I. SUMMARY

In June of 2006, the San Joaquin Valley Air Pollution Control District’s Governing Board adopted the most stringent emissions regulation for confined animal facilities (CAF) in the nation, District Rule 4570. With Rule 4570, District staff established a comprehensive set of regulatory mitigation measures designed to reduce emissions from the various areas of CAFs, such as the housing and manure management systems. The 2006 version of the rule applies to commercial operations such as larger dairies, beef feedlot, poultry, swine, and other cattle facilities. Implementation of Rule 4570 required significant commitment and investment from affected CAFs, resulting in emissions reductions that exceeded the emission reduction commitments contained in the District’s 1-Hour Ozone Plan.

The proposed amendments to Rule 4570 are the latest phase in the District’s ongoing effort to regulate emissions from CAFs. This report reflects revisions to the May 20,
2010 draft based on comments received from various stakeholders. As part of this ongoing effort, extensive energy has been devoted to evaluating and furthering science in the area of CAF-related emissions and potential mitigation measures. The District has worked closely with researchers and industry stakeholders, and this effort has yielded profound new information that has been used to develop the proposed amendments; most notably, scientific research that has shed new light on dairy silage emissions and potential mitigation measures.

This rule project would strengthen current rule requirements, lower threshold limits to bring in major poultry sources, tighten mitigation measures, and add additional compliance language including monitoring, testing, and recordkeeping to improve enforceability. With this rule-amending project, Rule 4570 meets RACT requirements and exceeds the emission reduction commitments contained in the District’s 2007 Eight-Hour Ozone Plan.

A. Reasons for Rule Development and Implementation

Air monitoring data in the San Joaquin Valley Air Basin (Valley) indicates ozone levels that exceed the eight-hour ozone National Ambient Air Quality Standards (NAAQS) set by the federal government to protect public health and welfare. As a result, the United States Environmental Protection Agency (EPA) has classified the Valley as extreme nonattainment. In accordance with the requirements of the federal Clean Air Act, nonattainment areas must develop plans to achieve attainment of the NAAQS. Consequently, the San Joaquin Valley Unified Air Pollution Control District (District), adopted the 2007 Ozone Plan. That plan is comprised of regulatory and incentive-based measures to reduce emissions of nitrogen oxides (NOx) and volatile organic compounds (VOC), which are the precursors to ground-level ozone.

Since amending Rule 4570 is a control measure in the District’s 2007 Eight-Hour Ozone Plan, it is subject to Code of Federal Regulations (CFR), Clean Air Act (CAA), and California Health and Safety Code (CH&SC) requirements. This rulemaking project is intended to support the attainment goals of the District’s 2007 Eight-Hour Ozone Plan. The proposed amendments to Rule 4570 (Confined Animal Facilities) will seek to obtain as much reduction of volatile organic compounds (VOCs) from confined animal facilities as is expeditiously practicable, technologically feasible, and economically reasonable, as determined by the District’s Governing Board. Furthermore, the rule is intended to satisfy the ozone plan commitments as identified in Table 1.
Table 1: Ozone Plan Commitments

<table>
<thead>
<tr>
<th>Subject</th>
<th>Reference</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Timeline</td>
<td>CAA Section 172(c)(1)</td>
<td>Ozone attainment plans shall implement control measures as expeditiously as practical, and provide for attainment.</td>
</tr>
<tr>
<td>RACT</td>
<td>CAA Sections 182(b)(2) and 182(f)</td>
<td>Ozone attainment plans shall assure that reasonably available control technology (RACT) for NOx and volatile organic compounds (VOC) is in use at sources and on source categories at or above the RACT threshold.</td>
</tr>
<tr>
<td>BARCT</td>
<td>CH&amp;SC 40919(a)(3)</td>
<td>Ozone attainment plans should provide for best available retrofit technology (BARCT) for existing permitted sources.</td>
</tr>
<tr>
<td>All Feasible Controls</td>
<td>CH&amp;SC 40914(b)(2)</td>
<td>Ozone attainment plans should include &quot;all feasible control measures.&quot;</td>
</tr>
<tr>
<td>Deadline</td>
<td>District 2007 Eight-Hour Ozone Plan</td>
<td>Rule adoption by the second quarter of 2010.</td>
</tr>
<tr>
<td>Reductions</td>
<td>District 2007 Eight-Hour Ozone Plan</td>
<td>The plan commits to 6.7 tons per day of VOC reductions in 2012 and 22.9 tons per day of VOC reductions in 2023.</td>
</tr>
</tbody>
</table>

District Rule 4570 is a VOC rule, and therefore underwent a RACT analysis as a part of the 2009 RACT Demonstration for Ozone State Implementation Plan analysis. This analysis compared District Rule 4570 to federal and state regulations and guidance as well as to comparable requirements in rules from the other Air Districts in California nonattainment areas. In the 2009 RACT Demonstration for Ozone SIP analysis, District staff concluded that District Rule 4570 satisfies RACT for confined animal facilities. EPA found that the 2006 version of Rule 4570 had deficiencies, as discussed later in this Final Draft Staff Report; therefore EPA proposed a limited approval and limited disapproval of the rule. District staff have worked with EPA to address and resolve these concerns. Please refer to Section XIII for further discussion regarding RACT.

B. Current Rule 4570

Rule 4570, as currently written, limits VOC emissions from large CAFs through mitigation measures that target each major aspect of CAF operations – from food to housing to manure management to land application. Operators must choose a certain number of management practices from a limited menu of options for each operation. The current rule can be accessed on-line at http://www.valleyair.org/rules/currntrules/r4570.pdf.
C. Summary of Rule Amendments

Recently completed emissions studies at California dairies have indicated that dairy feed is the most significant source of VOC emissions at dairy operations. These studies have shown that VOC emissions from open surfaces of silage piles and the silage-containing total mixed rations (TMR) placed as feed for cattle have significantly higher VOC flux rates and account for the majority of total VOC emissions measured at dairy facilities. These studies have also indicated that the feed VOC emissions are dominated by alcohols, primarily ethanol. The proposed rule amendments will strengthen the current mitigation measures included in the rule for feed sources and will include new additional requirements and management practices to reduce emissions of alcohols and total VOCs from this important source category.

The proposed rule amendments would go beyond the current rule in multiple aspects. Definitions and measure-specific testing and monitoring information have been added for clarification and increased enforceability. The threshold has been lowered for the majority of CAF types to apply to major source facilities previously exempt from the rule and to achieve additional emission reductions.

For clarity, the menu option tables for each CAF have been split into Phase I and Phase II mitigation measures. Phase I mitigation measures are those applicable to facilities currently subject to Rule 4570. Phase II tables include mitigation measures applicable to facilities that would be subject to Rule 4570 under the proposed regulatory threshold. The menu options of mitigation measures would be amended to provide more requirements, as well as make current measures more stringent. The mitigation measures have been refined to decrease any duplicity and ambiguity. Mitigation measures from all categories of CAFs, which were determined not to reduce emissions, were removed from rule language. A silage specific menu has been added to dairy, beef feedlot and other cattle sections to control a high emission source. Many of the menus have been revised to specify mandated measures in high emission source categories such as feed, silage and housing while still maintaining flexibility to accommodate the variability of individual operators and facilities.

The following is a summary of proposed amendments to each type of CAF mitigation measure menus:

Dairies

• Requirements bifurcated between newly affected medium dairies (greater than or equal to 500 milking cows), and large dairies (greater than or equal to 1,000 milking cows) currently subject to Rule 4570 requirements.
• Additional mitigation measures proposed, primarily for silage. The new mitigation measures would reduce VOC emissions through a combination of moisture content, compaction standards, spill maintenance, and pile management.
• Current menu options would be made more stringent by making some options mandatory for feed and housing mitigation measures.
Beef Feedlots and Other Cattle

- Additional mitigation measures proposed, primarily for silage. The new mitigation measures would reduce VOC emissions through a combination of moisture content, compaction standards, spill maintenance, and pile management.
- Current menu options would be amended and new menu options added, for clarity, to make monitoring more frequent, and to make menu options more stringent.

Swine

- Mitigation measures would be adjusted from optional menu of potential measures to mandatory list of required measures.

Poultry

- In order to clarify rule requirements and address EPA concerns regarding poultry mitigation measures, the poultry section would be bifurcated into Layer, and Broiler and Turkey.
- Mitigation measures would be adjusted from optional menu of potential measures to mandatory list of required measures.

Section 6 – Monitoring Requirements

Monitoring requirements would be added to the rule to reflect requirements of new or amended mitigation options. Monitoring requirements would also be added as a response to EPA concerns regarding possibly inadequate monitoring requirements.

Section 7 – Administrative Requirements

Recordkeeping requirements would be added, amended, and expanded to detail the records for each mitigation measure, thus helping owners/operators and compliance inspectors with ensuring that mitigation measures are utilized on a regular basis.

Section 8 – Compliance Schedule

Owners/operators of facilities subject to the proposed amendments would be required to submit permit applications by February 1, 2011, and full compliance with Phase II would be required within one year of the permit issuance date. Owners/operators of new or modified facilities that become subject to the rule under the new proposed regulatory thresholds would be required to comply with Phase II requirements.

