Base Year: 1999 By: M. Nguyen

SOURCE INVENTORY

CATEGORY # 32

WINERIES/BREWERIES - AGING

1999 EMISSIONS

Introduction

This category consists of both area and point sources. The area source accounts for the ethanol emissions from aging of brandy. Brandy is produced from a distillation process, separating ethanol and other volatile substances from fermented juices. The brandy is then aged for a period of two to ten years. During the aging process, usually, in 50-gallon oak barrels, there is a considerable amount of ethanol emissions released from the barrels into the atmosphere. The point source portion accounts for organic emissions from brewery sources contained in the District's Data Bank.

Methodology

In 1987, the Wine Institute reported that 45,938,000 gallons of brandy were in storage in California. This total was distributed to the counties based on the amount of grapes crushed in each county. The "California Department of Food and Agriculture - Final Grape Crush Report" shows the amount of grapes crushed in each of the 17 growing districts in the state. The amount of grapes crushed in each county was estimated by disaggregating the total according to the proportion of the amount of grapes produced in each county. However, for 1999, tonnage of grapes crushed were taken from each county's "Agricultural Crop Report", which totals 150,355 tons in the District. This translates to about 82,883 barrels of brandy in storage at the District.

An emission factor for a 50-gallon Brandy barrel was derived by the Wine Institute. The assumption being: brandy is 120 proof (60% alcohol) on the average; and alcohol is lost during aging at a rate of 2.5% per year per barrel. This resulted in an emission factor of 4.96 lbs. ethanol per barrel of brandy.

Emissions calculation from the aging of brandy consist of multiplying the emission factor with the amount of brandy barrels in storage for each county in the District. The methodology is presently based on ARB's methodology (Section 5-2).

Emissions from point sources are calculated from operating data (throughput, emission factors, control factors, if any, etc.) submitted for each equipment as part of the permit process. This operating data is updated upon renewal of the permit.

1999 Emission Calculations

Emission Factor = 50 gal/bbl x 8.388 lbs./gal x 2.5 %/100 x .6
= 4.96 lbs. ethanol/bbl.

Assumptions : 50-gal/bbl ; sp.gr. of ethanol @60F;
2.5% alcohol loss; 120 - proof brandy

$$\text{Emissions} = \frac{82{,}883 \text{ barrels/yr} \times 4.96 \text{ lbs./barrel}}{2{,}000 \text{ lbs./ton} \times 365 \text{ days/yr}}$$

= 0.563 ton/day of ethanol

Monthly Variation

Brandy is aged for a period of years, during which emissions are released 365 days per year and 24 hours per day.

County Distribution

County distribution is based on the number of 50-gallon brandy barrels in each county. Alameda, Contra Costa, Napa, Santa Clara, Solano, and Sonoma counties are assumed to produce or to store the 50-gallon brandy barrels.

TRENDS

History

From 1970 to 1987, estimated emissions were based on the summary report of the number of alcoholic production facilities in California published by U.S. Department of Census. The number of alcoholic production facilities had been reduced in Santa Clara County due to increasing new electronic manufacturers and housing development. However, grape production has increased since 1988, therefore, emissions were estimated to be at constant level during 1988-1990. In 1993, grape crush was down approximately 7 % from the 1992 crush, and 7 % less than the record-large 1982 crush of 3,115,531 tons. Emissions from 1993 to 1998 are assumed to be constant at the 1993 production level.

Growth

Future projection of emissions were based on the food manufacturing industries taken from ABAG's "Projections" report.