Monterey Bay Air Resources District
BOARD OF DIRECTORS MEETING
WEDNESDAY, FEBRUARY 19, 2020 – 1:30 P.M.
24580 SILVER CLOUD COURT, 3RD FLOOR, MONTEREY, CA, 93940
Summary of Actions

1. CALL TO ORDER – **The meeting was called to order by Chair McShane at 1:30 p.m**

2. PLEDGE OF ALLEGIANCE

3. Roll Call.
   Present: Mary Ann Carbone, Zach Friend, Chris Lopez, Steve McShane, Jane Parker, Honor Spencer, John Phillips. **Absent:** Anthony Botelho, Ryan Coonerty, Chris Krohn, Fred Ledesma.

4. WELCOME NEW MEMBERS TO THE BOARD OF DIRECTORS – **None present**

5. ELECTION OF 2020 BOARD OF DIRECTORS CHAIR AND VICE CHAIR
   Motion: Elect Steve McShane as Chair and Ryan Coonerty as Vice Chair, **Action:** Approve, **Moved by** Zach Friend, **Seconded by** Jane Parker. Motion passed unanimously.

6. PUBLIC COMMENT PERIOD – **None**

7. REPORTS BY COMMITTEE CHAIRS ON COMMITTEE MEETINGS
   a. Budget, Personnel, and Nominating Committee
   b. Advisory Committee

8. COMMENTS AND REFERRALS FROM CHAIR AND BOARD MEMBERS
   a. Director McShane is working with the City of Seaside on an Earth Day electric drive event.

9. REPORT FROM AIR POLLUTION CONTROL OFFICER
   Richard Stedman, APCO, reported on the following:
   Engineering
   - District released notice of a 30-day comment period on the preliminary decision to approve issuance of a Title V Permit significant modification to Calpine Corporation for their facility located in King City. The facility is no longer exempt from the Acid Rain program because the facility will no longer supply energy to Pacific Gas and Electric Company and steam to an industrial host. The Acid Rain Program requirements have been added to the Title V permit.
   - On February 12, the District held an Accela product orientation meeting to review test environment and begin the process of customizing the software to meet our needs.
   - A Monterey County winery has applied for a burn permit to conduct a conservation burn of approximately 150 acres of piled vineyard materials. Sonoma Ecology Center will conduct training of 2-3 piles on Thursday February 20th to demonstrate the methods of conservation burns. The remaining piles will be burned using the conservation burn methods which reduce

smoke and emissions. The end result of a conservation burn is biochar which can be used as soil amendment.

- Deadline for applications for an Inspector I/II position is February 24. Application materials are posted to District's website.

Planning and Air Monitoring

- Phase II of the Monterey Bay Electric Vehicle Incentive Program is continuing with 250 applications received, $210,000 obligated, and $190,000 remaining.
- On February 11 the Monterey County Board of Supervisors amended the East Garrison EIR to allow expanded use of the mitigation fund. These funds had been limited to School Bus and Irrigation pump projects.
- $175,000 in grant funds have been received from CARB for the Woodstove Change-out program. A new development this year will be a system to receive applications on-line through Laserfiche, the District's new Document Management System.

San Lorenzo Valley

- Staff is continuing to observe weather conditions and air quality in the SLV to forecast when a Spare the Air alert will be declared. No Spare the Air Alerts have been called since the program opened at the beginning of November.

Outreach

- District will be at the Salinas Valley Ag Tech Summit at Hartnell on March 18
- District will be participating in Earth Day event at the Presidio in Monterey on April 7
- Save the Date: Clean Air Leaders Awards on June 11 @ 6:30 p.m at Wedgewood in Carmel Valley. This will be the District's 10th year of sponsoring clean air awards.

APCO

- Will be speaking tonight at the Climate Crisis & Action: A Discussion with California Leaders Keynote by Jimmy Panetta. Sponsored by Citizens' Climate Lobby Monterey County, the Center for the Blue Economy, and the Monterey Bay Aquarium.
- Request to the Board of Directors for appointments to Hearing Board and Advisory Committee.

CONSENT AGENDA

Motion: *Approve items on Consent Agenda,* ***Action:*** *Approve,* ***Moved by*** *John Phillips,* ***Seconded by*** *Chris Lopez. Motion passed unanimously.*

10. **Accepted and Filed** Summary of Actions for the December 18, 2019 Board of Directors Meeting

11. **Received and Filed** Budget to Actual Report for the Seven Months Ended January 31, 2020

12. **Accepted and Filed** Report of Summary of Mutual Settlement Program Actions for December 2019 and January 2020
13. **Approved** Out-of-State Travel Request for the Administrative and Fiscal Specialist to Attend the 2020 Springbrook National Users Conference in Portland, Oregon in May 2020

REGULAR AGENDA

14. **RESOLUTION NO. 20-001: Held** a Public Hearing and **Adopted** a Resolution Approving Rule 441 Boilers, Steam Generators, and Process Heaters
Motion: *Adopt the resolution,* ***Action:*** *Approve,* ***Moved by*** *Jane Parker,* ***Seconded by*** *Mary Ann Carbone. Motion passed unanimously.*

Public Comment

- Lance Ericksen, Chevron
- John Haley, Environmental Health and Safety Committee

15. **Received** Report on Calendar Year 2019 Engineering and Compliance Activities
Receive the report only; no action required or taken.

