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DATE: September 17, 2020

TO: SJVUAPCD Governing Board



FROM: Samir Sheikh, Executive Director/APCO  
Project Coordinator: Jonathan Klassen

RE: **ITEM NUMBER 12: RECEIVE UPDATE ON 2020  
AGRICULTURAL BURNING REPORT**

**RECOMMENDATION:**

Receive an update on progress in preparing the District's 2020 Staff Report and Recommendations on Agricultural Burning.

**BACKGROUND:**

The San Joaquin Valley, in adherence with applicable state laws instituted under SB 705 (2003 Florez), has the toughest restrictions on agricultural burning in the state. The District's regulations no longer allow the burning of all field crops (with the exception of rice), almost all prunings and almost all orchard removals. The District also operates a comprehensive Smoke Management System (SMS), which only allows the limited categories of burning that are still permissible to take place on days with favorable meteorology and in amounts that will not cause a significant impact on air quality.

Until 2014, the restrictions imposed by the District resulted in an 80% reduction in the open burning of agricultural waste. The exceptional drought conditions that the Valley experienced from 2012 to 2016 resulted in hundreds of thousands of acres of orchards, vineyards and other agricultural crops being fallowed or removed. These conditions, paired with the demise of the biomass industry which had previously provided the primary alternative to agricultural burning for a significant amount of the agricultural waste generated in the Valley, has created a severe waste disposal issue.

Per the requirements in District Rule 4103 (Open Burning), every five years the District must review and make recommendations on agricultural burning in the Valley. Under state law, open burning for agricultural crop categories are required to be phased-out under a prescribed schedule, unless certain findings are made with respect to the availability of funding and economically feasible alternatives to open burning. In implementing these state requirements, District staff have successfully phased-out the open burning of the majority of crop types, and have postponed prohibitions for the remaining categories where feasible alternatives and funding have not been available. In 2015, the District prepared the most recent report, the *2015 Agricultural Burning Review* (2015 Report), which re-evaluated the technological and economical feasibility for the crop categories that had previously had burning prohibitions required by the rule postponed, due to a lack of feasible alternatives of eliminating the agricultural material. Based upon the 2015 Report, CARB provided concurrence through 2020 on the District's recommended postponements.

In accordance with CARB's five-year concurrence and requirements set forth in Rule 4103, the District is again evaluating the economic and technologic feasibility of removing the current postponement of burning prohibitions for certain crop categories. District staff are actively working with agricultural industry stakeholders, CARB, USDA-NRCS, and other partners to identify and promote alternatives to open burning in the Valley. The purpose of this item is to provide an informational update on District staff's work to date, in advance of a planned December 2020 public hearing for your Board to consider staff recommendations on the feasibility of further potential prohibitions on agricultural burning in the Valley.

## **DISCUSSION:**

The District has reduced emissions from agricultural burning significantly to date by prohibiting the open burning of a variety of field crops, prunings, weeds, orchards, vineyards, surface harvested prunings, and other materials. State law, as codified in California Health and Safety Code (CH&SC) Sections 41855.5 and 41855.6, and incorporated into District Rule 4103 (Open Burning), outlined a phased-in approach to the prohibitions. Through prior actions, your Board amended Rule 4103 to include specific requirements as outlined in the first three phases of the CH&SC. In September 2004, your Board amended Rule 4103 to include specific requirements that must be met for the burning of diseased crops. In May 2005, the rule was further amended to include best management practices for the control of other weeds and maintenance, as well as eliminate burning of waste from field crops, some types of orchard prunings, and weed abatement operations. These amendments implemented the burn prohibition for 90% of the crops identified in those categories. The May 2007 amendments to the rule further prohibited open burning of orchard removals, except for citrus crops, pome fruit crops (apple, pear, and quince), fig crops, and any other orchard removal that is less than 20 acres. The most recent amendment in April 2010, further prohibited open burning of brooder paper, deceased goats, grape canes, prunings of grape vines and fig

crops, and orchard removals of greater than 15 acres, excluding citrus crops and pome fruit crops.

