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MEMORANDUM

Date: September 7, 2009
To: Anne Olson
From: Dan Hinrichs
Subject: Small Wineries, Evaporative Coolers **Project No: 405**

The proposed small food processor and winery waiver program includes an analysis of those processes that produce a high-TDS by-product. These processes include evaporative coolers, water softeners, and boilers. All of these processes produce a byproduct waste stream that will have a high concentration of whatever minerals and salts are present in the water supply.

The problem is determining the level at which this waste is significant enough to create a problem in the environment. Then there is the issue of how this can be put into the waiver in a manner that it does not become oppressive and/or expensive for the regulated community.

I took one of my winery clients in south El Dorado County as an example. There are two evaporative coolers that cool the winery. The coolers were designed for home use (actually purchased at Home Depot). The water supply is from a well. The vents from on the coolers develop a material deposit on them that eventually restricts air flow and cooling efficiency. The winery owner removes the vents (three on each of three sides of the unit) and simply hoses them off. The deposits readily dissolve in the water. The wastewater falls on the gravel driveway. We did an experiment where he hosed off the vent in a bin. He took a sample to the lab and measured the quantity of wastewater. The laboratory used was California Laboratory Services (CLS). The results are summarized below:

Constituents in Evaporative Cooler Wastewater

Constituent	Concentration, mg/L
TDS	12,000
Chloride	670
Arsenic	0.056
Calcium	6.30
Iron	ND
Magnesium	160
Sodium	3,100
Zinc	0.050

The TDS concentration is extremely high with very high levels of sodium and chloride.

The quantity of water from the washing operation is 2.5 gallons per side for a total of 7.5 gallons per washing. The winery has 2 coolers resulting in a total of 15 gallons per cleaning event. The coolers are cleaned twice per year. There is also a pan at the bottom of the cooler that is dumped out when the unit is cleaned. The quantity is 10 gallons per cooler. The total amount of wastewater is:

$$(7.5 + 10) \text{ gallons} \times 2 \text{ coolers} \times 2 \text{ cleanings/year} = \mathbf{70 \text{ gallons/year}}$$

With this quantity and the concentrations shown above the resulting annual loadings of TDS, Na, and Cl are as follows:

TDS	7 lb/yr
Na	1.75 lb/yr
Cl	0.4 lb/yr

In order to put this into perspective one must look at the total TDS loading on the vineyard from irrigation. A typical water application is 2 ac-ft/ac/yr. Assuming an average irrigation application of 1.5 ac-ft/ac/yr and a TDS concentration of 500 mg/L, the TDS added is 2,039 pounds. Assuming a typical sodium concentration of 40 mg/L, the sodium added is 163 pounds.

The numbers for the irrigation water are typical, since no data were obtained for

the irrigation source water. Absent more data, the difference in the order of magnitude between the two point out the insignificant impact of the evaporative cooling system wastewater.

Since the waiver applies to those food processors and wineries that produce less than 120,000 gallons per year, the impact from waste from the evaporative cooler will be insignificant.