16. **Accepted and Filed** a Report on Daily Eight-Hour Peak Ozone Concentrations, Hourly Peak Ozone Concentrations, and PM2.5 and PM10 Air Monitoring Data for 2019
Receive the report only; no action required or taken.

17. **Received** Report on Wineries and Air District Regulations and **Provided** Direction to APCO on Rule 207 Changes
Motion: Withdraw currently submitted revision of Rule 207, do another revision, and resubmit to the State per recommendation by the California Air Resources Board. **Action: Approve, Moved by Chris Lopez, Seconded by Honor Spencer.**
Roll Call Vote
Mary Ann Carbone – Absent
Zach Friend – Yes
Chris Lopez – Yes
Steve McShane – Yes
Jane Parker – No
John Phillips – Yes
Honor Spencer – Yes
Motion carries 5/1

Public Comment

- Kim Stemler, Monterey County Vintners Association

CLOSED SESSION

18. The Board **met** in Closed Session pursuant to Government Code section 54950, relating to the following:

    a. Pursuant to Government Code section 54957.6, the Board will provide direction to negotiators. Designated representatives: Richard Stedman, APCO, Rosa Rosales, District Administrative Services Manager, and Lynn Kievlan, District Admin & Fiscal Specialist Employee Organization: SEIU Local 521.
    No reportable action

19. Adjournment – **The meeting was adjourned by Chair McShane at 3:30 p.m.**

Ann O'Rourke
Executive Assistant

Proposed Rule 441 Boilers, Steam Generators, and Process Heaters

SEONG KIM, AIR QUALITY ENGINEER II

ADVISORY COMMITTEE

DECEMBER 2019

Monterey Bay Air Resources District

Outline

Background

Proposed Rule Requirements

Rule Impacts

Timeline

Background

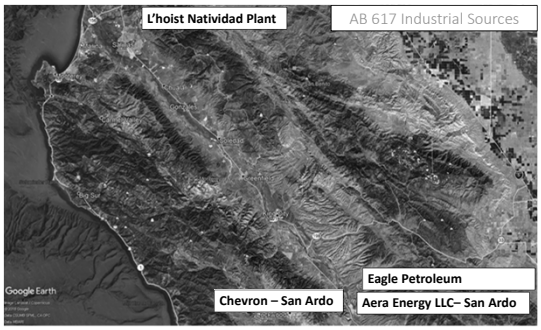
- The Health & Safety Code requires an air district that is nonattainment for one or more criteria pollutants to adopt an expedited rule development schedule that implements Best Available Retrofit Control Technology (BARCT).
  - Rule 441 is the first rule to implement the Board approved BARCT schedule.
- BARCT requirements only apply to industrial sources subject to the State Cap & Trade program as of January 1, 2017.
  - There are four industrial sources located in Monterey County.
- Applies to units rated at 2+ MMBTU/hr

Outreach

- Kickoff meeting on May 23, 2019 with affected industry stakeholders.
- Site visit with affected industry stakeholders on June 12, 2019.
- Site visit with burner manufacturer on October 29, 2019
- Advisory committee meeting on December 5, 2019
- Public Workshop on January 15, 2020.

Background

- Approximately 40 units in the District
  - Located at four facilities: L'hoist North America of Arizona, Chevron USA Inc., Aera Energy LLC, and Eagle Petroleum, LLC
- Rule 441 will address controlling oxides of nitrogen (NOx) and carbon monoxide (CO) emissions from boilers, steam generators, and process heaters.



Proposed Rule Requirements

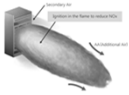
Proposed BARCT Emission Limits				
Source Category	Total Unit Rated Heat Input/Description (MMBTU/hr)	Fuel	NO_x Limit (ppmv @ 3% O_2)	CO Limit (ppmv @ 3% O_2)
Boilers & Process Heaters	≥ 2 to < 5	Gaseous	30	400
	≥ 5 to < 20		15	400
	≥ 20		9	400
Oilfield Steam Generators	≥ 2	Gaseous	15	400

NOx Emission Reductions Example: Oilfield Steam Generators

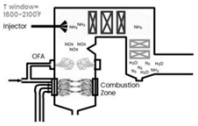
- Current Permit Limits: 180 -280 ppm
- Source Test Data: 50 -75 ppm
- Rule 441 Limit: 15 ppm
- Calculated range of emission reductions from 50% - 75% operating capacity.

