

STATE OF CALIFORNIA



California Environmental Protection Agency

**AIR RESOURCES BOARD**

**STAFF REPORT: INITIAL STATEMENT OF REASONS FOR RULEMAKING**

**PUBLIC HEARING TO CONSIDER THE  
LARGE CONFINED ANIMAL FACILITY DEFINITION**

Release Date: May 6, 2005  
Scheduled for Consideration: June 23-24, 2005

## STAFF REPORT: INITIAL STATEMENT OF REASONS

### PUBLIC HEARING TO CONSIDER THE LARGE CONFINED ANIMAL FACILITY DEFINITION (Implementation of Senate Bill 700, Florez 2003)

#### Air Resources Board Meeting

Begins June 23, 2005 at 9:00 a.m.  
and may continue June 24, 2005 at 8:30 a.m.  
San Joaquin Valley Air Pollution Control District  
1990 East Gettysburg Avenue  
Fresno, California 93726

or Via Videoconference (2 Locations)

District Northern Region Office  
4230 Kiernan Avenue, Suite 130  
Modesto, California 95356

District Southern Region Office  
2700 M Street, Suite 275  
Bakersfield, California 93301

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#### **Questions**

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## EXECUTIVE SUMMARY

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The California Air Resources Board (ARB/Board) is required by State law (SB 700, Florez, Statutes of 2003, Chapter 479) to develop a definition of “large” confined animal facilities (large CAFs) by July 1, 2005. This staff report and proposed regulation are presented to comply with this provision. The local air pollution control and air quality management districts (local air districts) will use the large CAF definition in the development of rules to mitigate emissions from large CAFs.

In developing the proposed definition, ARB is required to review all available scientific information, including emission factors for CAFs and the effect of these facilities on air quality in the State’s various air basins. ARB is also directed to consider the impact of emissions from these facilities on attainment and maintenance of ambient air quality standards.

We focused our efforts primarily on two air basins – the San Joaquin Valley and the South Coast (Los Angeles region). These two regions represent California’s most challenging air quality problems for both ozone and particulate matter pollution. Based on the available science, both areas will need substantial new reductions in emissions of reactive organic gases (ROG) in order to meet the new federal eight-hour ozone standard. Whether ammonia reductions will be a key part of the attainment strategy for the new federal particulate matter standard (PM2.5) is still an open question. For these reasons, our air quality analyses have focused on the contribution of livestock ROG emissions to ozone air quality.

As shown in Table ES-1, the federal eight-hour ozone standard has been exceeded in the San Joaquin Valley over 100 days in each of the past three years (ARB 2005a). The South Coast has had nearly as many annual exceedance days. These areas also exceed California’s more stringent State air quality standards by an even larger margin. This makes the impact of emissions from CAFs in these regions a critical consideration in the development of the large CAF definition.

Table ES-1. Number of Days over the Federal Eight-Hour Ozone Standard

Year	Number of Days over the Federal Eight-Hour Ozone Standard	
	San Joaquin Valley	South Coast
2004	109	88
2003	134	109
2002	125	96

From the standpoint of attainment of ozone ambient air quality standards, ROG is the most important class of compounds emitted from CAFs. There is significant ongoing research associated with emissions factors of ROG from livestock operations, particularly with dairies and certain chicken operations. There is also a peer review process underway. ARB’s current ROG emission factor of 12.8 lbs/year/head for dairies is within the range indicated by the research to date. When the evaluation of recent research results is completed, the emission factor may be higher or lower. However,

even if the emission factor were cut in half, the aggregate ROG emissions from dairies would continue to be significant.

Overall, livestock ROG emissions are most significant in the San Joaquin Valley. The current emission estimate is 29 tons per day – mostly from dairies. Table ES-2 shows that the San Joaquin Valley accounts for about 63% of the State’s livestock ROG emissions, while the South Coast accounts for 12%. Collectively, these two regions account for about 75% of the total livestock ROG emissions in the State.

Table ES-2. Livestock ROG Emissions for 2004<sup>a</sup>

Region	Livestock ROG Emissions (tons/day)			% of Total Statewide ROG Emissions from Livestock
	Dairies	Other Livestock	Total Livestock	
San Joaquin Valley	23.5	5.5	29.0	63%
South Coast	4.6	0.7	5.3	12%
Statewide	35.7	10.1	45.8	100%

<sup>a</sup>Source: (ARB 2004a) and other methods incorporating emission factor scaling by manure output and new poultry research data.

Based on the current emission estimate of 23.5 tons/day, dairies are a significant source category of ROG emissions in the San Joaquin. Other top categories include light and medium duty trucks, passenger cars, and oil and gas production. Consumer products, paints and coatings, and gasoline marketing, are other important source categories. Each of these categories is subject to air quality regulations to reduce their emissions. Bringing dairies and other livestock categories into the mitigation plan process is an important step in reducing ROG emissions in the San Joaquin Valley.

Individually, livestock operations can also be significant sources of emissions. For example, Table ES-3 illustrates the magnitude of emissions from the 1,161 San Joaquin Valley dairies with 50 or more milking cows, compared to other facilities in the region (ARB 2005b, SJV 2005). The larger emitting facilities, those over 5 tons per year of ROG emissions, include refineries, power plants, and manufacturing facilities. The smaller facilities, those under 5 tons per year of ROG emissions, include auto body shops and gasoline service stations. These facilities, both large and small, are subject to local air district permitting and control requirements.

Table ES-3. Emissions from Dairies Compared to Other Facilities in the San Joaquin Valley

ROG Emissions (tons per year)	# of Other Facilities	# of Dairies
0 – 1	889	108
1 – 5	319	461
5 – 10	46	293
10 – 15	30	164
15 – 20	14	53
Greater than 20	44	82

The mitigation plan process that will be triggered upon ARB approval of a large CAF definition is to be implemented by local air districts. SB 700 specifies that local air

districts designated as nonattainment for the federal ozone standard as of January 1, 2004, adopt rules that require large CAFs to develop and implement a mitigation plan. Areas designated as attainment for the federal ozone standard as of January 1, 2004, are also required to develop a large CAF rule unless the local air district makes a determination that large CAFs will not contribute to a violation of any State or federal air quality standard. SB 700 requires that local air districts assess, and consider in a public hearing, the costs, cost-effectiveness, and technical feasibility of any proposed rule.

In developing the proposed definition for large CAFs, ARB staff considered input from the livestock industry, environmental and community representatives, local air districts, the public, other State and federal agencies, and academic researchers. Key factors the staff considered include the:

- severity and nature of the air quality problem in various local air districts;
- number of animals and their associated emissions per district;
- status of research on emission factors;
- efficiency in definition structure (number of animals relative to facility number); and,
- ability of local air districts to expand the definition if warranted.

After considering these factors, staff is proposing the thresholds shown in Table ES-4. The definition is designed to address the combined, aggregate air quality impacts of the livestock industry in California, with an emphasis on the San Joaquin Valley. We did not take an individual facility emissions approach in defining a large CAF because it is impractical and uncertain, in part due to the developing state of livestock emissions estimation research. At this time, facility emissions are calculated on a per animal basis pending completion and peer review of research on specific emission rates for various processes at a facility. Also, even if more comprehensive process-based emission factors were available, we would still take the head count approach in order to provide certainty in terms of the definition's applicability.

For dairies, the proposed definition is 1,000 milking cows in the ten federal nonattainment areas as defined in SB 700. In the San Joaquin Valley, this captures 72% of the milking cows and 36% of the dairies with 50 or more milking cows. There are an estimated 430 dairies of 1,000 or more milking cows in the San Joaquin Valley and 108 dairies in the South Coast. Federal attainment areas as defined in SB 700 would be subject to a threshold of 2,000 milking cows. This approach appropriately excludes the smaller farms, ranches, dairies, and other livestock facilities, while at the same time laying the groundwork for significant air quality benefits in the San Joaquin Valley and the South Coast Air Basin, the regions that need them the most.

Table ES-4. Large Confined Animal Facility Definition by Livestock Category

Livestock Category	Facilities at or Exceeding Threshold are Considered Large	
	Nonattainment Areas*	Attainment Areas*
Dairy	1,000 milk producing cows	2,000 milk producing cows
Beef Feedlots	2,500 beef cattle	5,000 beef cattle
Other Cattle Operations	7,500 calves, heifers, or other cattle	15,000 calves, heifers, or other cattle
Chickens – Broilers	650,000	1,300,000
Chickens -- Egg Layers	650,000	1,300,000
Turkeys	100,000	200,000
Swine	3,000	6,000
Sheep and Goats	15,000	30,000
Horses	2,500	5,000
Ducks	650,000	1,300,000
Rabbits, Pheasants, Llamas, Others	30,000	60,000

\*Federal 1-hour ozone designation as of January 1, 2004

The thresholds shown in Table ES-4 take into account population and operation information that highlight natural breaks in the distribution of facility sizes. These thresholds allow most of the animals to be included, while minimizing the number of facilities affected. The thresholds for all the livestock categories are also scaled to be approximately equivalent in terms of facility emissions.

Higher thresholds are proposed for the SB 700 federal ozone attainment areas primarily because livestock emissions are relatively small compared to other sources, and can be addressed by local air districts on a case by case basis. Under SB 700, local air districts retain their authority to establish requirements beyond staff's proposed thresholds and could bring in smaller sized livestock operations if warranted. We believe that allowing local air districts this discretion is appropriate since the relative importance of confined animal facilities emissions to nonattainment or other air quality problems can vary considerably. The details and complete rationale for each livestock category threshold are provided in the body of this report. The specific proposed regulatory language is provided in Appendix A.



## 1. INTRODUCTION AND BACKGROUND

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Senate Bill 700 (SB 700, Chapter 479, Florez, Statutes of 2003) made agricultural sources of air pollution subject to air quality permitting and specified emission mitigation requirements. SB 700 requires the California Air Resources Board (ARB) to develop a definition for “large” confined animal facilities (CAFs) that will trigger the requirement for an emissions mitigation plan.

The objective of this staff report is to provide the definition of large confined animal facilities for California and the supporting rationale for the recommend definition. This definition is a key step in the framework to begin reducing livestock emissions from the livestock industry. The next, and more critical step following the definition of “large,” is that the local air pollution control and air quality management districts (local air districts) must adopt rules that require large CAFs to submit emission mitigation plans. Emission reductions from the livestock industry, along with all important air pollution sources, are particularly needed in the San Joaquin Valley in order to meet health based air quality standards.

### **SB 700 Requirements for Confined Animal Facilities**

Senate Bill 700 has numerous requirements related to agricultural air emissions and agricultural permitting. This staff report focuses specifically on the large confined animal facility provision of the legislation. Relative to CAFs, there are specific requirements for ARB, the local air districts, and the California Air Pollution Control Officers Association (CAPCOA). The following sections describe these responsibilities and the overall schedule for implementation.

#### California Air Resources Board Requirements

The ARB’s key responsibility is to develop a definition for the source category of a “large confined animal facility” on or before July 1, 2005. In developing the large CAF definition, the ARB “shall review all available scientific information, including, but not limited to, emissions factors for confined animal facilities, and the effect of those facilities on air quality in the basin and other relevant scientific information,” and “shall consider the emissions of air contaminants from those sources as they may affect the attainment and maintenance of ambient air quality standards” (HSC 40724.6(a)).

In a public hearing, the ARB must also approve livestock emission factors for use in the implementation of local air district rules on mitigation plans for CAFs (H&SC 40724.6(d)(1)(A)). Due to the ongoing peer review of the research related to emission factors, the ARB staff is not proposing to consider the approval of emission factors as part of this public hearing and will consider emission factors at a later date.

### Local Air District Requirements

Once ARB establishes the large CAF definition, local air districts designated as federal nonattainment for ozone as of January 1, 2004, must adopt, implement, and submit for inclusion in the SIP, a rule requiring large CAFs to submit a mitigation plan to reduce air contaminants to the extent feasible (HSC 40724.6(b)). For severe and extreme ozone attainment areas, best available retrofit control technology (BARCT) is required. In moderate and serious areas, large CAFs will need to use reasonably available control technology (HSC 40724.6(d)(1)(B)). In federal ozone attainment areas, districts must adopt a rule requiring large CAFs to reduce air contaminants to the extent feasible unless a district board makes a finding in public hearing that large CAFs will not contribute to a violation of any State or federal standard (HSC 40724.7(a) and 40724.6(b)).

In developing large CAF rules, local air districts are required to perform an assessment of the impacts of the rule or regulation. This assessment must include an evaluation of the number and size of affected sources, the nature and size of emissions, the emissions reduction potential, impacts on employment, probable costs of the rule, the availability and cost effectiveness of alternatives to the rule requirements, and the technical and practical feasibility of the rule requirements (HSC 40724.6 second (d)).

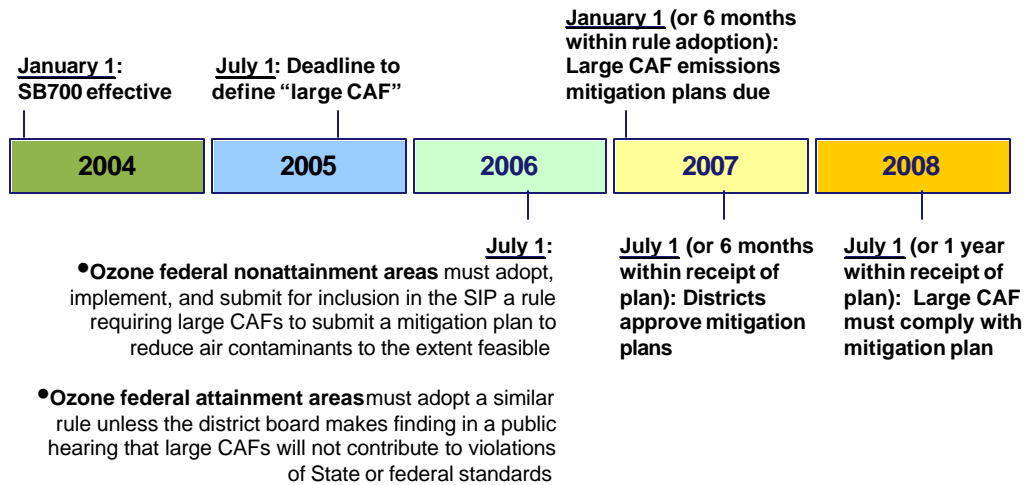
### CAPCOA Requirements

SB 700 also requires the CAPCOA to develop a clearinghouse of available control measures and strategies for agricultural sources of air pollution and emissions from agricultural operations by January 1, 2005 (HSC 40731). The clearinghouse is available on CAPCOA's website (CAPCOA 2005) and includes control measures for operations that create fugitive dust emissions, measures for confined animal facilities, controls for internal combustion engines, and emission reduction strategies for other agricultural equipment. The website is located here:  
<http://www.capcoa.org/AgClearinghouse.htm>.

### SB 700 Large CAF Implementation Schedule

Figure 1 illustrates the overall timeline of the SB 700 large CAF requirements. The legislation became effective on January 1, 2004. By July 1, 2005, the ARB must define a "large confined animal facility." The local air districts have until July 1, 2006 to adopt their large CAF mitigation rules. Large CAFs then have six months to submit their emission mitigation plans, and the local air districts have six additional months to approve submitted plans. One year after submitting their plans, large confined animal facilities must comply with the requirements of their mitigation plans no later than July 1, 2008.

Figure 1. SB 700 Large CAF Implementation Schedule



### Description of Public Outreach

To develop the large confined animal facility (large CAF) definition, the ARB staff worked with many stakeholders over the past several years to understand the livestock industry and identify key issues. Stakeholders include the air quality regulatory agencies, livestock industry representatives, academic researchers, other State and federal agencies, environmental and community representatives, and others.

ARB staff held numerous workshops and meetings to develop the definition for large confined animal facilities. In August 2004, we held our initial series of large CAF public workshops in Modesto, Tulare, Chino, and Sacramento. In January 2005, we sponsored a livestock emissions research symposium in Fresno, which was broadcast via video to Modesto, Bakersfield, and Diamond Bar. In March 2005, we held a workshop in Fresno to discuss specific proposals for the large confined animal facility definition. This workshop was also video-conferenced to Modesto, Merced, Diamond Bar, and Sacramento, as well as providing telephone participation. In addition to the formal workshops, ARB staff participated in numerous formal and informal meetings with representatives of the livestock industry, environmental organizations, local air districts, researchers, or other governmental agencies.

## **Structure of the Staff Report**

This staff report is divided into the following sections:

- Section 1. Introduction and Overview: Discusses Senate Bill 700, regulatory requirements, the implementation schedule, and the public process for developing the proposed regulation.
- Section 2. Characterization of Confined Animal Facilities: Discusses general information about livestock facilities, including the numbers, types, and sizes of facilities in different regions of the State.
- Section 3. Confined Animal Facility Impacts on Air Quality: Following an overview of the California air quality situation, provides information regarding emissions from confined animal facilities, how these emissions relate to regional air quality, and what environmental regulations are currently in place for the livestock industry.
- Section 4. Basis for the Staff's Proposed Regulation: Provides the rationale used to develop the large confined animal facility definition for California and the recommended proposal.
- Section 5. Environmental Impacts of Regulation: Describes what impacts the proposed regulation may have on the environment, including a discussion of environmental justice and ammonia emissions.
- Section 6. Economic Impacts of Regulation: Describes the economic impacts of the proposed regulation.
- Section 7. Alternatives to the Proposed Regulation: Describes other alternatives that were considered for the large CAF definition and why the alternatives are less effective.
- Section 8. References: Provides references used for the analyses.
- Appendices. Appendices are provided that include the proposed regulatory language, detailed California dairy information, a summary of the livestock air emissions research symposium, a discussion of activities to address livestock mitigation practices, the text of SB 700, the large CAF public workshop notices, and a summary of the major ROG sources in The San Joaquin Valley.

## 2. CHARACTERIZATION OF CONFINED ANIMAL FACILITIES

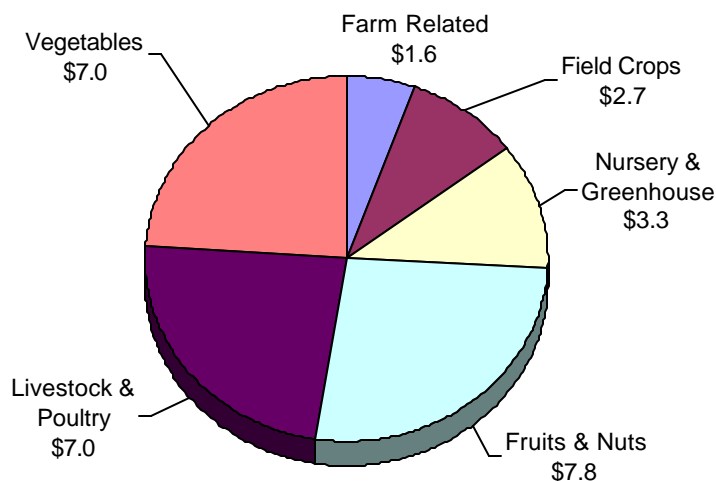
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### The California Agriculture Industry

The agricultural industry within California is very important, far exceeding the agricultural output of any other state in the nation. Agricultural marketings of California's farmers and ranchers reached \$27.8 billion in 2003. There are approximately 78,500 farming operations within California that produce 13 percent of the nation's gross farming receipts, while including only four percent of the total farms in the nation. The top 10 agricultural counties within California from highest to lowest ranking are Fresno, Tulare, Monterey, Kern, Merced, San Joaquin, Stanislaus, San Diego, Kings, and Ventura (CASS 2003a).

California's top 20 crop and livestock commodities account for 74 percent of the State's gross farm income. At number one, milk and cream have a gross income of about \$4 billion. California is the nation's largest dairy producer, producing one out of every five glasses of milk consumed in the nation. California has some of the largest dairies in the nation, with an average size of 800 milking cows, versus a national average size of less than 100 milking cows. Second in terms of agricultural sales are nursery products at \$2.4 billion, and third are grapes at \$2.3 billion, which accounts for 88 percent of all grapes grown in the nation. As shown in Figure 2, the combined income from the vegetable, field crop, and fruit and nut sectors are also substantial (CASS 2003a).

Figure 2. California Agricultural Cash Income, 2003 (billion \$)



## California Livestock Industry Overview

The livestock industry in California is continuing to grow. Livestock cash receipts during 2003 totaled \$7 billion, which was up 12% from 2002. Cattle and calves marketed from California feedlots increased by 7% in 2003, with a 27% increase in cash income. Between 2002 and 2003, the chicken industry in California had a 19% increase in cash income, egg layers showed a 38% increase in income, and milk and cream a 5% increase in income. (CASS 2003b for all statistics).

Table 1 shows the number of livestock farms and animals within California. Because of the dynamic nature of the livestock industry, these numbers are constantly changing, but they provide a general snapshot of the number of animals within California. These data are from the 2002 United States Department of Agriculture (USDA) agricultural census data (USDA 2004). Note that in performing the census, USDA includes all farms in their census, including very small producers. For example, the number of dairy farms includes 918 dairies that have less than 50 cows. For layer chickens, 3,167 farms are included that have less than 3,200 chickens. To give an indication of the number of these small farms, the two right hand columns of the table show the number of small farms (and associated animals) included in the total number of farms listed. USDA does not provide farm size information for horse and goat operations so the number of small farms is not shown for these livestock categories.

Table 1. 2002 California Livestock Farms and Animal Populations

Livestock	Total Number of Farms	Total Number of Animals	Number of Very Small Farms Included	Number of Animals in Very Small Farms
Dairy	2,793	2,806,357 <sup>a</sup>	918 (<50 head)	37,545
Feedlot	552	535,734	423 (<50 head)	3,492
Chicken – Broilers	338	39,245,511 <sup>b</sup>	269 (<10,000 head)	92,243
Chicken – Layers	3,244	22,768,304	3,167 (<3200 head)	108,584
Turkeys	237	8,790,704 <sup>c</sup>	157 (<1000 head)	2,569
Hogs	1,521	163,465	1,359 (<50 head)	11,345
Sheep	4,009	731,558	3,616 (<1000 head)	66,958
Horses and Ponies	16,446	131,951	Facility sizes not provided by USDA	
Goats	3,542	103,122	Facility sizes not provided by USDA	

(USDA 2004) <sup>a</sup>Dairy includes milk cows and support stock; <sup>b</sup>Based on a flock cycle time of 55 days, or 6.6 flocks per year; <sup>c</sup>Assumes 2 flocks per year

All of these animals produce substantial amounts of liquid and solid waste. A milk producing dairy cow can produce 150 pounds of manure a day (or 75 tons per day for 1,000 milking cows). A typical 20,000 head broiler chicken house produces over 2.25 tons of manure per day (ASAE 2004). Through biological decomposition process, these wastes produce emissions of reactive organic gases, ammonia, hydrogen sulfide, some nitrogen compounds, and methane. In addition, the activity of the animals and other facility operations can produce particulate matter emissions, oxides of nitrogen, and other pollutants.