D. Rule Development Process

As part of the rule development process, a public scoping meeting was held in March 2009. At the scoping meeting, District staff presented the objectives of this proposed rulemaking project and solicited input from stakeholders on issues related to Rule 4570. Comments received as a result of the scoping meeting were evaluated and, as appropriate, incorporated into proposed rule provisions. District staff conducted one public workshop to present the rule amendments and seek comments from the public. A socioeconomic focus group was held immediately after the workshop to outline the socioeconomic process and solicit economic information from stakeholders. Public comments and cost information received were incorporated into the Final Draft Staff Report with Appendices For Revised Proposed Amendments to Rule 4570.
Report and proposed rule amendments. District staff also held multiple technical meetings as requested by stakeholders. The Proposed Rule Amendments to Rule 4570 and Final Draft Staff Report will be brought before the District’s Governing Board for public hearing and adoption on June 17, 2010.

E. Global Climate Change and Greenhouse Gases

The California Global Warming Solutions Act of 2006 (AB 32) created a comprehensive, multi-year program to reduce greenhouse gas (GHG) emissions in California, with the goal of restoring emissions to 1990 levels by 2020. In the coming years, the ARB and the Legislature will be developing policies and programs to implement Assembly Bill 32 (AB 32). There are many win-win strategies that can reduce both GHG and criteria/toxic pollutant emissions. However, the District’s primary mission remains to achieve attainment with air quality standards to protect public health. Therefore, when situations that involve tradeoffs between GHG and criteria or toxic pollutants arise, the District will give precedence to reducing criteria or toxic pollutant emissions due to the more immediate public health concerns associated with such pollutants. A detailed analysis is included in the CEQA Negative Declaration for this rule.

II. BACKGROUND

A. Source Category Description

Confined animal facilities (CAF) are used in the raising of livestock for the purpose of providing dairy products, meat, and eggs. Due to the different methods of confinement and associated manure management, there is no typical CAF. The design and operation of a CAF varies depending on animal type, regional climatic conditions, business practices, and preferences of the operators.

The raising of livestock (livestock agriculture) has gone through significant changes since the 1990s. The size of all types of livestock agriculture farms continues to increase. Today, meat and dairy products typically originate on farms whose herds of cattle or hogs, or flocks of chickens are much larger than in the past. A big driver in the structural change in livestock agriculture is increased productivity and, through that, lower production costs to the farmer. These lower production costs are passed on to the consumer as lower prices for meat, dairy products, and eggs.

One example of the shift to large-scale production is the dairy industry. Nationally, only about 10% of all dairy cows were housed on farms with more than 1,000 head in 1992. By 2007, that ratio rose to 36% of all dairy cows. The shift to very-large dairies (1,000+ head) had its origin in California and other western states. Looking at California specifically, the state has become the largest producer of milk in the nation. The eight counties of the San Joaquin Valley are all in the top-ten California counties for milk production, with Tulare County heading the list. Tulare County alone produced almost as much milk as the entire state of Pennsylvania; the state ranked number five on the
2007 list of top milk-producing states. Tulare County was also well ahead of Minnesota, the sixth largest milk producing state.

For livestock agriculture, evidence to-date suggests that production costs fall as the farm size increases up to some threshold level. The largest dairy farms (1,000+ head) have production costs that are 15% lower than the next largest size class (500-999 head). Production costs then level out, suggesting that there is no unique optimal dairy size above 1,000 cows. For example, dairies with 2,000 cows have average costs similar to dairies with 1,000 cows.

Other types of livestock agriculture have also increased their average farm size. Production cost-saving for larger dairy operations is also true of layers (chickens raised to lay eggs), broilers (chickens raised for meat), pork and beef producers. Nationally, the median production of broilers (50% larger and 50% smaller) is 600,000 broilers per year. In 2002, the median production was 520,000. Active District permits echo this national trend.

B. Poultry Operations

Poultry facilities operate either as layer ranches for egg production or as broiler ranches where birds are grown for the fresh meat market. Poultry facilities, called ranches in reference to their specialized operation, may consist of one or more farms on properties that may be several miles apart. Several barn-like houses may make up a farm. A chicken layer house may have over 100,000 layers; a typical chicken broiler house contains approximately 20,000-25,000 birds; and a typical turkey broiler house contains approximately 10,000 birds at any one time.

In the United States, approximately 61% of the chicken layer houses and a majority of the breeder and broiler houses use power ventilation instead of natural ventilation. The most common type of power ventilation is tunnel ventilation. In tunnel-ventilated houses, all the fans are clustered at one end of the house and the fans push the air to the other end of the house. Curtains on the houses may be used on a non-routine basis for ventilation, particularly during colder weather.

Studies indicate that most chicken layer houses produce approximately two cubic yards of waste per week per five hundred chickens. Although a small amount of liquid manure may occur from egg washing operations located on the facility and a small amount of bedding may be collected as waste, poultry excretions account for a majority of the waste. Typically, hens are confined in a layer house that consists of many layer boxes positioned above the ground. On average, every seven (7) to nine (9) days workers remove manure from under the layer boxes, and every fourteen (14) to eighteen (18) weeks workers remove manure from the floor of the layer houses. However, many facilities list less frequent manure removal, ranging from one (1) to three (3) times per year (every 17-52 weeks) as a control technique used to comply with District Rule 4550 Conservation Management Plan (CMP). Several mitigation measures in Proposed Rule 4570 and Rule 4550 that the owners/operators could choose do not affect manure
removal frequency. Therefore, owners/operators can comply with both Rule 4550 and 4570.

In broiler facilities, complete litter removal from the house occurs one (1) to four (4) times per year. Litter removal frequencies vary from every two (2) to seven (7) flocks (approximately 90-315 days); more commonly, it is removed every third flock. Before introducing a new flock, the house is left empty, typically for five (5) days. During this interlude, the operator adjusts the temperature and other ambient conditions in the house. In the broiler industry, the new flocks of birds are brought into the houses as chicks are raised for approximately 45 days, until they reach the desired weight. Shortly thereafter, the grown birds are removed and the house is again left empty for approximately five (5) days to sanitize. This approximately 55-day cycle is the production period for one flock. Depending on management practices, litter production ranges from 0.5 to 0.7 pounds per pound of live bird weight. On average, for each pound of live weight gained, meat birds produced 0.52 pounds of litter during the production period.

Poultry excretions and bedding materials, such as rice hulls, are removed either by scraping or by flushing. In a scrape system, the litter is either swept or scraped from the house into a pile or piles outside the house. Typically, concerns about transmitting diseases among birds and flocks necessitate trucking the scraped litter offsite shortly after removal. The liquid handling system is similar to dairy flush systems, explained later in this report. However, less than 15% of the poultry operations in the San Joaquin Valley use liquid manure handling systems.

Based on current research data, litter and feed are the major sources of VOC emissions. These emission points are also sources of ammonia emissions. Since ammonia forms a significant health risk to the animals and decreases productivity, many facilities implement controls for ammonia. The humidity, litter additive, moisture, and ventilation controls widely used to control ammonia also constitute BARCT for VOC emissions.

C. Dairy Operations

For this description, dairy operations are defined as those operations producing milk or animals for facilities that produce milk. In order to produce milk, the cows must be bred and give birth. Typically, the gestation period for dairy cattle is nine (9) months and dairy cows are bred again approximately four (4) months after calving. Milk production typically peaks shortly after calving and then declines. Commonly a cow will produce milk for ten (10) to twelve (12) months and then be dry approximately two (2) months. Thus, a dairy operation may have several types of animal groups present including heifers, lactating cows, dry cows, calves, and bulls (for breeding purposes). Approximately 25% of a milking herd is replaced each year, but replacement levels can be as high as 40% for intensively managed herds (EPA 2001).
Calves are typically housed in individual pens or hutches. Older animals are typically housed in freestall barns, dry lots, tie stalls/stanchions, or any combination of the aforementioned. The freestall barn is the predominate type of housing system used on dairy farms for lactating cows. In a freestall barn, cows are housed in large pens with free access to feed bunks, waterers, and stalls for resting. Standard freestall barns have a feed alley in the center of the barn separating two feed bunks on each side. Animals stand on the corral side of the feed lane to eat; this is where the majority of the animal excretion occurs. In some cases, cows may be confined in or have access to corrals. Corrals are typically fenced in areas that may have shade. Corral confinements are similar to beef feedlots described later in this report. Tie stalls/stanchions are common on smaller dairy farms and older facilities. In this type of housing system, cows are confined in a stall for feeding, but have access to a dry lot or pasture for exercise. A mechanically or manually cleaned gutter is located behind each row of stalls for manure collection and removal.

Feeding and watering practices vary for each animal type. In general, calves are nursed for four (4) to five (5) days after birth. Calves are then fed a milk replacement until weaning, which generally occurs at about eight (8) weeks of age. During this period, a feed grain based starter diet is introduced. This starter diet is fed to calves until they are approximately three (3) months old. At approximately three (3) months, calf rumen development allows a shift to a roughage-based diet.

Older cattle and calves being raised for milk production are commonly fed a roughage-based diet. The principal constituents of these diets are corn or grain sorghum silage and legume or grass and legume hays with feed grains and byproduct foodstuff added in varying amounts to satisfy energy, protein, and other nutrient requirements. The manure tends to be generated in a semi-solid state.