Retrofit Control Technology

- Ultra Low NOx Burner
  - Cost-effective



- Ultra Low NOx Burner + Selective Catalytic Reduction
  - Not cost-effective



Compliance Schedule

- Submit a written plan detailing the method of achieving compliance of emission limits by December 31, 2020.
- Application required by December 31, 2021
- Demonstrate final compliance of emission limits by December 31, 2023

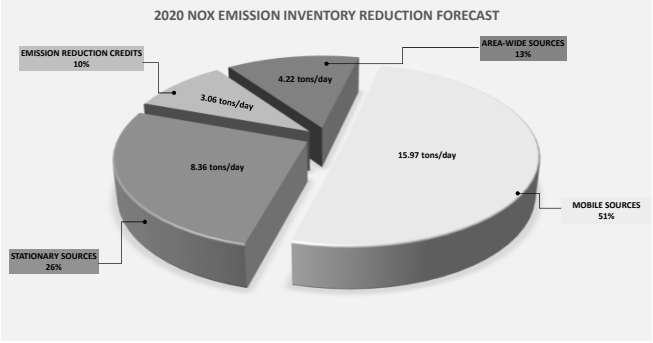
Exemptions to BARCT Limits

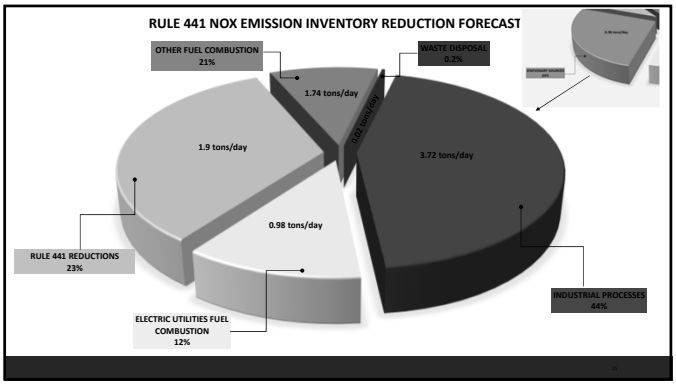
- Low-use units, < 90,000 therms or 9 billion BTUs per year.
- Units that use < 10% of its maximum heat input capacity while meeting a NOx limit of 30 ppmv and a CO limit of 400 ppmv.
- Units that were non-operational throughout 2019.
- Operation of units during curtailment conditions, up to 200 hours per year.

Low-use and non-operational units become subject to BARCT limits if status changes, and must meet Compliance Schedule outlined in rule.

Rule Impacts

Reduces NOx by approximately 694 to 1,390 tons per year

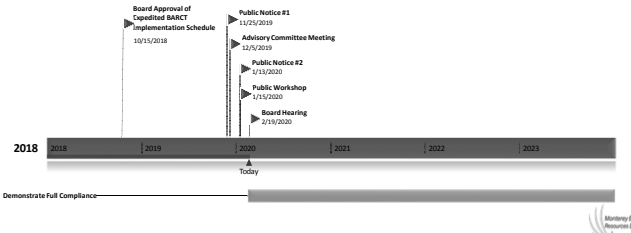




Cost-Effectiveness

- Cost ranges from $2,800 to $26,318/ton of NOx reduced, depending on the size of the unit
- Cost-effectiveness
  - Includes capital cost, operating cost, and maintenance cost

Timeline



Questions?

Seong Kim
Air Quality Engineer II
skim@mbard.org

Calendar Year 2019 Engineering and Compliance Activity Data

AMY CLYMO
ENGINEERING AND COMPLIANCE MANAGER

FEBRUARY 19, 2020

Monterey Bay Air Resources District

Outline

- Description of Engineering and Compliance
- Activity Data

Engineering

- Evaluate permit applications for compliance with federal, state, and local rules and regulations
- Issue permits with operating conditions
- Develop rules and regulations
- Report annual stationary source emission inventory

Engineering Data

Activity	Calendar Year 2019
Permit Applications Received	416
Authorities to Construct Issued	171
Startup Inspections	123
Permits to Operate Issued	344
Agricultural Diesel Engine Registrations	4
Title V Permits Issued	2
Emission Reduction Credits Issued	2

Permitted Units

Emergency Engines - 1,124

Retail Gas Stations - 225

Paint Spray Facilities - 302

Boilers – 204

Prime Engines - 150

Siloxane treatment system (yellow vessels)