## Livestock Facility Size and Animal Population Summary

As will be shown in detail in the following sections, the majority of livestock animals within California are maintained in larger operations. For example, statewide there are approximately 2,800 dairies. Approximately 38% of the dairies have over 500 cows, housing about 87% of the total cows in the State. For cattle feedlots, 96% of the animals are in just 3% of the facilities. The trend is similar for the other livestock categories including broiler chickens, layer chickens, turkeys, and swine – most of the animals are in a relatively small number of larger livestock facilities.

Table 2 illustrates the general mix of facility sizes and the associated animal populations. The table shows the number of livestock facilities, the percent of facilities, the number of animals (or head), and the percentage of animals in various livestock facility size categories (USDA 2004). Also, because there are often a large number of very small livestock facilities in each category (see Table 1), the percentage of facilities in each category with these very small facilities removed is also provided. Because the number of animals in the very small facilities is minor, and because they generally do not make an important difference in the percentage of total animals, this adjustment is not shown for the percentage of head calculation.

The reason for providing facility size information versus animal populations is the relationship between livestock emissions and the number of animals at a facility. Using dairies as an example, if all other process are identical, the ARB staff assumes that a 1,000 cow dairy will produce twice as many emissions as a 500 head dairy. The basis for this assumption is twofold. First, the manure output produced at a dairy is directly related to the number of cows at the dairy, that is, two milk producing cows will produce twice as much manure as one milk producing cow. It is the output of this manure, the treatment and biological decomposition of the wastes, and emissions directly from the cow that produce the dairy air emissions. Each additional cow at the dairy produces more manure and more gas, and thus more emissions. Second, the current method of estimating cow, chicken, swine, or any other livestock animal emissions is expressed in terms of emissions per head per year. Using this method, the facility emissions are directly proportional to the number of animals at the facility.

Table 2. California Livestock Facility Sizes, Animals, and Size Ranges

Livestock	Total		Facilities Larger than "Size Cut"					
	Facilities	Head	Facility Size Cut	# of facilities	% of facilities	% of non-small facilities <sup>d</sup>	# of head	% of head
Dairy <sup>a</sup>	2,793	2,806,357	500	1075	38	57	2,435,647	87
			1,000	517	19	28	1,796,992	64
Feedlots	552	535,734	1,000	19	3	15	513,813	96
			2,500	16	3	12	509,109	95
Broilers <sup>b</sup>	338	39,245,511	55,000	45	13	65	38,598,215	98
			135,000	29	9	42	37,505,983	96
Layers	3,244	22,768,304	50,000	57	2	74	22,198,928	97
			100,000	44	1	57	21,236,253	93
Turkeys <sup>c</sup>	237	8,790,704	30,000	66	28	83	8,647,995	99
			100,000	57	24	71	8,320,812	95
Hogs	1,521	163,465	1,000	10	1	6	126,594	77
			2000	6	0.4	4	123,094	75
Sheep	4,009	731,558	5,000	39	1	10	477,615	65
Goats	3,542	103,122	10,000	Facility sizes not provided by USDA				
Horses	16,446	131,951	500	Facility sizes not provided by USDA				

USDA 2004. <sup>a</sup>Dairy includes milk cows and support stock; <sup>b</sup>Based on a flock cycle time of 55 days, or 6.6 flocks per year; <sup>c</sup>Assumes 2 flocks per year; <sup>d</sup>Facilities shown in the previous table, designated as "very small" are removed from the percentage of facilities calculation.

## Dairies

The dairy industry in California is the State's largest single source of agricultural revenue, generating over \$4 billion in revenue each year. The latest USDA agricultural census for 2002 indicates that there are about 2,800 dairies in California housing about 2,800,000 milking cows and support stock. Note that these statistics include 918 dairies that have fewer than 50 cows, accounting for about 1% of the total cows in the State (see Table 1). In this report, we generally use the USDA statistics for overview data because they provide data collected on a consistent basis and include all of the major animal types. However, for some of the specific animal classifications such as dairies and poultry discussed later, we were able to collect additional regional and facility size information.

### Overview of a Dairy

Although every dairy within California is unique, Figure 3 shows an aerial view of a "typical" California San Joaquin Valley dairy. For scale, the vertical line on the left of the photo is a two-lane county road. This flush lane freestall dairy supports about 3,000 milking cows. The dairy has two main freestall housing barns, which are the two long horizontal structures shown, and a smaller barn in the center. Cows spend most of their time in these freestall areas eating, sleeping, and resting. The barns are surrounded by turnout areas (dirt corrals) for the cows to walk around and exercise. The center of the photo shows the milking parlor. To the bottom of the photo is the liquid waste storage lagoon, the manure dewatering area, and the dry manure storage



pile. The right hand side of the photo shows areas where dry, non milking, cows are maintained.

Most dairies within the San Joaquin Valley (SVJ) are of the flushed lane freestall design in which manure wastes are periodically flushed from concrete lanes in the freestall areas where the wastes collect. Manure also accumulates in the turnout corral areas and they are scraped periodically (e.g., monthly, semi-annually) using a tractor to remove the manure. As shown in the photo, most dairies in the SVJ are also surrounded by agricultural acreage, which is used to grow crops used for feed and other uses. These crops are typically fertilized by some of the nutrients in the liquid and solid manure wastes created by the dairy.

Figure 3. Aerial Photo of a Freestall Flush Lane Dairy.



In comparison to dairies in the SVJ, most dairies in Southern California are of the dry lot design in which no flush water is used. Instead, the manure is periodically scraped or otherwise removed using a tractor or other equipment. These dairies generally do not have significant cropland associated with the dairy. Other parts of the State use a variety of practices including those mentioned, as well as various grazing scenarios used in Northern California.

Traditionally, in addition to the milk cows, dairies also include a variety of support stock on-site including calves, young heifers that have not started milk production, and dry cows that are not in their milk production phase. Statewide, approximately half of the dairy-related cows within California are milked and the other half of the dairy cows are support stock that ultimately will be used for milk production (ARB 2004b). With many newer dairies, as well as some of the older facilities, there is a trend to remove support stock from the dairy. In this way, the dairy operator can focus their efforts on milk production and optimize their land use by placing as many milk (and revenue) generating cows on the facility as possible. The support stock are then handled by separate businesses that specialize in particular animals such as calves or heifers.

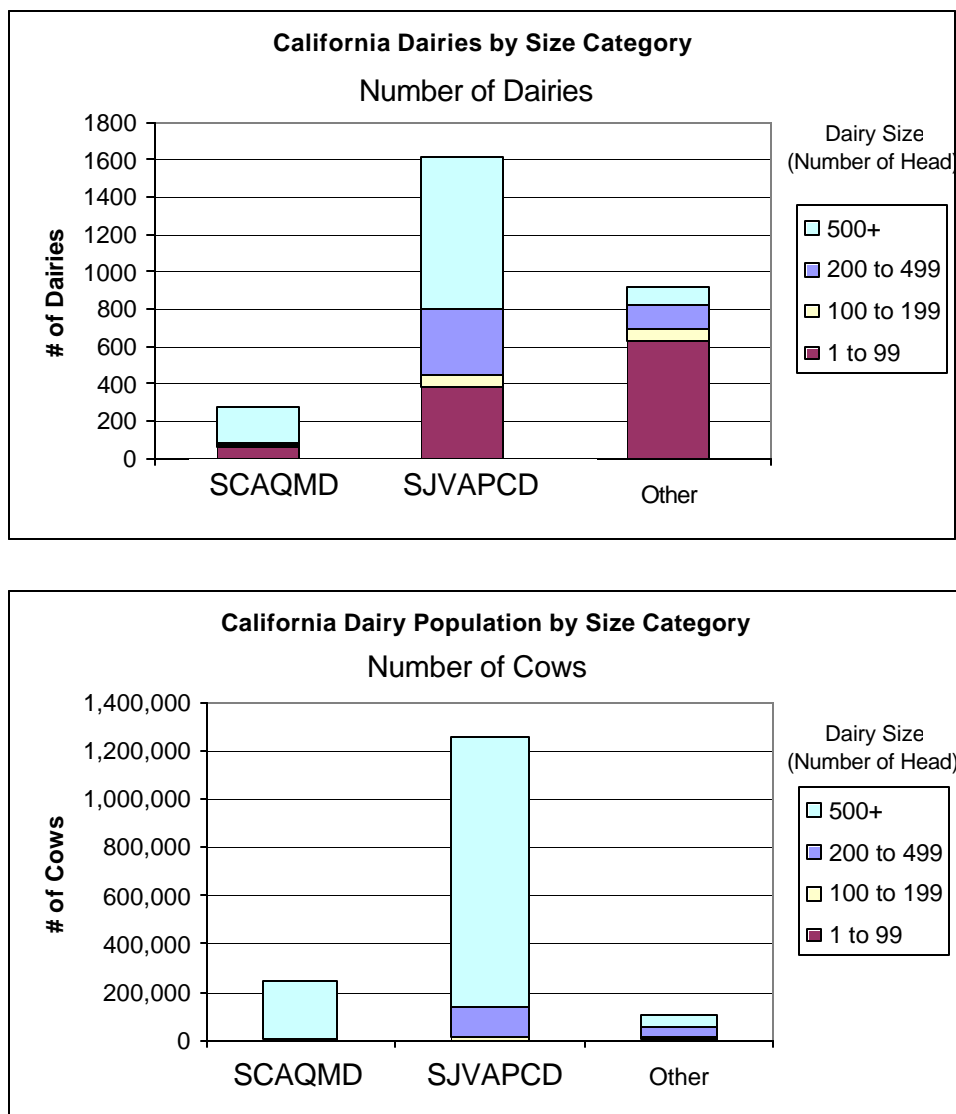
Emissions from a dairy can come from any and all of the locations mentioned including the flush water and manure in the freestalls and flush lanes, the turnout corrals, the lagoon(s), manure storage piles, manure applied to crops, emissions directly from the

cows, and other sources. These dairy emissions are created by complex biological processes and are released through many diverse and dispersed emission sources, making them very difficult to effectively evaluate and quantify. More general information on California dairies can be found in Appendix B.

Dairy Distribution by Size and Population

To give a sense of the California dairy industry, Figure 4 shows the size and regional distribution of dairies in California. The upper graph shows the number of dairies by region. The lower graph shows the number of milking cows contained in different sized dairies by region. In both the San Joaquin Valley Air Pollution Control District (San Joaquin Valley APCD or SJVAPCD) and South Coast Air Quality Management District (South Coast AQMD or SCAQMD), the majority of the dairies have over 500 milking head of cattle and the majority of the total animals are maintained in these larger dairies. (USDA 2004)

Figure 4. California Dairy Information for Specified Regions in California



## San Joaquin Valley Dairies

Because the majority of dairies and cows in California are in the San Joaquin Valley (SJV), this section provides additional detailed dairy size information for this region. Table 3 shows the dairy size information for the SJV. This data set is a combination of data available from USDA and the San Joaquin Valley APCD. The USDA data (USDA 2004) subdivides dairies by size category, but the largest category provided is 500 or more milking head. The San Joaquin Valley APCD data (SJV 2005a) provides detailed dairy size information, but generally does not include dairies less than 500 head. To get a complete picture of both the larger and smaller dairies in the SJV, both data sets were combined.

Although different methods were used in compiling the two data sets, and the data should not be considered exact, the information does provide a general characterization of the SJV dairy industry. Using this approach, about 1,500 dairies are accounted for from the total 1608 tabulated by USDA. As Table 3 shows, there are 340 very small dairies with fewer than 50 milking cows. To provide comparisons, the table includes the percentages of dairies and cows both with and without the very small dairies.

Table 3. San Joaquin Valley Dairy Size Distribution

Dairy Size Category	# of Dairies	% of Dairies	% of Dairies >=50 Head	# of Milk Cows	% of Milk Cows	% of Cows >=50 Head
1 to 49	340	23%		1,977	<1%	NA
50 to 199	108	7%	9%	12,904	1%	1%
200 to 499	355	24%	31%	120,888	10%	10%
500 to 699	111	7%	10%	65,546	5%	5%
700 to 999	157	10%	14%	127,876	11%	11%
1000 to 1999	284	19%	24%	400,175	33%	33%
2000 to 3999	116	8%	10%	314,005	26%	26%
4000 to 5999	25	2%	2%	117,773	10%	10%
6000 or more	5	<1%	<1%	38,886	3%	3%
Total All Dairies	1501			1,200,030		
Total Dairies > 49 Head	1161			1,198,053		

Dairies <501 head from USDA 2004  
Dairies >= 501 head from SJV 2005a

Table 4 shows the distribution of milking cows in the SJV in a different format. In the SJV, there are 430 dairies (36%) with 1,000 or more milking cows and 731 dairies (64%) with less than 1,000 milking cows. The dairies with 1,000 or more cows have about 72% of the milking herd and the dairies with less than 1,000 cows have about 28% of the total milking herd. Looking at 2,000 head dairies, there are about 146 dairies (13%) in the SJV with 2,000 or more milking cows and 1,015 dairies (87%) with less than 2000 head. About 39% of the cows are in dairies with 2,000 or more milking cows, with the remaining 61% in the smaller dairies.

Table 4. Distribution of SJV Milking Cows by Farm Size

Size of the Dairy (Number of Milking Cows per Dairy)	Percent of Total Milking Cows in the San Joaquin Valley	Dairies*	
		Number of Dairies	Percent of Dairies
> 50	100	1161	100
> 500	89	698	60
> 700	84	587	50
> 1000	72	430	36
> 2000	39	146	13

\* Excludes the estimated 340 dairies < 50 Milking Cows

### South Coast AQMD Dairies

The South Coast AQMD also has a concentration of dairies. Tables 5 and 6 provide detailed facility size data for the South Coast AQMD. These data are provided by the local air district, are based on locally collected information (SCAQMD 2004a), and include some of the non-milking cows, so it is not in exact agreement with the USDA data discussed previously. The South Coast AQMD data indicate that there are about 108 dairies (50%) with 1,000 or more cows on the dairy and 111 with less than 1,000 cows (50%). The dairies with 1,000 or more cows have 75% of the herd and the dairies with less than 1,000 cows have about 25% of the total herd. There are about 31 dairies (14%) with over 2,000 cows, which include about 38% of the cows.

Table 5. South Coast AQMD Dairy Size Distribution

Size Category	# of Dairies	% of Dairies	# of cows	% of Cows
1 to 499	30	14%	10,472	4%
500 to 699	36	16%	21,181	8%
700 to 999	45	21%	38,102	14%
1000 to 1999	77	35%	103,713	37%
2000+	31	14%	107,249	38%
Totals	219	100%	280,717	100%

Table 6. Distribution of South Coast AQMD Milking Cows by Farm Size

Size of the Dairy (Number of Cows per Dairy)	Percent of Total Cows	Dairies*	
		Number of Dairies	Percent of Dairies
> 50	100	219	100
> 500	96	189	86
> 700	89	153	70
> 1000	75	108	49
> 2000	38	31	14

## Other Region Dairies

Based on USDA statistics (USDA 2004) for areas outside of the San Joaquin Valley APCD and South Coast AQMD, there are only 89 dairies in other parts of the State that have over 500 milking cows. These 89 dairies with over 500 head include about 4% of the milk cows in the State. To give a sense of the number of dairies and cows throughout California counties, Table 7 shows the number of cows in dairies that have 500 or more cows, the number of dairies with 500 or more cows, and the average size of the dairies with over 500 cows.

The table shows that in those counties with substantial numbers of milking cows, virtually all of the cows are in dairies with 500 or more milking cows. Also, the average size of all of these dairies with 500 or more milking head is 1,336 milking cows. Note that this information is based on the 2002 census, so it does not show the newest dairies that have been built over the past 2 to 3 years.

Table 7. County Dairy Size Distribution by Number of Cows and Dairies

County	Number of Milking Cows				Number of Dairies		
	# of Milking Cows in Dairies >= 500 head	% of Milking Cows in Dairies >= 500 head	Average # of Milking Cows in Dairies > 500 Head	# of Milking Cows in Dairies >=50 and < 500 head	# of Dairies >= 500 Milking Head	% of Dairies >= 500 head	# of Dairies >=50 and < 500 Milking Head
Tulare	396,858	96%	1,780	14,932	223	82%	48
Merced	183,679	82%	1,201	39,379	153	53%	138
San Bernardino	152,979	97%	1,319	4,958	116	88%	16
Stanislaus	127,425	79%	958	34,459	133	53%	119
Kings	127,280	92%	1,224	10,890	104	76%	33
Riverside	87,743	97%	1,350	2,279	65	86%	11
San Joaquin	86,284	84%	1,135	16,955	76	54%	64
Fresno	78,757	87%	1,313	11,556	60	59%	41
Kern	74,206	100%	2,394	0	31	97%	1
Madera	42,152	88%	1,686	5,621	25	57%	19
Sonoma	18,262	58%	730	13,338	25	31%	55
Glenn	9,550	56%	796	7,435	12	21%	45
Sacramento	9,473	53%	947	8,433	10	22%	35
San Diego	4,351	78%	725	1,245	6	60%	4
Marin	3,505	35%	584	6,616	6	23%	20
Humboldt	3,484	22%	697	12,627	5	5%	95
Tehama	3,154	66%	789	1,631	4	21%	15
Yuba	2,914	100%	971	0	3	60%	2

Counties where there are no dairies greater than or equal to 500 milking cows			
Alameda	Mariposa	Nevada	Shasta
Alpine	Inyo	Orange	Santa Cruz
Amador	Lake	Placer	Sierra
Butte	Lassen	Plumas	Siskiyou
Calaveras	Los Angeles	San Benito	Solano
Colusa	Mendocino	San Francisco	Sutter
Contra Costa	Modoc	San Luis Obispo	Trinity
Del Norte	Mono	San Mateo	Tuolumne
El Dorado	Monterey	Santa Barbara	Ventura
Imperial	Napa	Santa Clara	Yolo

Note: USDA reports 18 dairies in these counties with over 500 milking head, but lists the number of milking cows as zero.

## Beef Cattle

As shown in Table 8, about 21% of California's feedlots with over 50 head have over 2,500 head of cattle. These 30 feedlots with over 2,500 head raise about 96% of California's beef feedlot cattle. The remaining feedlots with less than 2,500 cows include only 23,133 animals statewide. Information in the table is a combination of data from USDA and the California Farm Bureau (USDA 2004 and CFB), so it is not consistent with exclusive USDA data. Complete data were not provided for the larger facilities. Therefore, the number of head in the categories at 2,500 head and above are estimated based on the midpoint of the size category multiplied by the number of farms in the category. This creates inconsistencies in the total number of feedlot head, showing about 100,000 more feedlot animals than the USDA data would indicate. Nevertheless, the data gives an indication of the size distribution of larger feedlots.

Geographically, about half of the feedlot animals are located in the San Joaquin Valley (Fresno, Kern, Madera, Stanislaus, and Tulare Counties), and the other half are in Imperial County.

Table 8. California Feedlot Size Distribution

Size Category	Farms	% of Total Farms	Estimated Total Head	% of Total Head
50 to 99	56	39%	3,592	1%
100 to 199	26	18%	3,268	0%
200 to 499	20	14%	6,308	1%
500 to 999	8	6%	5,261	1%
1,000 to 2,499	3	2%	4,704	1%
2,500 to 4,999	4	3%	15,000	2%
5,000 to 9,999	8	6%	60,000	9%
10,000 to 19,999	7	5%	105,000	16%
20,000 to 39,999	9	6%	270,000	41%
40,000 to 74,999	0	0%	0	0%
75,000 to 99,999	1	1%	87,000	13%
100,000+	1	1%	100,000	15%
Total	143	100%	660,133	100%

Table 9 shows the distribution of feedlot animals in California by feedlot size. In the State there are 30 feedlots (21%) with 2,500 or more animals, and 113 feedlots (79%) with less than 2500 animals. The feedlots with 2,500 or more cows have about 96% of the animals and the feedlots with less than 2,500 cows have about 4% of the feedlot animals.

Table 9. Distribution of California Feedlots by Farm Size

Size of the Feedlot	Percent of Feedlot Animals	Feedlots	
		Number of Feedlots	Percent of Feedlots
> 50	100	143	100
> 500	98	38	29
> 1000	97	33	23
> 2,500	96	30	21
> 5,000	94	26	18
> 10,000	85	18	13
> 20,000	69	11	8

\* Excludes the estimated 423 feedlots with < 50 animals

### Other Cattle Operations (Calves, Heifers, Others)

In addition to cattle facilities that focus predominantly on milk or beef production, there are a variety of other cattle ranches that both support these industries and provide other products such as veal. For example, some ranches may specialize on raising young calves to reproductive age for dairy use; others may raise heifers or other young cattle for delivery to feedlots for fattening. In general, the animals at these facilities are substantially smaller than productive dairy or beef cattle. Because of this, on a per animal basis, they will produce lower manure waste output and lower emissions. For example, an average producing dairy cow produces 150 pounds of manure per day and a beef cow produces about 64 pounds per day. In contrast, a heifer produces 48 pounds of manure per day and a calf only produces 19 pounds per day (ASAE 2004). As the California cattle industry is currently configured, there are not yet tremendous numbers of animals in these types of other facilities. However, there are ongoing changes in the cattle industry towards increased facility specialization in raising and managing the various animal components (calves, heifers, etc.).

### Poultry (Broilers, Layers, Turkeys)

Poultry facilities either specialize in meat production (broilers and turkeys) or egg production (layers). Enclosed houses, often on the order of 50 feet by 300 feet in size, are most commonly used to house the birds. A typical poultry broiler house will have in the range of 20,000 birds per house. A group of several houses constitutes a poultry farm and several related farms are often called a ranch. Broilers have a 55-day production cycle from initial placement, growth, harvest, and reconditioning of the house for the next flock (SJV 2005b). Turkeys have about a 6-month production cycle.