Manure with a total solid content of 10% or less can be handled as a liquid. In slurry or liquid systems, the manure is flushed from alleys or pits to a storage facility. Typically, effluent from the solid separation system or supernatant from a pond or an anaerobic lagoon is used as flush water in animal housing. The supernatant is the clear liquid in the lagoon that is overlying the solids that settle below. Dairy manure that is handled and stored as a slurry or liquid may be mixed with dry manure. Liquid systems are common in large dairies due to their lower labor costs and ease of use with automatic flushing systems. Manure handled as solids can be removed by mechanized scraping systems, a tractor, or a chain scraper. Typically, the solid manure scraped is stock piled and dried for disposal through land application.

D. Beef Cattle Feeding Operations

This animal sector includes adult beef cattle (heifers and steers). Beef may spend all, part, or none of their lives on a CAF. There are three types of operations in the beef industry: cow-calf operations, backgrounding operations, and finishing operations. These operations are typically conducted at separate locations that specialize in each phase of production, but may occur at a single location.
Cow-calf operations are a source of heifers and steers fed for slaughter. These animals are fed primarily hay with some grain and other foodstuff. Backgrounding or stocker operations prepare weaned calves for finishing. The backgrounding process is highly dependent on feed prices. Typically the animals are fed the lowest priced feed at the time, which may be forages or crop residues, with the objective of building muscle and bone mass at a low cost. The duration of the backgrounding process may be from thirty (30) days to six (6) months old. Typically, high grain prices favor longer periods of backgrounding by reducing feed costs for finishing or fattening. After approximately 150 to 180 days, animals in finishing operations will reach slaughter weights of 1,050 to 1,250 pounds. Although, some feedlots start with younger or older cattle and the finishing cycle may be less than 100 days or over 270 days. Accordingly, feedlots typically have between 1.5 to 3.5 cattle turnovers per year.

In any case, animals are typically segregated by production stage in pens with feed truck access. The animals are typically fed two (2) to three (3) times per day using feed bunks located along feed alleys that separate the individual pens.

For these types of operations, the manure is commonly handled as a solid. Solid manure is typically scraped or moved by tractors to stockpiles. Manure accumulates in areas around feed bunks and water troughs most rapidly, thus these areas may need to be cleaned during the finisher cycle. However, there is significant concern and risks associated with entering areas where beef cattle are housed.

E. Swine Operations

The production cycle for hogs has three (3) phases: farrowing, nursing, and finishing. The first phase begins with breeding and gestation over a 114-day period followed by farrowing (giving birth). After farrowing, the newly born pigs or piglets normally are nursed for a period of three (3) to four (4) weeks until they reach a weight of approximately ten (10) to fifteen (15) pounds. Typically, there are from nine (9) to eleven (11) pigs per litter. Sows can be bred again within a week after a litter is weaned. Sows normally produce five (5) to six (6) litters before they are sold for slaughter at a weight of 400 to 460 pounds.

Weaned pigs are fed a starter ration until they reach a weight of approximately fifty (50) to sixty (60) pounds. At this point, they are typically eight (8) to ten (10) weeks of age. Then the animals are fed a growing and finally a finishing ration until they are approximately 240 to 280 pounds at which point they are approximately 26 weeks of age and ready for slaughter. The diet varies, but it typically includes small grains such as wheat and barley, corn and soybean meal.

The animals are typically housed in confinement buildings that are either totally enclosed or open-sided with curtains. Totally enclosed facilities are mechanically ventilated throughout the year. Open-sided buildings are naturally ventilated the majority of the year, but may be mechanically ventilated when the curtains are closed.
due to weather conditions. Manure may be flushed from the floor of the housing or fall through slats in the floor to a pit underneath the floor. Manure in the pit may be flushed or scraped.

III. EVALUATION OF THE LATEST SCIENTIFIC INFORMATION

When Rule 4570 was adopted in 2006, the research available at the time of rule adoption pointed to handling of solid and liquid animal wastes as being the highest largest source of VOC emissions at a dairy. District staff has made extensive efforts to review and further dairy emission-related research. Recent dairy emission research studies performed under the District, other interested agencies, and stakeholders have significantly increased knowledge of dairy emissions and also shed some light on potential strategies to reduce these emissions. The studies have been performed on California dairies and reflect current dairy practices. In contrast to the earlier focus on other sources, the current research indicates that silage piles and placing feed in the feed bunkers are a larger portion of the total dairy emissions than solid/liquid manure handling. The District is in the process of finalizing a revised dairy emission factor to reflect the new information. The draft emission factor and supporting staff report are available on the District’s website: www.valleyair.org./workshops/public_workshops_idx.htm.

Important findings of the latest dairy research studies include:

- Manure storage ponds and lagoons, which were previously thought to be a major source of VOC emissions at dairies, now appear to emit a comparatively small fraction of the overall dairy VOC emissions;
- Feed at dairies is a significant source of VOC emissions. The exposed faces of silage piles that are used to store and preserve silage to be fed to the cattle and the total mixed ration placed in lanes for cattle consumption emit significant amounts of VOCs, particularly alcohols.
- Emissions of alcohols (primarily ethanol) from feed, fresh manure, and directly from cows appear to comprise a significant fraction of dairy VOC emissions;
- Manure deposited in open corrals appears to be an important source of VOC emissions on some dairies;
- Emissions of volatile fatty acids (VFAs) are important but not as significant as previously estimated during the first revision of the dairy VOC emissions factor;
- The practice of flushing freestall barns more frequently has the potential to reduce VOC emissions from cow housing areas.
- Several of the compounds that have been identified as important components of dairy emissions, such as alcohols and volatile fatty acids, are highly soluble in aqueous solutions. This property may be important when developing potential mitigation strategies.
• Land application of solid and liquid dairy manure contributes a relatively small amount to total VOC emissions at dairy.

• Seasonal variation in emissions may be an important factor to consider when developing annual emission estimates. The seasonal variation in emission rates was observed to be more pronounced with ammonia emissions than VOC emissions.

IV. EMISSION CONTROL TECHNOLOGY

The majority of VOC emissions from confined animal operations are fugitive (evaporation of VOC from feed or waste, for example) or related to gaseous emissions from the livestock. The fugitive nature of the emissions from agricultural sources and their great land area impose challenges and limitations to the type of controls that can be feasibly applied to reduce emissions. Unlike other stationary sources, where the majority of emissions are collected and released through a chimney, pipe, vent, or stack, emissions from agricultural sources are spread out over large areas and are very dilute at the point of release. These emissions cannot reasonably be captured at the point of release since capture of these emissions would entail monumental changes, which have not yet been developed and are likely infeasible, to the methods that are currently used for agricultural production. Rule 4570 groups CAF emission sources into five areas: feed/feed storage, animal housing, solid waste handling, liquid waste handling, and land application of animal wastes. In this way, all of the major emission sources within a given CAF are included in the control requirements. Within each area, rather than capture fugitive emissions at the point of release, Rule 4570 provides for management practices that minimize the formation of VOCs or control VOCs by moving the VOC-forming material to a controlled situation. Some examples of Class One mitigation measures are feed manipulation, frequent scraping of animal housing, and covering of silage piles.

Management practices are not the only way that VOC emissions can be controlled. Owner/operators may have installed control technology to meet water standards or to reduce nuisance complaints from neighbors. These controls are expensive, both in terms of capital outlay and in terms of on-going operating and maintenance costs. However, they provide a high level of VOC control. Rather than penalize an operator who installs these controls by requiring that the Class One mitigation measure be implemented in addition to the costly control technology, Rule 4570 allows the owner/operator to replace a Class One mitigation measure with the advanced control technology under Class Two mitigation measures. In this way the emissions from the facility are reduced beyond what is required in the rule, and the operator is not penalized for making the more economically challenging choice of control. Select Class Two mitigation measures are discussed in more detail in Appendix E of this report.
V. PROPOSED AMENDMENTS TO RULE 4570

District Rule 4570 generally limits VOC emissions from large CAFs through required implementation of various management practices. Each major aspect of CAF operations is covered – from food to housing to manure management to land application. Operators must choose a certain number of management practices from a limited menu of options for each operation.

The following paragraphs detail the specific changes proposed by District staff to strengthen individual portions of the rule.

A. Menu Approach

As stated previously, the design and operation of a CAF varies depending on animal type, regional climatic conditions, business practices, and preferences of the owners/operators resulting in no typical CAF. As in the current rule, the proposed amendments to Rule 4570 generally provide a menu of mitigation measures options for affected owners/operators. This acknowledges that not all facilities can implement the same options due to infrastructure, conditional use permits, water board permits, soil types, production contracts, and other limitations. It also enables the owners and operators, who understand their particular operation best, to choose the mitigation measures that make the best environmental and economic sense for the facility. For clarity, the menu option tables for each CAF have been split into Phase I and Phase II mitigation measures. Phase I mitigation measures are those applicable to facilities currently subject to Rule 4570. Phase II tables includes increased requirements for facilities currently subject to Rule 4570 as well as mitigation measures applicable to facilities that would be subject to Rule 4570 under the proposed regulatory threshold.

A menu approach provides much needed flexibility for the variability of Valley operations. Each menu has been reevaluated to minimize redundancy and clarify any exclusive mitigation measures or those that address the same source. Many mitigation measures have also been mandated for the various CAFs.