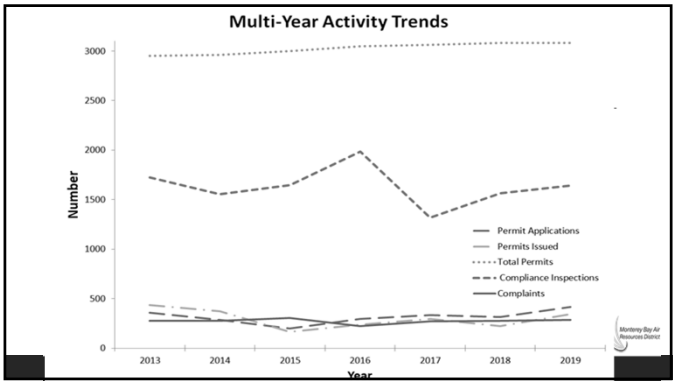
Dual Fuel Boiler (natural gas and digester gas)

Compliance

- Conduct inspections of permitted sources
- Ensure compliance with permit conditions
- Take enforcement action for violations
- Ensure compliance with the federal asbestos regulation
- Respond to complaints

Compliance Data

Activity	Calendar Year 2019
Compliance Inspections	1,643
Notices to Comply	232
Notices of Violation	59
Asbestos Inspections	151
Complaints Received	285
Breakdowns Received	19
Source Tests Observed	39
Variance Orders Issued	1

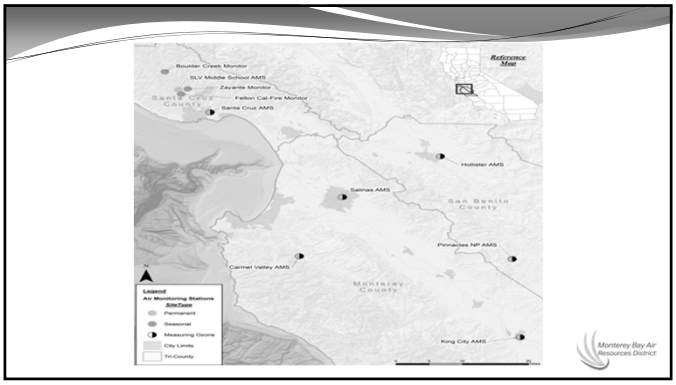


Questions?

Air Monitoring Summary for 2019

Monterey Bay Air Resources District

Board Report
February 19, 2020



Carmel Valley

Salinas

Instrument Rack - Front

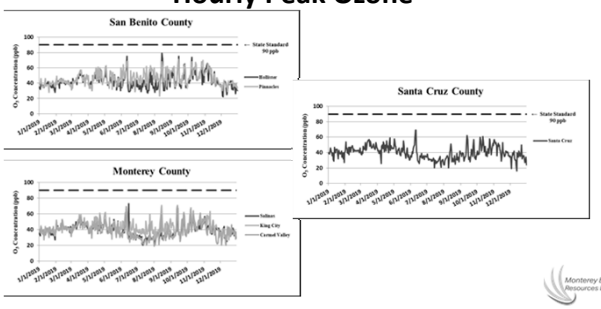
Instrument Rack - Back

Partisol Sampler

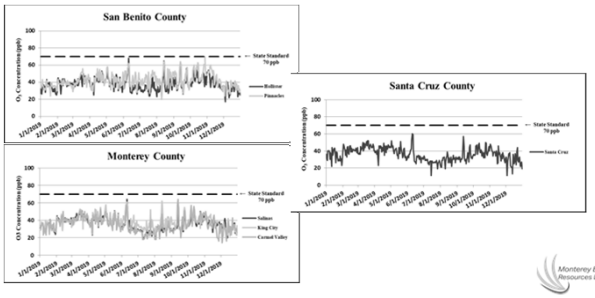
Ambient Air Quality (Daily) Standards

Pollutant	Averaging Time	California Standards	National Standards	
		Concentration	Primary Concentration[3]	Secondary Concentration[4]
Ozone	1 hour	0.09 ppm	--	--
	8 hour	0.070 ppm	0.070 ppm	0.070 ppm
PM2.5	24 hour	---	35 μg/m³	Same
PM10	24 hour	50 μg/m³	150 μg/m³	Same