Additionally, the 2010 amendment incorporated the requirement to prepare a “Staff Report and Recommendations on Agricultural Burning” for Board review and approval at least once every five years. In 2012, based on discussions with U.S. EPA, the District further restricted the open burning of citrus orchard removals. In 2015, the District prepared the most recent report, the *2015 Agricultural Burning Review* (2015 Report), which re-evaluated the technological and economical feasibility for the crop categories that had previously had burning prohibitions required by the rule postponed, due to a lack of feasible alternatives of eliminating the agricultural material. Based upon the 2015 Report, CARB provided concurrence through 2020 on the District’s recommended postponements. The current open burn prohibitions for various crop categories are summarized in the following table.

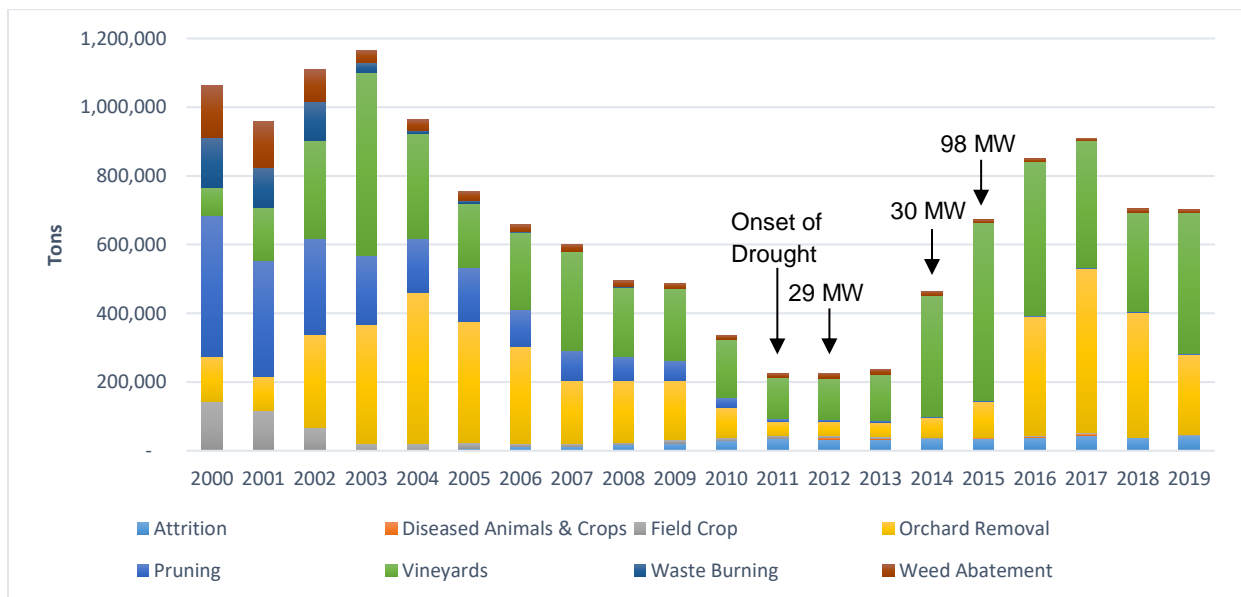
**Table 1 Agricultural Materials Prohibited from Open Burning**

Date	Crop Category	Agricultural Material Prohibited from Open Burning
2005	<b>Field Crops</b>	Alfalfa, asparagus, barley stubble, beans, corn, cotton, flower straw, hay, lemon grass, oat stubble, pea vines, peanuts, safflower, sugar cane, vegetable crops, and wheat stubble
	<b>Field Crops</b>	Rice Stubble: No more than 70% of operator’s acreage can be burned
	<b>Prunings</b>	Apricot crops, avocado crops, bushberry crops, cherry crops, Christmas trees, citrus crops, date crops, eucalyptus crops, kiwi crops, nectarine crops, nursery prunings, olive crops, pasture or corral trees, peach crops, persimmon crops, pistachio crops, plum crops, pluot crops, pomegranate crops, prune crops, and rose crops
	<b>Weed Abatement</b>	Berms, fence rows, pasture, grass, and Bermuda grass
2007	<b>Field Crops</b>	Rice Stubble: No more than 50% of the operator’s acreage can be burned
	<b>Orchard Removals</b>	Orchard removal matter for all crops with the exception of citrus, apple, pears, quince, and fig crops, and from 20 acres or less at a single location
2010	<b>Orchard Removal Matter</b>	Small Orchards: Reduced burn allowance to 15 acres or less per location per year (includes fig crops)
	<b>Other Materials</b>	Brooder paper, deceased goats
	<b>Field Crops</b>	Rice Stubble: Modified schedule to phase out by June 2015
	<b>Prunings</b>	Fig Crops