New scientific research has shown most dairy emissions come from Total Mixed Ration (TMR), silage and corrals. Therefore, proposed amendments would also include a number of specified measures in these categories to direct concentration on reducing emissions from these sources. Stakeholders have provided information to support specified menu options that are feasible but not yet implemented by all facilities.

B. Section 3.0 – Definitions

In this section, six definitions would be added – biofilter, oxygen barrier film, poultry molt, poultry litter, large CAF, medium dairy, and rain event. Biofilters can be used to reduce VOC emissions in certain situations. The definition for large CAF is taken from the California Code of Regulations Title 17, Section 86500. The purpose of the definition is to improve reader clarity, especially with respect to CAFs that would be new
to control requirements. The purpose for adding the medium dairy CAFs definition to the rule is to reduce the wordiness of certain rule provisions. Oxygen barrier film, poultry molt, poultry litter and rain event were added to provide clarity and more specification in the menu options.

Wording has been added to the definitions for standards from the Natural Resource Conservation Service California Field Office to make clear which specific document is being referenced. Animal waste has been changed to litter or manure throughout the rule language as requested by a commenter at the workshop.

C. Section 4.0 – Exemptions

The regulatory threshold, meaning the minimum number of animals that trigger the control requirements of the rule (mitigation measures) are listed in below Table 4. Stated another way, if the number of animals at the facility is, at all times, below the number in Table 4, the facility would not be required to implement applicable mitigation measures. The operator would, however, be required to show that the facility continues to qualify for the exemption by keeping adequate records of the number of animals at the facility.

The changes to the regulatory threshold reflect the Districts change in attainment status for the Federal Ozone Standard from severe to extreme non-attainment. Changes to the regulatory threshold also generates additional emission reductions from this source category.

<table>
<thead>
<tr>
<th>Livestock Category</th>
<th>Current Reg. Threshold</th>
<th>Proposed Reg. Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dairy</td>
<td>1,000 milking cows</td>
<td>500 milking cows</td>
</tr>
<tr>
<td>Beef Feedlots</td>
<td>3,500 beef cattle</td>
<td>1,750 beef cattle</td>
</tr>
<tr>
<td>Other Cattle Facility</td>
<td>7,500 calves, heifers, or other cattle</td>
<td>3,750 calves, heifers, or other cattle</td>
</tr>
<tr>
<td>Poultry Facilities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Layer</td>
<td>650,000 head</td>
<td>400,000 head</td>
</tr>
<tr>
<td>Broiler</td>
<td>650,000 head</td>
<td>400,000 head</td>
</tr>
<tr>
<td>Turkey</td>
<td>100,000 head</td>
<td>100,000 head</td>
</tr>
<tr>
<td>Swine Facility</td>
<td>3,000 head</td>
<td>3,000 head</td>
</tr>
<tr>
<td>Horses Facility</td>
<td>3,000 head</td>
<td>1,480 head</td>
</tr>
<tr>
<td>Sheep and Goat Facilities</td>
<td>15,000 head of sheep, goats, or any combination of the two</td>
<td>10,000 head of sheep, lambs, goats, or any combination</td>
</tr>
<tr>
<td>Any livestock facility</td>
<td>30,000 head</td>
<td>20,000 head</td>
</tr>
<tr>
<td>not listed above</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The terms chicken and duck have been replaced with broiler and layer to correspond with the clarifications made to the poultry section as described below in Section H.

D. Section 5.0 Requirements

In the current rule, some of the requirements related to facility mitigation plans and permits are located later in the rule. District staff is proposing that all of the requirements be located at the beginning of Section 5.0 and grouped by subject matter.

District operating permits would be required for all facilities that are at or above the regulatory threshold. All CAFs that are at or above the regulatory threshold would also be required to have a facility emission mitigation plan and to submit enough information to allow District staff to estimate the emissions from the CAF. Previously, the rule stated facilities may demonstrate 30% reductions in lieu of a mitigation plan. District staff propose that facilities should demonstrate equivalent facility-wide reductions in place of a mitigation plan. This ensures that projected emission reductions would occur regardless of the emission control approach.

District staff are proposing to retain that an operator would be required to implement all of the mitigation measures within 365 days of receiving a permit. An implementation time of one year would allow the District adequate time to provide much needed compliance assistance through new operator outreach, seminars and multi-language informational materials to new regulated CAFs. The 365 day allotment was also originally required during the previous Rule.

a. Dairy CAF Mitigation Measures

Dairy operations can be divided into six functional processes: feed/feed storage, silage, milk parlor, animal housing (freestalls and corrals), solid/liquid waste handling, and land application. Rule 4570 echoes these divisions and requires operators to implement a certain number of management practices (mitigation measures) for each functional process to control VOC emissions.

Due to a large number of medium size dairies that will be newly regulated under the proposed amendments to Rule 4570, some distinctions have been made between the number and frequency of mitigation measures to be implemented for medium and large dairy CAFs. There is more variability in medium size dairy operations and since many may not have previously been regulated by the District, they are required to implement fewer mitigation measures.

1. Changes to Specific Mitigation Measures

Feed

This rule amendment project proposes that three feed mitigation measures be revised. The changes reflect a more frequent performance of the mitigation measures as
suggested by dairy industry representatives or from South Coast AQMD’s Rule 223 for large CAF operations. Table 5 summarizes the changes to the specific mitigation measures.

Table 5 – Proposed Amendments to Specific Feed Mitigation Measures

<table>
<thead>
<tr>
<th>Mitigation Measure Description</th>
<th>Medium Dairies</th>
<th>Large Dairies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remove feed from the area where animals stand to eat feed.</td>
<td>Current - Exempt Proposed – Once every 7-14 days depending on animal type</td>
<td>Current - Once every 14 days Proposed - Once every 7-14 days depending on animal type</td>
</tr>
<tr>
<td>Remove spilled feed from the area where equipment travels to place feed in the feed bunk</td>
<td>Current - Exempt Proposed – Once every 14 days</td>
<td>Current Rule - Once every 14 days Proposed - Once every 7 days</td>
</tr>
<tr>
<td>Dispose of rations after grinding and mixing rations</td>
<td>Current - Exempt Proposed – Within 48 hours</td>
<td>Current – Within 48 hours Proposed – Within 24 hours</td>
</tr>
</tbody>
</table>

The frequency of removing feed from the area where animals stand to eat has been separated into two frequencies depending on animal type. Emissions from feed placed for heifers are expected to have much less emissions than the feed for the mature cows since it generally contains less silage; therefore a reduced removal frequency is appropriate.

As discussed earlier, recent research studies about the operational source of dairy VOCs have demonstrated that the total mixed rations are a significant source of VOCs. In addition to changes in frequency for certain feed mitigation measures, large dairies would have two of their feed mitigation measures specified by the rule to reflect recent research findings. The first specified mitigation measure is 1. Feed according to NRC guidelines which according to stakeholders could reasonably be achieved in practice by every facility. The second specified mitigation measure is a measure newly added to the rule to reduce emissions by minimizing the surface area of the feed bunker. Another mitigation measure has also been added to include more water in the rations. Since the VOCs in silage are polar, the addition of water, another polar substance, would serve as a solvent for the VOCs and slow the evaporation of VOCs from the feed. If slowed enough, the cows would, in theory, eat the feed before all of the VOCs evaporated, and therefore, reduce overall emissions from the rations. The previous specified requirement of adding moisture to the TMR has been made optional due to stakeholder concerns of the possible detriment to the health of cows.

Silage

Crop harvest occurs only a few times per year, but animals need to be fed every day. Cattle operations have learned how to preserve crops grown on-site so that they can reduce costs associated with purchasing feed. Silage is plant material (usually wheat, alfalfa, or corn) preserved through a fermentation process. The shredded plant material is stacked into a pile with a certain amount of compaction and then allowed to ferment. Fermentation is an anaerobic process, so silage piles are formed in a way to exclude as much oxygen as possible. Quality silage is achieved when lactic acid is the
predominant acid produced during the fermentation stage. Speed of fermentation is also important because the faster the fermentation is completed, the more nutrients will be retained in the silage. Since lactic acid is non-volatile, increasing the production of lactic acid during the silage fermentation process has the double benefit of increasing the quality of the silage and reducing emissions from organic compounds that are more volatile. The emission reductions from changing the chemical makeup of fermentation by-products are realized at three points:

- during the fermentation process,
- while removing the silage from the pile and
- when the combined silage and other feed components (called total mixed rations or TMR) are laid out for the animals to eat.

Recent emission studies at California dairies indicate that emissions from silage are a significant portion of the total dairy VOC emissions. In order to control as much of these emissions as possible, District staff proposes that individual dairies implement one mitigation measure from a menu of two options. The proposed individual mitigation measures cover all aspects of silage handling – from initial formation through feed-out.

