonstrate the control efficiency of their respective systems. Rather, CCWS was issued a new ATC allowing only 10 of the 40 tanks to be used for fermentation, and limiting

fermentation to white wine only. With those changes to the permits, BACT was no longer triggered and the requirement to demonstrate the actual control efficiency was removed from the permits. Additionally, the use of the NoMoVo or EcoPAS control systems was no longer required; rather, the permit allowed for optional use on the 10 tanks that are allowed to ferment white wine.

The refusal of the control vendors to demonstrate the actual control efficiency raises significant questions and concerns over the vendors' control efficiency claims. The Valley Air District cannot, in good faith, require controls which the vendors refuse to validate. The District's concern is that, if the vendors of this technology are aware that claims of the control efficiency are potentially overstated, but they also know that EPA is about to require their technology to be installed on a widespread basis, they gain no advantage by demonstrating their actual control efficiency. Since the effectiveness was yet again not demonstrated in 2015, and for the reasons stated in the 2013 evaluation of the use of controls at CCWS, the criteria of Achieved in Practice have yet to be satisfied for these installations.

Conclusion

For the reasons listed in the above discussions of each control installation, none of the installations have met all of the criteria necessary for the control technology to be considered as achieved in practice BACT or federal LAER.