San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

HEALTHY AIR LIVING™

NOV 14 2018

Brandon Greer
Central Valley Eggs, LLC
13606 Gun Club Rd
Wasco, CA 93280

Re: Notice of Preliminary Decision - Authority to Construct
Facility Number: S-8841
Project Number: S-1183494

Dear Mr. Greer:

Enclosed for your review and comment is the District's analysis of Central Valley Eggs, LLC's application for an Authority to Construct for the installation of a 3,339,000 bird capacity poultry ranch consisting of ten poultry houses, at the intersection of Gun Club Road and Hannawalt Avenue in northwest Kern County, CA.

The notice of preliminary decision for this project will be published approximately three days from the date of this letter. After addressing all comments made during the 30-day public notice and 45-day EPA notice comment periods, the District intends to issue the Authority to Construct. Please submit your written comments on this project within the 30-day public comment period, as specified in the enclosed public notice.

Thank you for your cooperation in this matter. If you have any questions regarding this matter, please contact Mr. Jesse A. Garcia of Permit Services at (559) 230-5918.

Sincerely,

Arnaud Marjollet
Director of Permit Services

AM:jag

Enclosures

cc: Tung Le, CARB (w/ enclosure) via email
cc: Gerardo C. Rios, EPA (w/ enclosure) via email
cc: Kathy Parker, Insight Environmental Consultants (w/ enclosure) via email

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www.valleyair.org www.healthyairliving.com

San Joaquin Valley Air Pollution Control District

Authority to Construct Application Review

New Poultry Ranch

Facility Name:	Central Valley Eggs, LLC	Date:	October 18, 2018
Mailing Address:	13606 Gun Club Rd Wasco, CA 93280	Engineer:	Jesse A. Garcia
		Lead Engineer:	Joven Refuerzo
Contact Person:	Kathy Parker		
Telephone:	(661) 282-2200 ext. 102		
E-Mail:	keparker@insenv.com		
Application #(s):	S-8841-1-3		
Project #:	S-1183494		
Deemed Complete:	September 27, 2018		

I. Proposal

Central Valley Eggs, LLC (Central Valley Eggs) has requested an Authority to Construct (ATC) permit for a 3,339,000 total bird capacity poultry ranch consisting of seven laying hen houses, each with a capacity of 330,000 birds, and three pullet houses, each with a capacity of 350,000 birds.

Central Valley Eggs previously received approval for the construction of this poultry ranch with ATCs S-8841-1-0, -1-1 and -1-2. The ATCs are summarized below:

ATC S-8841-1-0: This ATC was evaluated under project S-1161654, issued on November 7, 2017, and authorized the construction of the 3,339,000 bird capacity poultry ranch. One of the conditions on the ATC permit required each poultry house to be equipped with a belt manure aeration and removal system that continuously removes manure from the aviary section of the house. However, the facility has found that when the manure belts are operating continuously and the manure gets to the end of the house where it is transferred to the floor conveyor system, it contains too much moisture and sticks to the primary conveyor or to the scraper arms that are used to help transfer the manure between conveyors. Additionally, ATC S-8841-1-0 also required a source test to be performed to demonstrate compliance with permitted emissions limits. The source test is required to be performed under conditions representative of normal operations or conditons specified in the ATC. As discussed above, because the facility had determined that continuous operation of the manure belts resulted in excessive moisture, the facility proposed to *not* operate the manure belt continously which required a new ATC to be issued.

ATC S-8841-1-1: This ATC was evaluated under project S-1180558, issued on May 14, 2018, and authorized the construction of the 3,339,000 bird capacity poultry ranch similar to one authorized under ATC -1-0 except for a change in the frequency that the manure belt system operates. As discussed above, the requirement in ATC -1-0 to have the manure belt system operate continuously results in manure with an excessively high moisture content that disrupts the equipment and does not get properly removed. Therefore, rather than operating continuously, the facility proposed that the manure belt in each house advance by a minimum of half the length of the belt during a 24-hour period so it completes one full rotation within two days. A source test was required to be performed to demostrate compliance with the PM_{10} emission limits on the permit.

ATC S-8841-1-2: This ATC was also evaluated under project S-1180558, issued on May 14, 2018, and authorized the construction of the 3,339,000 bird capacity poultry ranch similar to one authorized under ATC -1-0. ATC -1-0 required the open end of each house to be equipped with water spray nozzles in order to minimize PM_{10} emissions from each house's exhaust fans. The facility wanted to verify if the permitted PM_{10} limits can be achieved without the use of these water sprays during the required source test; therefore, this ATC was issued.

The facility has performed the source test required under the previously issued ATCs and found the following results:

- The PM_{10} emission rate for laying hens, starters and growers are higher than previously proposed. The originally proposed emission factors and the newly proposed emission factors (including a margin of compliance) in this project are summarized in the table below:

PM10 Emission Factors (EF) (lb/1000 birds/day)		
Bird Type	**Previously Proposed EF**	**Newly Proposed EF**
Layer	0.02271	0.02712
Grower	0.009652	0.01152
Starter	0.00441	0.00526

- The ammonia emission rate for the laying hens is lower than previously proposed. The originally proposed emission factor was 0.504 lb/1,000 birds-day while the source test yielded a result of 0.030 lb/1,000 birds-day while the crude protein in the diet was limited to reduce emissions. As explained further in Section VII.B, the new emission factor to be used will be 0.25 lb/1,000 birds-day without the need to limit crude protein in the feed.

Since ATCs S-8841-1-0, -1-1 and -1-2 cannot be implemented due to the source tested PM_{10} emission factor being higher than the permitted limit, the ATC issued in this project will cancel and supersede those ATCs. Therefore, the following condition will be placed on the ATC:

- This Authority to Construct (ATC) cancels and supersedes ATCs S-8841-1-0, -1-1 and -1-2. [District Rule 2201]

Additionally, in project S-1161654, the facility originally proposed to construct a poultry facility with 4,320,000 birds in 13 new poultry houses (consisting of ten 327,000 bird capacity laying hen houses and three 350,000 bird capacity pullet houses). However, the Ambient Air Quality Analysis (AAQA) performed in project S-1161654 for the proposal for the 4,320,000 birds in 13 new poultry houses indicated that the increase in particulate matter (PM) emissions from the project would cause or make worse a violation of an Ambient Air Quality Standard (AAQS) and, therefore, would not comply with the requirements of District Rule 2201 - New and Modified Stationary Source Review Rule. Because of this, the facility modified the proposal during previous ATC projects and for the current project to limit the number of poultry houses/birds so the AAQA for the proposed projects could demonstrate that the emissions increase from the projects would not cause or make worse a violation of an Ambient Air Quality Standard.

Prior to approving any future project to increase the maximum number of birds or to construct additional poultry houses at the site, the facility will be required to demonstrate that PM_{10} emissions from the overall project (this ATC project and any future ATC project(s) for the additional birds and/or poultry houses) will not cause or make worse a violation of an AAQS.

The following condition will be included on the proposed ATC to ensure compliance:

- Issuance of any Authority to Construct (ATC) permit(s) or any construction that results in a further increase in the number of laying hens, pullets, or poultry houses at this facility such as described in the proposal for District ATC Project S-1183494, or the District CEQA document prepared for the project with the increase, shall be treated and analyzed as a part of Project S-1183494 for New and Modified Source Review (NSR) purposes to ensure that the cumulative emissions from the overall project will not cause or make worse a violation of an Ambient Air Quality Standard. [District Rule 2201 and California Environmental Quality Act]

Based on the above, the poultry ranch proposed in this project will be considered as a new emissions unit for NSR purposes (BACT, New Major Source, Offsets, etc.). Also, as discussed in Section E of the Rule 2201 evaluation section, source testing will not be required for the proposed poultry ranch.

II. Applicable Rules

Rule 1070	Inspections (12/17/92)
Rule 2201	New and Modified Stationary Source Review Rule (2/18/16)
Rule 2410	Prevention of Significant Deterioration (6/16/11)
Rule 2520	Federally Mandated Operating Permits (6/21/01)
Rule 4001	New Source Performance Standards (4/14/99)
Rule 4002	National Emissions Standards for Hazardous Air Pollutants (5/20/04)
Rule 4101	Visible Emissions (2/17/05)
Rule 4102	Nuisance (12/17/92)
Rule 4201	Particulate Matter Concentration (12/17/92)
Rule 4550	Conservation Management Practices (CMP) (8/19/04)
Rule 4570	Confined Animal Facilities (CAF) (10/21/10)
CH&SC 41700	Health Risk Assessment
CH&SC 42301.6	School Notice

Public Resources Code 21000-21177: California Environmental Quality Act (CEQA)
California Code of Regulations, Title 14, Division 6, Chapter 3, Sections 15000-15387: CEQA Guidelines

III. Project Location

The facility is located at 13606 Gun Club Road in Wasco, CA. The equipment is not located within 1,000 feet of the outer boundary of a K-12 school. Therefore, the public notification requirement of California Health and Safety Code 42301.6 is not applicable to this project.

IV. Process Description

Poultry Ranch

The primary function of Central Valley Eggs is the production and packing of eggs for human consumption. These eggs may be sold as shell eggs (table eggs), or may be used in the production of liquid, frozen, or dehydrated eggs.

Laying hens reach sexual maturity and begin laying eggs between 16 and 20 weeks of age, depending on breed. Before the onset of egg production, birds are referred to as pullets. Central Valley Eggs will operate three pullet houses. Baby chicks will be purchased and brought to the facility between 24 to 48 hours of age. After 16 weeks of age, the pullets will be moved from the pullet houses to one of the proposed laying hen houses where they will begin producing eggs.