Poultry operations can create significant quantities of waste that can produce airborne emissions through biological decomposition processes, as well as particulate emissions due to movement of the birds. A 20,000 head broiler chicken house can produce over 2.25 tons of manure per day. A 20,000 head layer house can produce up to 2 tons of manure per day, and 20,000 turkeys can produce over 5.5 tons of manure per day (ASAE 2004). Because most of the larger poultry operations in California maintain the birds in ventilated houses on litter of rice hulls or other materials, and do not generally

use water to flush wastes, there are fewer open sources of emissions at poultry operations compared to some other livestock sources such as dairies or feedlots.

The majority of poultry facilities in California are in the San Joaquin Valley and Southern California. Broiler chicken farms are dispersed throughout the State, but nearly all of the chickens are in Fresno, Madera, Sacramento, San Joaquin, and Tulare counties. For egg layer chickens, facilities are also located throughout the State, but most of the layer chickens are in Merced, Riverside, San Bernardino, San Diego, San Joaquin, Sonoma, and Stanislaus Counties. Most of California's turkeys are raised in Fresno, Kings, Madera, Merced, Stanislaus, and Tuolumne Counties. (USDA 2004).

In understanding the number of California poultry operations and their sizes, two sources of data were available. The first is the USDA 2002 agricultural census data, which has been shown previously. In addition to this information, representatives from the poultry industry within California were able to provide additional data that more fully describes the industry than the USDA data. For example, the largest facility size category reported by USDA for broilers is 135,000 head. The broiler data supplied by the poultry industry data show that there are 72 farms with over 135,000 head, and that there are 24 farms with over 650,000 head, and 20 farms with over 1,000,000 head (CPF 2005a). The industry supplied broiler data reports about 48 million broilers. The USDA data provides reports about 39 million birds. The fact that the industry broiler data reports more total birds than the USDA data gives us a good indication that the industry data reasonably represents the California broiler industry. The industry did not attempt to account for the over 250 very small broiler farms reported by USDA, but the USDA data shows these farms house less than 0.3% of the total broilers. Table 10 shows the industry supplied broiler data

For the layer chickens, the USDA data has a maximum size category of 100,000 birds. The layer industry was able to provide additional information regarding the larger facilities. The USDA data shows 44 facilities over 100,000 head, with 21,236,253 birds (USDA 2004). The layer industry data shows 45 facilities over 100,000 head with 18,385,000 birds (CGFA). This is reasonable agreement and helps to validate the industry data. The industry also did not try to account for the over 3,000 very small layer farms counted by USDA that include less than 0.5% of the layers. Table 11 shows the industry supplied layer data.

The turkey data supplied by the poultry industry (CPF 2005b) also agrees well with USDA data. Table 12 shows the industry supplied data.



Table 10. California Broiler Chicken Facility Size and Animals

Size Category	# of Farms	% of Facilities	# of Broilers	% of Broilers
<100,000	8	10%	490,075	1%
100,000 to 299,999	21	26%	4,426,308	9%
300,000 to 499,999	17	21%	6,684,856	14%
500,000 to 649,999	11	14%	6,466,766	14%
650,000 to 999,999	4	5%	3,408,214	7%
> 1,000,000	20	25%	26,131,840	55%
Total	81	100%	47,608,059	100%

Table 11. California Layer Chicken Facility Size and Animals

Size Category	# of Farms	% of Farms	# of Layers	% of Layers
<100,000	52	54%	2,349,000	11%
100,000 to 299,999	29	30%	4,748,000	23%
250,000 to 499,999	4	4%	1,577,000	8%
500,000 to 649,999	0	0%	0	0%
650,000 to 999,999	1	1%	660,000	3%
>1,000,000	11	11%	11,400,000	55%
Total	97	100%	20,734,000	100%

Table 12. California Turkey Facility Size and Animals

Size Category	# of Farms	% of Facilities	# of Turkeys	% of Turkeys
< 25,000	11	12%	168,371	2%
25,000 to 49,999	15	16%	574,795	7%
50,000 to 79,999	24	26%	1,580,563	20%
80,000 to 99,999	12	13%	1,018,848	13%
100,000 to 199,999	24	26%	3,143,761	39%
200,000 to 299,999	6	6%	1,283,359	16%
> 300,000	1	1%	301,600	4%
Total	93	100%	8,071,297	100%

Table 13 provides some additional description of the poultry broiler, layer, and turkey industry within California. For broilers, statewide about 62% of the animals are in 24 farms over 650,000 head. The other 38% of the broilers are in the remaining 57 farms. For layers, about 58% of the animals are in 12 farms with over 650,000 head. The other 42% of the layers are in the remaining 85 farms. For turkeys, 59% of the animals are in 31 farms with over 100,000 turkeys. The other 41% of the turkeys are in the remaining 62 farms.

Table 13. Distribution of California Poultry Operations by Farm Size

Size of the Farm	Percent of Animals	Farms	
		Number of Farms	Percent of Farms
<b>Broilers</b>			
> 0	100	81	100
> 100,000	99	73	90
> 300,000	90	52	65
> 500,000	76	35	44
> 650,000	62	24	30
> 1,000,000	55	20	25
<b>Layers</b>			
> 0	100	97	100
> 100,000	89	45	46
> 250,000	66	16	16
> 500,000	58	12	12
> 650,000	58	12	12
> 1,000,000	55	11	11
<b>Turkeys</b>			
> 0	100	93	100
> 25,000	98	82	88
> 50,000	91	67	72
> 80,000	72	43	46
> 100,000	59	31	33
> 200,000	20	7	7
> 300,000	4	1	1

## Other Livestock (Swine, Sheep, Goats, Horses, Others)

There are a variety of other smaller livestock operations throughout California including swine, sheep, goats, horses, rabbits, ducks, and others. Under SB 700, animals fed predominantly by grazing are specifically excluded from the regulation.

Tables 1 and 2, shown previously, tabulate the statewide number of facilities and animals for some of the additional livestock categories. As shown, the majority of the livestock animals are in the cattle and poultry industries, and the number of animals in the other categories is relatively small. For the other livestock categories including goats, horses, ducks, rabbits, or any other livestock, the USDA does not provide facility size information.

Table 14 provides the facility size breakdown for hog farms. As with the other livestock categories, the majority of hogs are in large facilities. About 75% of the 163,645 hogs are in just six facilities with 2000 or more swine. This includes only 3% of the 162 swine facilities with 50 more hogs. About 70% (over 110,000) of California's hogs are raised in Tulare County. Other counties with substantial hog populations are San Bernardino County with 10,000 head, and Stanislaus County with 23,000 head. The small number of remaining hogs not in these counties are distributed throughout the State, mostly in small farms with less than 100 hogs (USDA 2004).

Table 14. California Hog Farm Size Distribution

Size Category	# of Farms	% of Farms	# of Head	% of Total Head	% of Total Head >=50 hogs
1 to 99	1426	93.8%	15,886	10%	4%
100 to 499	78	5.1%	15,822	10%	10%
500 to 999	7	0.5%	5,163	3%	4%
1000 to 1999	4	0.3%	3,500	2%	2%
2000 to 4999	2	0.1%	9,680	6%	6%
5000 or more	4	0.3%	113,414	69%	74%
Totals	1521	100%	163,465	100%	100%

Table 15 provides some further description of the hog industry within California. For hogs, about 80% of the animals statewide in farms greater than 50 hogs are in 6 farms over 2,000 head. The other 20% of the hogs are in the remaining 156 farms.

Table 15. Distribution of California Hog Farms by Size

Size of the Farm	Percent of Hogs	Farms	
		Number of Farms	Percent of Farms
> 50	100	162	100
> 100	96	95	57
> 500	86	17	9
> 1000	82	10	5
> 2000	80	6	3
> 5000	74	4	2

\* Excludes the estimated 1359 farms with < 50 animals

Table 16 lists the number of farms and animals for the miscellaneous livestock categories (USDA 2004). As shown, the number of animals in these other categories is relatively small compared to the primary livestock categories.

Table 16. Other California Livestock Farms and Population

Livestock Category	# of Farms	# of Animals
Goats	3,542	103,122
Sheep	4,009	731,558
Horses and Ponies	16,446	131,951
Ducks	826	956,606
Emus	207	2,051
Geese	643	7,641
Ostriches	111	3,388
Pheasants	165	170,388
Pigeons or Squab	262	168,532
Quail	109	190,102
Other Poultry	377	168,029
Bison	98	1,810
Deer	9	924
Elk	6	202
Llamas	1,022	12,059
Mules, Burros, Donkeys	693	2596
Rabbits	417	45,795

### **3. CONFINED ANIMAL FACILITY IMPACTS ON AIR QUALITY**

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#### **Regional Ozone Attainment Status – Federal and State Exceedances**

During 2001 through 2004, the highest number of exceedance days for both the State and federal 1-hour ozone standard occurred in the San Joaquin Valley Air Basin and the South Coast Air Basin. Both areas had more than 105 State ozone standard exceedance days, 9 or more federal 1-hour ozone standard exceedance days, and more than 86 exceedances of the federal 8-hour ozone standard during each of the four years. The Sacramento Metro Area, Mojave Desert Air Basin, and Salton Sea Air Basin all had more than 35 State ozone standard exceedances and more than 25 or more federal 8-hour ozone standard exceedances during the same period. The remaining five ozone nonattainment areas (Mountain Counties Air Basin, San Diego Air Basin, San Francisco Bay Area Air Basin, and the South Central Coast Air Basin) averaged from 7 to 62 State ozone standard exceedances.

Table 17 shows the local air districts designated as nonattainment of the federal ozone standard as of January 1, 2004. The table also shows the number of days above all State and federal ozone standards during the years 2001 through 2004 in each region (ARB 2005a, ARB 2005c, ARB 2005d). For all standards, the San Joaquin Valley APCD and South Coast AQMD have the greatest number of exceedance days. In these two areas in particular, all sources of air pollution produce air quality impacts and have some level of significance. In these regions, virtually all emission sources, even those that are very small, are regulated. In addition, emission sources that are very small individually, but in aggregate can produce substantial emissions, are regulated. Table 18 illustrates the magnitude of emissions from dairies relative to other facilities in the San Joaquin Valley. The larger emitting facilities, those over 5 tons per year of reactive organic gas (ROG) emissions include refineries, power plants, and manufacturing plants. The smaller facilities, those under 5 tons per year of ROG emissions, include auto body shops and gasoline service stations. Also, for comparison, based on current emission estimates one cow emits as much ROG emissions as two new cars.

Table 17. Federal 1-Hour Ozone Designation and Classification Areas as of January 1, 2004

District Name (Area Description)	Designation / Classification for Federal 1-Hour Ozone Standard	Total Days Above Ozone Standard From 2001 Through 2005		
		State 1-Hour	Federal 1-Hour	Federal 8-Hour
South Coast (South Coast Air Basin)	Nonattainment / Extreme	467	173	385
South Coast (Coachella Valley)	Nonattainment / Severe-17	216	13	176
Antelope Valley	Nonattainment / Severe-17	298	38	234
Mojave Desert (Central San Bernardino Co.)	Nonattainment / Severe-17			
San Joaquin Valley	Nonattainment / Severe-15	493	109	477
Ventura	Nonattainment / Severe-15	119	5	87
Sacramento Metro	Nonattainment / Severe-15	198	19	156
Yolo-Solano	Nonattainment / Severe-15			
El Dorado	Nonattainment / Severe-15			
Placer	Nonattainment / Severe-15			
Feather River (S. Sutter Co.)	Nonattainment / Severe-15			
Feather River (N. Sutter Co. & Yuba Co.)	Nonattainment / Sec.185A			
Kern (East Kern Co.)	Nonattainment / Serious	90	1	88
Butte	Nonattainment / Sec.185A	21	0	30
Imperial	Nonattainment / Sec.185A	103	16	40
Bay Area	Nonattainment / Other	57	4	21

\* Severe 17 means that the area has 17 years to come into compliance; Severe 15 areas get 15 years.

Regions Designated as Attainment or Unclassified for the Federal 1-Hour Ozone Standard	
Attainment	
San Diego	Monterey Bay Unified
Santa Barbara	
Unclassified	
Lake	Great Basin Unified
Amador	Lassen
Calaveras	Modoc
Mariposa	Mojave Desert (East Riverside Co.)
Tuolumne	Mojave Desert (East San Bernardino Co.)
Northern Sierra	Siskiyou
Colusa	North Coast Unified
Glenn	Mendocino
Tehama	Northern Sonoma
Shasta	San Luis Obispo
El Dorado (Lake Tahoe)	South Coast (East of Coachella Valley)
Placer (Lake Tahoe)	

Table 18. Emissions from Dairies Compared to Other Regulated Facilities in the San Joaquin Valley

ROG Emissions (tons per year)	# of Other Facilities	# of Dairies
0 – 1	889	108
1 – 5	319	461
5 – 10	46	293
10 – 15	30	164
15 – 20	14	53
Greater than 20 tons	44	82

### State Implementation Plan Commitments for Livestock Operations

The San Joaquin Valley APCD has a commitment in the Extreme Ozone Attainment Demonstration Plan (EOADP) that will require confined animal facilities to reduce emissions of ROG from livestock facilities. The EODAP anticipates a 10% reduction in livestock ROG emissions by 2008 and a 25% reduction by 2010 (SJV 2004a).

In the South Coast AQMD, the primary livestock emission reduction strategy is in the 2003 Air Quality Management Plan (SCAQMD 2003), and is addressed by Rule 1127 (SCAQMD 2004a). This rule applies to dairies with more than 50 cows, heifers, and/or calves. The rule, which increases in stringency over several years, requires dairies to remove and dispose of their dairy manure on a frequent basis, pave their feed lanes, and minimize excess water in corrals (SCAQMD 2004a). Rule 1127 anticipates a 45% reduction in livestock ROG and a 30% reduction in ammonia emissions by 2010.

### Odor and Ammonia Emissions and Air Quality

Nearly all of the local air districts have rules prohibiting nuisance emissions, such as odors. In addition to odorous compounds, emissions of ammonia also pose air quality concerns. Ammonia contributes to the formation of ambient particulate matter, specifically ammonium nitrate or ammonium sulfate. These particles form to a varying degree in the presence of ammonia and oxides of nitrogen or sulfur. The particle formation is highly dependent on atmospheric temperature, humidity, concentrations of the precursor compounds, and other factors, so the particle formation is extremely variable and difficult to predict. Both the South Coast AQMD and San Joaquin Valley APCD sometimes have elevated ammonium nitrate levels. However, only in the South Coast AQMD has it been clearly established that reductions in ammonia levels will improve air quality. Current analysis indicates that ammonia reductions within the San Joaquin Valley APCD may improve air quality for only very limited parts of the SJV, but additional analysis is ongoing to better understand the role ammonia plays in the SJV particulate matter formation.

In addition to particle formation, there is also some concern about direct exposure to ammonia gas produced by livestock facilities or other sources. ARB staff performed a simplified modeling analysis to evaluate near-source exposure risks to ammonia. A summary of this analysis is provided in the section of this report on the Environmental Impacts of the Regulation.

## **Emissions from Confined Animal Facilities**

The ARB and the local air districts estimate emissions from virtually all sources of air pollution. Some of the key sources of agriculturally-related air pollution include on-field land preparation and crop harvest activities, agricultural residue burning, agricultural tractors and equipment, agricultural internal combustion engines, fuel storage tanks, and livestock operations including dairies, feedlots, and poultry operations. The primary pollutants of concern for meeting ambient air quality standards and produced by the livestock industry include particulate matter (PM10 and PM2.5), ROG, ammonia, and oxides of nitrogen (NOx). Other pollutants of potential interest include toxic air contaminants, hydrogen sulfide, nitrous oxide (N<sub>2</sub>O), nitric oxide (NO), and methane.

### Current Livestock Research and Emission Factors

The ARB has developed emission estimates for the livestock industry. It is important to recognize that the emission factors used to develop some of the livestock emission estimates are in a significant state of evolution, particularly for reactive organic gases (ROGs) from dairies. Dairy emissions research is ongoing by at least half a dozen researchers in California alone. As the research is completed, reviewed, and approved, the livestock emission estimates will be updated. The ARB livestock emission estimates are based on the current best available data as of March 2005. Other studies are forthcoming, but their results are not sufficiently reviewed and approved for incorporation in this report. For additional information regarding ongoing dairy emissions research, see Appendix C.

### Evaluating the Range of Emission Estimates and Emission Factors

There is ongoing research that needs to be considered in the development of improved emission factors for estimating dairy ROG emissions. Table 19 shows estimated dairy emissions for different size dairies showing a range of emission factors. The range of emission factors was selected to illustrate the possible impacts of different emissions factors. To assist in evaluating the data, we have provided the dairy sizes as both number of milking cows, and an estimated number of total cows at a dairy. Based on ARB statistics and information from the dairy industry, at a typical dairy, about 65-71% of the cows may be support stock. This means that for a dairy with 1000 milking cows, on average, there may be about 1710 total cows on the dairy (using the 71% value from ARB analysis). The number of total head in Table 19 reflects this adjustment.

In computing emission estimates, it is generally accepted that cows that are not actively being milked or cows that are young produce less manure and therefore produce less net airborne emissions on a per head basis. The ranges of example emission factors shown in the table below are for an adult milking cow. The current emission factor is 12.8 pounds ROG per head per year. To provide an adjustment for the smaller cows, an emissions scaling factor was computed using manure production data for the various classifications of dairy cows (milking, dry, heifer, calf) (ASAE 2004). Based on the manure output of the various dairy animals and the animal population splits within the SJV, the base adult cow emission factor shown is multiplied to 0.66 to adjust for the less



emitting cows. This adjusted emission factor is then multiplied by the total number of cows, not just the milk cows.

Table 19. Dairy ROG Emissions Using Various Emission Factors

Dairy Size		ROG Emissions (tons/year)				Emission Factors (lbs ROG/head/year)			
# Milking Head	# Total Head	Using EF 1	Using EF 2	Using EF 3	Using EF 4	EF 1	EF 2	EF 3	EF 4
50	85	0.4	0.4	0.2	0.1	14.2	12.8	7.0	3.5
200	341	1.6	1.4	0.8	0.4	14.2	12.8	7.0	3.5
500	853	4.0	3.6	2.0	1.0	14.2	12.8	7.0	3.5
700	1,194	5.6	5.0	2.8	1.4	14.2	12.8	7.0	3.5
1000	1,705	8.0	7.2	3.9	2.0	14.2	12.8	7.0	3.5
2000	3,411	16.0	14.4	7.9	3.9	14.2	12.8	7.0	3.5
4000	6,821	32.0	28.8	15.8	7.9	14.2	12.8	7.0	3.5
6000	10,232	48.0	43.2	23.6	11.8	14.2	12.8	7.0	3.5

### Estimated Statewide Livestock Emissions

Table 20 provides an estimate of the current statewide livestock emission estimates for livestock reactive organic gas (ROG), particulate matter 10 microns or less in size (PM10), and ammonia. As shown, estimates are provided for ROG and ammonia emissions for all livestock categories. PM10 data are not provided for all of the livestock categories due to lack of emissions data.

Table 20. Statewide Confined Animal Facility Emissions by Animal Type

	Livestock Emissions (tons/day)		
	ROG <sup>a</sup>	PM10 <sup>a</sup>	NH3 <sup>b</sup>
Dairy	35.7	8.3	134
Beef Feedlots	3.8	11	48
Broilers	1.4	NA	22
Layers	0.8	NA	28
Turkeys	0.8	NA	23
Swine	1.1	NA	5.0
Sheep	1.1	NA	8.0
Goats	0.02	NA	0.1
Horses	1.0	NA	4.4
Statewide All Livestock Total	45.8	19	274
Statewide All Emission Sources	2479	2108	717

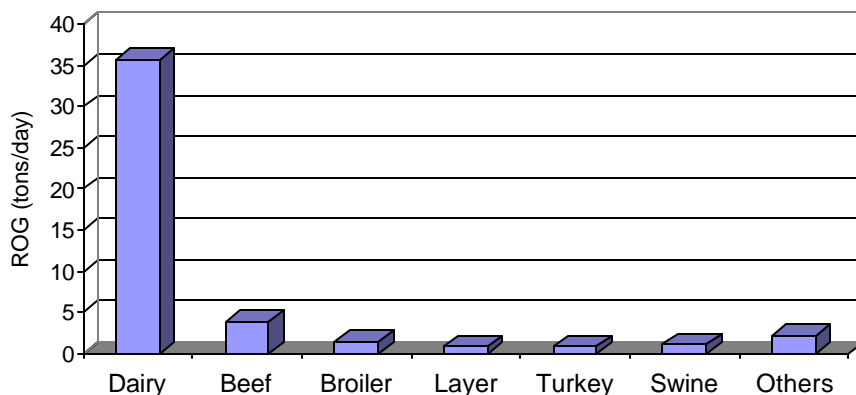
Notes: The base emission factor (EF) for dairy, beef, and other cattle operations is 12.8 lbs/head/year. The emissions for these categories are scaled based on manure output of various animal classes and the animal composition in the SJV. The layer, turkey, and duck EF are scaled based on the recently released broiler EF. Other EFs are from the ARB emission estimation methodology (ARB 2004a).

NA – The ARB has not yet estimated livestock emissions for these categories.

As Table 20 shows, on an overall statewide basis, non-range livestock ROG emissions are relatively small (about 2% of the total), as are PM10 emissions (about 1% of the total), and ammonia emissions are substantial (about 36% of the total). However, air pollution is a regional problem so it is also important to consider livestock emissions as they relate to regional emission sources and levels.

Figure 5 graphically shows the estimates of reactive organic gas emissions from livestock operations in California based on data and methods the ARB staff developed in 2004 (ARB 2004a).

Figure 5. California 2004 Livestock Reactive Organic Gas (ROG) Emissions



#### Estimated Regional Livestock Emissions

Both the South Coast AQMD and the San Joaquin Valley APCD have significant livestock populations. Table 21 shows ROG and ammonia emissions for the South Coast AQMD, the San Joaquin Valley APCD, and other local air districts. Particulate matter emissions from livestock are not shown here, but are estimated for some of the livestock categories. Dairy emissions are shown independently from other livestock emissions because they have some of the larger emission estimates and because there has been higher interest in dairies versus the other livestock categories. Appendix G provides a summary of major ROG sources in the San Joaquin Valley.

As Table 21 shows, the quantity of livestock ROG emissions in the South Coast AQMD are relatively small compared to the overall ROG emissions in the District. However, the South Coast AQMD is designated as an extreme ozone nonattainment area as of January 1, 2004. Because of the significant air quality problems in this region, all sources of emissions are important and warrant some level of emissions reduction. All of the sources in total must be considered, and the South Coast AQMD recognized this by requiring dairies that have 50 or more head to comply with local air district emissions mitigation rules (SCAQMD 2004b).