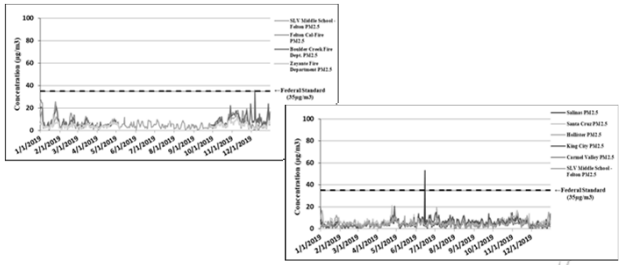
Hourly Peak Ozone



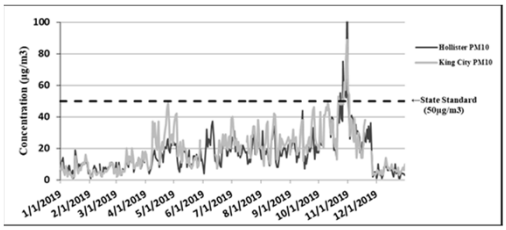
Daily 8-Hour Peak Ozone



PM2.5 Concentrations



PM10 Concentrations



Attainment Status

Pollutant	State Designation	Federal Designation
Ozone (O_3)	Nonattainment-Transitional	Attainment
Inhalable Particulates (PM_{10})	Nonattainment	Attainment
Fine Particulates ($PM_{2.5}$)	Attainment	Attainment
Carbon Monoxide (CO)	Monterey Co.-Attainment	Attainment
	San Benito Co.-Unclassified	Attainment
	Santa Cruz Co.-Unclassified	Attainment
Nitrogen Dioxide (NO_2)	Attainment	Attainment
Sulfur Dioxide (SO_2)	Attainment	Attainment
Lead	Attainment	Attainment

Discussion and Questions….

WINERY EMISSIONS AND AIR DISTRICT RULE APPLICABILITY

MARY GIRAUDO, ENGINEERING SUPERVISOR
BOARD OF DIRECTORS
FEBRUARY 19, 2020

Monterey Bay Air Resources District
www.mbard.org

Presentation Overview

- Wineries in District
- Winery Emissions and Emission Controls
- Rule 201 Permit Exemptions and Rule 207 New Source Review
- SB288 - Rule Revision Process
- Impact of Proposed Revisions to Rule 207

Wineries in Monterey, Santa Cruz, & San Benito Counties

- 192 Wine Producers and Blenders in MBARD Jurisdiction
  - 110 in Monterey County
  - 68 in Santa Cruz County
  - 15 in San Benito County
- 180 facilities qualify for permit exemption (94% of facilities)
- 13 wineries require local District permits
  - 11 permitted wineries
  - 2 wineries in permit application phase
- 1 winery requires a Federal Title V permit – Federal Major Source Threshold 100 tons per year

Attainment Status of Ambient Air Quality Standards (AAQS)

- MBARD is in attainment with all national AAQS
- MBARD does not meet State ozone and PM_{10} AAQS
- Volatile Organic Compound (VOC) emissions are precursors to ozone and PM_{10}

Air Emissions from Wineries

- Fermentation produces (carbon dioxide and ethanol)
- Oak barrel aging and storage (ethanol) "The Angel's Share"
- Fermentation emissions occur during peak ozone season, late summer/early fall
- Ethanol = VOC = ozone and PM_{10} precursor

Winery	City	Fermentation VOC Emissions (lbs/day)	Permitted Fermentation Throughput (gallons/year)	Aging & Storage VOC Emissions (lbs/day)	Permitted Aging/Storage Throughput (gallons/year)
Constellation Brands	Gonzales	1,808	30,437,595	326	4,130,000
The Wine Group	Soledad	268	9,500,000	105	2,183,000
Franciscan Vineyards	Soledad	250	4,515957	163	2,065,000
Delicato	Paicines	499	9,734,176	TBD	TBD
Kendall-Jackson	Soledad	236	5,906,952	60	2,655,000
Delicato	King City	234	4,000,000	45	590,000
Scheid Vineyards, Inc.	Greenfield	156	5,439,896	13	177,000
Monterey Wine Co.	King City	176	3,500,000	12	153,000
J. Lohr Winery	Greenfield	95	3,479,600	42	2,997,081
Conundrum Winery	Salinas	< 25	1,010,000	40	527,401
KVL Holdings Inc.	Soledad	< 25	563,000	20	241,900

2018 EMISSIONS INVENTORY REPORTING
(stationary sources >10 tons per year)

FACILITY NAME	VOC (tons/year)
CONSTELLATION WINES (Gonzales Winery)	85.38
CHEVRON U.S.A.	45.83
DYNEGY MOSS LANDING	38.94
AERA ENERGY, LLC - SAN ARDO FIELD	37.48
THE WINE GROUP - GSV SOLEDAD WINERY	26.33
ESTANCIA WINERY	20.88
JACKSON FAMILY WINES - MONTEREY	15.59
THRESHOLD ENTERPRISES	13.16
SCHEID VINEYARDS - WINERY	9.67
CITY OF SANTA CRUZ WWTP	4.77
MRWMD	4.61
MONTEREY ONE WATER (formerly MRWPCA)	3.16
SANTA CRUZ ENERGY, LLC (SC landfill)	3.01
CITY OF WATSONVILLE WWTP	1.97
LHOIST (formerly CHEMICAL LIME)	1.50
GRANITE ROCK - AROMAS	1.25
CALPINE KING CITY COGEN	0.84
AMERESCO SANTA CRUZ ENERGY LLC (Buena Vista)	0.49
AMERESCO SANTA CRUZ ENERGY LLC (Johnson Canyon)	0.12
WASTE SOLUTIONS GROUP OF SAN BENITO, LLC	0.11
TOTAL =	315.09
TOTAL VOCs from Wineries =	157.85
VOC Percent from Wineries =	50%