The proposed rule will require that all operations that feed animals from silage piles create the piles in a manner to achieve a minimum packing density and cover the piles to reduce emissions. Dr. Charles Krauter of California State University, Fresno has indicated that preliminary information from dairy emissions research that he has completed has shown that silage with higher density resulted in less total VOC emissions from both the silage piles and the total mixed ration (TMR) prepared from the silage and placed as feed for animals. Packing density is important when making silage because it enables the ensiled plant forage to quickly move from an aerobic phase to an anaerobic phase and achieve a rapid drop in pH that will hinder further microbial decomposition. The rapid drop in pH is primarily caused by conversion of soluble carbohydrates to nonvolatile lactic acid. Sufficient packing creates the conditions that allow lactic acid bacteria to dominate the fermentation rather than other organisms that will produce greater amounts of VOCs. Sufficient packing followed by covering of piles also reduces yeast counts in the silage. Because yeasts are primarily responsible for the production of ethanol during fermentation of silage, reducing the number of colony forming units of yeast will reduce the amount of ethanol generated and the concentration of ethanol in the silage. Ethanol is one of the most volatile compounds found in silage; therefore, reducing ethanol concentrations will reduce emissions. Increased density in silage piles reduces porosity, which will reduce transport of emissions to the atmosphere. Reduced porosity also limits the amount of air that penetrates the silage piles that causes aerobic decomposition and heating of the piles.

The first menu option requires that the silage pile be covered and details management practices for silage formation. Within silage formation, dairy operators can meet silage pile standards in one of three ways:

- by measuring the bulk density to verify that the bulk density is at least 44 pounds per cubic foot for corn silage and at least 40 pounds per cubic foot for other types of silage;
by manipulating silage pile formation parameters to meet a calculated bulk
density of 44 pounds per cubic foot for corn silage and at least 40 pounds per
cubic foot for other types of silage; or
by implementing specific work practices during silage pile formation that would
lead to good silage compaction and formation.

Additionally, the first menu option requires that dairy operators choose two more work
practices from a list of three options. The change is based on new information about
the relative contribution of manure to VOC emissions. The three work practices include:
• minimizing the pile’s exposed surface area;
• using a silage facer or maintaining a smooth vertical face; and
• inoculation of silage during pile formation or application of additives to reduce
  yeast counts.

This stringent set of requirements, in addition to the packing density and coverage
requirements, accommodate the variability in harvesting and silage management
practices found in the numerous dairies located in the San Joaquin Valley. The first two
practices both deal with managing the exposed area of silage piles by reducing the
open area or maintaining a smooth vertical surface. These practices will reduce the
exposed area and porosity at the working face of the silage piles, which will reduce
emissions from the working face. These practices will also reduce infiltration by
spoilage organisms that can produce VOCs and heating caused by aerobic
decomposition. Many dairies will not be able to choose both of these options without
significant changes to their current feed handling operations. In order to store the
amount of silage needed for the large dairies in the San Joaquin Valley, silage piles
must have a very large volume. Because of limited space on the ground and the need
to increase the size of silage pads, silage piles often must be built very high. The height
of typical silage piles will often be beyond the reach of equipment that must be used to
maintain a completely smooth surface. Because the equipment used at many dairy
operations cannot reach the highest portion of the piles, the surface of the piles will
often not be smooth but rather will have bulges and overhangs that will be gathered and
fed when they collapse and fall to the ground.

Silage additives, such as inoculants and additives to reduce yeast counts, are another
option that have shown promise to reduce emissions. Due to the variability and costs
associated with effective use of these additives, this practice will be included as an
optional requirement. The least costly option would involve inoculating the ensiled
material with homolactic bacteria. The purpose of inoculation with homolactic bacteria
is to shift the fermentation such that greater amounts of lactic acid are generated rather
than volatile compounds, such as ethanol. Because the bacteria in inoculants are living
organisms, there will be inherent variability in the effectiveness of the various products
available. The inoculants must provide sufficient bacteria to outcompete the naturally
occurring microorganisms in the ensiled forage and must be applied in a fairly uniform
manner to achieve optimum benefit. The successful application of the inoculants is
related to several factors including, the type of crop harvested, the stage the crop is
harvested, the moisture content of the forage, the buffering capacity of the forage, the
density of the piles, etc. Because properly harvested and ensiled corn will generally
have higher counts of naturally-occurring homolactic bacteria, inoculating corn silage
with homolactic bacteria will often not cause great changes in fermentation when
compared to other crops. In some instances inoculation of corn with homolactic
bacteria can cause greater aerobic losses when the silage is fed because the inoculants
will shift the fermentation away from the production of acetic acid and other organic
acids that inhibit aerobic growth of yeast when the silage is fed. With corn silage, the
inoculating with homolactic bacteria is probably most effective when something else in
the process has not been optimal. For other crops, inoculating with homolactic bacteria
is probably more likely to provide a benefit but a great deal of variability will still remain.
As stated above, the other additives and preservatives are much more expensive than
inoculants. The greater expense of these additives often results in farmers applying
minimal amounts to the forage rather than the optimal rate. Additionally, these additive
options will have issues similar to those associated with the use of inoculants. For
example, propionic acid is corrosive, must be handled with care, and may require
specialized application equipment and the quality and characteristics of the specific crop
being ensiled will still be very important factors in the success of these additives.
Therefore, because of the dairy-to-dairy, crop-to-crop, and even season-to-season
variability, it is more reasonable to allow individual producers to assess their operations
to determine if this option would be beneficial for their particular operation.

District staff used information from industry representatives to establish a baseline of
current silage practices and to develop the requirements to reduce the exposed surface
area of silage piles to less than the current baseline. Reducing the exposed area from
the current baseline will reduce emissions. District staff reviewed scientific and
technical literature concerning the process of making silage to develop the mitigation
measures that will ensure the production of quality silage while also minimizing
emissions from the silage.

In addition, allowing for some optional measures rather than specifically mandating all
requirements allows the flexibility for producers to reduce emissions while choosing
options that will minimize the compliance costs for their particular operation. This is a
very important consideration. Based on the socioeconomic analysis, dairies will spend
approximately 20% of their profits to comply with the proposed rule revisions. The
emission reductions achieved by the measures included in the revised rule are already
projected to exceed the reductions required from this rule in the District’s attainment
plan. Mandating additional requirements would result in increased compliance costs at
a time when the dairy industry is experiencing financial hardship.

The second menu option for silage is for dairy operators to utilize a sealed feed storage
system like an AG-Bag™. Since the sealed systems are usually four to five feet in
diameter, the plant material can be compacted and pushed into the bag as a single
operation. With a very small working face compared to traditional silage piles and being
totally enclosed, sealed feed storage systems have inherently fewer emissions. Sealed
systems are already in use at some dairies for certain crops, however, sealed systems
take up more space per volume of silage and are considered expensive compared to traditional silage piles.

The third menu option allows dairies to propose alternative mitigation measures to reduce silage emissions. This offers flexibility for future innovation in emission control practices and techniques.

In the Class Two mitigation measures, District staff is proposing that the two Class Two mitigation measures that involve an add-on VOC emission control device be retired from the rule because they are infeasible. Any active venting of silage to a control device would ruin its feed value because silage must remain anaerobic. Further analyses of Class Two mitigation measures are included in Appendix E. The third Class Two mitigation measure, choosing not to feed any silage, would also be removed as a menu option because if a facility does not feed silage, the section would not apply and there is no need to include it as an option. Although the Class Two options are being removed, this is not a rule relaxation and a dairy operator is able to suggest Class Two mitigation measures as an alternative mitigation measure.

**Milking Parlor**

The recent research indicates that the frequent flushing required for dairy health standards results in very low emissions from this dairy operation. For this reason, no change is proposed for mitigating VOC emissions from milking parlors. Further analyses of Class Two mitigation measures are included in Appendix E.

**Animal Housing (Freestall Barns and Corrals)**

Dairy cows spend most of their time in freestall barns or corrals. Mitigation measures include work practices to minimize the accumulation of solid or liquid animal waste. A new specified mitigation measure has been added to both the freestall and corral options to pave feed lanes at least either six or eight feet on the corral side of the feedlane fence depending on animal size and type. Heifers are smaller animals that produce much less manure than milk cows so six feet feedlanes are sufficient to allow cleaning of the manure deposited in this area. The mitigation measure would minimize emissions by paving those areas where the animals are most likely to leave manure. Since the manure would not be in contact with soil bacteria, VOC emissions resulting from decomposition of soil bacteria would be reduced. The paving also facilitates flushing or scraping of manure from freestall barns and corrals.

**Freestall Barns**

Three total freestall mitigation measures would be required by large dairies, which includes new mitigation measure to pave feedlanes and two additional measures. Medium dairies would also be required to pave feedlanes and implement one other mitigation measure for freestalls. Of the freestall mitigation measures, there are certain measures which are performed more frequently in South Coast AQMD Rule 223, which
is the rule that corresponds to District Rule 4570. Also, stakeholders have suggested that certain measures could be performed more frequently. In each of these cases, District staff is proposing that the changes apply only to large dairy CAFs. Operators of medium dairy CAFs who elect these particular mitigation measures would perform the mitigation measure at the frequency of the current rule. Table 6 details the proposed changes.