The San Joaquin Valley APCD was designated as a severe federal one-hour ozone nonattainment area as of January 1, 2004 and the ROG emissions from livestock

operations are more substantial. As an important source of air pollution, the majority of livestock facilities must begin to reduce their emissions. Within the SJV, even if the livestock emission estimates were cut in half, the emissions levels in aggregate are still significant and need to be considered in a strategy to improve the regional air quality. Without mitigation, livestock emissions will continue to grow while emissions from other ROG source categories will decrease as new emission standards are implemented.

The remainder of Table 21 shows livestock emissions of ROG for local air districts, sorted by dairy ROG emissions. Table 22 shows ammonia data.

Table 21. Livestock ROG Emissions for 2004

Air District	ROG (tons/day)			% of ROG Contributed by Livestock
	All ROG Sources	Dairy	Other Livestock	
San Joaquin Valley APCD	368.4	23.5	5.5	7%
South Coast AQMD	773.3	4.6	0.7	1%
Imperial County	30.2	3.3	1.9	16%
Bay Area	411.7	0.7	0.3	0%
Monterey Bay Unified	72.9	0.5	0.1	1%
Sacramento Metropolitan	69.7	0.4	0.1	1%
North Coast Unified	31.4	0.4	0.0	1%
Northern Sonoma County	12.0	0.3	0.1	4%
Glenn County	9.6	0.3	0.0	4%
Feather River	20.0	0.2	0.0	1%
Tehama County	8.5	0.2	0.0	3%
San Diego County	194.9	0.2	0.2	0%
San Luis Obispo County	26.7	0.2	0.1	1%
Santa Barbara County	44.4	0.2	0.1	0%
All Other Districts	405.1	0.9	0.9	0%
Statewide Total	2478.7	35.7	10.1	2%

Notes: The base emission factor (EF) for dairy, beef, and other cattle operations is 12.8 lbs/head/year. The emissions for these categories are scaled based on manure output of various animal classes and the animal composition in the SJV. The layer, turkey, and duck EF are scaled based on the recently released broiler EF. Other EFs are from the ARB emission estimation methodology (ARB 2004a).

Table 22. Livestock Ammonia Emissions for 2004<sup>a</sup>

Air District	Ammonia Emissions (tons/day)			% of Ammonia Contributed by Livestock
	All Ammonia Sources	Dairy	Other Livestock	
San Joaquin Valley APCD	235.0	85.96	80.51	71%
South Coast AQMD	109.6	14.06	15.53	27%
Imperial County	174.3	13.62	22.43	21%
Bay Area	47.5	2.67	3.54	13%
Monterey Bay Unified	11.9	2.00	1.77	32%
Sacramento Metropolitan	11.1	1.54	2.45	36%
North Coast Unified	4.2	1.47	0.16	39%
Northern Sonoma County	7.7	1.39	1.89	43%
Glenn County	4.0	1.36	0.16	38%
Feather River	4.3	0.81	0.25	25%
Tehama County	2.2	0.76	0.23	45%
San Diego County	24.4	0.67	4.21	20%
San Luis Obispo County	5.5	0.67	0.43	20%
Santa Barbara County	5.8	0.65	0.52	20%
All Other Districts	70.7	3.45	9.50	18%
Statewide Total	718.1	131.1	143.6	38%

<sup>a</sup>Source: ARB 2005a based on Environ 2002, and ARB methods.

## **Existing Regulations Applicable to Confined Animal Facilities**

### Local Air Districts

Several local air districts are already in the process of regulating emissions from the livestock industry. In the Joaquin Valley APCD, District Rule 4550 defines agricultural Conservation Management Practices (CMPs) for livestock particulate matter dust control. Facilities subject to the rule include agricultural operations over 100 acres and animal feeding operations with

- 500 or more mature dairy cows;
- 190 or more cattle other than milking cows or veal calves;
- 55,000 or more turkeys;
- 125,000 or more chickens, other than laying hens; or
- 82,000 or more laying hens.

The rule requires facility operators to implement a variety of options to reduce particulate matter in the areas of manure handling, feed handling, unpaved road, land preparation, harvesting, unpaved road dust, and other emission sources (SJV 2004a). In addition, livestock facilities within the San Joaquin Valley APCD that produce more than 12.5 tons per year of ROG are required to get permits. Using current emission estimates, this would include:

- Farming operations with 350 or more contiguous acreage irrigated using internal combustion engines,
- Dairy operations with 1,954 or more cattle,
- Feedlot operations with 3,086 or more heifers, or
- A broiler, laying hen, or turkey ranch with 130,211 or more birds

The San Joaquin Valley APCD is also in the process of developing Rule 4750, which will require large confined animal facilities to obtain permits and specify requirements for reducing emissions of ROG from livestock facilities. The District is now in the process of holding public workshops to gather input on the rule (SJV 2005b). This rule anticipates a 10% reduction in livestock ROG emissions by 2008 and a 25% emissions reduction by 2010.

In the South Coast AQMD, the primary livestock regulation is Rule 1127. This rule applies to dairies with more than 50 cows, heifers, and/or calves. The rule, which increases in stringency over several years, requires dairies to remove and dispose of their dairy manure on a frequent basis, pave their feed lanes, and minimize excess water in corrals (SCAQMD 2004b). Rule 1127 anticipates a 45% reduction in livestock ROG and a 30% reduction in ammonia emissions by 2010. In addition, South Coast AQMD Rule 403 for fugitive dust control is undergoing revisions that will include some commercial poultry ranches in the District.

Finally, Imperial County Air Pollution Control District has Rule 420 for livestock dust control (Imperial 2002). The rule requires any person using or operating a livestock feed yard to prepare a dust plan containing procedures for assuring a moisture content

between 20% to 40% for manure in the top three inches of occupied pens, and provide an outline of manure management practices, including manure removal plans.

#### U.S. Environmental Protection Agency

Under the United States Clean Water Act, the United States Environmental Protection Agency (U.S. EPA) requires confined animal feeding operations that produce discharges to water to apply for a National Pollutant Discharge Elimination System (NPDES) permit. Facilities above a specified size, for example 700 adult cows for dairies or 135,000 chickens for broiler ranches, are required to develop and implement a nutrient management plan identifying manure management practices. (EPA 2003). These plans and associated permits are administered by the California Regional Water Quality Control Boards.

#### State Water Resources Control Board

California's Regional Water Quality Control Boards (RWQCBs) imposes waste discharge requirements for individual livestock facilities. Violations of these requirements can lead to enforcement actions and facilities may be required to prepare a Report of Waste Discharge. The RWQCBs are also responsible for the implementation and enforcement of the requirements of the U.S. EPA confined animal feeding operation regulations mentioned previously.

## 4. BASIS FOR THE STAFF'S PROPOSED REGULATION

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### Overview

This section provides a discussion of how staff developed the recommended definition for large confined animal facilities (large CAFs). The definition is based on livestock emissions, how those emissions contribute to regional air pollution, and the need to include most of the livestock in the definition to provide the necessary scope to substantially reduce the emissions where feasible and cost effective. ARB's definition of a large CAF is only the first step in the SB 700 process. Following our definition, local air districts with large CAFs must then develop a rule that requires the facility operators to develop and submit emission mitigation plans. SB 700 requires that local air districts assess and consider in a public hearing the costs and technical feasibility of any proposed rule, among other requirements.

### Large Confined Animal Facility Definition (Section 86500)

The basis for defining large confined animal facilities at a certain threshold or headcount is the understanding that it is necessary to reduce airborne emissions from the majority of animals in livestock facilities, particularly in regions with significant air quality problems. The definition is designed to address the combined, aggregate air quality impacts of the livestock industry in California, with an emphasis on the San Joaquin Valley. We did not take an individual facility emissions approach in defining a large CAF because it is impractical and uncertain, in part due to the developing state of livestock emissions estimation research. At this time, facility emissions are calculated on a per animal basis pending completion and peer review of research on specific emission rates for various processes at a facility. Also, even if more comprehensive process-based emission factors were available, we would still take the head count approach in order to provide certainty in terms of the definition's applicability. This approach provides a clear, consistent, equitable, and predictable large CAF definition. Other approaches considered have significant shortcomings for both the livestock industry and the local air districts responsible for developing rules to regulate the industry. Alternative options are discussed fully later in the report.

The thresholds chosen take into account population and operation information that highlight natural breaks in the distribution of facility sizes. These thresholds allow most of the animals to be included, while minimizing the number of facilities affected. The thresholds for all the livestock categories are also scaled to be approximately equivalent in terms of facility emissions.

### Ozone Nonattainment Areas

After consideration of the types and numbers of facilities involved, in order for regions with the poorest air quality to meet their air quality goals and State Implementation Plan commitments, a majority of the livestock emissions need to be brought into the regulatory framework. This does not necessarily mean that a majority of the facilities will be regulated, but instead that most of the animals and their associated emissions will be included. Our proposal does this while minimizing the total number of affected livestock facilities. We are also proposing that the definition be less stringent in those

areas in which there are less significant air quality problems. These are the areas designated as attainment for the federal 1-hour federal ozone standard as of January 1, 2004. The details and complete rationale for each large confined animal facility definition by livestock category are provided on the following pages.

Table 23 provides the specific recommended definitions for large confined animal facilities. Facilities that have or exceed the specified number of animals on any day would be considered “large” confined animal facilities. In addition, separate thresholds are defined for those areas in which livestock operations are not significant sources of regional air emissions, and where emissions reductions from livestock operations are not necessarily needed to meet federally mandated air quality requirements. However, SB 700 provides mechanisms for local air districts to provide more stringent requirements if needed to meet other air quality goals.

Table 23. Large Confined Animal Facility Definition by Livestock Category

Livestock Category	Facilities at or Exceeding Threshold are Considered Large	
	Nonattainment Areas*	Attainment Areas*
Dairy	1,000 milk producing cows	2,000 milk producing cows
Beef Feedlots	2,500 beef cattle	5,000 beef cattle
Other Cattle Operations	7,500 calves, heifers, or other cattle	15,000 calves, heifers, or other cattle
Chickens -- Broilers	650,000	1,300,000
Chickens -- Egg Layers	650,000	1,300,000
Turkeys	100,000	200,000
Swine	3,000	6,000
Sheep and Goats	15,000	30,000
Horses	2,500	5,000
Ducks	650,000	1,300,000
Rabbits, Pheasants, Llamas, Others	30,000	60,000

\*Federal 1-hour ozone designation as of January 1, 2004

In the next phase in the SB 700 large CAF process, local air districts will develop rules that take into account specific information related to facility sizes, practices, and other factors (as specified in HSC 40724.6 second (d)). We also expect that livestock facilities will be provided with a variety of reasonable and cost effective options for reducing emissions, and the facility operators will be able to select from the available options those practices or technologies that are the most effective and applicable to their unique situations. Appendix D provides some additional discussion about ongoing activities to identify effective processes and technologies that can be used to reduce livestock emissions.

This facility threshold approach, which is based on a fixed parameter (in this case number of head), and which varies by region, is consistent with other regulations to reduce air pollution. For another example, a rule to reduce boiler emissions is based on a size of 5 million BTU/hour, and internal combustion engine rules are based on engine



size range such as engines over 50 horsepower. In both these cases, the criteria for determining if the source is regulated are based on the size of the process, and not specifically the emissions. Also, the San Joaquin Valley APCD, when adopting Rule 4550, based the animal feeding operation sizes on capturing more than 70 percent of the animal populations (SJV 2004a). Due to many factors, the headcount based approach, which addresses the majority of the livestock emissions, is the most beneficial, reasonable, and effective method for defining large confined animal facilities.

One other consideration in establishing proposed facility size cuts was whether the natural break points resulted in equitable treatment between the different livestock categories. As Table 24 shows, the proposed thresholds generally result in similar amounts of emissions from the different types of livestock facilities, based on current emission estimates.

Table 24. Livestock Facility Emissions at Proposed Size Cuts

Livestock Category	Nonattainment Areas		Attainment Areas	
	Head	ROG (tons/year)	Head	ROG (tons/year)
Dairy	1,000 milking cows	7.2	2,000 milking cows	14.4
Beef Feedlots	2,500	6.9	5,000	13.8
Other Cattle Operations	7,500	8.0	15,000	15.9
Chickens -- Broilers	650,000	8.1	1,300,000	16.1
Chickens -- Egg Layers	500,000	6.2	1,000,000	12.4
Turkeys	100,000	3.2	200,000	6.4
Swine	3,000	6.9	6,000	13.8
Sheep	15,000	7.2	30,000	14.4
Goats	15,000	7.2	30,000	14.4
Horses	2,500	8.4	5,000	16.8
Ducks	650,000	8.1	1,300,000	16.2

Notes: The base emission factor (EF) for dairy, beef, and other cattle operations is 12.8 lbs/head/year. The emissions for these categories are scaled based on manure output of various animal classes and the animal composition in the SJV. The layer, turkey, and duck EF are scaled based on the recently released broiler EF. Other EFs are from the ARB emission estimation methodology (ARB 2004a).

### Ozone Attainment Areas

Some regions within California have minimal livestock industries relative to other emission sources. The areas of the State that are attainment for the federal ozone standard as of January 1, 2004, fall in this category. In these regions, we recommend a head count of 2,000 or more milking cows on any day necessary to trigger the large threshold for dairies, with equivalent head counts for other livestock categories. This approach captures the very largest livestock facilities throughout the State, while reducing unnecessary burdens on livestock facilities in those regions where air emissions from the livestock industry are less critical to ozone attainment or maintenance. This approach in no way limits the local air districts' ability to regulate their livestock facilities more completely if warranted on a case-by-case basis. SB 700 includes provisions that allow the local air districts to develop more stringent livestock requirements than the State large CAF thresholds (HSC 40724.6(i), 40724.7(b)).

### Basis for Dairies

Because of the structure of the dairy industry, developing a large CAF definition for dairies is more difficult than the other livestock categories. Unlike most of the other livestock facilities in California in which nearly all of the animals are concentrated in a small number of relatively large facilities, the dairy industry has significant numbers of dairies in a variety of size ranges. Returning to Figure 4, the charts show that the majority of California cows are in dairies in the South Coast AQMD and the San Joaquin Valley APCD. About 93% of California's dairy cows are in these two regions. As of January 1, 2004, the South Coast AQMD was classified as an extreme nonattainment area for the federal one-hour ozone standard and the San Joaquin Valley APCD was classified as severe, so both regions have significant air quality problems. In these two regions combined, about 90% of the cows are in dairies over 500 head, which includes about 65% of the total dairies (dairies <50 head excluded). The remaining 7% of California's dairy cows are outside of these areas, with about 4% in 89 dairies that have 500 or more milk cows. (USDA 2004).

For dairies, we recommend that facilities with 1,000 or more milking cows on any day be defined as large CAFs in areas designated as nonattainment for ozone as of January 1, 2004. This would mean that in the area with the most milking cows, the San Joaquin Valley, the majority of the cows and their emissions (about 72%) would be captured, while impacting the smallest number of facilities (430, around 36% of all dairies with 50 or more milking cows). Moving to a smaller size, such as 700 milking cows, brings in 37% more dairies but only 17% of additional emissions. Moving to a larger size, such as 2,000 milking cows would only capture around 39% of the emissions.

The definition of 1,000 head is designed to include only the milking cows. As mentioned previously, most dairies within California still include support stock on site such as calves and dry cows, increasing the total number of animals on site. The trend is towards moving the support stock off of the milking dairy to maximize land use so that the dairy operator can focus on the primary business of producing milk. We have deliberately not included the support stock in the large CAF definition for the following reasons:

- 1) The regulation is substantially simplified and clarified because a cow conversion calculator is not needed to determine how many calves, or heifers, or dry cows equal a milking cow;
- 2) Most dairy facilities will have exact information about the number of cows they milk at any time, but the number of support stock can fluctuate and may be tracked less completely;
- 3) Historically, a typical dairy includes about 50-75% support stock, meaning that a 1,000 head dairy may include about 1,500 to 1,750 total animals present. By nature of their diet and size, these support animals produce substantially less manure than milking cows, and will produce lower emissions than milking cows at a dairy;
- 4) Using a definition of 1,000 milking head, and not explicitly including the support stock in no way diminishes the effectiveness of the definition; the vast majority of the milking cows are included while minimizing impacts on the industry;
- 5) Local air district emissions mitigation rules will apply to all components of the dairy, including support stock. The support stock are only excluded for determining the large definition, but not intended to be excluded in required emission mitigation plans.

For all of these reasons, the large CAF definition for dairies is based on the number of milking cows at the dairy.

As mentioned, in parts of the State other than the SJVUAPCD and SCAQMD, there are only 89 dairies that have over 500 head of cows, making up about 4% of the total dairy herd. These remaining dairies are primarily distributed in Sonoma, Glenn, Sacramento, San Diego, Marin, Humboldt, Tehama, and Yuba counties. In general, because there are a small number of these remaining dairies and they are widely dispersed, they are less likely to have significant impacts on regional air quality. For this reason, in areas that are attainment for the federal ozone air quality standard as of January 1, 2004, the definition for large CAFs is less stringent because these regions do not currently have the same urgency to begin the process of reducing livestock emissions. This approach also reduces regulatory burdens on existing facilities in these regions, but ensures that new large dairies would not be sited in areas for the express purpose of avoiding permitting and emissions mitigation plans required under SB 700. Therefore, for parts of the State designated as attainment areas for ozone as of January 1, 2004, dairies with 2,000 or more milking cows on any day are considered large CAFs. Also, note that under the authority of SB 700, the ARB definition of large confined animal facilities does not restrict local air districts from using more stringent definitions than the ARB develops.

#### Basis for Beef Feedlot Cattle

For beef feedlots, we recommend that facilities with 2,500 or more head on any day be defined as large CAFs in areas designated as nonattainment for ozone as of January 1, 2004. The majority of the cattle and their emissions (about 95%) would be captured, while impacting the smallest number of facilities (16, or only ~3% of all beef

feedlot operations). Moving to a smaller size, such as 1,000 head, brings in 19% more feedlots but only 1% of additional emissions. In keeping with the rationale for dairies, in attainment areas for the 1-hour ozone standard, the feedlot large CAF definition is 5,000 head or greater on any day. This definition brings in the vast majority of the feedlot cattle while excluding the large number of smaller facilities.

#### Basis for Other Cattle Operations

For the category of Other Cattle Operations, we recommend that facilities with 7,500 or more calves, heifers, or other cattle on any day be defined as large CAFs in areas designated as nonattainment for ozone as of January 1, 2004. In other regions of the State, the recommended definition is 15,000 or more calves, heifers, or other cattle on any day. There is very little information regarding the number and size of Other Cattle Operations. These operations generally exist to support the dairy and beef industries, so the animals often end up getting tabulated within these industries and are not clearly identified. Nevertheless, there are facilities that raise cattle that are not explicitly defined as dairies or feedlots. This Other Cattle Category is defined to include those facilities.

With the lack of facility information, it was not possible to identify the size of an Other Cattle facility that would include a specified number of animals in the large CAF definition. Instead, to ensure equity between the Other Cattle Operations and the dairy and feedlot operations, we compared manure output for the various types of animals. These Other Cattle facilities include a variety of animals ranging from calves that produce as little as 8 pounds of manure per day, to larger heifers that can produce up to 48 pounds of manure per day – ARB staff uses a figure of roughly 25 pounds of manure per head. This value is 2.6 times smaller than the manure produced by a beef cow (64 lbs/day) (ASAE 2004).

Scaling from the feedlot definition of 2,500 head to an Other Cattle definition, a value of around 7,500 head is obtained, based on the ratio of 64 to 25 pounds of manure per day. Thus, a definition of 7,500 or more head on any day was used in the nonattainment regions and 15,000 or more head on any day in other areas to ensure equity with other livestock categories under the large CAF definition.

#### Basis for Poultry

Broilers: For broiler chicken facilities, we recommend that facilities with 650,000 or more broiler chickens on any day be defined as large CAFs in areas designated as nonattainment for ozone as of January 1, 2004. A threshold of 1,300,000 or more head on any day is recommended for the remainder of the State. About 62% of the broiler chickens are in the 24 facilities (30%) with 650,000 or more chickens. Moving to a smaller size, such as 300,000, brings in 116% more facilities but only 45% of additional chickens. In addition, the majority of the facilities with 650,000 or more chickens are of the more modern tunnel-ventilated design houses, which can be more effectively updated to reduce emissions than the older style naturally ventilated houses used for most of the smaller facilities. Moving to a larger size, such as 1,000,000, only excludes 4 facilities, while excluding 13% of the broiler chickens.

Layers: For layer chickens, we recommend a threshold of 650,000 or more head on any day for the ozone nonattainment areas, and 1,300,000 or more head on any day for the remainder of the State. This definition would include about 58% of the layers and 12% of the total 97 layer facilities. Moving to a smaller size, such as 100,000, brings in 266% more facilities but only 54% of additional emissions. Raising the definition to 1,000,000 for the ozone nonattainment areas includes slightly fewer facilities and chickens. However, because the average layer facility size based on USDA data is about 480,000 head, we felt it best to not raise the level above 650,000.

Turkeys: For turkeys, we recommend a threshold of 100,000 or more head on any day for the ozone nonattainment areas, and 200,000 or more head on any day for the remainder of the State. This definition would include about 59% of the turkeys and 33% of the total 93 turkey facilities. Moving to a smaller size in the ozone nonattainment areas, such as 50,000, brings in 92% more facilities but only 54% of additional emissions. Moving to a larger size, such as 200,000 turkeys, would result in only 20% of the turkeys being included.

#### Basis for Other Livestock

For swine, the basis for determining large facilities is very similar to feedlots. Based on the earlier discussion of the hog industry, it is clear that a definition in the range of 2,000 to 5,000 head would capture the majority of the swine and their emissions (about 75%) while impacting the smallest number of facilities (4 to 6). Within the range specified, we have selected 3,000 or more head on any day as the large CAF threshold for areas designated as nonattainment for ozone as of January 1, 2004. In other areas of the State, the swine large CAF definition is 6,000 head or greater on any day. This definition brings in the vast majority of the hogs while excluding the large quantity of small and very small facilities that have only 25% of the remaining hogs widely dispersed throughout the State.