The laying hens at Central Valley Eggs typically have a production life of 102 weeks. The laying hens are usually replaced after 102 weeks because the natural decreasing rate of egg production becomes inadequate to cover feed costs. At this point, laying hens become spent hens and may be slaughtered or rendered to recover any remaining value.

Cage-Free Aviary Houses

The laying hens are confined in any of seven proposed cage-free housing systems which allows for automation of feed distribution and egg collection. In cage-free aviary houses laying hens are housed in climate-controlled buildings with multiple levels that allow the hens to roam freely in defined sectors of the building. Cage-free aviary houses have perches and nesting areas as well as open floor space that allows for natural bird behaviors, such as scratching and dust bathing. As in other houses for laying hens, there are wire mesh floors under the nesting areas that are slightly sloped so the eggs roll down to an egg collection belt; however, because the hens can move throughout the house, workers must also manually collect eggs from the feeding and watering and floor areas.

As in other houses, the laying hens have constant access to food and water. Manure is removed from cage-free aviary houses by mechanized belts below the nesting and feeding areas and scrapers below the bottom belt. The manure belt in each house advances by a minimum of half the length of the belt during a 24-hour period so it completes one full rotation within two days, and the moisture content of the manure is expected to be approximately 30% and will allow the manure to be easily transferred within the manure management system. In cage-free aviary houses manure must also be periodically removed from the house aisle ways.

Each of the laying hen houses measures 651 feet x 90 feet x 43.5 feet and has a capacity of 330,000 birds. Additionally, each laying hen house is equipped with forty-eight 1.5 horsepower exhaust fans, each with a total airflow rate of 26,200 cfm. Each pullet house measures 684 feet x 111 feet x 25 feet and has a capacity of 350,000 birds. Each pullet house is equipped with thirty-eight 1.5 horsepower exhaust fans, each with a total airflow rate of 26,200 cfm. All houses are mechanically ventilated to remove moisture and carbon dioxide produced by respiration.

All of the exhaust fans are located on the end of each house. The exhaust fans draw air into the building through slots located under the eaves along the perimeter of the roof and exhaust air out the end of each building. When ambient temperatures call for it, the inlet air will be cooled using water and evaporative cooling cells. The cold air from each side will be directed toward the ceiling, and will get pushed toward the center of each house. The cold air will then mix with the hot air inside the house before it descends into the area occupied by the birds.

Wet manure from the poultry houses will be conveyed to a segregated enclosure at the end of each poultry house, on the opposite side of the wall where the fans exhaust air from the poultry living area. The end of each poultry house is partially open and a tarp covers approximately 40% of the upper part of the opening. The ATC issued in this project will require the facility to have water sprays installed under the bottom edge of the tarp at the open end of each poultry house. The water sprays will be operated at all times, except during the periods of actual rainfall.

Numerous belts under each tier of bird cages will collect and convey the manure from the front of the house to a floor conveyor at the back of the house. The floor conveyor transfers the manure to a covered incline conveyor located on the outside of the house. The incline conveyor carries the manure to an automated belt system that spreads the wet manure in three windrows to allow for efferent-controlled drying while maintaining a higher value of nitrogen and other elements, which lowers PM_{10} and ammonia (NH_3) emissions. The manure drying and storage operation will take place under a covered area at the end of each house. Storing the manure under a cover at the end of each poultry house eliminates exposure to wind and rain.

V. Equipment Listing

S-8841-1-3: 3,339,000 POULTRY RANCH CONSISTING OF SEVEN MECHANICALLY VENTILATED CAGE-FREE AVIARY LAYING HEN HOUSES AND THREE MECHANICALLY VENTILATED PULLET HOUSES

VI. Emission Control Technology Evaluation

PM_{10}, VOC, and ammonia (NH_3) are the major pollutants of concern from poultry farms. The ventilation rate of the poultry houses affects the amount of VOC, PM_{10}, and NH_3 that is emitted from the houses.

All pollutants emitted from the manure are expected to be included with the emissions from within the poultry houses. Mechanical ventilation will decrease the moisture content of the manure. As the moisture content of the manure decreases, volatilization of NH_3 from the manure will decrease. Once the manure is dry, emissions of VOC and NH_3 are expected to be negligible.

PM_{10} Emissions:

The in-house manure drying system will also act as a filter to reduce PM_{10} emissions from the houses. One study measured a greater than 80% reduction in PM_{10} concentrations from cage-free laying hen houses equipped with in-house manure drying systems.[1]

The end of each house is open where the exhaust fans blow air out. In order to help knock down any solid particles that may be exiting the open ends of the houses, a tarp has been installed that covers approximately 40% of the upper part of the opening. It is not known if the tarp covering the top 40% of the opening at the end of each house will provide additional PM_{10} emission control. Therefore, as a conservative estimate, additional PM_{10} control will not be included for the tarp for the purposes of this project.

The facility has proposed water sprays to help further reduce the PM_{10} emissions potentially being released to the atmosphere. The water sprays will be installed underneath a plastic tarp that is covering the top 40% of the opening at the end of each house.

VOC Emissions:

The maximum number of proposed birds that can be kept at the facility as a result of this project will cause all of the poultry houses at the facility to be subject to the requirements of District Rule 4570, *Confined Animal Facilities*.

The mitigation measures that the applicant has selected to comply with District Rule 4570 and VOC control efficiency for the measures selected are shown in the following table.

District Rule 4570 Mitigation Measures Chosen	
Housing Mitigation Measures	Control Efficiency
Use drinkers that do not drip continuously AND inspect water pipes and drinkers and repair leaks daily.	10%
Feed Mitigation Measures	Control Efficiency
Feed according to National Research Council (NRC) guidelines.	10%
Feed animals probiotics designed to improve digestion according to manufacturer recommendations.	10%
Feed animals an amino acid supplemented diet to meet their nutrient requirements.	10%
Feed animals feed additives such as amylase, xylanase, and protease, designed to maximize digestive efficiency according to manufacturer recommendations.	10%
Total Control Efficiency	**41%**

[1] Winkel, A.; Mosquera Losada, J.; Ellen, H.H.; Aarnink, A.J.A.; Ogink, N.W.M. Dust filtering properties and ammonia emission of on-farm drying systems for poultry manure (2012) Proceedings of the International Symposium on Emissions of Gas and Dust from Livestock (EmiLi). p. 245 – 248. https://www.wageningenur.nl/en/Publication-details.htm?publicationId=publication-way-343235373735 Also see: https://colloque4.inra.fr/var/emili2012/storage/fckeditor/file/Documents/sp3/Presentation%20EmiLi%202012%20Albert%20Winkel%20v2.pdf.

Ammonia (NH_3) Emissions:

Many District Rule 4570 mitigation measures will also reduce NH_3 emissions. However, because of limited data, at this time this District cannot accurately apply control efficiencies to calculate the NH_3 emissions reductions attributed to the Rule 4570 mitigation measures.

VII. General Calculations

A. Assumptions

Laying Hen Houses

- The emission factors for poultry are on a per bird basis, and account for multiple sources of emissions. That is, emissions from the hen housing and solid manure handling are included in the per bird emission factors. Therefore, except as noted below, emissions from the hen housing and solid manure handling permits are calculated together.
- Emissions from solid manure are considered negligible once the manure is dried. Therefore, all emissions from solid manure will be attributed to the poultry houses.
- A maximum of 330,000 hens can be kept in each of the seven proposed adult laying hen houses. However, the facility-wide daily maximum will be limited to 2,289,000 hens (327,000 hens x 7 houses); this will be used to calculate daily emissions.
- A maximum average of 2,168,690 hens, calculated on a rolling 12-month basis, can be kept in all houses combined; this will be used to calculate annual emissions.
- As a worst case for calculation purposes, the laying hen houses will be at their maximum capacity for 24 hours per day and 365 days per year (per applicant).
- Each poultry house operates independently and has separate exhaust ventilation. Therefore, each poultry house is a separate emissions unit.
- The Final Project Report on Southeastern Broiler Gaseous and Particulate Matter Emissions Monitoring (December 2009) by Iowa State University and University of Kentucky gives a ratio of 0.40 for PM_{10}/Total Suspended Particulate (TSP). Based on this information, PM_{10} emissions from the poultry houses are assumed to be 40% of TSP emissions, and TSP emissions from the poultry houses will be calculated as 250% (1/0.40 = 2.5) of PM_{10} emissions unless otherwise noted.

Pullet Houses

- The pullet houses will be populated in cycles. A typical pullet house cycle will last 18 weeks and consist of six weeks with chick starters (ages 0 – 6 weeks), 10 weeks with pullet growers (ages 6 – 16 weeks), and two empty weeks for cleaning and sanitation (proposed by the applicant).
- A maximum of 350,000 pullets (young hens) can be kept in each of the three pullet houses. As a worst case for calculation purposes, the pullet houses will be at their maximum capacity for three full cycles per year for chick starters (18 weeks per year) and pullet growers (30 weeks per year), and two cycles for cleaning and sanitation (4 weeks per year) (proposed by the applicant).

To streamline emission calculations, $PM_{2.5}$ emissions are assumed to be equal to PM_{10} emissions. Only if needed to determine if a project is a Federal major modification for $PM_{2.5}$ will specific $PM_{2.5}$ emission calculations be performed.

B. Emission Factors

Laying Hen Houses:

Uncontrolled Emission Factors:

NH_3 Emissions

In previous project S-1180558, it was established that a 10% control efficiency can be applied for every 1% reduction in crude protein in the feed below 17.38%.