Date	Crop Category	Agricultural Material Prohibited from Open Burning
	<b>Surface Harvested Prunings</b>	Almond, Walnut, and Pecan: Prohibit burning for each ag operation whose total nut acreage at all sites is 3,500 acres or more (allows burning of up to 20 acres per year for sites less than 3,500 acres)
	<b>Vineyard Materials</b>	Grape vines, grape canes
<b>2012</b>	<b>Orchard Removals</b>	Citrus orchard removals over 3,500 acres are not allowed to burn as of 2012. Citrus orchard removals under 3,500 acres are allowed to burn on a case-by-case basis, depending on feasibility of alternatives

While the requirements of District Rule 4103 achieved significant reductions in open burning through 2013, recent years have seen an increase in open burning due to a variety of reasons, as illustrated in the figure below. Until 2014, the restrictions imposed by the District resulted in an 80% reduction in the open burning of agricultural waste. The exceptional drought conditions that the Valley experienced from 2012 to 2016 resulted in hundreds of thousands of acres of orchards, vineyards and other agricultural crops being fallowed or removed, and ongoing crop transitions have continued to exacerbate the challenge with respect to the disposal of agricultural materials. Additionally, in recent years, a significant number of existing biomass plants that historically provided an outlet for agricultural materials have shut down due to evolving energy markets and lower energy prices offered by utilities upon contract renewal. These conditions have resulted in significantly increased challenges in providing sustainable, feasible alternatives to the open burning of agricultural waste.

**Figure 1 Annual Tons of Material Burned Compared to Decrease in Megawatt Capacity at Biomass Plants**



In November 2015, your Board directed staff to take actions aimed at short-and long-term measures to alleviate the effect on agricultural growers of the biomass capacity shortfall in the Valley and to identify cleaner alternatives to agricultural open burning. As a part of the District's efforts to identify and advance cleaner alternatives to open burning of agricultural waste, in November 2017, the District convened the Central Valley Summit on Alternatives to Open Burning of Agricultural Waste to bring together Valley growers, researchers/experts, representatives from the biomass power industry, representatives from new and developing technology vendors, and Valley stakeholders. Over the course of the two day Summit, the comprehensive agenda explored the history of agricultural burning regulations in the Valley, the current state of agricultural burning and alternatives, air quality impacts associated with open burning, challenges faced in other regions of the state, and the opportunities and challenges of implementing alternatives to open burning of agricultural waste.

Your Board has subsequently taken action to pursue a number of alternatives to open burning, including adoption of a new incentive program in November 2018, to assist growers in demonstrating new on-field practices for the disposition of agricultural materials. This well-subscribed program provides incentives for growers to chip, shred, or mulch woody agricultural material as an alternative to the open burning of these materials. Recognizing the variety of agricultural operations in the Valley, the program allows growers to select from several on-field uses for chipped agricultural materials from orchard or vineyard removals, such as soil incorporation (whole orchard recycling) and land application of mulch. Since November 2018, your Board has allocated \$8,000,000 into this program, which has funded soil incorporation and land application projects to assist with the disposal of nearly 17,000 acres of agricultural material. Data received through the implementation of this incentive program has provided District staff with valuable data as to the cost and feasibility of soil incorporation for various crop types, which will assist in the preparation of future recommendations for agricultural burning.

Based on the discussions at the Summit, it was determined that air curtain burn boxes may serve as one potential feasible alternative to significantly reduce emissions from open burning of agricultural and other wood waste materials. Towards that end, in February 2018, your Board directed staff to explore the feasibility of utilizing air curtain burn boxes to dispose of agricultural wood waste materials, and in December 2018, subsequently adopted amendments to District Rule 2280 (Portable Equipment Registration) to streamline permitting requirements and facilitate the use of air curtain burners in the Valley.