Stationary Source Emissions Inventory (> 10 tons per year)

20 sources >10 tpy, includes 5 wineries

VOC emissions from 5 wineries = 158 tons per year

50% of VOC from wineries

Constellation Brands US Operations, LLC dba Gonzales Winery

Franciscan Vineyards dba Estancia Estates
The Wine Group dba Golden State Vintners

Local Rules (201 and 207)

- Rule 201 establishes permit exemptions
- Rule 207 establishes permit emission thresholds for emission control and offsets

Rule 201 Permit Exemptions

- Wineries in operation as of May 14, 1997 with an annual production rate less than 1.25 million gallons.
- New or reconstructed, as defined in Rule 207, wineries with annual production rate less than 150,000 gallons.

Air District Exemption Comparison

District	Reference	Exemption Threshold Limits
Santa Barbara County APCD	Rule 202	Emissions from fermentation, aging and bottling with actual emissions less than 1 ton per year (if no aging, equivalent to 322,581 gallons red wine)
San Joaquin Valley APCD	Certification Statement	Annual production rate less than 47,600 gallons
San Luis Obispo APCD	No Specific Rule Exemption	By policy wineries are not permitted but they are "registered" and pay renewal fees
Bay Area AQMD	Regulation 2, Rule 1	Fermentation tanks for wine
	2017 Clean Air Plan, Further Study Measure	Review emissions generated by fermentation at wineries and breweries to determine if reductions can be achieved

Rule 207 New Source Review

Federal and state emission thresholds for permit review:

- Best Available Control Technology (BACT)
- Offsets

Rule 207 BACT and Offset Thresholds

	Best Available Control Technology (BACT)	Offsets	Offset Exemptions
FEDERAL	≥ 150 lbs/day facility-wide aggregated emissions	≥ 150 lbs/day facility-wide aggregated emissions	APCO discretion upon demonstration of findings
			< 10 tons per year (Rule revision in 2006)
STATE	≥ 25 lbs/day individual permit unit	25 tons/year (Health and Safety Code)	NA
		137 lbs/day facility-wide aggregated emissions (Rule 207)	< 10 tons per year (Rule revision in 2006)

Equivalency of Tons/Year to Pounds/Day

$$25 \frac{\text{tons}}{\text{year}} \times \frac{1 \text{ year}}{365 \text{ days}} \times \frac{2000 \text{ lbs}}{1 \text{ ton}} = 137 \frac{\text{lbs}}{\text{day}}$$

District Board Required Findings

- ✓ If District is in attainment with all national ambient air quality standards, revisions will not impair or impede continued maintenance of national standards or progress toward achieving attainment of State ambient air quality standards.
- ✓ The revised rule will not exempt, relax or reduce the obligation of any major stationary source, as those rules existed on December 30, 2002, to obtain a permit or **meet best available control technology requirements.**
- ✓ Consistent with Division 26 Air Resources procedural requirements.
- ✓ Consistent with environmental justice guidance.

Rule 207 BACT and Offset Thresholds

	Best Available Control Technology (BACT)	Offsets	Offset Exemptions
FEDERAL	≥ 150 lbs/day facility-wide aggregated emissions	≥ 150 lbs/day facility-wide aggregated emissions	APCO discretion upon demonstration of findings
			< 10 tons per year (Rule revision in 2006)
STATE	≥ 25 lbs/day individual permit unit	25 tons/year (Health and Safety Code)	NA
		137 lbs/day facility-wide aggregated emissions (Rule 207)	< 10 tons per year (Rule revision in 2006)

Next Steps to Increase Offset Threshold to 25 Tons/Year

- Propose Revisions to Rule 207
- District Board adopt required findings
- CARB Executive Officer appoints hearing officer to conduct public hearing to review rule revisions and Board findings

Rule Impacts on Best Available Control Technology (BACT) Requirements

- RULE CHANGE WOULD NOT ALLEVIATE THE NEED TO INSTALL BACT IF THRESHOLDS EXCEEDED
- Two systems have been achieved in practice and cost effective in Santa Barbara County. Units are published in the BACT clearinghouse for closed-top tanks ≤ 30,000 gallons capacity.
- For tanks > 30,000 gallons capacity, cost analysis will be required.
- Emission controls allow wine industry to grow in CA while still achieving air quality goals.