The facility performed a source test on the operation while limiting the crude protein (CP) in the feed to 15% and yielded a result of 0.030 lb/1,000 birds-day. Since the facility is proposing to remove the crude protein limit of 15%, the following equation can be used to calculate an uncontrolled emission factor:

Uncontrolled EF (lb/bird-yr) = Controlled NH_3 EF ÷ (1 – Total Control Efficiency)

Where,

Total Control Efficiency = 10% / % CP Drop x (Baseline CP – Proposed CP)
= 10% / % CP Drop x (17.38% – 15%)
= 23.8%

Therefore,

Uncontrolled EF (lb/bird-yr) = Controlled NH_3 EF[2] ÷ (1 – Total Control Efficiency)
= 0.030 lb/1,000 birds-day ÷ (1 – 0.238)
= 0.039 lb/1,000 birds-day

As a conservative estimate to include a margin of compliance, an uncontrolled emission factor of 0.250 lb/1,000 birds-day will be used for this project.

[2] The controlled emission factor is taken as the source tested value for the operation.

VOC Emissions

Uncontrolled Emission Factors for Cage-Free Aviary Poultry Houses			
Pollutant	**(lb/bird-year)**	**(lb/1,000 birds-day)***	**Source**
VOC	0.025	0.0685	"Quantification of Gaseous Emissions from California Broiler Production Houses": Table 7, Reactive Organic Gas Source tests were conducted on mechanically ventilated broiler houses during the spring and fall of 2004. The participants in the project include the following: AIRx Testing; California Air Resources Board; California Department of Food and Agriculture; California Poultry Federation; Foster Farms; & University of California, Davis - Animal Science, Reference document included in Appendix A

*Conversion from lb/bird-year to lb/1,000 birds-day performed using the following equation: EF (lb/bird-year) x 1 year/365 days x 1,000 birds/1 bird

Controlled Emission Factors:

PM_{10} Emissions

The applicant has source tested the operation and verified the emissions to be 0.02465 lb/1,000 birds-day during peak temperatures with the houses operating in full automation to regulate airflow and with an in-house manure drying system, a tarp covering the top 40% of the open end of each house and water sprays over the open house ends. Including a 10% margin of compliance in addition to the source test results, the PM_{10} emission factor used will be 0.02712 lb/1,000 birds-day.

VOC Emissions

As discussed above, the Rule 4570 mitigation measures that will be performed in these poultry houses will reduce VOC emissions from the houses by 41%. Therefore, the controlled VOC emission factor is calculated as follows:

Controlled VOC EF = Uncontrolled EF (lb/bird-yr) x (1 – Total Control Efficiency)
Controlled VOC EF = 0.0685 lb-VOC/1,000 birds-day x (1 - 0.41)

Controlled VOC EF = 0.0404 lb-VOC/1,000 birds-day

Controlled Laying Hens Emission Factors			
Pollutant	**Total Control Efficiency (%)**	**Uncontrolled Laying Hen Emission Factor (lb/1,000 birds-day)**	**Controlled Laying Hen Emission Factor (lb/1,000 birds-day)**
PM_{10}	N/A	N/A	0.02712
VOC	41	0.0685	0.0404
NH_3	N/A	N/A	0.250

Pullet Houses:

Pullets are smaller in size, eat less feed, and produce less manure than adult laying hens. Therefore, it is expected that the emissions generated by pullets are going to be less than the emissions generated by adult laying hens. The emissions factors for pullets will be estimated by comparing the amount of feed pullets consume versus the amount of feed adult laying hens consume.

In accordance with the article "Feeding Chickens for Egg Production" from eXtension.org (http://articles.extension.org/pages/69065/feeding-chickens-for-egg-production) the average amount of feed consumed by pullets and adult laying hens are shown in the following table:

Bird Type	Age	Average Feed Intake per Age Period	Average Weekly Feed Intake
Chick Starter	0-6 weeks	24.5 lb/6 weeks	4.08 lb/week
Pullet Grower	6-20 weeks	125 lb/14 weeks	8.93 lb/week
Laying Hen	20 weeks and up	21 lb/week	21 lb/week

Therefore, the amount of emissions expected from pullets as compared to adult laying hens can be determined using the following equation:

Pullet Emissions = Laying Hen Emissions x (Pullet Feed Rate / Laying Hen Feed Rate)

And the pullet emissions will be estimated as follows:

Bird Type	Average Feed Rate	Average Laying Hen Feed Rate	% of Laying Hen Feed Rate
Chick Starter	4.08 lb/week	21 lb/week	19.4%
Pullet Grower	8.93 lb/week	21 lb/week	42.5%

Uncontrolled Emission Factors:

The uncontrolled pullet emission factors will be determined using the uncontrolled laying hen emission factors referenced in this document above and multiplying them by the relative feed rate.

Uncontrolled Pullet Emission Factors					
Pollutant	Laying Hen Emission Factor (lb/1,000 birds-day)	Chick Starter Percentage of Laying Hen Emissions	Chick Starter Emission Factor (lb/1,000 birds-day)	Pullet Grower Percentage of Laying Hen Emissions	Pullet Grower Emission Factor (lb/1,000 birds-day)
VOC	0.0685	0.194	0.01329	0.425	0.029
NH_3	0.6614	0.194	0.1283	0.425	0.2811

Controlled Emission Factors:

PM_{10} Emissions

As discussed above, the applicant has source tested the operation and verified the emissions during peak temperatures with the houses operating in full automation to regulate airflow and with an in-house manure drying system, a tarp covering the top 40% of the open end of each house and water sprays over the open house ends. Including a margin of compliance in addition to the source test results, the PM_{10} emission factor, as proposed by the applicant, will be 0.01152 lb/1,000 birds-day for starters and 0.00526 lb/1,000 birds-day for growers.

VOC Emissions

The mitigation measures and controls that are applicable to the laying hen houses, as described above, will also apply to the pullet houses. Therefore, the pullet houses are expected to have a total VOC control efficiency of 41%. Therefore, the controlled VOC emission factors can be determined using the following equation and the controlled pullet emission factors are shown in the table below:

Controlled EF = Uncontrolled EF (lb/bird-year) x (1 – CE)

NH_3 Emissions

Once the pullets arrive at the facility, they begin maturing and growing in size to become viable laying hens by 16 weeks of age. Thus, the crude protein level in the feed for pullets is typically higher than that of laying hens and Central Valley Eggs does not wish to take a limit on the protein level of the pullet feed. No other ammonia emission mitigation measures are being proposed for the pullet houses for the purposes of this project. Therefore, the uncontrolled emission factors for chick starters and pullet growers listed above will be used as the controlled emission factors for the pullet houses.

Controlled Pullet Emission Factors					
Pollutant	**Total Control Efficiency (%)**	**Uncontrolled Chick Starter Emission Factor (lb/1,000 birds-day)**	**Controlled Chick Starter Emission Factor (lb/1,000 birds-day)**	**Uncontrolled Pullet Grower Emission Factor (lb/1,000 birds-day)**	**Controlled Pullet Grower Emission Factor (lb/1,000 birds-day)**
PM_{10}	N/A	N/A	0.00526	N/A	0.01152
VOC	41	0.01329	0.00784	0.029	0.01711
NH_3	N/A	N/A	0.1283	N/A	0.2811

C. Calculations

1. Pre-Project Potential to Emit (PE1)

Since this is a new emissions unit, PE1 = 0 for all pollutants.

2. Post Project Potential to Emit (PE2)

Laying Hen Houses:

The daily emissions can be determined using the controlled emission factors listed above and the maximum amount of birds in each laying hen house. The annual emissions for each laying hen house will be determined by taking the controlled emission factors listed above and the maximum amount of birds in each laying hen house and multiplying by a worst case operating scenario of 365 days per year.

Daily PE2 (lb/day) = Number of Birds x Controlled EF (lb/1,000 birds-day)

Annual PE2 (lb/year) = Number of Birds x Controlled EF (lb/1,000 birds-day) x 365 days/year

Daily PE2 for Each Laying Hen House					
Pollutant	# of Birds	x	EF (lb/1,000 birds-day)	=	PE2 (lb/day)
PM_{10}	330,000	x	0.02712	=	8.9
VOC	330,000	x	0.0404	=	13.3
NH_3	330,000	x	0.250	=	82.5

Annual PE2 for Each Laying Hen House							
Pollutant	# of Birds	x	EF (lb/1,000 birds-day)	x	Operation (days/year)	=	PE2 (lb/year)
PM_{10}	330,000	x	0.02712	x	365	=	3,267
VOC	330,000	x	0.0404	x	365	=	4,866
NH_3	330,000	x	0.250	x	365	=	30,113

The facility consists of seven laying hen houses with a combined limit of 2,289,000 birds/day and an annual daily average of 2,168,690 birds/day; therefore, the total emissions from all seven houses will be determined as follows:

Total Daily $PE_{\text{Laying Hen Houses}}$ = Number of Birds x Controlled EF (lb/1,000 birds-day)

Total Annual $PE_{\text{Laying Hen Houses}}$ = Number of Birds x Controlled EF (lb/1,000 birds-day) x 365 days/year

Total Daily PE2 for All Laying Hen Houses					
Pollutant	# of Birds	x	EF (lb/1,000 birds-day)	=	PE2 (lb/day)
PM_{10}	2,289,000	x	0.02712	=	62.1
VOC	2,289,000	x	0.0404	=	92.5
NH_3	2,289,000	x	0.250	=	572.3

Annual PE2 for All Laying Hen Houses							
Pollutant	# of Birds	x	EF (lb/1,000 birds-day)	x	Operation (days/year)	=	PE2 (lb/year)
PM_{10}	2,168,690	x	0.02712	x	365	=	21,467
VOC	2,168,690	x	0.0404	x	365	=	31,980
NH_3	2,168,690	x	0.250	x	365	=	197,893

Pullet Houses:

The pullet houses will have chick starters for 18 weeks per year (126 days), pullet growers for 30 weeks per year (210 days) and be empty for cleaning and sanitation for 4 weeks per year (28 days). Therefore, the emission rates from the pullet houses will be calculated as follows:

Daily PE2:

The daily PE2 from the pullet houses can be determined using the daily controlled EF and the maximum amount of birds in a house at any given time. Since the pullet houses will house birds in cycles, the worst case daily emissions from each pullet house will be the highest daily emission rates from either chick starters or pullet growers.