For the other animal classes, information is not readily available regarding the size distributions of the various facilities. However, the total number of animals in these other classifications is relatively minor compared to the beef and dairy facilities. So, it is important to set definitions for these animal classes, and a requirement under SB 700, but the air quality impact of these other facilities is expected to be extremely small compared to the major livestock classifications.

To help set large CAF definitions for the other animal types, we evaluated animal manure generation rates. Referring to Table 25 (ASAE 2005), horses produce about the same quantity of manure as beef feedlot cows. On average, horses produce around 56 pounds of manure per head per day and feedlot cows produce 64 pounds of manure per head per day. Although the digestive processes, feed, and waste characteristics are different for these two animals, for the purposes of defining large CAFs, the similarities are sufficient to use the same definition for both horses and feedlots. Therefore, the large CAF definition for horses is 2,500 or more head on any day in ozone nonattainment areas, and 5,000 or more head on any day in other parts of the State.

Because the quantity of duck manure output is relatively similar to broiler chicken manure output, the recommended large CAF definition for ducks is set to agree with the broiler chicken definition.

Manure output data was not located for sheep or goats. Instead, adult sheep and goats both weigh in the range of about 150 pounds. A beef cow weighs about 1,000 pounds (Penn State). Dividing the beef cow weight by the sheep and goat weight, we see that beef cattle are about 6 times heavier than sheep and goats. Making the assumption that animal weight has some relation to manure output, and further, assuming that manure output is related to the magnitude of air emissions, we can develop a large CAF definition for the sheep and goats. Using this information, we have defined a large CAF for sheep and goats as 15,000 or more head on any day in ozone nonattainment areas, and 30,000 or more head on any day in all other parts of the State. This value is effectively six times the beef cow definition to reflect the differences in animal weights.

For the other animal classes such as emus, geese, ostriches, pheasants, pigeons, squab, quail, bison, deer, elk, llamas, mules, burros, donkeys, gerbils, rabbits, or other animals raised in confined animal facilities, a size of 30,000 or more animals on any day is defined as a large CAF in ozone nonattainment regions. The large CAF definition for these animals is 60,000 or more animals on any day in all other parts of the State. Based on the information provided previously in Table 16, it appears extremely unlikely that facilities with these types of animals California will exceed these thresholds, which is appropriate considering the small number of animals, the small facilities, and the minor ambient air quality impacts they are likely to produce.

Table 25.  
Livestock Manure Production

	Manure Production (lbs/head/day)
Lactating Cow	150
Dry Cow	83
Calf	8 to 19
Heifer	19 to 48
Beef Cow	64
Broiler	0.23
Layer	0.19
Turkey (male)	0.59
Turkey (female)	0.31
Duck	0.36
Swine	10
Horse	56

### **Recordkeeping and Reporting Requirements (Section 85601)**

Beginning on January 1, 2006, a facility that is defined as a large confined animal facility under this proposed rulemaking shall be required to keep records that specify the daily number of animals maintained at the facility. The large CAF operator will be required to keep these records on site and readily accessible, and will submit these records to the local air districts consistent with compliance schedules set forth in any applicable local air district regulations. Most large confined animal facility operators already keep daily feed records and other information that would allow them to readily comply with this requirement.

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## 5. ENVIRONMENTAL IMPACTS OF THE REGULATION

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### **Air Quality and Environmental Impacts**

#### California Environmental Quality Act Analysis

The California Environmental Quality Act (CEQA) and ARB policy require an analysis to determine the potential adverse environmental impacts of proposed regulations. Because the ARB's program involving the adoption of regulations has been certified by the Secretary of Resources (Public Resources Code, Section 21080.5, Exemption of specified regulatory programs), the CEQA environmental analysis requirements are allowed to be included in the ARB Staff Report (i.e. the Initial Statement of Reasons) in lieu of preparing an environmental impact report or negative declaration. In addition, the ARB will respond in writing to all significant environmental points raised by the public during the public review period or at the Board hearing. These responses will be contained in the Final Statement of Reasons for the regulation.

Staff evaluated the potential environmental impacts from the proposed regulation and determined that no significant adverse environmental impacts are likely to result from the proposal. This determination was made because the proposed regulation simply specifies a threshold by which a confined animal facility is considered "large", with no direct environmental impacts resulting from this action. However, the regulation will trigger actions by local air districts that should have a positive air quality impact. This is because large confined animal facilities as defined by this proposed regulation will be required to submit information that the district determines is necessary to prepare an emissions inventory of all regulated pollutants and to prepare and submit an emissions mitigation plan that identifies the emissions reduction strategies the facility will use to reduce emissions. The impact of these requirements is not currently quantifiable because the environmental benefits will depend on regulatory approaches developed by each local air district as a result of the adoption of their large CAF regulation. The local air districts will be required to perform their own environmental analyses when adopting the rules, thus ensuring that the requirements of the California Environmental Quality Act are met.

#### Discussion of Other Environmental Impacts of Livestock Facilities

Confined animal feeding operations can have potential environmental impacts on air, water, and soil. In addition, some animal feeding operations can create odor and fly impacts that can cause nuisance problems. Most confined animal facilities have several potential pathways for creating environmental impacts. Some of the key air emissions pathways include the treatment, decomposition, distribution, and disposal of the animal's wastes, emissions from equipment used at facilities, emissions produced directly by the animals, and other facility activities.

In general, the largest sources of air and water environmental impacts from confined animal facilities are due to the animal waste products. These products include excreted manure and urine, and can also include gaseous emissions directly from the animal. An average milking dairy cow produces between 80 to 150 pounds of manure per day. For a confined animal facility, substantial quantities of feed are brought to a single

location. This feed contains a variety of nutrients that are provided to the animals. Those nutrients and other components that are not utilized by the animal are excreted as wastes. The wastes are stockpiled within animal feeding operations and are periodically disposed of or otherwise utilized. Nitrogen compounds in the waste can provide valuable plant nutrients, but they can also produce ammonia gas and nitrates, which can have negative air and water quality impacts. Organic material in livestock waste is consumed by microbes that can produce a mix of volatile organic gases that can contribute to ozone formation. Salts in the livestock wastes can create soil and water problems.

Discharges of livestock wastes to water and land have historically been regulated within California to mitigate some of the environmental impacts of these activities. Until recently, the airborne emissions from livestock operations had been unregulated within the State. In part, this is because there was not a clear recognition of the potential significance of livestock emissions. However, as we continue progress in improving air quality, it is important that all sources of air pollution, including livestock, are included in the regulatory framework. Throughout the State, emissions controls have become increasingly more stringent on currently regulated sources of air pollution such as factories, vehicles, consumer products, coatings, and other sources. To meet State and federally mandated requirements to improve air quality, emissions from all air pollution sources must be reduced whether they are large or small, industrial or agricultural, individually or in aggregate.

### **Environmental Justice**

State law defines environmental justice as the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies (Senate Bill 115, Solis; Stats 1999, Ch. 690; Government Code § 65040.12(c)). The Board approved Environmental Justice Policies and Actions on December 13, 2001, to establish a framework for incorporating environmental justice into the ARB's programs consistent with the directives of State law. The policies subsequently developed apply to all communities in California, but they recognize that environmental justice issues have been raised more in the context of low income and minority communities, which sometimes experience higher exposures to some pollutants as a result of the cumulative impacts of air pollution from multiple mobile, commercial, industrial, areawide, and other sources.

Actions of the ARB, local air districts, and federal air pollution control programs have made substantial progress towards improving the air quality in California. However, some communities continue to experience higher exposures than others because of the cumulative impacts of air pollution from multiple sources. Adoption and implementation of this proposal will have no negative environmental impacts on environmental justice communities. Local air districts rules for large CAFs should result in air quality benefits for all residents in those local districts. In addition, to ensure that everyone has had an opportunity to stay informed and participate fully in the development of the large confined animal definition, staff has held workshops throughout the State, provided

opportunities to participate in meetings by videoconference and phone, widely distributed all materials, and maintained consistent contact with interested community and environmental representatives.

### **Livestock Ammonia Analysis**

At several of our SB 700 Large CAF workshops, concerns were raised regarding exposure to gaseous ammonia emitted by dairies. To evaluate the potential significance of these emissions, ARB staff performed a simplified modeling analysis of dairy ammonia emissions. Using average meteorology for Fresno and assuming emissions of 74 pounds of ammonia per cow per year, a dairy size of 500 meters square, and 1,000 cows, on an annual average basis, ammonia concentrations of 1 to 5 micrograms/cubic meter ( $\text{ug}/\text{m}^3$ ) might be observed. The Office of Environmental Health Hazard Assessment (OEHHA) ammonia health threshold for chronic exposure is  $200 \text{ ug}/\text{m}^3$  (OEHHA 2005). Based on this, it would require a dairy size of 40,000 to 200,000 head to reach the chronic exposure level. There are no existing California dairies of this size.

This regulation does not directly address the potential impacts of ammonia emissions from multiple facilities that might be situated in close proximity to residential communities, schools, or other sensitive land uses. However, local air districts have the authority to address any such issues within their jurisdictions.

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## **6. ECONOMIC IMPACTS OF THE REGULATION**

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Sections 11346.3 and 11346.5 of the Government Code require State agencies to assess the potential for adverse economic impacts on California business enterprises and individuals when proposing to adopt or amend any administrative regulation. The assessment shall include a consideration of the impact of the proposed regulation on California jobs, business expansion, elimination, or creation, and the ability of California business to compete.

State agencies are required to estimate the cost or savings to any State or local agency, and school districts. The estimate is to include any nondiscretionary cost or savings to local agencies and the cost or savings in federal funding to the State.

In developing any new regulatory program, it is important to ensure that any economic burdens on the industry are consistent with the environmental benefits that may be ultimately achieved. In addition, the livestock industry within California provides thousands of jobs and other benefits to the State, so it is important to maintain a vital California livestock industry while working to reduce the industry's air quality impacts.

For those facilities that are defined as large under the SB 700 large confined animal facility definition, there will be ultimately be additional costs to facilities to reduce their emissions. However, the large CAF definition itself does not impose any direct costs. The direct costs will occur in subsequent phases of the regulatory implementation as local air districts determine which emissions mitigation practices are reasonable and effective for "large" livestock operations, and the facilities develop and comply with emission mitigation plans that are consistent with local air district rules. As the local air districts develop their large CAF rules, they are required pursuant to SB 700 to perform an assessment of the impacts of the rule or regulation to include: the number and size of the affected sources, the nature and size of emissions, the emissions reduction potential, impacts on employment, probable costs, availability and cost effectiveness of alternatives, and the technical and practical feasibility of new rules and requirements.

Although a comprehensive cost analysis is not appropriate for this document, it is clear that as local air districts develop their large CAF rules, a relatively minor new cost to facilities will be additional permitting and administrative fees. Costs that are more significant may be incurred for improvements in waste facility management and other practices needed to reduce air emissions. In some cases, these costs may be relatively minimal if the facility has already incorporated much of the best available management practices. In other cases, costs could be substantial, ranging from tens to hundreds of thousands of dollars or more for some potential control technologies.

In developing the large CAF definition, the ARB staff has attempted to minimize future economic impacts to the extent feasible while still ensuring the most complete options for improving air quality. To minimize unnecessary economic burdens, we have focused the definition on those livestock facilities that include the vast majority of the animals and their associated aggregate emissions. This approach excludes most of the

facilities that are clearly small and are typically less capable of absorbing the costs of emissions mitigation regulations. In addition, the recommended large CAF definition is described based on facility animal counts, which definitively excludes the smaller facilities from being defined as “large” which could occur if the definition were based on facility process-based emissions. We have also developed a definition that excludes the vast majority of facilities from regulation in those areas where livestock emission reductions may be necessary to meet air quality goals.

## **7. ALTERNATIVES TO THE PROPOSED REGULATION**

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No alternatives considered by the agency would be more effective in carrying out the purpose for which the regulation is proposed or would be as effective or less burdensome to affected private persons than the proposed regulation. The staff evaluated various alternatives to the current proposal. A description of the alternatives considered and staff's rationale for finding them unsuitable follows below.

### **Take No Action**

ARB is required under State law (HSC 40724.6(a)) to adopt a definition of large confined animal facility by July 1, 2005, so taking no action is not allowable under State law.

### **Base the Large CAF Definition on Facility Emissions**

One approach discussed during the development of this regulation was to have a definition based on individual facility emissions at one-half the applicable emissions threshold for a major source. The rationale behind this approach is that it would be consistent with permitting requirements outlined in SB 700 (HSC 40724.6(c)). For the San Joaquin Valley APCD, the permitting threshold under SB 700 for a large confined animal facility is 12.5 tons per year of reactive organic gases (ROG), and in the South Coast AQMD, the permitting threshold under SB 700 is 5 tons per year of ROG. Most other areas of the State have permitting thresholds under SB 700 for large confined animal facility of 50 tons per year of ROG.

One of the key shortcomings of the approach is that the definition would be based on a foundation that is undergoing significant change – the data and methods used to estimate livestock emissions. Several million dollars of livestock emissions research is ongoing in California. From the preliminary livestock emissions research now available, the range of measured emissions estimates is substantial. This work will continue over the next several years to continue refining and better understanding livestock emissions. An important finding from this research is that there are measurable amounts of reactive organic gas emissions coming from confined animal facilities and that there are many different kinds of reactive organic gas compounds being emitted. As this report is being written, the San Joaquin Valley Dairy Permitting Advisory Group (DPAG) is working to identify a dairy ROG emission factor and ARB is evaluating ongoing research. The current emission factor is 12.8 lbs/head/year. The estimates under consideration by the DPAG are higher and lower than this estimate.

We did not take an individual facility emissions approach in defining a large CAF because it is impractical and uncertain, in part due to the developing state of livestock emissions estimation research. At this time, facility emissions are calculated on a per animal basis pending completion and peer review of research on specific emission rates for various processes at a facility. Also, even if more comprehensive process-based emission factors were available, we would still take the head count approach in order to provide certainty in terms of the definition's applicability.

To further illustrate, Table 26 shows the number of animals that would trigger the “large” definition using the current livestock emission estimates and an emissions threshold of 12.5 tons per year of ROG. The table only shows reactive organic gases, but is it possible that ammonia and particulate matter could also be considered in an emissions based definition. Using this approach, a facility operator would need to first estimate their overall emissions, ensuring that they were using approved emissions data. If they exceed the threshold, they would be considered large. If the emissions data are updated, or if there are changes to the facility that would affect emissions, the facility operator would need to recalculate their emissions and reevaluate if they are considered large under the new scenario. This would place a tremendous workload burden on local air districts, as they would need to expend considerable resources evaluating each facility on a case-by-case basis.

As shown, using facility specific emissions as a basis for defining large confined animal facilities creates uncertainties for local air districts, industry, and other stakeholders. It would also spur continuous debates regarding the “best” emissions data. A facility emissions based approach also creates unpredictability in the planning processes for developing State Implementation Plans for meeting air quality standards, and could create potential economic and competitive inequities between larger (generally newer) and smaller (generally older) livestock facilities. Finally, unless an emissions threshold lower than 12.5 tons per year of ROG were used for a facility emissions definition, significant portions of the dairy industry and their associated emissions will remain unregulated in California.

One argument made on behalf of the facility emissions approach is that it would allow the livestock industry to be regulated like other agricultural industries. However, the livestock industry is being treated like other agricultural operations. SB 700 requires all agricultural sources to mitigate their emissions, not just livestock facilities. Local air districts with significant air quality problems are required to identify and implement reasonable and cost effective emission reductions from all agricultural sources. For example, in the San Joaquin Valley APCD, rules are already in place to reduce particulate matter emissions from general crop-based agricultural operations and dairies with 500 or more cows. In the South Coast AQMD, dairies with 50 or more cows are permitted and required to reduce emissions. Rules are also being developed to reduce emissions from agricultural engines. Agricultural processing plants also have stringent emissions regulations on nearly all of their emission sources.



Table 26. Number of Head to Exceed 12.5 tons/year ROG

	ROG EF (lbs/head/year)	Number of Head to Exceed Emissions Threshold 12.5 tons ROG/year
Dairy	12.8	1,735 milk cows
Beef Feedlots	12.8	4,577
Broilers	0.025	1,008,065
Layers	0.025	1,008,065
Turkeys	0.064	392,947
Swine	4.64	5,388
Sheep	0.96	26,042
Goats	0.96	26,042
Horses	6.7	3,731

Notes: The base emission factor (EF) for dairy, beef, and other cattle operations is 12.8 lbs/head/year. The emissions for these categories are scaled based on manure output of various animal classes and the animal composition in the SJV. The layer, turkey, and duck EF are scaled based on the recently released broiler EF. Other EFs are from the ARB emission estimation methodology (ARB 2004a).

### Provide Consistent Statewide Definition

The staff also considered the alternative of recommending a large CAF definition that is consistent statewide. After consulting with the local air districts, evaluating their air quality needs, and evaluating the distribution of livestock distribution throughout California, it was clear that many regions within California have relatively minimal livestock populations and less severe air quality problems than the San Joaquin Valley and the South Coast Air Basins. Providing a consistent statewide definition would not provide meaningful air quality improvements, while imposing unnecessary workloads on local air districts and industry. Therefore, for the areas of the State designated as attainment for the federal ozone standard as of January 1, 2004, the proposed large CAF definition is less stringent. In these regions, we recommend a head count of 2,000 milking cows at a dairy necessary to trigger the “large CAF” threshold, and equivalent thresholds for other livestock categories (twice the nonattainment area thresholds). This approach captures the very largest livestock facilities throughout the State while reducing unnecessary burdens on local air districts and livestock facilities in those regions where there is relatively good air quality and relatively minor air emissions from the livestock industry. It also ensures that large dairies would not be sited in areas for the express purpose of avoiding permitting and emissions mitigation plans required under SB 700. Also under SB 700, local air districts have the authority to develop more stringent requirements for bringing livestock facilities under regulation, so this approach does not limit a local air district’s ability to regulate their livestock facilities more fully if they so choose (HSC 40724.6(i) and 40724.7(b)).

### More or Less Inclusive Definition

The staff recommendation provides an optimal combination of bringing the fewest number of livestock facilities to get the most air quality benefit. Other options were considered, including bringing in more facilities or bringing in fewer facilities under the

large CAF definition. In all cases, bringing in more facilities under the large CAF definition would add a smaller number of livestock animals, providing very little additional air quality benefit while adding unnecessary workload burdens to local air districts and the livestock industry. On the other hand, bringing in fewer livestock facilities does have the potential to significantly minimize the potential for effectively reducing livestock emissions. This results from how the large CAF definition thresholds were determined. The majority of livestock animals are in the larger livestock facilities. The large CAF definition was developed to include the majority of the emissions, or animals, which are in these larger facilities. If additional facilities are excluded, it will include these larger facilities which confine significant portions of the livestock population. Therefore, bringing in fewer facilities can substantially reduce the overall air quality effectiveness of the large CAF definition. For these reasons, the alternatives of including fewer or more facilities were determined to be less effective than the proposed recommendation.

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## APPENDIX A

### PROPOSED REGULATION ORDER DEFINITION OF LARGE CONFINED ANIMAL FACILITY Title 17 Division 1 Chapter 1 New Subchapter 2.7 Large Confined Animal Facilities

A new Subchapter 2.7, commencing with section 86500 is added to Title 17, Division 1, Chapter 1 to read as follows:

#### **Title 17, New Subchapter 2.7**

#### **§86500 Large Confined Animal Facility**

A large confined animal facility shall mean:

(a) In any area designated as a federal ozone nonattainment area for ozone as of January 1, 2004, any confined animal facility that maintains on any one day:

- 1,000 or more milk-producing dairy cows;
- 2,500 or more beef cattle;
- 7,500 or more calves, heifers, or other cattle;
- 100,000 or more turkeys;
- 650,000 or more chickens other than laying hens
- 650,000 or more laying hens
- 3,000 or more swine;
- 15,000 or more sheep, lambs, or goats;
- 2,500 or more horses;
- 650,000 or more ducks;
- 30,000 or more rabbits or other animals.

(b) In any area other than an area described in subsection (a) above, any confined animal facility that maintains on any one day:

- 2,000 or more milk-producing dairy cows;
- 5,000 or more beef cattle;
- 15,000 or more calves, heifers, or other cattle;
- 200,000 or more turkeys;
- 1,300,000 or more chickens other than laying hens
- 1,300,000 or more laying hens
- 6,000 or more swine;
- 30,000 or more sheep, lambs, or goats;
- 5,000 or more horses;
- 1,300,000 or more ducks;
- 60,000 or more rabbits or other animals.

NOTE: Authority cited: Sections 39600, 39601, 40724.6 Health and Safety Code.

Reference: Sections 39011.5 and 40724.6.

**§86501 Recordkeeping and Reporting Requirements**

Beginning January 1, 2006, the owner or operator of a large confined animal facility under Section 86500 shall be required to keep records that specify the numbers of animals maintained daily and such other information as may be required by air pollution control district or air quality management district rules. Such records shall be maintained at a central place of business for a period of not less than three years and shall be made available upon request to the Executive Officer or Air Pollution Control Officer or their representative.

NOTE: Authority cited: Sections 39600, 39601, 40724.6 Health and Safety Code.  
Reference: Sections 39011.5 and 40724.6.



## APPENDIX B

### DETAILED CALIFORNIA DAIRY INFORMATION

#### General California Dairy Information

The following section provides several descriptors of the dairy industry in California. In many cases, the factors described below are not explicitly used in the definition of a large CAF for dairies, but they were used to inform our decisions regarding the sizes and types of facilities that would be responsible for the majority of dairy emissions, and to give a clearer picture about what types of facilities would be affected.

Milk Output, Number of Dairies, Cows per Farm – Based on data from the California Department of Food and Agriculture (CDFA), in 1960, there were nearly 8,000 dairy farms in California producing about 10 billion pounds of milk per year. Based on the CDFA data (which does not count the very small farms), now there are about 2,100 dairies producing 35 billion pounds of milk per year. In 1960, the typical dairy farm had about 100 milking cows. Now, based on CDFA data, the average dairy size in California is about 800 milking cows. During this same period, the number of cows has roughly doubled in California, to the current estimate of about 1.7 million milking cows. An average cow in California now also produces nearly 21,000 pounds of milk per year, versus just 10,000 pounds of milk per year in 1960 (CDFA 2003). These CDFA statistics are collected and compiled differently than the previously discussed USDA data, which is why they vary from the earlier data.