Additionally, District staff has spent considerable time and effort and will continue to look for paths forward to find ways to assist with keeping biomass a viable alternative to open burning in the short-term until longer-term solutions can be found. Working with legislators and stakeholders we have sought out possible short-term and long-term solutions to these problems. This included petitioning the District's independent Hearing Board for a Stipulated Order of Abatement. On December 16, 2015, the Hearing Board granted the Stipulated Order of Abatement to allow the burning of

orchard removal material in situations where no economically feasible alternative is available due to the current state of biomass capacity in the Valley. As a part of reviewing feasible alternatives to the open burning of agricultural materials, District staff will also make determinations as to the necessity of the continuation of the Stipulated Order of Abatement. As is the case for all agricultural burning in the Valley, the burning conducted pursuant to the Stipulated Order of Abatement has been carefully controlled and monitored through the District’s Smoke Management System to prevent emissions from these burns creating or significantly contributing to a violation of federal air quality standards.

**2020 Evaluation of Feasibility of Further Prohibiting Open Burning**

The upcoming 2020 Agricultural Burning Report will evaluate the feasibility of prohibiting burning for currently postponed crop categories due to the historical lack of feasible alternatives for disposal of the agricultural material (see below table). Under state law (California Health and Safety Code 41855.5 and 41855.6), the District may postpone the open burning restrictions for the remaining crop categories if all of the following conditions are met:

1. There is no economically feasible alternative means of eliminating waste.
2. There is no long-term federal or state funding commitment for continued operation of biomass facilities in the Valley or development of alternatives to burning.
3. Continued issuance of permits for that specific category or crop will not cause, or substantially contribute to, a violation of an applicable federal ambient air quality standard.
4. CARB concurs with the District’s determinations.

**Table 2 Agricultural Materials with Postponed Open Burning Prohibitions**

Crop Category	Agricultural Material With Postponed Prohibition	2015 Review Determination
<b>Field Crops</b>	Rice straw (up to 70% of planted acreage), residual rice stubble, spot burning of rice stubble, and weeds and vegetative materials on rice field levees and banks	<i>No economically feasible alternative due to fluctuations in demand for rice straw and issues with inconsistent water allocation</i>
<b>Prunings</b>	Apples, pears, and quinces	<i>Burning is only feasible alternative to prevent spread of disease (Fire Blight) which is prevalent among these crops</i>
<b>Weed Abatement</b>	Pond and levee banks	<i>No feasible alternatives due to slopes of banks and potential for contamination of water ways</i>

Crop Category	Agricultural Material With Postponed Prohibition	2015 Review Determination
<b>Orchard Removals</b>	Apples, pears, and quinces	<i>Burning is only economically feasible alternative to prevent spread of disease (Fire Blight) which is prevalent among these crops</i>
<b>Orchard Removals</b>	Citrus at farming operations with a combined citrus acreage of less than 3,500 acres on a case-by-case basis where alternatives are explored and are not feasible	<i>Case-by-case analysis allowed due to potential lack of economically feasible alternatives for smaller farming operations</i>
<b>Orchard Removals</b>	Small orchard removals less than 15 acres	<i>No economically feasible alternative below 15 acres due to high initial setup charges for chipping</i>
<b>Surface Harvested Prunings</b>	Up to 20 acres per year of almond, pecan and walnut prunings at farming operations with a combined total nut acreage of less than 3,500 acres	<i>No economically feasible alternative below 20 acres due to set-up charges and cost of shredding equipment</i>
<b>Surface Harvested Prunings</b>	Additional acres of almond, pecan and walnut prunings at farming operations with a combined total nut acreage of less than 3,500 acres on a case-by-case cost effectiveness basis	<i>Case-by-case analysis allowed due to potential lack of economically feasible alternatives for smaller farming operations</i>
<b>Vineyard Materials</b>	Raisin trays	<i>No economically feasible alternative due to polymer in the trays which slows the decomposition rate for soil incorporation and makes them unacceptable for biomass plants</i>
<b>Vineyard Removals</b>	Removals of grape and kiwi vineyards	<i>No economically feasible alternative due to the trellis wire that becomes embedded in the wood and associated high costs</i>
<b>Other Materials</b>	Diseased beehives	<i>No technologically feasible alternative for disposal</i>

**Analysis of Availability and Feasibility of Potential Alternatives to Open Burning**

The analysis required in 2020 will include a comprehensive evaluation of the feasibility of further prohibiting open burning of agricultural materials in the Valley. The availability of economically feasible alternatives to open burning is a key factor in the District’s ability to further restrict agricultural burning for the limited categories of crops that are not already prohibited from burning. Through ongoing evaluation of alternatives to agricultural open burning, input from agricultural stakeholders, technology manufacturers and vendors, and work with USDA-NRCS and other partners, District staff have identified several potential alternatives to the open burning of agricultural waste. District staff will evaluate the availability and costs of implementing various

alternatives to open burning in the Valley. In recent years, alternatives have continued to progress which may provide opportunities moving forward, but that must also be carefully evaluated with respect to availability, cost, and feasibility. Specific alternatives that will be analyzed as a part of the upcoming 2020 evaluation will include:

- **Soil Incorporation/Land Application:** Chipped or shredded agricultural biomass materials can be used to produce wood mulch. Wood mulch can be a mixture of shredded wood, bark, and compost. Wood mulch can be used in landscape projects, or for erosion control. The material is primarily used to reduce erosion by protecting bare soil from rainfall impacts, increasing water infiltration, and reducing runoff. A significant portion of pruned orchard material is currently shredded in-row and used as mulch in the orchard. The shredded material can be left on the ground or can be incorporated into the soil when the field is tilled. Recent research studies and demonstration projects have evaluated the costs and feasibility of “whole orchard recycling” or soil incorporation, where agricultural material from orchard and vineyard removals is chipped and then tilled into the soil.
- **Biomass Plants:** Biomass power plants have historically provided a significant alternative to the open burning of agricultural waste. Due to current energy policies, biomass facilities are facing a lack of funding and difficulty in sustaining ongoing operation in the face of new energy markets and pricing. The closing of numerous biomass facilities has resulted in a decrease in total megawatt capacity at Valley plants, significantly reducing available alternatives to open burning.
- **Pyrolysis/Gasification:** Pyrolysis and gasification are possible paths to convert agricultural biomass to higher value products including synthetic gas and bio-char. Burning syngas to produce power offers certain advantages over directly burning the biomass because the gas can be cleaned and filtered to remove problematic chemical compounds, and the combustion effluent can be well-controlled through emission reduction technologies. Using syngas is also potentially more efficient than direct combustion of biomass because the gas can be combusted at higher temperatures. Syngas can also be used to produce methanol and hydrogen, or converted into a liquid fuel.
- **Bio-char:** Bio-char can be created by pyrolysis or gasification of biomass, and is a high value product that can help increase the feasibility of gasification/pyrolysis projects. Bio-char can increase soil fertility and agricultural productivity. Bio-char can also be processed into activated carbon that can be used for the removal of specific compounds from gaseous and liquid streams.
- **Composting:** Composting is the process by which organic material is broken down aerobically by bacteria and other microorganisms to form a biologically stable organic substance suitable as a soil amendment and plant fertilizer. Organic waste decomposes naturally in the presence of water, warmth, and



oxygen. Composting accelerates the process by adding moisture and maintaining an elevated temperature.

- **Air Curtain Burners:** Air Curtain Burners were designed to control pollution from open burning, primarily to reduce PM or smoke. These devices are open top combustion devices with vertical, refractory lined walls that operates by forcefully projecting a fan driven pane of high velocity air over the top of the combustion chamber in such a manner as to maintain a curtain of air over the surface and a recirculating motion of air under the curtain.

### ***Economic Analysis by Third-Party Consultant***

As directed by your Board in August 2019, the District has recently contracted with a socioeconomic consultant to assist the District in conducting an economic analysis of the potential impacts of potential burning prohibitions. The consultant will prepare Valley-specific information on the costs of production of and revenues and profits for specific crop types and farm sizes. The consultant is also working to take into account the impacts of the COVID-19 pandemic on agricultural operations, and to account for these impacts in the analysis of costs of production and potential revenue for each farm type. The District's economic analysis will compare the per-acre costs for each potential alternative to the per-acre net revenue and profit for each crop category.

### ***Continued Public and Stakeholder Engagement Processes Critical***

District staff will continue evaluating available alternatives and other considerations regarding the technologic and economic feasibility of prohibiting burning for the remaining categories. Meetings with the public and stakeholders will continue through public workshops and stakeholder meetings in order to discuss and receive input to support a comprehensive report. Through input received from agricultural stakeholders, the socioeconomic consultant, and the interested public, and in close coordination with CARB, USDA-NRCS, and other partners, District staff will make determinations on potentially available alternatives to open burning, the costs of these alternatives, and the feasibility of further curtailing open burning of agricultural materials in the Valley. District staff plan to return to your Board to present the final report and recommendations for this item in December 2020.