Daily PE2 (lb/day) = Number of Birds x Controlled EF (lb/1,000 birds-day)

Chick Starters:

Chick Starter Daily PE2 for Each Pullet House					
Pollutant	# of Birds	x	EF (lb/1,000 birds-day)	=	PE2 (lb/day)
PM_{10}	350,000	x	0.00526	=	1.8
VOC	350,000	x	0.00784	=	2.7
NH_3	350,000	x	0.1283	=	44.9

Pullet Growers:

Pullet Grower Daily PE2 for Each Pullet House					
Pollutant	# of Birds	x	EF (lb/1,000 birds-day)	=	PE2 (lb/day)
PM_{10}	350,000	x	0.01152	=	4.0
VOC	350,000	x	0.01711	=	6.0
NH_3	350,000	x	0.2811	=	98.4

As shown above, the worst case daily emissions from the pullet houses is during the pullet grower cycle. Therefore, the pullet grower PE2 values will be set as the maximum daily emission rates from each pullet houses.

Annual PE2:

The annual emissions for each house will be the sum of the chick starter emissions for 126 days per year and pullet grower emissions for 210 days per year.

Annual $PE_{Chick\ Starters}$ (lb/year) = # of Birds x EF (lb/1,000 birds-day) x 126 days/year

Annual $PE_{Pullet\ Growers}$ (lb/year) = # of Birds x EF (lb/1,000 birds-day) x 210 days/year

Annual $PE_{Pullet\ House}$ (lb/year) = Annual $PE_{Chick\ Starters}$ (lb/year) + Annual $PE_{Pullet\ Growers}$ (lb/year)

Chick Starters:

Chick Starter Annual PE2 for Each Pullet House							
Pollutant	# of Birds	x	EF (g/bird-yr)	x	Number of Days Chick Starters Housed (day/year)	=	Annual PE2 (lb/year)
PM_{10}	350,000	x	0.00526	x	126	=	232
VOC	350,000	x	0.00784	x	126	=	346
NH_3	350,000	x	0.1283	x	126	=	5,658

Pullet Growers:

Pullet Grower Annual PE2 for Each Pullet House							
Pollutant	# of Birds	x	EF (g/bird-yr)	x	Number of Days Pullet Grower Housed (day/year)	=	Annual PE2 (lb/year)
PM_{10}	350,000	x	0.01152	x	210	=	847
VOC	350,000	x	0.01711	x	210	=	1,258
NH_3	350,000	x	0.2811	x	210	=	20,661

Annual PE2 per Pullet House:

Annual PE2 for Each Pullet House					
Pollutant	Chick Starter Annual PE2 (lb/yr)	+	Pullet Grower Annual PE2 (lb/yr)	=	Annual PE2 (lb/yr)
PM_{10}	232	+	847	=	1,079
VOC	346	+	1,258	=	1,604
NH_3	5,658	+	20,661	=	26,319

Total PE2 for all Three Pullet Houses:

The facility consists of three pullet houses; therefore, the total annual emissions from all three houses will be determined as follows:

Total $PE_{Pullet\ Houses}$ = $PE_{Per\ House}$ x 3 Houses

Total PE2 for all Three Pullet Houses							
Pollutant	Daily PE2 per House (lb/day)	Annual PE2 per House (lb/yr)	x	Number of Laying Hen Houses	=	Total Daily PE2 for All Pullet Houses (lb/day)	Total Annual PE2 for All Pullet Houses (lb/yr)
PM_{10}	4.0	1,079	x	3	=	12.0	3,237
VOC	6.0	1,604	x	3	=	18.0	4,812
NH_3	98.4	26,319	x	3	=	295.2	78,957

Total Emissions from All Ten Poultry Houses:

The total emissions from all ten poultry houses can be determined by summing the emissions from the seven laying hen houses and the three pullet houses.

Total Emissions = $PE2_{Laying\ Hen\ Houses}$ + $PE2_{Pullet\ Houses}$

Total Daily PE2 for Ten Poultry Houses					
Pollutant	Total Daily PE2 for Seven Laying Hen Houses (lb/day)	+	Total Daily PE2 for Three Pullet Houses (lb/day)	=	Total Daily PE2 for Ten Poultry Houses (lb/day)
PM_{10}	62.1	+	12.0	=	**74.1**
VOC	92.5	+	18.0	=	**110.5**
NH_3	572.3	+	295.2	=	**867.5**

Total Annual PE2 for Ten Poultry Houses					
Pollutant	Total Annual PE2 for Seven Laying Hen Houses (lb/yr)	+	Total Annual PE2 for Three Pullet Houses (lb/yr)	=	Total Annual PE2 for Ten Poultry Houses (lb/yr)
PM_{10}	21,467	+	3,237	=	**25,046**
VOC	31,980	+	4,812	=	**36,792**
NH_3	197,893	+	78,957	=	**276,850**

3. Pre-Project Stationary Source Potential to Emit (SSPE1)

Pursuant to District Rule 2201, the SSPE1 is the Potential to Emit (PE) from all units with valid Authorities to Construct (ATC) or Permits to Operate (PTO) at the Stationary Source and the quantity of Emission Reduction Credits (ERC) which have been banked since September 19, 1991 for Actual Emissions Reductions (AER) that have occurred at the source, and which have not been used on-site.

The annual PE values for permit units S-8841-2 to S-8841-15 used in the following SSPE1 table are taken from the PE values calculated in project S-1161654 and summarized in the table on the following page:

SSPE1 (lb/year)						
Permit Unit	**NO_X**	**SO_X**	**PM_{10}**	**CO**	**VOC**	**NH3**
S-8841-2-0*	0	0	0	0	0	0
S-8841-3-0	126	0	4	87	7	0
S-8841-4-0	126	0	4	87	7	0
S-8841-5-0	126	0	4	87	7	0
S-8841-6-0	126	0	4	87	7	0
S-8841-7-0	126	0	4	87	7	0
S-8841-8-0	126	0	4	87	7	0
S-8841-9-0	126	0	4	87	7	0
S-8841-10-0	126	0	4	87	7	0
S-8841-11-0	126	0	4	87	7	0
S-8841-12-0	126	0	4	87	7	0
S-8841-13-0	126	0	4	87	7	0
S-8841-14-0	126	0	4	87	7	0
S-8841-15-0	309	0	7	33	16	0
SSPE1	**1,821**	**0**	**55**	**1,077**	**100**	**0**

*The potential emissions for the solid manure handling system (permit unit -2) are included in the potential emissions from the poultry ranch (permit unit -1). Since ATCs S-8841-1-0, -1-1 and -1-2 cannot be implemented, permit unit -1 will be re-permitted under this project. Therefore, there are no emissions from permit unit -1, and consequently there are no emissions from permit unit -2.

4. Post Project Stationary Source Potential to Emit (SSPE2)

Pursuant to District Rule 2201, the SSPE2 is the PE from all units with valid ATCs or PTOs at the Stationary Source and the quantity of ERCs which have been banked since September 19, 1991 for AER that have occurred at the source, and which have not been used on-site.

SSPE2 (lb/year)						
Permit Unit	**NO_X**	**SO_X**	**PM_{10}**	**CO**	**VOC**	**NH3**
S-8841-1-3	0	0	25,046	0	36,792	276,850
S-8841-2-0*	0	0	0	0	0	0
S-8841-3-0	126	0	4	87	7	0
S-8841-4-0	126	0	4	87	7	0
S-8841-5-0	126	0	4	87	7	0
S-8841-6-0	126	0	4	87	7	0
S-8841-7-0	126	0	4	87	7	0
S-8841-8-0	126	0	4	87	7	0
S-8841-9-0	126	0	4	87	7	0
S-8841-10-0	126	0	4	87	7	0
S-8841-11-0	126	0	4	87	7	0
S-8841-12-0	126	0	4	87	7	0
S-8841-13-0	126	0	4	87	7	0
S-8841-14-0	126	0	4	87	7	0
S-8841-15-0	309	0	7	33	16	0
SSPE2	**1,821**	**0**	**25,101**	**1,077**	**36,892**	**276,850**

*The potential emissions for the solid manure handling system (permit unit -2) are included in the potential emissions from the poultry ranch (permit unit -1). Therefore, post-project emissions for permit unit -2 are included in post-project emissions for permit unit -1.

5. Major Source Determination

Rule 2201 Major Source Determination:

Pursuant to District Rule 2201, a Major Source is a stationary source with a SSPE2 equal to or exceeding one or more of the following threshold values. For the purposes of determining major source status the following shall not be included:

- any ERCs associated with the stationary source
- Emissions from non-road IC engines (i.e. IC engines at a particular site at the facility for less than 12 months)
- Fugitive emissions, except for the specific source categories specified in 40 CFR 51.165

Rule 2201 Major Source Determination (lb/year)						
	NO_X	SO_X	PM_{10}	$PM_{2.5}$	CO	VOC
SSPE1	1,821	0	55	55	1,077	100
SSPE2	1,821	0	25,101	25,101	1,077	36,892
Major Source Threshold	20,000	140,000	140,000	140,000	200,000	20,000
Major Source?	No	No	No	No	No	Yes

Note: $PM_{2.5}$ assumed to be equal to PM_{10}

As seen in the table above, the facility is not an existing Major Source for any pollutant; however, is becoming a Major Source for VOC emissions as a result of this project.