Winery	Facility-Wide VOC Emissions (tons/year)	Exceeds Offset Thresholds*	Fermentation VOC Emissions (lbs/day)	Exceeds BACT Thresholds	Allowable Fermentation Throughputs (gallons/year)	2018 Fermentation Throughputs (gallons/year)
Constellation Brands	144.0	YES	1,808	YES	30,437,595	29,283,867
The Wine Group	44.8	YES	268	YES	9,500,000	5,030,805
Franciscan Vineyards	43.2	YES	250	YES	4,515,957	3,974,523
Delicato (SB)	23.0	YES/NO	499	YES	9,734,176	2,954,090
Kendall-Jackson	22.4	YES/NO	236	YES	5,906,952	3,916,425
Delicato (Mty)	18.8	YES/NO	234	YES	4,000,000	2,456,522
Scheid Vineyards, Inc.	15.8	YES/NO	156	YES	5,439,896	4,973,332
Monterey Wine Co.	14.2	YES/NO	176	YES	3,500,000	2,636,390
J. Lohr Winery	12.2	YES/NO	95	YES	3,479,600	1,591,723
Conundrum Winery	9.2	NO	< 25	NO	1,010,000	706,460
KVL Holdings Inc.	6.5	NO	< 25	NO	563,000	562,366

*Difference if offset threshold 137 lb/day vs. 25 tons/year

Rule Impacts of Increased Offset Threshold to 25 Tons/Year

- Rule change would allow 6 wineries to increase the overall VOC emissions by 43.6 tons/year (87,000 lbs/year) before triggering offset requirements.
- Emissions equivalent to a production rate of either 14 million gals/year red wine, or 35 million gals/year white wine.
- Represents a 31% increase in production rates from our permitted wineries (based on an assumed average of 24.5 million gallons).
- Foresee rule change providing additional growth for the emerging cannabis and composting industries.

Questions?

Mary Giraudo
Supervising Air Quality Engineer
mgiraudo@mbard.org

aromatica

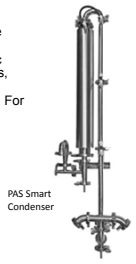
Innovation for Fermentation

Q1, 2020

1

Background

- Our process captures vapors released during wine fermentation.
- These are water, ethanol, and other volatile aromatics, with CO2 as the driver and carrier gas.
- Our proprietary condensers convert these vapors into a highly aromatic wine spirit that can be used to make better wine, increase winery profits, and expand sustainability.
- Chilled condensers as air quality controls have been used for decades. For example, in 1982, Fresno County APCD identified condensation as the most cost-effective technology for winery emissions.[1]
- Our development work has focused on the unique winery application
  - Increasing capture efficiency without compromising the winemaker's art
  - Lowering capture costs
  - Demonstrating byproduct value
  - Maximizing ease of use for cellar crews



PAS Smart Condenser

[1] "Winery emission control in California," Fresno County Air Pollution Control District, September 1982

Achieved in Practice: Centralized or Distributed

PAS-100 system, manifold to 24 fermenting tanks, ~200K gallons

PAS-10, Single Tank

3

Achieved in Practice: Indoors or Out

Smart Condenser Advantages

- Designed Specifically for Wineries
  - Condenser designs to maximize capture efficiency without pressure in tank headspace
- Zero Water Use
- Zero Waste Stream
  - Aromatic wine spirits valued at up to $400/gal. (~20X annual capture cost)
- Low Energy Use
- Self Cleaning
  - CO2 and Ethanol is essentially a cleaning solvent
  - Basic engineering (check valves, foam screens, etc.) to prohibit contamination of manifolds
- Designated as Achieved in Practice BACT
- Low Cost
  - <$.01/bottle (avg. cork cost is $0.10-0.25)

5

aromatica

Thank You

6

Cost Model: 1.5-million Case Winery

Cases Produced	1,500,000	
Potential to Emit (tpy)	11.2	
Controlled Emissions (@67%)	7.5	
Capture Equipment	$ 564,691	Incl. manifolding and all direct and indirect costs
Annualized (CRF .0963)	$ 54,404	
Annual Costs	$ 35,901	Includes disposal fee
Total Annual Cost	$ 90,305	
$/ton of VOC	$ 12,047	
$/case	$ 0.060	
$/750ml bottle	$ 0.005	

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Independent Winemaker Taste Testing

The following are comments extracted from a variety of recent tastings and trials using Aromatica wine spirits:

- *"Improved my premium wine. Turned a standard Cab into a brooding Prisoner. Made it even more 'flawless'"*
- *"Much improved mouthfeel"*
- *"Wine nose, aromas, and bouquet improved; took a relatively flat/tired wine and gave it new life"*
- *"Using less expensive grapes, was able to blend in Aromatica and achieve a higher target style and quality"*
- *"Improved wine that had vegetative smell and taste"*
- *"Restored aromatics to a wine damaged by aggressive RO filtration required to fix a VA problem." (Note: This Pinot Noir subsequently won a Silver Medal at the SF Chronicle competition).*
- *"This could give our lower tier wines 'over the top' aromatics and a more fruit forward presentation"*
- *"Possibilities are infinite…"*
- *"Pretty impactful…in a nice way. Increased black fruit flavor"*
- *"Could see it being used in an older wine to bring bouquet and mouthfeel back up; lifts the wine stylistically"*
- *"Added tropical fruit and butter"*
- *"Very impressive…"*

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AGENDA ITEM NO. 8

NoMoVo

No More Volatiles

REGULATION DRIVING INNOVATION

A SOLUTION TO VOC CAPTURE, CONTROL & REUSE

WINE INDUSTRY SUSTAINABILITY STATEMENTS

Responsibility for the stewardship of our planet is a growing challenge — it's one we work hard to champion.