Table 6 – Proposed Amendments to Specific Freestall Mitigation Measures

<table>
<thead>
<tr>
<th>Mitigation Measure Description</th>
<th>Medium Dairies</th>
<th>Large Dairies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remove wet animal waste from freestall beds.</td>
<td>Current – Exempt</td>
<td>Current - Once every 14 days</td>
</tr>
<tr>
<td></td>
<td>Proposed – Once every 14 days</td>
<td>Proposed - Once every 7 days</td>
</tr>
<tr>
<td>Rake, harrow, scrape, or grade bedding in freestalls</td>
<td>Current – Exempt</td>
<td>Current - Once every 14 days</td>
</tr>
<tr>
<td></td>
<td>Proposed – Once every 14 days</td>
<td>Proposed - Once every 7 days</td>
</tr>
</tbody>
</table>

In addition to the change in frequency for freestall mitigation measures, staff is proposing certain freestall and corral mitigation measures be retired from the rule. These include:

- Installing floats of other devices in water troughs to prevent spills;
- Inspecting water troughs and pipes for leaks;
- Using a dry waste handling system to remove animal waste.

**Corrals**

Staff proposes that large dairies shall implement four specified mitigation measures in addition to selecting two out of the six remaining optional measures. Therefore, the number of required mitigation measures would be six total and would remain unchanged from the current rule. Specified measures for large dairies would include:

- Pave feedlanes.
- Clean corrals 4 times/year, or at least once between April and July and at least once between October and December.
- Manage manure depth in concreted areas < 12 inches, or scrape/flush feed concrete lanes every 7 days.
- Inspect and repair leaks every 14 days.

Owner/operators of medium dairies would also be required to pave feedlanes and select two additional measures from the remaining menu for a total of three measures.

One mitigation measure has been added to clean under corral shades once every 14 days. Because cows will tend to congregate and spend long periods in shaded areas a large portion of the manure will be deposited in these areas; therefore, removing manure from these areas will reduce emissions.

The remaining optional measures are required to provide flexibility for the affected facilities to comply with the rule. Flexibility is necessary because of the variability within the affected emissions category. Dairy housing corrals vary by geographical location, age of the facility and standard practices at the time of construction, size and financial
resources of the facility, as well as the operator’s preferences. Geographical location determines such factors as drainage, soil types, and proximity to water table. These variations may make it very difficult for certain dairies to maintain mandated corral drainage requirements, especially during the wet season, or for corrals constructed in low lying areas. Dairy size and financial capability also determine design features at the time of construction. Large or more financially capable dairies may be able to invest significant amounts of money for engineered grading and proper sloping of corrals, as well as paving over more extensive corrals areas. Smaller dairies, on the other hand, may have more difficulty complying with certain requirements because limited initial capital investments did not allow for optimum design of the facilities at the time of construction.

Solid/Liquid Manure Handling

Because the most recent emissions research indicates that the handling and storage of solid manure is a very small emission source at California dairies, District staff is proposing no change in the number of required mitigation measures or to the performance frequency. All the measures in this category have been retained as optional because they are mutually exclusive. An operator making the required investment (covering materials and labor) to cover animal waste/separated solids piles would not logically be planning to remove the waste/separated solids from the facility within 72 hours of removal from corrals/separation areas since the investment would not make any sense for such short-term storage, on top of hauling or tipping fees. Likewise, the operator choosing removal within 72 hours would not logically choose covering piles since there will be no manure to be stored in piles at the facility. The mitigation measure to store no separated solids outside of anaerobic digesters or aerobic digesters will be removed due to the practicality of the measure.

For liquid animal waste handling, the proposed rule has no change for the Class One mitigation measures, which are work practices that assure viable bacteria colonies in lagoons to treat the animal waste. One mitigation measure will be retired, namely use no lagoons, because this is not a viable option for medium and large dairies in California. The state’s Water Quality Board requires nearly all dairies to treat their wastes before releasing any process water back to the environment. The measure to use an anaerobic treatment lagoon will be clarified to be designed in accordance with NRCS Guideline 359.

All of the other measures in this section have all been retained as optional because they are all independent of each other. Again, each measure listed is expected to achieve its own reductions, and no two measures can reasonably be classified as two ways of doing the same thing. The number of measures provided in the category will accommodate the variability within the dairy industry as far as treatment of liquid waste manure is concerned. Variability is expected due to various factors such as age, size, and financial capability of the facility. For instance, due to BACT requirements, newer facilities are designed with enough lagoon capacity to comply with NRCS guidelines for anaerobic treatment, whereas older facilities that were not subject to BACT often do not
have sufficient lagoon capacity for NRCS guidelines but can instead potentially use a phototropic treatment lagoon. Smaller facilities that cannot afford the expenses associated with phototropic treatment, which requires a large number of aerators, may still achieve sizeable reductions by using an efficient solids separation system.

**Land Application of Solid/Liquid Animal Waste**

There is no change to the number of mitigation measures that are required for large dairies while medium dairies would be required to implement one mitigation measure in this section. Application of liquid/slurry manure via injection with drag hose or similar apparatus has been added as an optional mitigation measure.

All of the measures in this section will be retained as optional because they are all independent of each other. Each measure listed is expected to achieve its own reductions, and no two measures can reasonably be classified as two ways of doing the same thing. The number of measures provided in the category will accommodate the variability within the dairy industry as far as application of solid and liquid/slurry manure to land is concerned. Variability is expected due to various factors such as available cropland, manure management practices, and financial capabilities of the different facilities. For instances, some facilities may not have enough cropland to apply both solid and liquid manure, or some may be using only dry manure management methods that do not generate any liquid/slurry waste that need to be applied to land. Facilities with limited financial capabilities may not be able to use such methods as pre-treatment of waste in digester, or direct injection into land but can achieve fairly similar reduction using more cost effective methods such as discing manure into the soil after spreading, or proper preparation of fields prior to irrigation with liquid manure in order to avoid standing puddles.

2. **Compliance Schedule**

Existing medium dairies that would become subject to Phase II control requirements would have until February 1, 2011 to submit a completed permit application and full compliance would be required within one year of the permit issuance date. Dairies currently subject to the rule would also have to submit a completed permit application by February 1, 2011 and be in full compliance with the Phase II provisions of the rule within one year of the permit issuance date.

b. **Beef Feedlot CAF Mitigation Measures**

As with dairy operations, beef feedlots have distinct operational areas. The operational areas include: feed/feed storage; silage; animal housing; solid/liquid manure handling; and land application of animal manure. District staff is proposing no change to feed/feed storage at this time other than a clarification to allow steam-flaked corn or other cereal grains. The changes to silage are the same changes that are being proposed for dairy – see the explanation above for details.
For animal housing, two mitigation measures would be rewritten to reduce the amount of manure that would be allowed in individual housing floors. The standard would be moved from 18 inches to 12 inches (not including in-corral mounding). The purpose is to mirror dairy requirements. The fence line manure build-up would not exceed 12 inches unless the housing floor mitigation measure is chosen, which would allow build-up along the fence line of 18 inches. This was included as a suggestion from stakeholders to decrease surface area of manure while also decreasing tractor work necessary to keep fence line build-up realistically under control. Clarification has been made to the measure of maintaining pens so that there are no puddles preventing water from standing more than forty-eight (48) hours or to Harrow, rake, or scrape pens sufficiently to maintain a dry surface. The measure to install floats will be retired.

No changes are proposed for the solid manure handling. Clarifications have been made to the options for liquid manure handling to use an anaerobic treatment lagoon designed in accordance with NRCS Guideline No. 359. The measure to manage the facility such that there are no lagoons will be retired. Changes for land application mitigation measures will reflect those made to the dairy land application section as described above.

Existing beef feedlots that would become subject to control requirements would have until February 1, 2011 to submit a completed permit application and full compliance would be required within one year of the permit issuance date.

c. Other Cattle CAF Mitigation Measures

The phrase “other cattle operations” is a catch-all for cattle CAFs that are not dairies or beef feedlots. One specific type of cattle operation that fits in this category are calf ranches. Dairy calf ranches are facilities that raise female calf to maturity. Details of animal ownership vary depending on the operation. When the cow is mature enough to breed, she is moved to a dairy, then either inseminated or put with a bull for breeding. After a calf is born, it is shipped to the dairy calf ranch; the now-mature cow goes “into production” at the dairy and the cycle begins again. Dairy animals at calf ranches are usually younger and smaller than mature animals with a lower emission factor associated with activities at a calf ranch. Although the other cattle operations have lower emissions, certain operations are similar to dairies. For example, other cattle operations can have silage piles that are similar in size to a dairy. For this reason, the dairy silage mitigation measures have been copied to this section of the rule.

District staff is proposing no change to the number of mitigation measures. For those mitigation measures that are similar to dairy mitigation measures, staff proposes the same changes to the other cattle mitigation measures. One mitigation measure has been added to clean under corral shades once every 14 days as suggested by stakeholders.