Milk Output versus Number of Cows – Milk output is highly correlated to the number of milk cows within California. As the cow population changes, the milk output directly changes in direct relation to the population, particularly now that the per cow milk output seems to have leveled off. An average California cow produces about 21,000 pounds of milk per year (CDFA 2003). Most of California's cows are Holsteins, which produce an average of 22,700 lbs/year of milk, the highest of any breed. The other major breed in California is Jersey cows, which produce about 16,700 lbs/year of milk. Other breeds within California include Guernseys, cross breeds, Ayrshires, and Brown Swiss (CDC).

Dairy Size versus Dairy Product Sales – Based on USDA statistics, there are approximately 517 dairies in California with over 1,000 milking head. These dairies over 1,000 milking head bring in about \$2.4 billion in dairy product sales, or about 63% of the total dairy product sales. A simple average of the number of dairies divided by the sales equates to about \$4.5 million in sales per 1,000 milking head dairy. For dairies from 500 to 999 milking head, the average dairy product sales are \$1.6 million (USDA 2004). Table B-1 provides this data for all of the dairy size categories. Of course, because the computed averages shown are simply an average of the number of dairies divided by the sales, it does not provide any indication about the sales of any specific dairy. In addition, because expenses are not shown, this information does not reflect dairy profits. As with the other data in this report, the exact number of dairies does not

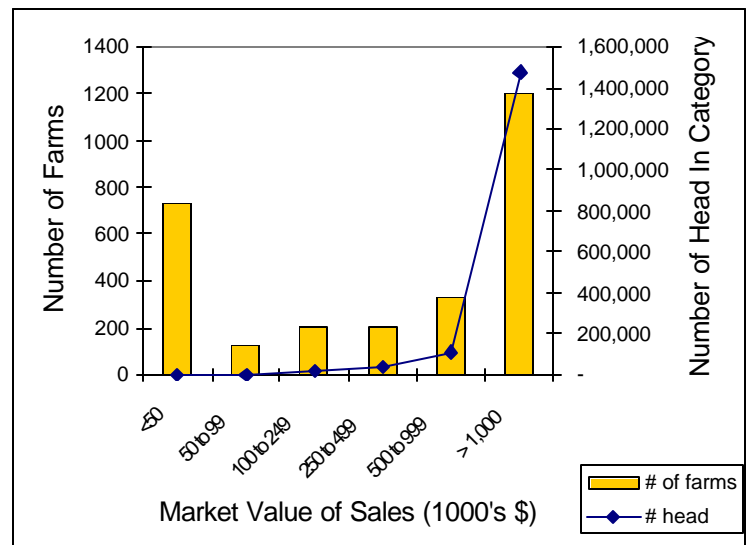
precisely agree with other data sets due to how the data were collected and compiled by the USDA. These minor differences do not affect the outcome of the analysis.

Table B-1. Dairy Product Sales by Dairy Size

Dairy Size Milk Cows	Number of Farms	Dairy Product Sales (\$1000)	Percentage of Total Sales	Computed Average Sales (\$)
1 to 9	167	2,504	0%	14,994
10 to 19	135	4,343	0%	32,170
20 to 49	104	7,191	0%	52,875
50 to 99	136	26,705	1%	196,360
100 to 199	159	44,712	1%	281,208
200 to 499	504	377,393	10%	748,796
500 to 999	558	901,930	24%	1,616,362
1,000 or more	517	2,359,291	63%	4,563,426
Total	2280	3,724,068		

Another way to look at this data is to compare the number of farms, the number of animals, and the market value of total facility sales. In Figure B-1, the bars show the number of facilities that have market value sales ranging from less than \$50,000 to over \$1,000,000. The line part of the graph shows the number of milking cows within each sales category. From this chart it is clear that the vast majority of the cows (over 90%) are in the 1,200 dairies with over a million dollars in sales; of these 1,200 dairies, 539 have sales over \$2.5 million.

Figure B-1. Dairy Farms versus Sales and Milking



**Production Costs** – Operating a dairy has many of costs. Animal feed is on average 43% of the operating costs, replacement cows are 13% of costs, operating expenses are 13%, and labor is 11%. Additional costs include marketing (3%), taxes and insurance (1%), depreciation (3%), allowances for return on investment (7%), and return on management (3%). In terms of actual costs, the total Statewide average cost per cow per month is about \$216, breaking down to \$104 for feed, \$26 for labor, \$31 for herd replacement, \$47 for operating costs such as supplies, veterinary services, fuel, utilities, etc., and about \$8 for marketing costs. On a milk production basis, the production cost is about \$12.44 per 100 pounds of milk production (CDFA 2003). This information, although not directly related to the large CAF definition, helps indicate those areas where a dairy operator incurs the largest expenses, and gives a sense of the overall operation.

On an industry-wide basis, the USDA census data indicates that there is a total of \$4.1 billion in total dairy market value sales and government payments, which averages to \$1,736,306 per dairy. For total dairy production expenses, \$3.4 billion is shown, with an average of \$1,532,128 per dairy. So, based on this, the industry on a whole could produce a profit of \$669 million, or an average of about \$204,000 profit per dairy. Naturally, these values are all industry-wide averages and do not reflect the financial performance of any specific dairy, which would vary substantially based on many factors.

Dairy Ownership – Nearly 2,000 of California's dairy farms, or about 70% are family owned. These family owned farms have about 49% of the cows. About 25% of the California dairies (about 700) are owned by partnerships, and have about 44% of the cows. The remaining 5% of the dairies (about 140) and 7% of the cows are in family corporations. (USDA 2004)

Manure Waste Handling – Based on a recent U.S. EPA study (EPA 2004), about 60% of California's dairy cow manure is processed through flush barn systems, 36% is processed using scrape barns, and the remaining facilities use a variety of methods. Based on knowledge of the distribution of dairies within California and the manure management practices, the U.S. EPA estimate for flush lane dairies is probably somewhat low. Instead, it is more likely that about 70 - 80% of the dairy manure is processed in flush lane dairies. These different manure treatment options will ultimately play a role in evaluating which manure management options are most effective for reducing dairy emissions.



## APPENDIX C

### SUMMARY OF LIVESTOCK AIR EMISSIONS RESEARCH SYMPOSIUM

To get a better understanding of the state of the science for livestock emissions, the California Air Resources Board (ARB) organized a Livestock Air Emissions Research Symposium to provide a forum for researchers to present their most current research findings on the airborne emissions from dairy, beef, and poultry operations. The symposium, held on January 26, 2005, in Fresno, California, was also videoconferenced to Southern California, Bakersfield, and Modesto, or participants could call-in via phone. Nine researchers presented their results to approximately 150 participants.

Each livestock research project provides a piece of the puzzle for understanding livestock air emissions. Much of the work presented, particularly for organic gas emissions from livestock, are among the first of its kind. The majority of the presentations focused on dairy and beef cattle. The presentations from the researchers are available on ARB's website at <http://www.arb.ca.gov/ag/caf/lersymp.htm>.

The following general conclusions can be drawn from the symposium presentations:

- All dairy and beef emissions results presented are preliminary. It is not possible to draw supportable conclusions regarding dairy or beef facility emissions based on information presented at the symposium.
- The research projects show that reactive organic gas (ROG) emissions are produced directly from the cow (Mitloehner), as well as from the livestock wastes, waste handling, waste decomposition, and animal feed (Krauter, Schmidt, Cassel, Goorahoo, Zhang, Mukhtar, Koziel).
- Each project focused on different components of the overall livestock emissions system. For example, Krauter focused on overall dairy emissions, Schmidt focused on process specific dairy emissions, and Mitloehner measured emissions directly from cows housed in an environmentally controlled chamber.
- In measuring ROG emissions from livestock, many different compounds were identified.
- There was substantial variability in the livestock ROG emissions estimates between the various research studies. This is likely due to the variability in the different measurement and analytical techniques, as well as the large emissions variability in complex biological systems such as a dairy facility or a cow.
- Additional work is needed to refine livestock emissions sampling and analysis methods to identify the full mass of reactive organic gases produced. Work is also needed to better understand the magnitude, sources, and variability of all important livestock emissions including ROG, ammonia, and particulate matter.
- The symposium underscored the need for the researchers to develop consistent reporting protocols so the results can be more easily understood and compared.

## Summary of the Research Presented at the Symposium

The table below provides a summary of the research presented at the symposium. Studies were performed to evaluate full facility emissions (ambient) and specific processes at dairies (surface flux chamber), enteric emissions directly from cows and their fresh wastes (enclosure), emissions from different waste management practices (enclosure and laboratory), and emissions from a poultry house.

Table C-1. Summary of Research Presented at the Livestock Emissions Research Symposium

Researcher	Measurement Type	Pollutants	Emission Sources Evaluated		
			Cow Enteric Emissions	Specific Facility Processes	Full Facility Emissions
Cassel	Full facility ambient	Organics	Yes, included in ambient measurements	No	Yes
Mitloehner	Cows in enclosure	Organics, NH3, others	Yes	Enteric emissions and fresh manure	No
Schmidt	Surface flux chamber	Organics, NH3, others	No	Yes, multiple processes evaluated	No, enteric not included
Krauter	Full facility ambient	Organics, NH3, others	Yes, included in ambient measurements	Some process specific resolution	Yes
Goorahoo	Full facility ambient	NH3, CH4	Yes, included in ambient measurements	Some process specific resolution	Yes
Zhang	Laboratory	Organics, NH3, others	No	Manure decomposition in lab setting	No
Mukhtar	Surface flux chamber	NH3	No	Yes, multiple processes evaluated	No, enteric not included
Koziel	Surface flux and ambient	NH3, H2S	Yes, included in ambient measurements	Yes, multiple processes evaluated	Yes
Summers	Poultry house fan exhaust outlet	Organics, NH3	Measured emissions from a ducted fan outlet of a poultry house		

## APPENDIX D

### ONGOING ACTIVITIES TO ADDRESS LIVESTOCK EMISSION MITIGATION PRACTICES

There is significant work ongoing to gain a better understanding of activities and processes that can reduce livestock air emissions. Already, some local air districts have adopted, or are in the process of developing livestock rules to reduce particulate matter, reactive organic gas, and ammonia emissions from livestock facilities (SCAQMD 2004b, SJV 2004a, SJV 2005b). These rules and others have clearly recognized the benefits of providing the agricultural industry many options for reducing their emissions, and providing local flexibility for facility operators in selecting the practices that are most effective and applicable for each unique agricultural operation. We expect that this approach will also be used as air districts develop emission mitigation rules for large confined animal facilities.

As part of the implementation of SB 700, the California Air Pollution Control Officers Association (CAPCOA) was required to develop a clearinghouse of available control measures and strategies for agricultural sources of air pollution and emissions from agricultural operations by January 1, 2005 (HSC 40731). The clearinghouse is available on CAPCOA's website (CAPCOA 2005) and includes control measures for operations that create fugitive dust emissions, measures for confined animal facilities, controls for internal combustion engines, and emission reduction strategies for other agricultural equipment. The website is located here:  
<http://www.capcoa.org/AgClearinghouse.htm>.

Much of the effort to evaluate livestock emissions mitigation in California is currently focused on dairy emissions. There are two major groups within California directly focusing on identifying and categorizing practices, operations, and technologies for reducing dairy emissions. The Dairy Manure Technology Feasibility Assessment Panel, hosted by the California Air Resources Board and convened in February 2005, has a panel of experts drawn from government, industry, academia, and environmental and conservation groups. The goal of the group is to develop a report that provides:

- descriptions of technologies most likely to improve the management and treatment of dairy manure in the San Joaquin Valley;
- a list of technology providers with full contact information;
- an assessment of each technology based on its environmental and economic performance, and technology development status;
- discussion of knowledge gaps where additional research is needed; and
- recommendations about which types of technologies might hold the most promise for improving management and treatment of dairy manure in the San Joaquin Valley.

In evaluating technologies, the panel will consider reductions in air emissions, excess nutrients (nitrogen, etc.), salts, and other items such as odors and pathogens. The panel will also consider the economic performance, quality of supporting data,

development status of the technology, and the potential to create energy. The draft report is scheduled to be completed in Summer 2005. The website for the panel is located here: <http://www.arb.ca.gov/ag/caf/dairypnl/dairypanel.htm>

In addition, the San Joaquin Valley Dairy Permitting Advisory Group (DPAG) was formed to act as a clearinghouse and gather technical and scientific information that will be used as a resource in the permitting of dairy operations located in the San Joaquin Valley Air District. The DPAG includes scientists, regulators, industry, and environmental representatives. For more information, the DPAG website is located here: [http://www.valleyair.org/busind/pto/dpag/dpag\\_idx.htm](http://www.valleyair.org/busind/pto/dpag/dpag_idx.htm)

In addition to these activities, several research studies are ongoing to evaluate promising livestock emission mitigation practices. Livestock emission mitigation research is being performed by the University of California at Davis, California State University Fresno, Purdue University, Texas A&M, and others. In the upcoming years, we will have a substantially better understanding of what approaches are effective, technologically feasible, and cost effective for reducing livestock emissions.



**APPENDIX E**  
**TEXT OF SENATE BILL 700**



BILL NUMBER: SB 700      CHAPTERED  
BILL TEXT

CHAPTER 479

FILED WITH SECRETARY OF STATE    SEPTEMBER 22, 2003  
APPROVED BY GOVERNOR    SEPTEMBER 22, 2003  
PASSED THE SENATE    SEPTEMBER 11, 2003  
PASSED THE ASSEMBLY    SEPTEMBER 10, 2003  
AMENDED IN ASSEMBLY    SEPTEMBER 9, 2003  
AMENDED IN ASSEMBLY    SEPTEMBER 4, 2003  
AMENDED IN ASSEMBLY    AUGUST 21, 2003  
AMENDED IN ASSEMBLY    JULY 14, 2003  
AMENDED IN ASSEMBLY    JULY 2, 2003  
AMENDED IN ASSEMBLY    JUNE 26, 2003  
AMENDED IN SENATE    MAY 13, 2003  
AMENDED IN SENATE    MAY 7, 2003  
AMENDED IN SENATE    APRIL 24, 2003

INTRODUCED BY    Senators Florez and Sher

FEBRUARY 21, 2003

An act to amend Section 42310 of, and to add Sections 39011.5, 39023.3, 40724, 40724.5, 40724.6, 40724.7, 40731, 42301.16, 42301.17, 42301.18, and 44559.9 to, the Health and Safety Code, relating to air quality.

LEGISLATIVE COUNSEL'S DIGEST

SB 700, Florez. Air quality: emissions: stationary sources: agricultural operations.

(1) Existing law authorizes the board of every air quality management district and air pollution control district to establish a permit system that requires any person that uses certain types of equipment that may cause the emission of air contaminants to obtain a permit. Existing law exempts vehicles and certain types of equipment from those permit requirements.

This bill would eliminate that exemption for any equipment used in agricultural operations in the growing of crops or the raising of fowl or animals. To the extent that the bill would increase the number of permits that a district board, electing to establish a permit system prior to January 1, 2004, would be required to issue, the bill would impose a state-mandated local program.

(2) Existing law defines various terms governing the construction of air pollution control laws in the state, and authorizes the state board to revise those definitions to conform with federal law.

This bill would define the terms "agricultural source of air pollution" and "fugitive emissions," and would prohibit, notwithstanding the existing authority, the state board from revising those definitions.

(3) The existing federal Clean Air Act requires districts to adopt local programs for issuing operating permits to major stationary sources of air pollutants. The existing act defines a stationary source as any building, structure, facility, or installation that emits or may emit any air pollutant.

This bill would require each district that is designated a serious federal nonattainment area for an applicable ambient air quality

standard for particulate matter as of January 1, 2004, to adopt, implement, and submit for inclusion in the state implementation plan, a rule or regulation requiring best available control measures (BACM) and best available retrofit control technology (BARCT) for agricultural practices at agricultural sources of air pollution to reduce air pollutants from those sources for which that technology is applicable for agricultural practices by the earliest feasible date, but not later than January 1, 2006, and would require each district subject to those requirements to comply with a schedule for public hearing, adoption, and implementation of the final rule.

The bill would require each district that is designated a moderate federal nonattainment area or an applicable ambient air quality standard for particulate matter as of January 1, 2004, to adopt and implement control measures necessary to reduce emissions from agricultural practices by the earliest feasible date, but no later than January 1, 2007, unless the district determines that those sources do not significantly cause or contribute to a violation of state or federal standards.

The bill would require, by January 1, 2005, the state board to review all available scientific information and develop a definition of a "large confined animal facility."

The bill would require, by July 1, 2006, each district that is designated as a federal nonattainment area for ozone as of January 1, 2004, to adopt, implement, and submit for inclusion in the state implementation plan, a rule or regulation that requires the owner or operator of a large confined animal facility as that term is defined by the state board to obtain a permit to reduce, to the extent feasible, emissions of air contaminants from the facility. The bill would require the district to perform an assessment of the impacts of the rule or regulation prior to its adoption. The bill would authorize a permit holder to appeal any district determination or decision related to that permit.

The bill would require a district that is designated as being in attainment for the federal ambient air quality standard for ozone as of January 1, 2004, to adopt the same rule or regulation required of nonattainment districts, by July 1, 2006, unless the district board makes a determination that large confined animal facilities will not contribute to a violation of any state or federal ambient air quality standard. The bill would provide the rule or regulation is not required to be submitted for inclusion into the state implementation plan.

The bill would require the California Air Pollution Control Officers Association, in consultation with the state board and other interested parties, by January 1, 2005, to develop a clearinghouse of available control measures and strategies for agricultural sources of air pollution and emissions of air contaminants from agriculture operations.

The additional duties for districts under the bill would impose a state-mandated local program.

(4) Existing law establishes the Capital Access Loan Program for Small Businesses, administered by the California Pollution Control Financing Authority, which provides loans through participating financial institutions to entities authorized to conduct business in the state and whose primary business location is in the state.

This bill would require the authority to expand the program to include outreach to financial institutions that service agricultural interests in the state for the purposes of funding air pollution

control measures.

(5) Under existing law, any person who violates a rule, regulation, permit, or order of a district is guilty of a misdemeanor. Because this bill would increase the number of people who are subject to that provision, it would expand the scope of a crime, thereby imposing a state-mandated local program.

(6) The California Constitution requires the state to reimburse local agencies and school districts for certain costs mandated by the state. Statutory provisions establish procedures for making that reimbursement.

This bill would provide that no reimbursement is required by this act for specified reasons.

THE PEOPLE OF THE STATE OF CALIFORNIA DO ENACT AS FOLLOWS:

SECTION 1. (a) The Legislature finds and declares all of the following:

(1) Agricultural operations necessary for growing crops or raising animals are a significant source of directly emitted particulates, and precursors of ozone and fine particulate matter. These emissions have a significant adverse effect on the ability of areas of the state, including, but not limited to, the San Joaquin Valley, to achieve health-based state and federal ambient air quality standards.

(2) Since 1999, the agriculture industry has reduced emissions of oxides of nitrogen (NOx) by more than 2000 tons per year, emissions of particulate matter of 10 microns in diameter (PM 10) by more than 500 tons per year, and emissions of volatile organic compounds (VOCs) from agricultural chemicals by more than 20 percent. According to the state board, however, agricultural sources of air pollution still contribute twenty-six percent of the smog-forming emissions in the San Joaquin Valley.

(3) In the San Joaquin Valley, a large portion of the sources of particulate emissions are areawide sources whose emissions are directly related to growth in population and the resulting vehicle miles traveled. According to the State Air Resources Board, however, agricultural sources of air pollution account for over fifty percent of the directly emitted particulate air pollution generated in the valley during the fall, amounting to over 170 tons per day of emissions.

(4) All parties living or operating a business in an area that has been classified as being a nonattainment area with respect to the attainment of federal or state ambient air quality standards share the responsibility of reducing emissions from air pollutants.

(5) The federal Clean Air Act (42 U.S.C. Sec. 7401 et seq.) prohibits the state from adopting emission standards or limitations less stringent than those established under the federal act, including limitations on emissions from agricultural sources.

(6) Division 26 (commencing with Section 39000) of the Health and Safety Code establishes numerous policies and programs to reduce air pollutants for the protection of public health.

(7) The purpose of the act adding this section is to establish a new set of programs at the state and regional levels to reduce air emissions from agricultural sources in order to protect public health and the environment.

(b) It is therefore the intent of the Legislature to require the State Air Resources Board and air quality management districts and

air pollution control districts in the state to regulate stationary, mobile, and area sources of agricultural air pollution.

SEC. 2. Section 39011.5 is added to the Health and Safety Code, to read:

39011.5. (a) "Agricultural source of air pollution" or "agricultural source" means a source of air pollution or a group of sources used in the production of crops, or the raising of fowl or animals located on contiguous property under common ownership or control that meets any of the following criteria:

(1) Is a confined animal facility, including, but not limited to, any structure, building, installation, barn, corral, coop, feed storage area, milking parlor, or system for the collection, storage, treatment, and distribution of liquid and solid manure, if domesticated animals, including, but not limited to, cattle, calves, horses, sheep, goats, swine, rabbits, chickens, turkeys, or ducks are corralled, penned, or otherwise caused to remain in restricted areas for commercial agricultural purposes and feeding is by means other than grazing.

(2) Is an internal combustion engine used in the production of crops or the raising of fowl or animals, including, but not limited to, an engine subject to Article 1.5 (commencing with Section 41750) of Chapter 3 of Part 4 except an engine that is used to propel implements of husbandry, as that term is defined in Section 36000 of the Vehicle Code, as that section existed on January 1, 2003. Notwithstanding subdivision (b) of Section 39601, the state board may not revise this definition for the purposes of this section.

(3) Is a Title V source, as that term is defined in Section 39053.5, or is a source that is otherwise subject to regulation by a district pursuant to this division or the federal Clean Air Act (42 U.S.C. Sec. 7401 et seq.).

(b) Any district rule or regulation affecting stationary sources on agricultural operations adopted on or before January 1, 2004, is applicable to an agriculture source.

(c) Nothing in this section limits the authority of a district to regulate a source, including, but not limited to, a stationary source that is an agricultural source, over which it otherwise has jurisdiction pursuant to this division, or pursuant to the federal Clean Air Act (42 U.S.C. Sec. 7401 et seq.) or any rules or regulations adopted pursuant to that act that were in effect on or before January 1, 2003, or to exempt an agricultural source from any requirement otherwise applicable under Sections 40724 or 42301.16, based upon a finding by the district in a public hearing that the aggregate emissions from that source do not exceed a de minimus level of more than one ton of particulate matter, nitrogen oxides or volatile organic compounds per year.