Conducting our business in an environmentally responsible manner to help mitigate our impact on water, air and soil.

Sustainable winegrowing is a comprehensive set of practices that are environmentally sound, socially equitable and economically viable.

A HISTORY LESSON…

	Regulation		*Innovation*		*Result*
GM	Cap on VOC emissions from solvent based paints.	⇨	Water based pigment and clear coat paints.	=	More resilient paints reducing warranty claims.
Frito Lay	Limit on PM10 emissions from chip fryers.	⇨	Inline stack recovery system removing oil from steam exhaust.	=	Reclaim of up to 5% of oil used in production.
Starbucks Coffee	Limit on PM10 emissions from coffee roasters.	⇨	Introduction of Catalytic Oxidizers for emissions.	=	Fuel savings versus thermal & heat recovery.

WINE INDUSTRY KNOWLEDGE

Jackson Family Wines · Miller Family Wine Company · J. Lohr Vineyards & Wines · Constellation Brands · Covey Run · Columbia Winery · Treasury Wine Estates · Beringer Blass Wine Estates Est 1876 · E&J Gallo Winery

A WINE STORY

Regulation → SBCAPCD enforcement of daily VOC limits from wine fermentation, using AP-42 calculations.

$$EF = (0.136T - 5.91) + [(B - 20.4)(T - 15.21)(0.00085) + C]$$

Innovation
- R&D spans from 2009 thru 2014 with the evolution to version 4.0, the current platform.
- BAAQMD performs independent efficiency tests in 2011 & 2013 resulting in +90% capture.

Status
- AIP: v4.0 successfully operating for 6 consecutive harvests.
- BACT: Granted in August 2017 by SBCAPCD
- Patents:
  - US-879170-02-US-NAT – granted August 2018
  - US-879170-03-AU-NAT – granted November 2018
  - US-879170-04-EU-NAT – published

CONFIGURATIONS

MOBILE or DEDICATED

- MODEL 1836, up to 60,000 gallons of actively fermenting wine
- Self contained
- Plug & Play
- Easily moved by fork truck
- Good when flexibility is required, and tank use is random
- Or a few tanks are dedicated to fermentation

NETWORKED TANK SYSTEMS

- Model 2448, up to 100,000 gallons of actively fermenting wine
- Designed to be connected to bank of tanks via exhaust piping system
- Separate slurry tank for quick changeover
- Integrated CIP (clean-in-place)

photo credit to WESCO Tank Co.

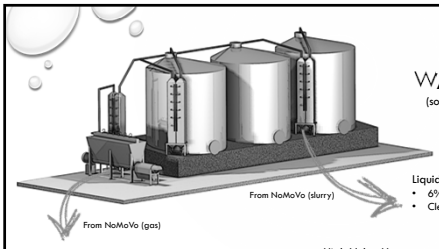
1 2 3 ... n

LARGE FERMENTATION TANK CLUSTER

- For tank systems with more than 100,000 gallons of actively fermenting wine
- NoMoVo units can be interconnected to provide unlimited capture capacity on tanks of any size.
- Easily integrated into existing tank farm controls systems.

CO_2 MANAGEMENT

- With an interconnected tank system to NoMoVo, it can exhaust CO_2 directly outside reducing risk to employees and costly air changes
- Some facilities have CO_2 exhaust systems and NoMoVo can connect directly to those systems



From NoMoVo (slurry)

From NoMoVo (gas)

WASTE TO WORTH

(solutions to lower operational costs)

Liquid Captured
- 6% to 14% Ethanol
- Clear ETOH & water-based solution

Uncontaminated CO_2
- Compressed as inert gas
- Combined with compounds for sequestering

High Value Uses
- Blended back into wine tanks to balance alcohol levels
- As a standalone beverage that can be flavored (Wine Vodka)
- In the production of liquors or blended / flavored beverages.
- As a pre-cleaning solution for winery tanks and equipment
- As push in transfer pipes water between wine batches to minimize wine loses

FAQ..?

Is there an impact to the wine..?

No. The system cleans the discharged off-gases that are part of the normal fermentation process.

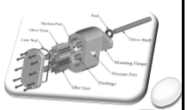
What happens if the tank has a foamover..?

In the rare occurrence of a foamover, the system is cleaned-in-place, recharged with process water and can immediately be put back online.

Are there specialized wear parts..?

The core system has no moving parts, so minimal wear and tear.

Circulation pumps, temperature regulators, filters and sensors are all standard wine operations components.



AGENDA ITEM NO. 8

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