Rule 2410 Major Source Determination:

The facility or the equipment evaluated under this project is not listed as one of the categories specified in 40 CFR 52.21 (b)(1)(iii). Therefore the PSD Major Source threshold is 250 tpy for any regulated NSR pollutant.

PSD Major Source Determination (tons/year)						
	NO_2	VOC	SO_2	CO	PM	PM_{10}
Estimated Facility PE before Project Increase	0.9	0.1	0.0	0.5	0.0	0.0
PSD Major Source Thresholds	250	250	250	250	250	250
PSD Major Source?	No	No	No	No	No	No

As shown above, the facility is not an existing PSD major source for any regulated NSR pollutant expected to be emitted at this facility.

6. Baseline Emissions (BE)

The BE calculation (in lb/year) is performed pollutant-by-pollutant for each unit within the project to calculate the QNEC, and if applicable, to determine the amount of offsets required.

Pursuant to District Rule 2201, BE = PE1 for:

- Any unit located at a non-Major Source,
- Any Highly-Utilized Emissions Unit, located at a Major Source,
- Any Fully-Offset Emissions Unit, located at a Major Source, or
- Any Clean Emissions Unit, located at a Major Source.

otherwise,

BE = Historic Actual Emissions (HAE), calculated pursuant to District Rule 2201.

Since these are new emissions units, BE = PE1 = 0 for all pollutants.

7. SB 288 Major Modification

SB 288 Major Modification is defined in 40 CFR Part 51.165 as "any physical change in or change in the method of operation of a major stationary source that would result in a significant net emissions increase of any pollutant subject to regulation under the Act."

Since this facility is not an existing Major Source for any of the pollutants addressed in this project, this project does not constitute an SB 288 major modification.

8. Federal Major Modification

District Rule 2201 states that a Federal Major Modification is the same as a "Major Modification" as defined in 40 CFR 51.165 and part D of Title I of the CAA.

Since this facility is not an existing Major Source for any pollutants, this project does not constitute a Federal Major Modification.

9. New Major Source

The Federal offset quantity is only calculated for the pollutants for which the project is a new Major Source. The Federal offset quantity is the sum of the annual emission changes for all new and modified emission units in a project calculated as the potential to emit after the modification (PE2) minus the actual emissions (AE) during the baseline period for each emission unit times the applicable federal offset ratio. There are no special calculations performed for units covered by an SLC.

VOC **Federal Offset Ratio** **1.5**

Permit No.	Actual Emissions (lb/year)	Potential Emissions (lb/year)	Emissions Change (lb/yr)
S-8841-1-3	0	36,792	36,792
		Net Emission Change (lb/year):	36,792
		Federal Offset Quantity: (NEC * 1.5)	55,188

10. Rule 2410 – Prevention of Significant Deterioration (PSD) Applicability Determination

Rule 2410 applies to any pollutant regulated under the Clean Air Act, except those for which the District has been classified nonattainment. The pollutants which must be addressed in the PSD applicability determination for sources located in the SJV and which are emitted in this project are: (See 52.21 (b) (23) definition of significant)

- PM
- PM_{10}

I. Project Emissions Increase - New Major Source Determination

The post-project potentials to emit from all new and modified units are compared to the PSD major source thresholds to determine if the project constitutes a new major source subject to PSD requirements.

The facility or the equipment evaluated under this project is not listed as one of the categories specified in 40 CFR 52.21 (b)(1)(i). The PSD Major Source threshold is 250 tpy for any regulated NSR pollutant.

PSD Major Source Determination: Potential to Emit (tons/year)						
	NO_2	VOC	SO_2	CO	PM	PM_{10}
Total PE from New and Modified Units	0.0	18.4	0.0	0.0	12.5	12.5
PSD Major Source threshold	250	250	250	250	250	250
New PSD Major Source?	N	N	N	N	N	N

As shown in the table above, the potential to emit for the project, by itself, does not exceed any PSD major source threshold. Therefore Rule 2410 is not applicable and no further analysis is required.

10. Quarterly Net Emissions Change (QNEC)

The QNEC is calculated solely to establish emissions that are used to complete the District's PAS emissions profile screen. Detailed QNEC calculations are included in Appendix B.

VIII. Compliance Determination

Rule 1070 Inspections

This rule applies to any source operation which emits or may emit air contaminants.

This rule allows the District to perform inspections for the purpose of obtaining information necessary to determine whether air pollution sources are in compliance with applicable rules and regulations. The rule also allows the District to require record keeping, to make inspections and to conduct tests of air pollution sources. Therefore, the following conditions will be listed on each ATC to ensure compliance:

- Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to enter the permittee's premises where a permitted source is located or emissions related activity is conducted, or where records must be kept under condition of the permit. [District Rule 1070]
- Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit. [District Rule 1070]

Rule 2201 New and Modified Stationary Source Review Rule

A. Best Available Control Technology (BACT)

1. BACT Applicability

Pursuant to District Rule 2201, Section 4.1, BACT requirements are triggered on a pollutant-by-pollutant basis and on an emissions unit-by-emissions unit basis. Unless specifically exempted by Rule 2201, BACT shall be required for the following actions*:

a. Any new emissions unit with a potential to emit exceeding two pounds per day,
b. The relocation from one Stationary Source to another of an existing emissions unit with a potential to emit exceeding two pounds per day,
c. Modifications to an existing emissions unit with a valid Permit to Operate resulting in an Adjusted Increase in Permitted Emissions (AIPE) exceeding two pounds per day, and/or
d. Any new or modified emissions unit, in a stationary source project, which results in an SB 288 Major Modification or a Federal Major Modification, as defined by the rule.

*Except for CO emissions from a new or modified emissions unit at a Stationary Source with an SSPE2 of less than 200,000 pounds per year of CO.

a. New emissions units – PE > 2 lb/day

As seen in Section VII.C.2 above, the applicant is proposing to permit 10 new poultry layer houses each with a PE greater than 2 lb/day for VOC, PM_{10}, and NH_3 emissions. Therefore, BACT is triggered for VOC, PM_{10}, and NH_3 emissions.

b. Relocation of emissions units – PE > 2 lb/day

As discussed in Section I above, there are no emissions units being relocated from one stationary source to another; therefore BACT is not triggered.

c. Modification of emissions units – AIPE > 2 lb/day

As discussed in Section I above, there are no modified emissions units associated with this project. Therefore BACT is not triggered.

d. SB 288/Federal Major Modification

As discussed in Sections VII.C.7 and VII.C.8 above, this project does not constitute an SB 288 and/or Federal Major Modification for any pollutant. Therefore BACT is not triggered for any pollutant.

2. BACT Guideline

BACT Guideline 5.7.2 applies to poultry layer houses. Central Valley Eggs is proposing to permit 10 new poultry layer houses. Therefore, BACT Guideline 5.7.2 is applicable to these poultry layer houses and is included in Appendix C.

3. Top-Down BACT Analysis

Per Permit Services Policies and Procedures for BACT, a Top-Down BACT analysis shall be performed as a part of the application review for each application subject to the BACT requirements pursuant to the District's NSR Rule.

Pursuant to the attached Top-Down BACT Analysis (see Appendix D), BACT has been satisfied with the following:

PM_{10}: Completely enclosed mechanically ventilated layer housing with evaporative cooling pads, mixing fans, and a computer control system; and belt manure aeration/drying and removal system with manure removal at least twice per week.

VOC: Completely enclosed mechanically ventilated layer housing with evaporative cooling pads, mixing fans, and a computer control system; belt manure aeration/drying and removal system with manure removal at least twice per week; all birds fed in accordance with NRC or other District-approved guidelines; and all mortality removed from houses at least once per day.

NH_3: Completely enclosed mechanically ventilated layer housing with evaporative cooling pads, mixing fans, and a computer control system; belt manure aeration/drying and removal system with manure removal at least twice per week; all birds fed in accordance with NRC or other District-approved guidelines; and all mortality removed from houses at least once per day.

The following conditions will be included on the ATC S-8841-1-3 to ensure compliance with BACT requirements.

- Each poultry house shall be completely enclosed and mechanically ventilated with evaporative cooling pads, fans, and a computer control system. [District Rule 2201]
- Each poultry house shall be equipped with a belt manure aeration and removal system that advances by a minimum of half the length of the belt every 24 hours. [District Rule 2201]
- All mortality in each poultry house shall be removed at least once per day. [District Rule 2201]
- Permittee shall feed all animals according to National Research Council (NRC) guidelines. [District Rules 2201 and 4570]

B. Offsets

1. Offset Applicability

Pursuant to District Rule 2201, Section 4.5, offset requirements shall be triggered on a pollutant by pollutant basis and shall be required if the SSPE2 equals or exceeds the offset threshold levels in Table 4-1 of Rule 2201.

The SSPE2 is compared to the offset thresholds in the following table.

Offset Determination (lb/year)					
	NO_X	SO_X	PM_{10}	CO	VOC
SSPE2	1,821	0	25,101	1,077	36,892
Offset Thresholds	20,000	54,750	29,200	200,000	20,000
Offsets triggered?	No	No	No	No	Yes

2. Quantity of Offsets Required

As seen above, the SSPE2 is greater than the offset thresholds for VOC only. Therefore offset calculations will be required for this project.

The quantity of offsets in pounds per year for VOC is calculated as follows for sources with an SSPE1 less than the offset threshold levels before implementing the project being evaluated.