SEC. 3. Section 39023.3 is added to the Health and Safety Code, to read:

39023.3. "Fugitive emissions" mean those emissions that cannot reasonably pass through a stack, chimney, vent, or other functionally equivalent opening. Notwithstanding subdivision (b) of Section 39601, the state board may not revise this definition for the purposes of this section.

SEC. 4. Section 40724 is added to the Health and Safety Code, to read:

40724. (a) Each district that is designated as a serious federal nonattainment area for an applicable ambient air quality standard for particulate matter as of January 1, 2004, shall adopt, implement,

and submit for inclusion in the state implementation plan, a rule or regulation requiring best available control measures (BACM) for sources for which those measures are applicable and best available retrofit control technology (BARCT) to reduce air pollutants from sources for which that technology is applicable for agricultural practices, including, but not limited to, tilling, discing, cultivation, and raising of animals, and for fugitive emissions from those agricultural practices a manner similar to other source categories by the earliest feasible date, but not later than January 1, 2006. The rule or regulation shall also include BACM and BARCT to reduce precursor emissions in a manner commensurate to other source categories that the district show cause or contribute to a violation of an ambient air quality standard. Each district that is subject to this subdivision shall comply with the following schedule with respect to the rule or regulation imposing BACM and BARCT:

(1) On or before September 1, 2004, notice and hold at least one public workshop for the purpose of accepting public testimony on the proposed rule or regulation.

(2) On or before July 1, 2005, adopt the final rule or regulation at a noticed public hearing.

(3) On or before January 1, 2006, commence implementation of the rule or regulation.

(b) Nothing in this section shall delay or otherwise affect any action taken by a district to reduce emissions of air contaminants from agricultural sources, or any other requirements imposed on a district or a source of air pollution pursuant to the federal Clean Air Act (42 U.S.C. Sec. 7401 et seq.).

(c) In adopting a rule or regulation pursuant to this section, a district shall do all of the following:

(1) Ensure the size and duration of use of an internal combustion engine subject to BARCT pursuant to this section is commensurate to the size and duration of use of internal combustion engines subject to regulation by a district or the state board regulated at other stationary sources.

(2) Ensure that BARCT established pursuant to this section for an internal combustion engine is similar to BARCT for other stationary source engines subject to regulation by a district or the state board.

(3) Ensure that the cost-effectiveness of BARCT for an internal combustion engine subject to this section is similar to the cost-effectiveness of BARCT for other internal combustion engines subject to regulation by a district or the state board.

(4) Compare the cost-effectiveness of BARCT for an internal combustion engine subject to this section to the list of available and proposed control measures prepared pursuant to Section 40922.

(5) Adopt control measures pursuant to this section in order of their cost-effectiveness, unless a district determines that a different order of adoption is necessary due to the enforceability, public acceptability, or technological feasibility of a given control measure, or to expeditiously attain or maintain a national or state ambient air quality standard.

(6) Except as otherwise provided under this section, ensure that any rule or regulation adopted pursuant to this section complies with all applicable requirements of this division, including, but not limited to, any applicable requirements established pursuant to Sections 40703, 40727, 40728.5, and 40920.6.

(7) Hold at least one public meeting that is conducted at a time

and location that the district determines is convenient to the public at which the district reviews the comparison prepared pursuant to paragraph (4).

(d) Nothing in this section limits the authority of a district to regulate a source including, but not limited to, a stationary source that is an agricultural source over which it otherwise has jurisdiction pursuant to this division or the federal Clean Air Act (42 U.S.C. Sec. 7401 et seq.) or any rules or regulations adopted pursuant to that act. Nothing in this section shall delay or otherwise affect any action taken by a district to reduce emissions of air contaminants from agricultural sources, or any other requirements imposed upon a district or a source of air pollution pursuant to the federal Clean Air Act. This section may not be interpreted to delay or otherwise affect the adoption, implementation, or enforcement of any measure that was adopted, or included in a rulemaking calendar or air quality implementation plan that was adopted, by the district prior to January 1, 2004.

SEC. 5. Section 40724.5 is added to the Health and Safety Code, to read:

40724.5. (a) By the earliest feasible date, but no later than January 1, 2007, each district that is designated a moderate federal nonattainment area for an applicable ambient air quality standard for particulate matter as of January 1, 2004, and that is not subject to the requirements of Section 40724, shall adopt and implement control measures necessary to reduce emissions from agricultural practices, including, but not limited to, tilling, discing, cultivation, and raising of animals, and from fugitive emissions in a manner similar to other source categories from those activities by the earliest feasible date. Control measures adopted and implemented pursuant to this section shall also be implemented by the district to reduce precursor emissions in a manner commensurate to other source categories that the district show cause or contribute to a violation of an ambient air quality standard.

(b) A district is not required to adopt and implement control measures pursuant to this section if it determines in a public hearing that agricultural practices do not significantly cause or contribute to a violation of state or federal standards.

(c) In adopting a rule or regulation pursuant to this section, a district shall do all of the following:

(1) Ensure the size and duration of use of an internal combustion engine subject to BARCT pursuant to this section is commensurate to the size and duration of use of internal combustion engines subject to regulation by a district or the state board regulated at other stationary sources.

(2) Ensure that BARCT established pursuant to this section for an internal combustion engine is similar to BARCT for other stationary source engines subject to regulation by a district or the state board.

(3) Ensure that the cost-effectiveness of BARCT for an internal combustion engine subject to this section is similar to the cost-effectiveness of BARCT for other internal combustion engines subject to regulation by a district or the state board.

(4) Compare the cost-effectiveness of BARCT for an internal combustion engine subject to this section to the list of available and proposed control measures prepared pursuant to Section 40922.

(5) Adopt control measures pursuant to this section in order of their cost-effectiveness, unless a district determines that a



different order of adoption is necessary due to the enforceability, public acceptability, or technological feasibility of a given control measure, or to expeditiously attain or maintain a national or state ambient air quality standard.

(6) Except as otherwise provided under this section, ensure that any rule or regulation adopted pursuant to this section complies with all applicable requirements of this division, including, but not limited to, any applicable requirements established pursuant to Sections 40703, 40727, 40728.5, and 40920.6.

(7) Hold at least one public meeting that is conducted at a time and location that the district determines is convenient to the public at which the district reviews the comparison prepared pursuant to paragraph (4).

(d) Nothing in this section limits the authority of a district to regulate a source including, but not limited to, a stationary source that is an agricultural source over which it otherwise has jurisdiction pursuant to this division or the federal Clean Air Act (42 U.S.C. Sec. 7401 et seq.) or any rules or regulations adopted pursuant to that act. Nothing in this section shall delay or otherwise affect any action taken by a district to reduce emissions of air contaminants from agricultural sources, or any other requirements imposed upon a district or a source of air pollution pursuant to the federal Clean Air Act. This section may not be interpreted to delay or otherwise affect the adoption, implementation, or enforcement of any measure that was adopted, or included in a rulemaking calendar or air quality implementation plan that was adopted, by the district prior to January 1, 2004.

(e) Nothing in this section shall delay or otherwise affect any action taken by a district to reduce emissions of air contaminants from agricultural sources, or any requirements imposed on a district or a source of air pollution pursuant to the federal Clean Air Act (42 U.S.C. Sec. 7401 et seq.).

SEC. 6. Section 40724.6 is added to the Health and Safety Code, to read:

40724.6. (a) On or before July 1, 2005, the state board shall review all available scientific information, including, but not limited to, emissions factors for confined animal facilities, and the effect of those facilities on air quality in the basin and other relevant scientific information, and develop a definition for the source category of a "large confined animal facility" for the purposes of this section. In developing that definition, the state board shall consider the emissions of air contaminants from those sources as they may affect the attainment and maintenance of ambient air quality standards.

(b) Not later than July 1, 2006, each district that is designated as a federal nonattainment area for ozone as of January 1, 2004, shall adopt, implement, and submit for inclusion in the state implementation plan, a rule or regulation that requires the owner or operator of a large confined animal facility, as defined by the state board pursuant to subdivision (a), to obtain a permit from the district to reduce, to the extent feasible, emissions of air contaminants from the facility.

(c) A district may require a permit for a large confined animal facility with actual emissions that are less than one-half of any applicable emissions threshold for a major source in the district for any air contaminant, including, but not limited to, fugitive emissions in a manner similar to other source categories, if prior to

imposing that requirement the district makes both of the following determinations in a public hearing:

(1) A permit is necessary to impose or enforce reductions in emissions of air pollutants that the district show cause or contribute to a violation of a state or federal ambient air quality standard.

(2) The requirement for a source or category of sources to obtain a permit would not impose a burden on those sources that is significantly more burdensome than permits required for other similar sources of air pollution.

(d) The rule or regulation adopted pursuant to subdivision (b) shall do all of the following:

(1) Require the owner or operator of each large confined animal facility to submit an application for a permit within six months from the date the rule or regulation is adopted by the district that includes both of the following:

(A) The information that the district determines is necessary to prepare an emissions inventory of all regulated air pollutants emitted from the operation, including, but not limited to, precursor and fugitive emissions, using emission factors approved by the state board in a public hearing.

(B) An emissions mitigation plan that demonstrates that the facility will use reasonably available control technology in moderate and serious nonattainment areas, and best available retrofit control technology in severe and extreme nonattainment areas, to reduce emissions of pollutants that contribute to the nonattainment of any ambient air quality standard, and that are within the district's regulatory authority.

(2) Require the district to act upon an application for permit submitted pursuant to paragraph (1) within six months of a completed application, as determined by the district.

(3) Require the owner or operator to implement the plan contained in the permit approved by the district, and shall establish a reasonable period, of not more than three years, after which each permit shall be reviewed by the district and updated to reflect changes in the operation or the feasibility of mitigation measures. The updates required by this paragraph are not required to be submitted for inclusion into the state implementation plan.

(4) Establish a reasonable compliance schedule for facilities to implement control measures within one year of the date on which the permit is approved by the district, and shall provide for 30 days public notice and comment on any draft permit.

(d) Prior to adopting a rule or regulation pursuant to subdivision (b), a district shall, to the extent data are available, perform an assessment of the impacts of the rule or regulation. The district shall consider the impacts of the rule or regulation in a public hearing, and make a good faith effort to minimize any adverse impacts. The assessment shall include all of the following:

(1) The category of sources affected, including, but not limited to, the approximate number of affected sources, and the size of those sources.

(2) The nature and quantity of emissions from the category, and the significance of those emissions in adversely affecting public health and the environment and in causing or contributing to the violation of a state or federal ambient air quality standard.

(3) The emission reduction potential.

(4) The impact on employment in, and the economy of, the region

affected.

(5) The range of probable costs to affected sources and businesses.

(6) The availability and cost-effectiveness of alternatives.

(7) The technical and practical feasibility.

(8) Any additional information on impacts that is submitted to the district board for consideration.

(e) Nothing in this section shall delay or otherwise affect any action taken by a district to reduce emissions of air contaminants from agricultural sources, or any other requirements imposed on a district or a source of air pollution pursuant to the federal Clean Air Act (42 U.S.C. Sec. 7401 et seq.).

(f) In adopting a rule or regulation pursuant to this section, a district shall comply with all applicable requirements of this division, including, but not limited to, the requirements established pursuant to Section 40703, 40727, and 40728.5.

(g) A permit holder may appeal any district determination or decision required by this section pursuant to Section 42302.1, in addition to any other applicable remedy provided by law.

(h) Nothing in this section authorizes a district to adopt a rule or regulation that is duplicative of a rule or regulation adopted pursuant to Sections 40724 and 40724.5.

(i) Nothing in this section limits the authority of a district to regulate a source including, but not limited to, a stationary source that is an agricultural source over which it otherwise has jurisdiction pursuant to this division or the federal Clean Air Act (42 U.S.C. Sec. 7401 et seq.) or any rules or regulations adopted pursuant to that act. Nothing in this section shall delay or otherwise affect any action taken by a district to reduce emissions of air contaminants from agricultural sources, or any other requirements imposed upon a district or a source of air pollution pursuant to the federal Clean Air Act. This section may not be interpreted to delay or otherwise affect adoption, implementation, or enforcement of any measure that was adopted, or included in a rulemaking calendar or air quality implementation plan that was adopted, by the district prior to January 1, 2004.

SEC. 7. Section 40724.7 is added to the Health and Safety Code, to read:

40724.7. (a) A district that is designated as being in attainment for the federal ambient air standard for ozone shall adopt a rule or regulation as described in Section 40724.6 shall fulfill both of the following conditions:

(1) The regulation shall be adopted not later than July 1, 2006, unless a district board makes a determination in a public hearing, based on substantial scientific evidence in the record, that large confined animal facilities will not contribute to a violation of any state or federal ambient air quality standard.

(2) The regulation may not be submitted for inclusion in the state implementation plan.

(b) Nothing in this section shall delay or otherwise affect any action taken by a district to reduce emissions of air contaminants from agricultural sources, or any other requirements imposed on a district or a source of air pollution pursuant to the federal Clean Air Act (42 U.S.C. Sec. 7401 et seq.).

(c) In adopting a rule or regulation pursuant to this section, a district shall comply with all applicable requirements of this division, including, but not limited to, the requirements established

pursuant to Section 40703, 40727, and 40728.5.

(d) Nothing in this section authorizes a district to adopt a rule or regulation that is duplicative of a rule or regulation adopted pursuant to Section 40724.

(e) The rule or regulation adopted by a district pursuant to this section is not required to be submitted for inclusion into the state implementation plan.

SEC. 8. Section 40731 is added to the Health and Safety Code, to read:

40731. In order to assist in the development of the BACM, RACM, and BARCT measures specified in Sections 40724, 40724.5, and 40724.6, and to reduce or eliminate emissions of regulated air pollutants and their precursors, the California Air Pollution Control Officers Association, in consultation with the state board and other interested parties, shall, not later than January 1, 2005, develop a clearinghouse of available control measures and strategies for agricultural sources of air pollution and emissions from agricultural operations, including, but not limited to, the following sources:

(a) Operations that create fugitive dust emissions, including, but not limited to, discing, tilling, material handling and storage, and travel on unpaved roads.

(b) Confined animal facilities, including, but not limited to, any structure, building, installation, barn, corral, coop, feed storage area, or milking parlor, including, but not limited to, a system for the collection, storage, treatment, and distribution of liquid or solid manure from domestic animals, including, but not limited to, cattle, calves, horses, sheep, goats, swine, rabbits, chickens, turkeys, or ducks, if those animals are corralled, penned, or otherwise caused to remain in restricted areas for commercial agricultural purposes, and feeding is by means other than grazing.

(c) Internal combustion engines used in the production of crops or the raising of animals or fowl, except an engine that is used to propel an implement of husbandry, as that term is defined in Section 36000 of the Vehicle Code, as that section existed on January 1, 2003.

(d) Other equipment, operations, or activities associated with the growing of crops or the raising of fowl or animals, that emit, or cause to be emitted, any regulated air pollutant, or any precursor to any regulated air pollutant.

SEC. 9. Section 42301.16 is added to the Health and Safety Code, to read:

42301.16. (a) In addition to complying with the requirements of this chapter, a permit system established by a district pursuant to Section 42300 shall ensure that any agricultural source that is required to obtain a permit pursuant to Title I (42 U.S.C. Sec. 7401 et seq.) or Title V (42 U.S.C. Sec. 7661 et seq.) of the federal Clean Air Act is required by district regulation to obtain a permit in a manner that is consistent with the federal requirements.

(b) Except as provided in subdivision (c), a district shall require an agricultural source of air pollution to obtain a permit unless it makes all of the following findings in a public hearing:

(1) The source is subject to a permit requirement pursuant to Section 40724.6.

(2) A permit is not necessary to impose or enforce reductions of commissions of air pollutants that the district show cause or contribute to the violation of state or federal ambient air quality standard.

(3) The requirement for the source or category of sources to obtain a permit would impose a burden on those sources that is significantly more burdensome than permits required for other similar sources of air pollution.

(c) Prior to requiring a permit for an agricultural source of air pollution with actual emissions that are less than one-half of any applicable emissions threshold for a major source in the district, for any air contaminant, but excluding fugitive dust, a district shall, in a public hearing, make all of the following findings:

(1) The source is not subject to a permit requirement pursuant to Section 40724.6.

(2) A permit is necessary to impose or enforce reductions of emission of air pollutants that the district show cause or contribute to a violation of a state or federal ambient air quality standard.

(3) The requirement for a source or category of sources to obtain a permit would not impose a burden on those sources that is significantly more burdensome than permits required for other similar sources of air pollution.

SEC. 10. Section 42301.17 is added to the Health and Safety Code, to read:

42301.17. (a) A district may adopt by regulation a program under which the district does not require a permit to be obtained by an agricultural source of air pollution that the district may otherwise require to obtain a permit if the owner or operator of the source has taken the following actions to reduce emissions from the source:

(1) Removed all internal combustion engines used in the production of crops or the raising of fowl or animals, except an engine that is used to propel implements of husbandry, at the source and replaced them with engines that meet or exceed the most stringent standards adopted by the state board and the United States Environmental Protection Agency for new internal combustion engines.

(2) Reduced or mitigated emissions from all agricultural activities, including, but not limited to, tilling, discing, cultivation, the raising of livestock and fowl, and similar activities, to a level that the district determines does not cause, or contribute to, a violation of a state or federal ambient air standard, toxic air contaminant, or other air emission limitation.

(3) Reduced or mitigated all emissions from any farm equipment, underground petroleum fuel tanks, or other similar equipment used in agricultural activities to a level that the district determines does not cause or contribute to a violation of a state or federal ambient air standard, toxic air contaminant, or other air emission limitation.

(4) Complied with any other conditions required by state or federal law or district rule or regulation for the source.

(b) Subdivision (a) does not apply to those permits required to be issued pursuant to Title I (42 U.S.C. Sec. 7401 et seq.) or Title V (42 U.S.C. Sec. 7661 et seq.).

SEC. 11. Section 42301.18 is added to the Health and Safety Code, to read:

42301.18. (a) Any agricultural source that existed prior to January 1, 2004, that becomes subject to a permit requirement pursuant to a district rule or regulation that was adopted prior to that date shall be permitted as an existing source and not as a new source.

(b) Any agricultural source that is an existing source pursuant to

subdivision (a) shall be permitted by the district based upon its maximum potential to emit air contaminants, to the extent that level can be determined, as of January 1, 2004.

(c) A district may not require an agricultural source to obtain emissions offsets for criteria pollutants for that source if emissions reductions from that source would not meet the criteria for real, permanent, quantifiable, and enforceable emission reductions.

SEC. 12. Section 42310 of the Health and Safety Code is amended to read:

42310. (a) A permit shall not be required for any of the following:

(1) Any vehicle.

(2) Any structure designed for and used exclusively as a dwelling for not more than four families.

(3) An incinerator used exclusively in connection with a structure described in subdivision (b).

(4) Barbecue equipment that is not used for commercial purposes.

(5) (A) Repairs or maintenance not involving structural changes to any equipment for which a permit has been granted.

(B) As used in this subdivision, maintenance does not include operation.

(b) Nothing in this section shall affect any requirements imposed on a district or a source of air pollution, including, but not limited to, an agricultural source, pursuant to the federal Clean Air Act (42 U.S.C. Sec. 7401 et seq.).

SEC. 13. Section 44559.9 is added to the Health and Safety Code, to read:

44559.9. The authority shall expand the Capital Access Loan Program established by this article to include outreach to financial institutions that service agricultural interests in the state for the purpose of funding air pollution control measures.

SEC. 14. The provisions of the act adding this section are severable. If any provision of this act or its application is held invalid, that invalidity shall not affect other provisions or applications that can be given effect without the invalid provision or application.

SEC. 15. No reimbursement is required by this act pursuant to Section 6 of Article XIII B of the California Constitution for certain costs that may be incurred by a local agency or school district because in that regard this act creates a new crime or infraction, eliminates a crime or infraction, or changes the penalty for a crime or infraction, within the meaning of Section 17556 of the Government Code, or changes the definition of a crime within the meaning of Section 6 of Article XIII B of the California Constitution.

In addition, no reimbursement is required by this act pursuant to Section 6 of Article XIII B of the California Constitution for certain other costs that may be incurred by a local agency or school district because a local agency or school district has the authority to levy service charges, fees, or assessments sufficient to pay for the program or level of service mandated by this act, within the meaning of Section 17556 of the Government Code.

**APPENDIX F**  
**PUBLIC WORKSHOP NOTICES**







Agency Secretary

# Air Resources Board



**Alan C. Lloyd, Ph.D.**

**Chairman**

1001 I Street • P.O. Box 2815  
Sacramento, California 95812 • [www.arb.ca.gov](http://www.arb.ca.gov)

August 2, 2004

Dear Sir/Madam:

Senate Bill 700 (Florez, 2003) requires the California Air Resources Board (ARB or Board) to adopt a definition for a Large Confined Animal Facility (large CAF) by July 1, 2005. The staff of ARB invites your participation in a public workshop to solicit input for developing a large CAF definition. Working with stakeholders, ARB staff will review relevant scientific information, including emission factors for CAFs and how large CAFs may affect the attainment and maintenance of ambient air quality standards. A preliminary workshop agenda is attached as well as background information to provide some initial topics for discussion.

These workshops are the first in a series of stakeholder meetings. Our planned schedule for adopting the large CAF definition is as follows:

- August 2004 Public workshops to solicit input on defining large CAF
- January 2005 Public workshop to review livestock emissions research data
- March 2005 Public workshops to discuss staff proposal to define large CAF
- May 2005 Release staff report on proposed large CAF definition
- June 2005 Public hearing on staff proposals to define large CAF

The first large CAF definition workshops will be held at the times and locations shown below:

<b>Modesto</b>	<b>Tulare</b>	<b>Chino</b>	<b>Sacramento</b>
August 24, 2004	August 25, 2004	August 26, 2004	September 2, 2004
10:00 – 12:30	10:00 –12:30	10:00 – 12:30	10:00 – 12:30
Stanislaus County Ag Commission 3800 Cornucopia Way Harvest Hall Modesto, CA	County Ag Commissioner's Building 4437 Laspina Street Tulare, CA	Inland Empire Utilities Agency Headquarters Board Room 6075 Kimball Avenue Bldg. A Chino, CA	Central Valley Auditorium Cal/EPA Building 1001 I Street Sacramento, CA (webcast available)

*The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our Website: <http://www.arb.ca.gov>.*

California Environmental Protection Agency

Sir/Madam  
August 2, 2004  
Page 4

The workshops in Modesto, Tulare, and Chino will have a call-in number for those unable to participate in person. The toll free call-in number is (888) 220-3084, the pass code is 41322, and the leader name is Sue Wyman. The Sacramento workshop will be webcast via the internet. You may access the webcast at ARB's homepage at <http://www.arb.ca.gov>, and then select webcasts. Questions can be submitted to [onair@arb.ca.gov](mailto:onair@arb.ca.gov) the day of the event. In addition, the meeting places are accessible to persons with disabilities. If you have special accommodation or language needs, please contact the Sue Wyman at (916) 445-9477 or [swyman@arb.ca.gov](mailto:swyman@arb.ca.gov) as soon as possible. TTY/TDD/Speech-to-Speech users may dial 7-1-1-for the California Relay Service.