Other cattle operations that would become subject to control requirements of the rule would have until February 1, 2011 to submit a completed permit application and full
compliance would be required within one year of the permit issuance date. Facilities that are already subject to the control requirements of the rule would have until February 1, 2011 to submit a completed permit and implementation of the more frequent performance of certain mitigation measures would be required within one year of the permit issuance date.

d. Swine CAF Mitigation Measures

District staff proposes to maintain the swine CAF threshold at 3,000 head which counts mature animal head by definition. District staff proposes to revise the swine CAF menu and specify required measures retiring all other menu options. Since there is only one facility currently subject to Rule 4570, with no new foreseen facilities coming under the rule, there is no need for variability as in other CAFs. Being a low emission source, no other changes to the individual swine mitigation measures are proposed. Existing swine operations would have until February 1, 2011 to submit a completed permit application and full compliance would be required within one year of the permit issuance date.

e. Poultry CAF Mitigation Measures

As with other CAFs, the management practices for reducing VOC emissions are divided between the various operations. In the case of poultry, the operations are: feed/feed storage, housing, and solid/liquid waste handling. Poultry operations vary by geographical location, age of the facility and standard practices at the time of construction, size and financial resources of the facility, as well as the operator’s manure management preferences. There is also a large degree of variability in the manure management practices, housing techniques, and potential feeding practices for the different type of poultry operations in the valley. These differences are explained in the poultry description in Section II. B. Due to these differences, the requirements in the rule for poultry operations do not apply to all the various types of poultry facilities (layers, broilers, and turkeys). The measures as presented in the current rule, show a false impression that there are a dozen or so mitigation measures available as an option for a particular poultry facility when in fact, only a handful are feasible. Therefore, the poultry category will be broken down into the following three categories to ensure that the mitigation measures required are feasible: 1) Layers, 2) Broilers and Turkeys. In addition to clarifying the mitigation measures for the right type of poultry operation, mitigation measures will now also be mandated rather than left as options for selection. Refer to Tables 8 and 9 in the Proposed Draft Rule 4570 for specified options.

All of the feed measures affecting animal diet have been combined into one measure as options as all are intended to improve efficiency in the animals. Feed or dispose of feed within 48 hours of grinding and mixing has been change to feed or dispose within 14 days of production. Additionally, drinkers and water lines would be inspected daily for leaks. The frequency matches South Coast AQMD Rule 223. Frequency for inspecting changing the height of drinkers if necessary would be increased from once every fourteen days to once every seven days. This is less than what is required in the South
Coast AQMD rule, however, birds do not change height enough overnight to warrant a daily change in drinker height.

The following measures have been determined to be infeasible or not applicable and will be retired from the rule:

- **Remove caked animal waste every 14 days.**
  This measure does not apply to layer operations because emissions from poultry houses are generally created through the high moisture from the manure. In general, once manure is caked, the manure is essentially dry and will no longer have potential emissions. Therefore, this mitigation measure will be removed as it will result in minimal emission reductions.

- **Clean under poultry cages every 14 days.**
  There are no cages for broilers or turkeys; therefore this measure does not apply. Industry standard for layers currently consists of removing manure underneath the cages once per year and in some instances twice per year. The manure is generally handled when the layers are no longer in the houses. Therefore, removing manure on a daily basis will be highly cost prohibitive and have a huge impact on animal welfare.

- **Use poultry litter additives designed to reduce air emissions or moisture content in litter.**
  Layers do not have poultry litter at their facilities, therefore, this measure does not apply. This measure is primarily used to mitigate ammonia emissions and is used primarily in the Midwest during the coldest times of the year when it is infeasible to operate the fans. California conditions are quite different. In addition, the materials applied are highly acidic and if used frequently will corrode metal in the housing due to the acid in the air. Therefore, this measure is not highly used. Other measures can be used in lieu of this and result in similar reductions in emissions. Therefore, this measure is being deleted for broiler and turkey facilities as well.

- **Use no foggers in the house.**

- **Slope the house at 3% does not apply to poultry houses.**

- **Install mounds or berms up gradient to prevent the runoff of stormwater into pens.**

- **Maintain the roof structure and manage roof runoff.**
  This measure requires that all of the houses install gutter systems on the roof. The rain water will not have any contact with the manure in the housing whether the water falls down from the side of the roof to the ground or through a gutter system. This measure will not result in any real reductions and is an unnecessary capital expense. Therefore, this measure has been removed.

- **Manage the facility such that there are no lagoons.**
  If there is no liquid manure management system, then this category will not be applicable and therefore, this measure will be removed.

- **Remove solids from the waste system with a solid separator system, prior to the waste entering the lagoon.**
  The required measure of an anaerobic treatment lagoon or a phototrophic lagoon by nature requires that there is proper solids separation. Therefore, this measure
is being removed as it is an essential part of an anaerobic treatment lagoon or a phototropic lagoon.

- Maintain lagoon pH between 6.5 and 7.5.
  Maintaining a lagoon as an anaerobic treatment lagoon or a phototropic lagoon will by nature balance the pH of the lagoon to ensure that emissions are minimized, therefore this measure is being removed.

Existing poultry operations that would become subject to control requirements would have until February 1, 2011 to submit a completed permit application and full compliance would be required within one year of the permit issuance date.

E. Other Proposed Changes

The requirements for a permit and the emission mitigation plan from Section 5.0 and Section 6.0 would be consolidated the beginning of Section 5.0 to improve reader understanding. The requirements for a mitigation plan would be consolidated to Section 5.1 for reader clarity. The Sections 5.0 and 6.0 would be renumbered as needed. Section 5.2 has been altered to reflect related SB 700 language about permit renewal. Recordkeeping has been added to Section 5.4.1.1 to retain a signed written copy of a determination that a measure is suspended because it is detrimental to animal health.

Monitoring requirements have been added to the rule. This is in response to EPA concerns that certain mitigation measures need to be monitored more often than annually in order to verify compliance. The monitoring requirements for aerated static piles, biofilters, and non-biofilter VOC emission control devices has been modeled on District Rule 4565 (Biosolids, Animal Manure, and Poultry Litter).

The required records in Section 7.0 have been expanded to detail the records and testing needed for each mitigation measure. The proposed change will help owners/operators and compliance inspectors with making sure that mitigation measures are utilized on a regular basis. The following have been added:

- Feed Moisture Content
- Silage Density
- Silage Covers
- Silage Pile Formation
- Silage Pile Material Moisture Content
- Exposed Silage
- Silage Spillage Removal
- Silage Inoculation
- Housing Bedding Material
In light of the fact that Rule 4570 will apply to more operations and that those operations will be smaller than those currently regulated, the District is committed to providing multiple resources and tools to minimize costs and administrative burden associated with the implementation of this rule. District staff plans to review required records to minimize paperwork burden and provide outreach to the medium-sized CAFs throughout the Valley.

F. Revisions from the May 20, 2010 Draft

Revisions from the May 20, 2010 draft are reflected in the Revised Proposed Amendments to Rule 4570 based on comments received from various stakeholders. The revisions clarify the rule requirements and are not considered to be significant because they do not change the rule stringency or place any new requirements on operators. The following revisions have been made:

- Table 4.1 Dairy CAF Mitigation Measure Requirements Section B. Silage was changed to read a “dairy CAF that feeds silage shall implement” to be consistent with language used in the other CAF tables. The Class Two Mitigation Measure to eliminate silage from animal diet was removed from Tables 4.1, 4.2 and 4.3 Section B. The silage mitigation measure section would not be applicable if a facility does not feed silage. The revision reaches the same end result of not feeding silage. Nothing in the rule would prohibit a CAF operator from choosing not to feed silage.

- The Theoretical Length of Chop in Tables 4.1, 4.2, and 4.3 B. Silage mitigation measure d. ii. was adjusted from 3/8 inch to 1/2 inch for unprocessed corn. The slightly longer Theoretical Length of Chop allows for increased effective fiber, which is need to stimulate rumen activity in high-producing milk cows, while remaining within the recommended range for achieving adequate silage density.

- Mitigation measure f. to maintain silage working face was added back into Table 4.1 B. Silage. It had been unintentionally left out of the Ma 20 version of the rule. This language is now consistent with the silage sections in other CAF tables.

- A clarification stating that the mitigation measure has not been achieved in practice and may not be technologically feasible has been added to the following mitigation measures. This is to clarify that although these mitigation measures remain voluntary options in the rule, they cannot be required because of their high costs and questions regarding their overall feasibility. Revised sections include:
  - Table 4.1 C. Milk Parlor Class Two Mitigation Measure 3 - Enclose milk parlor and vent to a control device.
  - Table 4.1 E. Corrals Class Two Mitigation Measure 12 - House animals in an enclosure and vent to a VOC control device.
  - Table 4.3 C. Housing Class Two Mitigation Measure 19 - House animals in an enclosure and vent to a VOC control device.
Nothing in the rule would prohibit the use of such measures. A CAF operator may still propose to install and operate such controls under the alternate control measures option.

- The following Class Two Mitigation Measures were moved to Class One Mitigation Measures. Other mitigation measures were renumbered accordingly. The revision results in no change as the measures are still equivalent options and were not correctly considered as Class Two Mitigation Measures according to the Class Two Mitigation Measure definition.
  - Table 4.1 E. Corrals Class Two Mitigation Measure 11. was moved to Class One Mitigation Measure 10.
  - Table 4.1 G. Liquid Manure Class Two Mitigation Measure 8. was moved to Class One Mitigation Measure 5.
  - Table 4.2 C. Housing Class Two Mitigation Measure 11. was moved to Class One Mitigation Measure 10.
  - Table 4.3 Class Two Mitigation Measure 18. was moved to Class One Mitigation Measure 16.

- Table 4.1 F. Solid Manure/Separated Solids Mitigation Measure 8. For this measure it should be noted that any new combustion equipment associated with a digester would need to meet all applicable prohibitory rule requirements for emissions of criteria pollutants and may be subject to BACT for NOx and/or other criteria pollutants.

- Language has been added to Sections 6.0 and 7.10 to specify the timeframe the requirements should be implemented according to Section 8.0.