Offsets Required (lb/year) = [(SSPE2 – ROT + ICCE) x DOR]

Where,
SSPE2 = Post Project Stationary Source Potential to Emit
ROT = Respective Offset Threshold, for the respective pollutant
ICCE = Increase in Cargo Carrier Emissions
DOR = Distance Offset Ratio, determined pursuant to Section 4.8

Emergency equipment that is used exclusively as emergency standby equipment for electrical power generation or any other emergency equipment as approved by the APCO that does not operate more than 200 hours per year of non-emergency purposes and is not used pursuant to voluntary arrangements with a power supplier to curtail power, is exempt from providing emission offsets. Permit units S-8841-3 through -15 are for emergency standby IC engines and the emissions associated with these permit units will be excluded from the SSPE2 prior to calculating actual offset amounts.

Offsets Required (lb/year) = [(SSPE2 – Emergency Equipment – ROT + ICCE) x DOR]

SSPE2 (VOC)	= 36,892 lb/year
S-8841-3-0 to -15-0 (VOC)	= 100 lb/year
Offset threshold (VOC)	= 20,000 lb/year
ICCE	= 0 lb/year

In accordance with Rule 2201, Section 4.8.1, the DOR for VOC offsets for projects that are new Major Sources shall be 1.5:1. As shown in Section VII.C.8, this project constitutes a new Major Source for VOC emissions. Therefore, the DOR will be 1.5:1 and the total amount of VOC ERCs that need to be withdrawn for this project is:

Offsets Required (lb/year) = [(36,892 – 100 – 20,000 + 0) x 1.5]
= 16,792 x 1.5
= 25,188 lb-VOC/year

Calculating the appropriate quarterly emissions to be offset is as follows:

Quarterly offsets required (lb/qtr) = (25,188 lb-VOC/year) ÷ (4 quarters/year)
= 6,297.00 lb/qtr

Therefore the appropriate quarterly emissions to be offset for the poultry ranch are as follows:

1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total Annual
6,297	6,297	6,297	6,297	25,188

The applicant has stated that the facility plans to use ERC certificate S-4718-1 to offset the increases in VOC emissions associated with this project. The above certificate has available quarterly VOC credits as follows:

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
ERC #S-4718-1	14,082	14,082	14,082	14,082

As seen above, the facility has sufficient credits to fully offset the quarterly VOC emissions increases associated with this project.

Proposed Rule 2201 (offset) Conditions:

- Prior to operating equipment under this Authority to Construct, permittee shall surrender VOC emission reduction credits for the following quantity of emissions: 1st quarter – 6,297 lb, 2nd quarter – 6,297 lb, 3rd quarter – 6,297 lb, and 4th quarter – 6,297 lb. These amounts include the applicable offset ratio specified in Rule 2201 Section 4.8 (as amended 2/18/16). [District Rule 2201 and Public Resources Code 21000-21177: California Environmental Quality Act]
- ERC Certificate Number S-4718-1 (or a certificate split from this certificate) shall be used to supply the required offsets, unless a revised offsetting proposal is received and approved by the District, upon which this Authority to Construct shall be reissued, administratively specifying the new offsetting proposal. Original public noticing requirements, if any, shall be duplicated prior to reissuance of this Authority to Construct. [District Rule 2201 and Public Resources Code 21000-21177: California Environmental Quality Act]

C. Public Notification

1. Applicability

Pursuant to District Rule 2201, Section 5.4, public noticing is required for:

a. New Major Sources, Federal Major Modifications, and SB 288 Major Modifications,
b. Any new emissions unit with a Potential to Emit greater than 100 pounds during any one day for any one pollutant,
c. Any project which results in the offset thresholds being surpassed,
d. Any project with an SSIPE of greater than 20,000 lb/year for any pollutant, and/or
e. Any project which results in a Title V significant permit modification

a. New Major Sources, Federal Major Modifications, and SB 288 Major Modifications

New Major Sources are new facilities, which are also a Major Source and existing facilities which have a project with an increase in emissions greater than the respective Major Source threshold for any pollutant. Since this project has an increase in emissions greater than the Major Source for VOC emissions, public noticing is required for this project for New Major Source purposes.

As demonstrated in Sections VII.C.7 and VII.C.8, this project does not constitute an SB 288 or Federal Major Modification; therefore, public noticing for SB 288 or Federal Major Modification purposes is not required.

b. PE > 100 lb/day

Applications which include a new emissions unit with a PE greater than 100 pounds during any one day for any pollutant will trigger public noticing requirements.

As seen in Section VII.C.2 above, this project includes new laying hen house emission units which have daily emissions greater than 100 lb/day for NH_3 emissions, therefore public noticing for PE > 100 lb/day purposes is required.

c. Offset Threshold

Pursuant to District Rule 2201, Section 4.5.3, offset requirements shall be triggered on a pollutant-by-pollutant basis, unless exempted pursuant to Section 4.6, offsets shall be required if the post-project Stationary Source Potential to Emit (SSPE2) equals or exceeds specific threshold levels.

The following table compares the SSPE1 with the SSPE2 in order to determine if any offset thresholds have been surpassed with this project.

Offset Thresholds				
Pollutant	**SSPE1 (lb/year)**	**SSPE2 (lb/year)**	**Offset Threshold**	**Public Notice Required?**
NO_X	1,821	1,821	20,000 lb/year	No
SO_X	0	0	54,750 lb/year	No
PM_{10}	55	25,101	29,200 lb/year	No
CO	1,077	1,077	200,000 lb/year	No
VOC	100	36,892	20,000 lb/year	Yes

As detailed above, the offset threshold was surpassed for VOC with this project; therefore public noticing is required for offset purposes.

d. SSIPE > 20,000 lb/year

Public notification is required for any permitting action that results in a SSIPE of more than 20,000 lb/year of any affected pollutant. According to District policy, the SSIPE = SSPE2 – SSPE1. The SSIPE is compared to the SSIPE Public Notice thresholds in the following table.

SSIPE Public Notice Thresholds					
Pollutant	**SSPE2 (lb/year)**	**SSPE1 (lb/year)**	**SSIPE (lb/year)**	**SSIPE Public Notice Threshold**	**Public Notice Required?**
NO_x	1,821	1,821	0	20,000 lb/year	No
SO_x	0	0	0	20,000 lb/year	No
PM_{10}	25,101	55	25,046	20,000 lb/year	Yes
CO	1,077	1,077	0	20,000 lb/year	No
VOC	36,892	100	36,792	20,000 lb/year	Yes
NH_3	276,850	0	276,850	20,000 lb/year	Yes

As demonstrated above, the SSIPEs for PM_{10}, VOC and NH_3 are greater than 20,000 lb/year; therefore public noticing for SSIPE purposes is required.

e. Title V Significant Permit Modification

Since this facility does not have a Title V operating permit, this change is not a Title V significant Modification, and therefore public noticing is not required.

2. Public Notice Action

As discussed above, public noticing is required for this project for being a New Major Source, NH_3 emissions in excess of 100 lb/day, the VOC emission offset threshold being surpassed, and the SSIPE exceeding 20,000 lb/year for VOC, PM_{10}, and NH_3 emissions. Therefore, public notice documents will be submitted to the California Air Resources Board (CARB) and a public notice will be published in a local newspaper of general circulation prior to the issuance of the ATCs for this equipment.

D. Daily Emission Limits (DELs)

DELs and other enforceable conditions are required by Rule 2201 to restrict a unit's maximum daily emissions, to a level at or below the emissions associated with the maximum design capacity. The DEL must be contained in the latest ATC and contained in or enforced by the latest PTO and enforceable, in a practicable manner, on a daily basis. DELs are also required to enforce the applicability of BACT.

- No more than 330,000 birds shall be kept in each of the seven laying hen houses at any time. [District Rule 2201]
- No more than a combined total of 2,289,000 birds shall be kept in all of the seven laying hen houses at any time. [District Rule 2201]
- No more than a combined total of 2,168,690 birds shall be kept in all of the seven laying hen houses at any time based on a rolling 365 day average. [District Rule 2201]

- No more than 350,000 birds (chick starters or pullet growers) shall be kept in each of the three pullet houses at any time. For the purposes of this permit, chick starters are defined as birds from zero to six weeks of age and pullet growers are defined as birds from six weeks to 16 weeks of age. [District Rule 2201]
- Each pullet house shall not contain chick starters for more than 126 days per rolling 12-month period and pullet growers for more than 210 days per rolling 12-month period. [District Rule 2201]
- Emissions from each laying hen house shall not exceed any of the following limits: 0.02712 lb-PM_{10}/1,000 birds-day, 0.0404 lb-VOC/1,000 birds-day, or 0.250 lb-NH_3/1,000 birds-day. [District Rule 2201]
- Emissions from each pullet house shall not exceed any of the following limits: 1) Chick Starters: 0.00526 lb-PM_{10}/1,000 birds-day, 0.00784 lb-VOC/1,000 birds-day, or 0.1283 lb-NH_3/1,000 birds-day; and 2) Pullet Growers: 0.01152 lb-PM_{10}/1,000 birds-day, 0.01711 lb-VOC/1,000 birds-day, or 0.2811 lb-NH_3/1,000 birds-day. [District Rule 2201]
- Each poultry house shall be completely enclosed and mechanically ventilated with evaporative cooling pads, fans, and a computer control system. [District Rule 2201]
- Each poultry house shall be equipped with a belt manure aeration and removal system that advances by a minimum of half the length of the belt every 24 hours. [District Rule 2201]
- The tarp used to reduce PM emissions from the exhaust fans shall be inspected on a quarterly basis. The tarp shall be inspected thoroughly for rips, tears, leaks, or any evidence of structural failures that result in excessive PM emissions and shall be repaired or replaced as needed. [District Rule 2201]
- No bedding or litter materials shall be used on the bottom floor of the poultry houses at this facility. [District Rule 2201]
- All mortality in each poultry house shall be removed at least once per day. [District Rule 2201]
- Permittee shall feed all animals according to National Research Council (NRC) guidelines. [District Rules 2201 and 4570]
- Permittee shall use drinkers that do not drip continuously. [District Rules 2201 and 4570]
- Permittee shall inspect water pipes and drinkers and repair leaks daily. [District Rules 2201 and 4570]
- Permittee shall feed animals probiotics designed to improve digestion according to manufacturer recommendations. [District Rules 2201 and 4570]
- Permittee shall feed animals an amino acid supplemented diet. [District Rules 2201 and 4570]
- Permittee shall feed animals additives such as amylase, xylanase, and protease, designed to maximize digestive efficiency. [District Rules 2201 and 4570]
- The open end of each poultry house shall be equipped with a tarp covering approximately 40% of the upper part of the opening. The open end shall also be equipped with water sprays installed under the bottom edge of the tarp to reduce particulate matter (PM) emissions from the exhaust fans. The water sprays shall operate at all times, except during periods of actual rainfall. [District Rule 2201]
- The water sprays used to reduce PM emissions from the exhaust fans shall be inspected on a quarterly basis. The water spray nozzles shall be inspected thoroughly for leaks, clogs, or any evidence of structural failures that result in excessive PM emissions and shall be repaired or replaced as needed. [District Rule 2201]