If you have any questions about the workshop, please contact Michael FitzGibbon, of my staff, at (916) 445-6243 or [mfitzgib@arb.ca.gov](mailto:mfitzgib@arb.ca.gov).

Sincerely,

/s/

Robert D. Fletcher, Chief  
Planning and Technical Support Division

Attachment

cc: Mr. Mike FitzGibbon, Manager  
Emission Inventory Analysis Section  
Planning and Technical Support Division

Ms. Sue Wyman  
Meeting Coordinator  
Planning and Technical Support Division

## Attachment 1

### **PRELIMINARY AGENDA**

#### **Workshop to Discuss Defining Large Confined Animal Facilities (CAFs) as Required by SB 700**

- I. Introductions
- II. Summary of SB700 Requirements and Status of Research
- III. Possible Concepts for Defining Large CAFs
- IV. Stakeholder Comments and Discussion
- V. Next Steps, Workshop & Meeting Schedules
- VI. Adjourn

Note: A final agenda will be provided at the workshops.

## Attachment 2

### **Background Information for Workshop to Discuss Defining Large Confined Animal Facilities as Required by SB 700**

#### ***What are the California Air Resources Board's responsibilities under SB 700 related to large confined animal facilities?***

The Air Resources Board (ARB/Board) is required to review scientific information, including emission factors, and develop and adopt a definition for "large confined animal facilities" by July 1, 2005. In developing the definition, the Board must consider emissions of air contaminants from these facilities as they may affect the attainment and maintenance of ambient air quality standards. (Health and Safety Code (H&SC) Section 40724.6(a))

Over the next few months, the ARB will host several stakeholder meetings regarding livestock emission factors and the definition of large CAFs. These meetings will provide an earlier opportunity for public comment on possible approaches before staff prepares a definition for consideration by the Board.

#### ***What is a confined animal facility?***

In summary, a confined animal facility (CAF) is a facility in which domesticated animals are maintained in restricted areas for commercial agricultural purposes, and feeding is not by grazing. As specifically defined by Health and Safety Code (H&SC) section 39011.5(a)(1), a confined animal facility:

"Is a confined animal facility, including, but not limited to, any structure, building, installation, barn, corral, coop, feed storage area, milking parlor, or system for the collection, storage, treatment, and distribution of liquid and solid manure, if domesticated animals, including, but not limited to, cattle, calves, horses, sheep, goats, swine, rabbits, chickens, turkeys, or ducks are corralled, penned, or otherwise caused to remain in restricted areas for commercial agricultural purposes and feeding is by means other than grazing."

#### ***What are the ramifications of being identified as a large CAF?***

Large CAFs in regions designated as a federal ozone nonattainment area as of January 1, 2004 will be subject to an emissions mitigation plan requirement. There are some exemptions from the mitigation requirements for air districts that demonstrate that large CAFs in their region do not contribute to a violation of any State or federal ambient air quality standards.

***What are the air districts responsibilities under SB 700 related to large confined animal facilities?***

Air districts that are designated as federal ozone nonattainment areas as of January 1, 2004 must adopt, implement, and submit a rule for inclusion in the State Implementation Plan that addresses large CAFs as defined by ARB. The rule or regulation must require the facility to obtain a permit and to reduce to the extent feasible emissions of air contaminants. (H&SC Section 40724.6) SB 700 provides detailed district requirements for developing large CAF rules and criteria for removing facilities from the program. The full text of the bill is located here: <http://www.leginfo.ca.gov/bilinfo.html>. Once on the webpage, search for SB 700 (Florez).

***What air pollutants will be considered in evaluating air quality impacts of CAFs?***

The focus will be on emissions of pollutants that contribute to ozone and particulate matter pollution. This includes reactive organic gases, oxides of nitrogen, directly emitted particulate matter, and ammonia.

***What opportunities will stakeholders and the public have to provide input?***

The ARB staff will host regular stakeholder meetings to solicit input on the large CAF definition and to maintain an open exchange of the data, reasoning, and assumptions used in defining large CAFs. The first workshops are scheduled for August 2004. Additional workshops will be scheduled in January 2005 to discuss livestock emission research results, and March 2005 to discuss staff proposals for defining large CAFs. A draft staff report will be developed and released for comment.

In June 2005, the large CAF definition will then be presented to the Board for consideration, during which further comment may be provided to the Board. A summary of the schedule is shown below.

August 2004	Public workshops to solicit input on defining large CAF
January 2005	Public workshop to review livestock emissions research data
March 2005	Public workshops to discuss staff proposal to define large CAF
May 2005	Release staff report on proposed large CAF definition
May 2005	Stakeholder meetings to receive comments on staff report
June 2005	Public hearing on staff proposals to define large CAF

***Who will be involved in developing the large CAF definition and identifying the most appropriate livestock emission factors?***

ARB staff will coordinate a process that includes all interested stakeholders. Stakeholders are expected to include local air districts, the California Air Pollution Control Officers Association, livestock industry groups, Farm Bureaus, UC Cooperative Extension staff, academic experts, U.S. EPA technical staff, environmental groups, and others.

## ***What are some possible topics for identifying large confined animal facilities in California?***

As a basis to start discussion, ARB staff has compiled topics to discuss for identifying large CAFs. During the workshop, we will seek input and feedback on these ideas, and any other options for identifying large CAFs.

### 1. Facility emissions

This approach might establish facility emissions thresholds that are consistent throughout the State. If a confined animal facility exceeds the thresholds, then it would be considered a large CAF. Discussion items:

- Would pollutants be treated individually, or collectively?
- Should different animal types have different emissions thresholds?
- Would livestock emissions thresholds be consistent with permitting thresholds for other industries producing similar pollutants?
- What emissions data and methods are needed to effectively quantify facility livestock emissions?
- Would consistent statewide thresholds be either too stringent, or too lenient for some regions?

### 2. Facility emissions considering attainment status

Similar to A, above, except this approach would vary the large CAF emissions thresholds by air district or basin, based upon the attainment status of the district. If a confined animal facility located in a region exceeds the local thresholds, then they would be considered a large CAF.

Discussion items:

- Similar to A, above, plus,
- If some regions have less stringent thresholds, could this encourage livestock facility migration?

### 3. Number of animals present at facilities

Several agencies now use the number of animals present at a facility (i.e., 1000 milking cows) to determine which facilities are regulated. This approach could be used to define large CAFs under SB 700. Discussion items:

- Would headcount thresholds be varied by region?
- If emission factors or methods changed, would headcount thresholds also need to be updated?
- If a facility has extensive emission controls, but exceeds the per-head threshold, would it still be defined as a large CAF?
- Are facility-specific head count data reasonably available?
- Using the per-head approach, how can we avoid inequities between livestock and other facilities regulated for their air emissions?

#### 4. Economic or production information

This approach could be based on either the facility revenue, production, or some other value. The approach includes an underlying assumption that facilities with higher revenue or production: a) create more air pollution and, b) are more capable of absorbing the costs of regulation. Discussion items:

- Will it be feasible to collect facility and species specific economic and production information?
- What data are needed to show a link between air quality and economic or production information?
- Using this approach, how could we avoid inequities between livestock regulations and other regulated facility types?

#### 5. Facility management practices

Some livestock management practices may be inherently more polluting and more amenable to emission reductions. This approach would use information about facility manure management practices and other factors to identify which facilities are considered large CAFs. Discussion items:

- If a large dairy and a small dairy used the same management practices, would they be treated the same?
- There are many management practice variations for each livestock category. Will it be possible to catalog the various practices and associate them with air quality impacts?
- Could existing facility operators avoid regulation by changing their management practices? What undesirable consequences could this produce?

What information will be evaluated to help define a large CAF?

This will be discussed with stakeholders during the workshop. Parameters used to define a large CAF may include, but are not limited to the following:

- Types and quantities of air pollutants from CAFs;
- Facility size and population data;
- Management practices of animal activities (e.g., waste handling, feed handling, housing) and non-animal activities (e.g., engines);
- Production information (head marketed, eggs produced, milk production);
- Economic information (gross & net receipts);
- Historical definitions of large CAFs or confined/concentrated animal feeding operations (CAFOs);
- Existing district or EPA permitting programs and applicability thresholds;
- Emission reduction potentials for livestock types or sources; and
- Air basin attainment status.



Agency Secretary

# Air Resources Board

1001 I Street • P.O. Box 2815  
Sacramento, California 95812 • [www.arb.ca.gov](http://www.arb.ca.gov)



January 6, 2005

Dear Sir/Madam:

The California Air Resources Board (ARB or Board) staff invites you to participate in a Livestock Emissions Research Symposium. At the Symposium, researchers will present their most current findings regarding the airborne emissions from dairy, beef, and poultry operations. A preliminary program of presenters is attached.

The Symposium is part of ARB's ongoing process to adopt a definition for a Large Confined Animal Facility (large CAF) by July 1, 2005 as required by Senate Bill 700 (Florez, 2003). Following this Symposium, we expect to have a public workshop in March 2005 to discuss the staff's proposed definition for large CAFs. We expect to release a staff report in May 2005 for consideration at the June 23, 2005 public hearing.

Details for the Symposium are as follows:

**DATE:** Wednesday, January 26, 2005

**TIME:** 9:00 a.m. to 4:00 p.m.

**LOCATION:** San Joaquin Valley Air Pollution Control District  
Central Office  
1990 East Gettysburg Avenue  
Fresno, California 93726

In addition, the workshop will video teleconferenced to the following locations:

San Joaquin Valley Air Pollution Control District  
Northern Office  
4230 Kiernan Avenue, Suite 130  
Modesto, California 95356

San Joaquin Valley Air Pollution Control District  
Southern Office  
2700 M Street, Suite 275  
Bakersfield, California 93301

*The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our Website: <http://www.arb.ca.gov>.*

California Environmental Protection Agency



Sir/Madam

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In addition to presentations by researchers, there will be limited time available for others to provide 5-minute presentations regarding technologies or practices that may help reduce livestock emissions.

The meeting places are accessible to persons with disabilities. If you have special accommodation or language needs, please contact Ms. Heather Arias at (916) 323-2722 or [harias@arb.ca.gov](mailto:harias@arb.ca.gov). TTY/TDD/Speech-to-Speech users may dial 7-1-1 for the California Relay Service.

Please also contact Mr. Mike FitzGibbon at (916) 445-6243 or [mfitzgib@arb.ca.gov](mailto:mfitzgib@arb.ca.gov) with any questions about the workshop or if you are interested in making a short technology presentation.

Sincerely,

Robert D. Fletcher, Chief  
Planning and Technical Support Division

Attachment

cc: Mr. Mike FitzGibbon, Manager  
Emission Inventory Analysis Section  
Planning and Technical Support Division

Ms. Heather Arias  
Transportation Strategies Section  
Planning and Technical Support Division

## FINAL PROGRAM – LIVESTOCK EMISSIONS RESEARCH SYMPOSIUM

### Livestock Emissions Research Symposium

Wednesday, January 26, 2005

9:00 a.m. – 4:00 p.m.

#### WELCOME

9:00 a.m. *Bob Fletcher, Air Resources Board*

#### BEEF

9:15 a.m. *"Ammonia and Hydrogen Sulfide Emissions from Beef Cattle Feedlots"*

*Dr. Jacek Koziel, Iowa State University*

Research in air quality engineering and livestock odor. Measurements of gas, odor, particulate matter emissions from livestock operations. Development and evaluation of odor control technologies.

#### DAIRY

9:45 a.m. *"On Farm Measurements of Methane and Select Carbonyl Emission Factors for Dairy Cattle"*

*Terry Cassel, University of California, Davis*

Modeled emission factors for methane and select carbonyls measured in spring, summer, and fall at one dairy will be presented along with a description of total non-methane, non-ethane organic carbon measurements at dairies

10:15 a.m. *Break*

10:30 a.m. *"Reactive Organic Gases (ROG) and Amine Emissions from a Northern California, Flushed Lane Dairy: Technical Approach and Report of Emission Factors"*

*Dr. CE Schmidt, Independent Environmental Consultant*

Results are discussed from a field-sampling project to evaluate process-specific emissions at a Northern California Dairy. The United States Environmental Protection Agency (U.S. EPA) flux chamber method was used to collect emissions of ROG, amine, and other relevant compounds. Emissions are reported for each tested process, the full facility, and on a per cow basis.

## FINAL PROGRAM – LIVESTOCK EMISSIONS RESEARCH SYMPOSIUM

11:00 a.m. *"Use of Laser Technology to Monitor Ammonia"*

*Dr. Dave Goorahoo, Dr. Charles Krauter, B. Goodrich, and Matt Beene, California State University, Fresno*

A review of the technology involved in the use of an open path tunable diode laser (OPTDL) for monitoring ammonia emissions at dairies. Results showing diurnal and seasonal fluctuations of ammonia during various dairy management practices and discussion of using the OPTDL for modeling downwind emission concentrations.

11:30 a.m. *"Monitoring and Modeling of ROG and Ammonia at Three California Dairies"*

*Dr. Charles Krauter, Dr. Dave Goorahoo, B. Goodrich, and Matt Beene, California State University, Fresno*

Dairy emissions data from a sampling program at dairies in Merced, Fresno, and Kings Counties that began in the fall of 2002. ROG samples were collected in canisters and analyzed Gas Chromatograph Mass Spectrography (GCMS) and Gas Chromatograph Flame Ionization Detection (GCFID). The ammonia was sampled with active denuders and Tunable Diode Lasers. Samples were taken upwind and at several sites downwind of various dairy operations. Modeling of emissions was done using Industrial Source Complex Short-Term version 3 (ISC-STv3), a steady state Gaussian plume model.

12:00 p.m. *Break for Lunch*

1:00 p.m. *"Process-based Approach to Estimate Air Emissions from California Dairies"*

*Dr. Frank Mitloehner, University of California, Davis*

Discussion of projects designed to evaluate parameters such as animal housing and manure handling, under controlled conditions using environmental chambers, on emissions from livestock facilities. We will use these data to drive a process-based model to identify the flow of carbon, nitrogen, and sulfur through the different operational processes on a dairy (feeding, housing, manure storage, land application) to eventually predict emissions of volatile organic compounds, methane, ammonia, nitrous oxide, nitric oxide, nitrogen and hydrogen sulfide. This site-specific approach will significantly improve estimates of emissions from California dairies.

## FINAL PROGRAM – LIVESTOCK EMISSIONS RESEARCH SYMPOSIUM

1:30 p.m.     *"Treatment of Dairy Manure with Anaerobic Digestion and Aeration Technologies for Reducing Gaseous Emissions"*

*Dr. Ruihong Zhang, University of California, Davis*

This paper reports the findings of an on-going study at U.C. Davis in quantifying the emission reductions of several gases (ammonia, hydrogen sulfide, methane, and volatile organic compounds) by anaerobic digestion and aeration treatment processes for dairy manure. Anaerobic digestion and aeration technologies have proven to be effective in providing the necessary treatment of animal waste for the benefits of water pollution control. Anaerobic digesters could also provide dairies with the benefit of biogas-energy production as well. Such waste treatment technologies are expected to reduce the air emissions from manure management systems. However, how much emission reduction that can be achieved for dairies is not known.

2:00 p.m.     *"A Process Based Approach to Measure Ammonia from Dairy Operations Using a Flux Chamber Protocol"*

*Dr. Saqib Mukhtar, Texas A&M University*

Report on the methods and results of using flux chambers to measure ammonia emissions at dairies.

2:30 p.m.     *Break*

### POULTRY

2:45 p.m.     *"Emissions from Poultry Production"*

*Matt D. Summers, California Department of Food and Agriculture*

A collaborative effort to estimate the emissions from broiler production in California is discussed. Methodology and equipment was developed so that standardized U.S. EPA source test methods could be applied to a mechanically ventilated poultry house. Resulting emissions throughout the broiler cycle for ammonia, particulate matter, and volatile organic compounds are presented and analyzed.

## **FINAL PROGRAM – LIVESTOCK EMISSIONS RESEARCH SYMPOSIUM**

### **TECHNOLOGY PRESENTATIONS**

3:15 p.m.     *“Five Minute Presentations Regarding Technologies or Practices that may Help Reduce Livestock Emissions”*

*Moderated by Patrick Gaffney, Air Resources Board*

### **CLOSING**

4:00 p.m.     *Bob Fletcher, Air Resources Board*

**FINAL PROGRAM WILL BE AVAILABLE AT THE SYMPOSIUM**



Agency Secretary

# Air Resources Board

1001 I Street • P.O. Box 2815  
Sacramento, California 95812 • [www.arb.ca.gov](http://www.arb.ca.gov)



February 11, 2005

Dear Sir/Madam:

The California Air Resources Board (ARB or Board) invites you to participate in a public workshop to discuss a proposed definition for a Large Confined Animal Facility (large CAF). The workshop details are as follows:

DATE: Wednesday, March 2, 2005

TIME: 1:30 p.m. to 3:30 p.m.

LOCATION: San Joaquin Valley Air Pollution Control District  
Central Office  
1990 East Gettysburg Avenue  
Fresno, California 93726

Senate Bill 700 (Florez, 2003) requires ARB to adopt a large CAF definition by July 1, 2005. ARB staff held a series of workshops in August and September 2004 to solicit input for developing the large CAF definition. ARB staff also held a Livestock Emissions Research Symposium on January 26, 2005, at which researchers presented their most current findings regarding the airborne emissions from dairy, beef, and poultry operations.

Throughout the last year, ARB staff has been working with stakeholders to review relevant scientific information, including emission factors for CAFs and how large CAFs may affect the attainment and maintenance of ambient air quality standards. This information is being used to develop the draft definition proposals, which will be presented at the workshop.

Staff will use input received at the workshop in proposing the large CAF definition. The definition will be included in a staff report expected to be released in May 2005 for consideration by the Board at the June 23, 2005 public hearing.

The workshop will also be teleconferenced and video teleconferenced. You may send questions on-line during the workshop by e-mail to [meetingquestion@valleyair.org](mailto:meetingquestion@valleyair.org). The workshop title should be placed in the subject line, followed by your questions in the body of the e-mail. To participate by teleconference, please call 888-549-9134, using the pass code 148277.

*The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our Website: <http://www.arb.ca.gov>.*

California Environmental Protection Agency

Sir/Madam  
February 11, 2005  
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The following locations are available for video teleconference participation:

San Joaquin Valley Air Pollution Control District  
Northern Office  
4230 Kiernan Avenue, Suite 130  
Modesto, California 95356

San Joaquin Valley Air Pollution Control District  
Southern Office  
2700 M Street, Suite 275  
Bakersfield, California 93301

South Coast Air Quality Management District  
21865 E. Copley Drive  
Conference Room CC08  
Diamond Bar, California 91765

The meeting places are accessible to persons with disabilities. If you have special accommodation or language needs, please contact Ms. Heather Arias at (916) 323-2722 or [harias@arb.ca.gov](mailto:harias@arb.ca.gov). TTY/TDD/Speech-to-Speech users may dial 7-1-1 for the California Relay Service.

Please also contact Ms. Arias with any questions about the workshop.

Sincerely,

/s/

Robert D. Fletcher, Chief  
Planning and Technical Support Division

Attachment

cc: Rich Burt  
San Joaquin Valley Air Pollution Control District  
1990 East Gettysburg Avenue  
Fresno, California 93726

Heather Arias  
Transportation Strategies Section  
Planning and Technical Support Division

# **Large Confined Animal Facility Definition Workshop**

**Wednesday, March 2, 2005**

**1:30 p.m. – 3:30 p.m.**

## **WELCOME**

1:30 p.m. *Bob Fletcher, Air Resources Board*

## **SB 700 REQUIREMENTS**

1:40 p.m. *Michael FitzGibbon, Air Resources Board*

## **RESEARCH SYMPOSIUM UPDATE**

1:50 p.m. *Patrick Gaffney, Air Resources Board*

## **LARGE CAF DEFINITION DISCUSSION**

2:00 p.m. *Patrick Gaffney, Air Resources Board*

## **NEXT STEPS**

3:15 p.m. *Michael FitzGibbon, Air Resources Board*

## **CLOSING**

3:30 p.m. *Bob Fletcher, Air Resources Board*



## APPENDIX G

### SAN JOAQUIN VALLEY MAJOR ROG SOURCE CATEGORIES

#### Major ROG Emissions Sources in the San Joaquin Valley for 2004

Emissions Rank	Source Category	ROG (tons/day)	% of Total
1	Light and Medium Duty Trucks	37.4	10%
2	Light Duty Passenger Cars	33.6	9%
3	Oil and Gas Production (Evaporative Losses)	29.6	8%
4	Pesticides	25.8	7%
5	Consumer Products	24.9	7%
6	Livestock Waste (Dairy Cattle)	23.5	6%
7	Prescribed Burning	17.7	5%
8	Off-Road Equipment (Lawn/Garden-Construction, etc)	15.4	4%
9	Aircraft	12.3	3%
10	Coatings (Paints and Thinners-Non-Architectural)	11.6	3%
11	Architectural Coatings (Paints and Thinners)	10.5	3%
12	Petroleum Marketing (Gasoline Evaporative Losses)	10.1	3%
13	Food and Agriculture (Crop Processing and Wineries)	10.1	3%
14	Recreational Boats	10.1	3%
15	Heavy Duty Gas Trucks	9.3	3%
16	Agricultural Burning	8.5	2%
17	Farm Equipment (Tractors)	8.3	2%
18	Residential Fuel Combustion	6.5	2%
19	Heavy Duty Diesel Trucks	5.1	1%
20	Off-road Recreational Vehicles	4.6	1%
-	All Other Sources	48.8	13%
Total		366.4	100%

ARB 2005e - Modified to reflect revised estimates for the livestock categories of dairies, poultry, and beef cattle.