- Section 7.2.3 has been added clarifying that owners/operators shall retain records sufficient to demonstrate compliance only with applicable mitigation measures.

- Section 7.3.3 has been clarified to reflect a reasonable demonstration of compliance with measures regarding feed removal.

- Section 7.8.3 has been clarified to reflect the timeframe allowed for liquid manure standing in the field.

- Other minor clarifications such as renumbering and correct spelling have also been made.
VI. EMISSIONS AND EMISSION REDUCTION ANALYSIS

The estimated current baseline emissions inventory for CAFs is summarized in Table 7.

Table 7 – Estimated Baseline Emission Inventory

<table>
<thead>
<tr>
<th>Type of CAF</th>
<th>VOC Emission Inventory in tons per day</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2008 current rule</td>
</tr>
<tr>
<td>Dairy</td>
<td>108.33</td>
</tr>
<tr>
<td>Beef Feedlot</td>
<td>3.0</td>
</tr>
<tr>
<td>Other Cattle</td>
<td>3.93</td>
</tr>
<tr>
<td>Swine</td>
<td>2.04</td>
</tr>
<tr>
<td>Poultry</td>
<td>2.96</td>
</tr>
<tr>
<td>All other CAFs not listed above</td>
<td>0.72</td>
</tr>
<tr>
<td>Total CAF Emissions</td>
<td>120.98</td>
</tr>
</tbody>
</table>

The estimated emissions reductions associated with implementation of the proposed amendments is summarized in Table 8. Details of the emission reduction analysis are found in Appendix B of this staff report.

Table 8 – Estimated Emission Reductions

<table>
<thead>
<tr>
<th>Type of CAF</th>
<th>Estimated Emission Reductions in tons per day</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2012 (1st full year of compliance)</td>
</tr>
<tr>
<td>Dairy</td>
<td>22.11</td>
</tr>
<tr>
<td>Beef Feedlot</td>
<td>0</td>
</tr>
<tr>
<td>Other Cattle</td>
<td>0</td>
</tr>
<tr>
<td>Swine</td>
<td>0</td>
</tr>
<tr>
<td>Poultry</td>
<td>0.32</td>
</tr>
<tr>
<td>All other CAFs not listed above</td>
<td>0</td>
</tr>
<tr>
<td>Total Estimated Reductions</td>
<td>22.43</td>
</tr>
</tbody>
</table>

VII. COSTS AND COST EFFECTIVENESS ANALYSIS

District staff estimated added compliance costs for the change in rule provisions. For dairy CAFs, it is estimated that the changes to the rule will affect operations at individual dairies by requiring the operator to use certain emission reduction practice. Overall, the implementation cost for dairy CAFs is estimated to be $30.9 million per year. District staff estimates that the additional cost to poultry CAF owner/operators, and more specifically to chicken meat and egg producers, is $405,275 annually. Compliance costs for beef feedlots and other cattle operations is estimated to be minimal and likely absorbed into current practices.
Cost effectiveness is a measure of the cost required to achieve the emissions reductions associated with the proposed rule, found by dividing the compliance cost by the estimated emission reductions. For the two main CAF categories impacted by the proposed amendments, dairy and poultry CAFs, the cost-effectiveness is estimated to be $3,097/ton of VOC reduced, and $3,470/ton of VOC reduced, respectively. A detailed cost-effectiveness analysis for the proposed Rule 4570 amendments is included as Appendix C of this staff report.

VIII. SOCIOECONOMIC IMPACT ANALYSIS

Pursuant to state law, District staff is required to perform a socioeconomic impact analysis prior to adoption, amendment, or repeal of a rule that has significant air quality benefits or that will strengthen emission limitations. As part of the District’s socioeconomic analysis process, owners, operators, and other interested parties were invited to submit economic information to aid District staff with the socioeconomic impact analysis. This information and supporting data was provided to an outside consultant who identified and analyzed the socioeconomic impacts of the proposed amendments to Rule 4570 on the regional economy. The results of the socioeconomic analysis are available as Appendix D of this staff report.

IX. ENVIRONMENTAL IMPACT ANALYSIS

Pursuant to the California Environmental Quality Act (CEQA), staff investigated the possible environmental impacts of the proposed amendments to Rule 4570. District staff has concluded that the proposed amendments to Rule 4570 will not have significant adverse environmental impact. A proposed negative declaration has been issued by the District and made available for public review and comment. Upon approval of the proposed rule amendments by the District’s Governing Board, District staff will file a Notice of Determination with each County Clerk within the boundaries of the District under the provision of Public Resource Code Section 15075 (d).

Comments were received from the California Regional Water Quality Control Board regarding management practices that may increase water usage, as summarized in Appendix A. As requested by the Water Board, the CEQA analysis has revised the environmental impacts under Hydrology and Water Quality to reflect this comment but to conclude that there will be no significant adverse impact due to existing water rules.
X. RULE CONSISTENCY ANALYSIS

Pursuant to CH&SC 40727.2, District staff has prepared a rule consistency analysis that compares the elements of amendments with the corresponding elements of other District rules, federal regulations and guidelines that apply to the same source category or type of equipment. District staff found that the proposed amendments and requirements of this rule would not conflict with federal rules, regulations, or policies covering similar stationary sources. The rule consistency analysis is presented in Appendix F of this report.

XI. REASONABLY AVAILABLE CONTROL TECHNOLOGY (RACT) ANALYSIS

CAA Section 182(b)(2) states that ozone attainment plans shall assure that RACT for volatile organic compounds (VOC) is applied at certain sources. District Rule 4570 is a VOC rule, therefore underwent a RACT analysis as a part of the 2009 RACT Demonstration for Ozone SIP analysis.

A RACT analysis requires an examination of three broad elements, applicability, stringency, and enforceability, against Federal rules, regulations, and technology guidelines, as well as comparing it against rules from other Districts in California. As a part of the 2009 RACT Demonstration for Ozone SIP analysis, District Rule 4570 was compared to federal and state regulations and guidance including emission limits and optional control requirements as well as to comparable requirements in rules from the other Air Districts in California nonattainment areas. In the 2009 RACT Demonstration for Ozone SIP analysis District staff concluded based on the aforementioned analyses, that District Rule 4570 satisfies RACT for confined animal facilities.

In its review of the 2006 Rule 4570, EPA proposed a limited approval and limited disapproval of revisions to the San Joaquin Valley Air Pollution Control District portion of the California State Implementation Plan (SIP) in the Federal Register on July 14, 2009. EPA cited two primary rule deficiencies in its proposed limited disapproval. EPA cited that the threshold limit for poultry was too high and that the rule submittal did not provide adequate analysis to demonstrate that the rule’s control measure menus implement RACT for poultry and swine.

District staff have worked diligently with EPA to address and resolve these concerns. Staff have strengthened rule requirements by lowering threshold limits to bring in major poultry sources as well as tightened menus and added specific measures instead of leaving compliance options as complete operator choice. Additional compliance language including monitoring, testing, and recordkeeping have been added to rule language to improve enforceability. The District is committed to continue to work with EPA to ensure all RACT requirements are met. The CAF portion of the 2009 RACT Demonstration for Ozone SIP analysis is presented in Appendix G.
XII. HEALTH BENEFIT ANALYSIS

The District adopted its first confined animal facility rule, Rule 4570, at a public hearing held on June 15, 2006. Prior to and during the rule adoption hearing, the District considered (1) the feasibility of the control measures contained in Rule 4570, (2) the economic impacts associated with the rule, (3) reductions in ozone pre-cursors that would result from compliance with the rule, and (4) the public health impacts of ozone and ozone precursors. As is normally the case under CAA rulemaking, the District did not consolidate this information into a specific discussion of the rule’s impact on public health in 2006. However, because Rule 4570 was triggered by the enactment in 2003 of Senate Bill 700 (codified under California Health and Safety Code section 40724.6(e)), the California Fifth Appellate District ruled that rulemaking under this statute must explicitly consider the public health impacts of control measures on CAFs. These benefits were to be balanced against the economic impacts of the proposed rule and its feasibility.

In response to this ruling, the District, in conjunction with a temporary suspension and readoption of Rule 4570, conducted a health benefit analysis of the Ozone Plan in 2009 that included (1) the contribution of the CAF sector to ozone concentrations in the San Joaquin Valley, (2) Rule 4570’s contribution to regional ozone reductions in 2012 and 2020, and (3) a quantification of cumulative health benefits in 2020 resulting from the Ozone Plan. Of particular relevance to the current proposed amendment of Rule 4570, that 2009 health benefit analysis quantified the distinct contribution to VOC reductions made by previously adopted Rule 4570 as well as the additional reductions accruing from the current proposed amendments. This prior health benefit analysis satisfied the requirements of the H&SC section 40724.6(e) and an explicit analysis of health benefits from the proposed amendment is not required. However, because of the relevance of that analysis to the proposed amendment, and the similarity in the VOC reductions estimated in the 2009 analysis and the reduction estimate from the proposed amendments of 27.64 tons per day of VOC, an abbreviated reiteration of that analysis is included in Appendix H.
XIII. REFERENCES


2. San Joaquin Valley Air Pollution Control District. DRAFT *Air Pollution Control Officer's Revision of the Dairy VOC Emissions Factor*, January 2010.