- Permittee shall maintain records of inspections, maintenance, repair, and replacement of the tarps and water spray nozzles used to reduce PM emissions from the exhaust fans. The records shall include the dates of inspections and a description of any corrective actions taken. [District Rule 2201]

E. Compliance Assurance

1. Source Testing

Per District Policy APR 1705, Source Testing, there are no specific source testing requirements for laying hen ranches or poultry houses. However, District Policy APR 1705, Section I.D states that when permit applicants propose emission factors that are new or are different from those typically used for similar sources, initial source testing shall be required. Central Valley Eggs has state of the art, cage-free aviary style laying hen houses at this facility that are expected to have low PM_{10} and NH_3 emission rates as compared to other similar poultry houses. This type of operation is new to the District and established reference materials for the expected emissions from this style of house are not well documented or readily available. Therefore, initial source testing for PM_{10} and NH_3 emissions was required for at least one of the proposed laying hen houses.

District Policy APR 1705, Section I.E. states that when establishing source testing requirements, it must be noted that certain types of equipment do not lend themselves to source testing. Large sources (i.e. too big for total enclosure) of fugitive emissions without a stack are an example of such sources. Central Valley Eggs proposed in previous projects to operate each poultry house with up to 48 exhaust fans blowing the air exiting the open end of the houses. The houses are not equipped with exhaust stacks. In addition, the potentially large volume of airflow exiting the open end of each house makes it hard to capture and monitor the emission rates being generated. Therefore, this type of operation does not lend itself readily to source testing and periodic annual source testing to verify the PM_{10} and NH_3 emission factors will not be required for this operation.

Since an initial source test has already been performed for this operation and periodic annual source testing is not required, there are no additional source test requirements for Rule 2201.

2. Monitoring

The capacity of the new poultry ranch under this project will result in the facility becoming subject to District Rule 4570 - Confined Animal Facilities.

The poultry houses will be required to utilize water sprays over the open ends of each house where the exhaust air escapes to the atmosphere to further reduce PM_{10} emissions. As discussed above, all of the emissions generating activities occur within each poultry house. Therefore, the following monitoring conditions will be included on the ATC:

- Permittee shall inspect water pipes and drinkers and repair leaks daily. [District Rules 2201 and 4570]
- The tarp used to reduce PM emissions from the exhaust fans shall be inspected on a quarterly basis. The tarp shall be inspected thoroughly for rips, tears, leaks, or any evidence of structural failures that result in excessive PM emissions and shall be repaired or replaced as needed. [District Rule 2201]
- The water sprays used to reduce PM emissions from the exhaust fans shall be inspected on a quarterly basis. The water spray nozzles shall be inspected thoroughly for leaks, clogs, or any evidence of structural failures that result in excessive PM emissions and shall be repaired or replaced as needed. [District Rule 2201]

3. Recordkeeping

Recordkeeping is required to demonstrate compliance with the offset, public notification and daily emission limit requirements of Rule 2201. The following condition will be listed on the ATC:

- Permittee shall maintain records of inspections, maintenance, repair, and replacement of the tarps and water spray nozzles used to reduce PM emissions from the exhaust fans. The records shall include the dates of inspections and a description of any corrective actions taken. [District Rule 2201]
- Permittee shall maintain records to demonstrate that the belt manure aeration and removal system advances by a minimum of half of its length every 24 hours. [District Rule 2201]
- Permittee shall maintain quarterly records of maintenance and repair activities associated with the belt manure aeration and removal system that includes the dates of maintenance and repair, and a description of any corrective actions taken. [District Rule 2201]
- Permittee shall maintain records of feed content, formulation, and quantity of feed additive utilized, to demonstrate compliance with National Research Council (NRC) guidelines. Records such as feed company guaranteed analyses (feed tags), ration sheets, or feed purchase records may be used to meet this requirement. [District Rules 2201 and 4570]
- Permittee shall maintain daily records of mortality removal in each poultry house. [District Rule 2201]
- Permittee shall maintain records of dates manure is removed from each poultry house. [District Rule 2201]
- Permittee shall maintain records indicating that water pipes and drinkers are inspected daily, and that any leaks are repaired. [District Rules 2201 and 4570]
- Permittee shall maintain records to demonstrate animals are fed probiotics designed to improve digestion. Records such as feed company guaranteed analyses (feed tags), ration sheets, or feed purchase records may be used to meet this requirement. [District Rules 2201 and 4570]
- Permittee shall maintain records to demonstrate animals are fed an amino acid supplemented diet. Records such as feed company guaranteed analyses (feed tags), ration sheets, or feed purchase records may be used to meet this. [District Rules 2201 and 4570]

- Permittee shall maintain records that demonstrate animals are fed feed additives such as amylase, xylanase, and protease. Records such as feed company guaranteed analyses (feed tags), ration sheets, or feed purchase records may be used to meet this. [District Rules 2201 and 4570]
- Permittee shall maintain daily records of the number of animals of each species and production group at the facility and records of any changes to this information. For the pullet houses, the permittee shall also maintain records of the age of birds, the growing stage the birds are in, and the total number of days each growing stage has been housed for the current rolling 12-month period. [District Rules 2201 and 4570]
- Permittee shall maintain daily records of the total number of birds kept in all seven laying hen houses. [District Rule 2201]
- Permittee shall maintain daily records of the rolling 365-day average of total number of birds kept in all seven laying hen houses. [District Rule 2201]
- Permittee shall keep and maintain all records for a minimum of five (5) years and shall make records available to the APCO and EPA upon request. [District Rules 2201 and 4570]

4. Reporting

No reporting is required to demonstrate compliance with Rule 2201.

F. Ambient Air Quality Analysis (AAQA)

Section 4.14 of District Rule 2201 requires that an AAQA be conducted for the purpose of determining whether a new or modified Stationary Source will cause or make worse a violation of an air quality standard. The District's Technical Services Division conducted the required analysis. Refer to Appendix E of this document for the AAQA summary sheet.

The proposed location is in an attainment area for NO_X, CO, and SO_X. As shown by the AAQA summary sheet the proposed equipment will not cause a violation of an air quality standard for NO_X, CO, or SO_X.

The proposed location is in a non-attainment area for the state's PM_{10} as well as federal and state $PM_{2.5}$ thresholds. As shown by the AAQA summary sheet the proposed equipment will not cause a violation of an air quality standard for PM_{10} and $PM_{2.5}$.

The following condition will be included on the proposed ATC:

- Issuance of any Authority to Construct (ATC) permit(s) or any construction that results in a further increase in the number of laying hens, pullets, or poultry houses at this facility such as described in the proposal for District ATC Project S-1183494, or the District CEQA document prepared for the project, shall be treated and analyzed as a part of ATC Project S-1183494 for New and Modified Source Review (NSR) purposes to ensure that the cumulative emissions from the overall project will not cause or make worse a violation of an Ambient Air Quality Standard. [District Rule 2201 and California Environmental Quality Act]

G. Compliance Certification

Section 4.15.2 of this Rule requires the owner of a new Major Source or a source undergoing a Federal Major Modification to demonstrate to the satisfaction of the District that all other Major Sources owned by such person and operating in California are in compliance or are on a schedule for compliance with all applicable emission limitations and standards. As discussed in Section VIII above, this facility is a new Major Source, therefore this requirement is applicable. Central Valley Eggs statewide compliance certification is included in Appendix F.

H. Alternate Siting Analysis

Section 4.15.1 of this Rule requires the owner of a new Major Source or a source undergoing a Federal Major Modification states that an owner must perform the following analysis:

Alternative siting: For those sources for which an analysis of alternative sites, sizes, and production processes is required under Section 173 of the Federal Clean Air Act, the applicant shall prepare an analysis functionally equivalent to the requirements of Division 13, Section 21000 et. seq. of the Public Resources Code.

Recent studies have shown that California's egg demand requires approximately 35 million laying hens. State inventories and industry estimates show that the actual number of laying hens currently located within the state to be at only 50% of the demand level. In order to help the state meet its egg demands, Central Valley Eggs will be applying for multiple laying hen ranches in the Central Valley to reduce the volume of eggs imported from other states. The first proposed site will be located in the southern valley (Kern County). Other future sites will be located north of Kern County as appropriate to minimize truck traffic and shipping costs.

Central Valley Eggs evaluated all sites within Kern County that met their minimum size requirements of 150 acres and had adequate water supplies. Site selection was also based on sites that meet all of the requirements of Kern County Zoning Ordinance, Chapter 19.12.130, Section E: "Permitting of Commercial Poultry Farms". Through this evaluation, Central Valley Eggs found two sites that satisfied all of their requirements and were for sale. They purchased both sites, and will be permitting both locations as poultry ranches, the first site in this project and the second site in a future project. Central Valley Eggs has satisfied the alternative siting analysis requirements for this project (see more detailed Alternative Siting Analysis discussion provided by Central Valley Eggs in Appendix G).

Rule 2410 Prevention of Significant Deterioration

As shown in Section VII.C.9 above, this project does not result in a new PSD major source or PSD major modification. No further discussion is required.

Rule 2520 Federally Mandated Operating Permits

As discussed above, this facility is a major source. Pursuant to Rule 2520 and as required by permit condition, the facility will have up to 12 months from the date of ATC issuance to either submit a Title V Application or comply with District Rule 2530 Federally Enforceable Potential to Emit. The facility has already submitted Title V application under project S-1174067; therefore, compliance with this rule is expected.

Rule 4001 New Source Performance Standards (NSPS)

This rule incorporates NSPS from Part 60, Chapter 1, Title 40, Code of Federal Regulations (CFR); and applies to all new sources of air pollution and modifications of existing sources of air pollution listed in 40 CFR Part 60.

No subparts of 40 CFR Part 60 apply to poultry houses. Therefore, the requirements of Rule 4001 are not applicable to the operation.

Rule 4002 National Emission Standards for Hazardous Air Pollutants (NESHAPs)

This rule incorporates NESHAPs from Part 61, Chapter I, Subchapter C, Title 40, CFR and the NESHAPs from Part 63, Chapter I, Subchapter C, Title 40, CFR; and applies to all sources of hazardous air pollution listed in 40 CFR Part 61 or 40 CFR Part 63.

No subparts of 40 CFR Part 61 or 40 CFR Part 63 apply to poultry houses. Therefore, the requirements of Rule 4002 are not applicable to the operation.

Rule 4101 Visible Emissions

Rule 4101 states that no person shall discharge into the atmosphere emissions of any air contaminant aggregating more than 3 minutes in any hour which is as dark as or darker than Ringelmann 1 or 20% opacity.

Pursuant to Section 4.12, emissions subject to or specifically exempt from Regulation VIII (Fugitive PM_{10} Prohibitions) are exempt from this regulation. According to District Rule 8011, Section 4.0 - Exemptions, On-field agricultural sources are exempt from the provisions of Regulation VIII.

District Rule 8011, Section 3.34 defines an Off-field Agricultural Source as any agricultural source that meets the definition of: outdoor handling, storage and transport of bulk material; paved road; unpaved road; or unpaved vehicle/equipment traffic area. District Rule 8011, Section 3.35 defines an On-field Agricultural Source as any agricultural source that is not an off-field agricultural source. Therefore, this rule does not apply to the activities conducted solely for the raising of poultry.

Rule 4102 Nuisance

Rule 4102 prohibits discharge of air contaminants which could cause injury, detriment, nuisance or annoyance to the public. Public nuisance conditions are not expected as a result of these operations, provided the equipment is well maintained. Therefore, compliance with this rule is expected.

California Health & Safety Code 41700 (Health Risk Assessment)

District Policy APR 1905 – *Risk Management Policy for Permitting New and Modified Sources* specifies that for an increase in emissions associated with a proposed new source or modification, the District perform an analysis to determine the possible impact to the nearest resident or worksite.

A health risk assessment (HRA) is not required for a project with a total facility prioritization score of less than one. According to the Technical Services Memo for this project (**Appendix E**), the total facility prioritization score including this project was greater than one. Therefore, an HRA was required to determine the short-term acute and long-term chronic exposure from this project. The results of the HRA are summarized in the table below.

Project HRA Summary		
Categories	**10 New Poultry Houses**	**Facility Totals**
Prioritization Score	>1.0	>1.0
Acute Hazard Index	0.45	0.89
Chronic Hazard Index	0.08	0.41
Maximum individual Cancer Risk (10^{-6})	2.69E-06	3.62E-06
T-BACT Required?	**No**	
Special Permit Conditions?	**Yes**	

Discussion of T-BACT

BACT for toxic emission control (T-BACT) is required if the cancer risk exceeds one in one million. As demonstrated above, T-BACT is not required for this project because the HRA indicates that the risk is not above the District's thresholds for triggering T-BACT requirements; therefore, compliance with the District's Risk Management Policy is expected.

District policy APR 1905 also specifies that the increase in emissions associated with a proposed new source or modification not have acute or chronic indices, or a cancer risk greater than the District's significance levels (i.e. acute and/or chronic indices greater than 1 and a cancer risk greater than 20 in a million). As outlined by the HRA Summary in Appendix E of this report, the emissions increases for this project was determined to be less than significant.

Rule 4201 Particulate Matter Concentration

Section 3.1 prohibits discharge of dust, fumes, or total particulate matter into the atmosphere from any single source operation in excess of 0.1 grain per dry standard cubic foot.

Maximum PM emission rate for each proposed house (Assuming PM is 250% of PM_{10})

= 8.9 lb-PM_{10}/day x 2.5 lb-PM/lb-PM_{10} = 21.4 lb-PM/day

Each of the proposed laying hen houses will be equipped with 48 exhaust fans, each capable of an air flow rate of 26,200 cfm. Each of the pullet houses will be equipped with 38 exhaust fans. Although multiple fans will always be operating for the health of the birds, for the purpose of Rule 4201 compliance calculations, it will conservatively be assumed that only one fan is operating in each house, resulting in a minimum air flow rate of 26,200 cfm for each house.

Minimum house ventilation rate: = 26,200 scfm

PM Conc. (gr/scf) = [(21.4 lb/day) x (7,000 gr/lb)] ÷ [(26,200 ft^3/min) x (60 min/hr) x (24 hr/day)] = 0.0040 gr/scf

PM Conc. = 0.0040 gr/scf < 0. 1 gr/scf

As shown above, PM emissions concentrations from each of the poultry houses are below the applicable limit. Therefore, compliance with the requirements of this rule is expected.

Rule 4550 Conservation Management Practices (CMP)

This rule applies to agricultural operation sites located within the San Joaquin Valley Air Basin. The purpose of this rule is to limit fugitive dust emissions from agricultural operation sites.

Pursuant to Section 4.0, the provisions of this rule apply to agricultural sources where the total acreage of all agricultural parcels is 100 or more acres (excluding the animal feeding operation and exempted lands) and to animal feeding operations with at least 82,000 laying hens. This facility is proposing to house 2,289,000 laying hens and 1,050,000 brooders/pullets at this facility. Therefore, this rule applies to the laying hen ranch.

Pursuant to Section 5.1, effective on and after July 1, 2004, an owner/operator shall implement the applicable CMPs selected pursuant to Section 6.2.

Pursuant to Section 5.2, an owner/operator shall prepare and submit a CMP application for each agricultural operation site to the APCO for approval.

Pursuant to Section 6.3.3, an owner/operator shall submit a CMP application to the APCO within 90 days for an agricultural operation site or an agricultural parcel that is acquired or becomes subject to the provisions of Section 5.0 after October 31, 2004.

The facility has received approval of their current CMP plan on September 11, 2017. Continued compliance with the requirements of District Rule 4550 is expected.

Rule 4570 Confined Animal Facilities (CAF)

This rule applies to Confined Animal Facilities (CAFs) located within the San Joaquin Valley Air Basin. The purpose of this rule is to limit emissions of Volatile Organic Compounds (VOC) from CAFs.

Pursuant to Section 5.1, owners/operators of any CAF shall submit, for approval by the APCO, a permit application for each CAF. This facility has submitted an ATC application to authorize the installation of this CAF. Therefore, this requirement is satisfied.

Pursuant to Section 5.1.2, a thirty-day public noticing and commenting period shall be required for all large CAFs receiving their initial Permit-to-Operate or Authority-to-Construct. For poultry facilities, a large CAF is defined as a facility with at least 650,000 birds. The proposed project will result in Central Valley Eggs becoming a large CAF. However, the facility has already gone through public notice for compliance with the District Rule 4570 in project S-1161654; therefore, 30-day public notice will not be required for this project.

Pursuant to Section 5.1.3, owners/operators shall submit a facility emissions mitigation plan of the Permit-to-Operate application or Authority-to-Construct application. The mitigation plan shall contain the following information:

- The name, business address, and phone number of the owners/operators responsible for the preparation and the implementation of the mitigation measures listed in the permit.
- The signature of the owners/operators attesting to the accuracy of the information provided and adherence to implementing the activities specified in the mitigation plan at all times and the date that the application was signed.
- A list of all mitigation measures shall be chosen from the application portions of Sections 5.5 or 5.6.

The facility has submitted a District-approved Rule 4570 Phase II compliance application form under project S-1161654, which includes the required information listed above. Therefore, this section is satisfied.

Pursuant to Sections 5.1.4 through 5.1.6, the Permit-to-Operate or Authority-to-Construct application shall include the following information, which is in addition to the facility emission mitigation plan:

- The maximum number of animals at the facility in each production stage (facility capacity).
- Any other information necessary for the District to prepare an emission inventory of all regulated air pollutants emitted from the facility as determined by the APCO.
- The approved mitigation measures from the facility's mitigation plan will be listed on the Permit to Operate or Authority-to-Construct as permit conditions.
- The District shall act upon the Authority to Construct application or Permit to Operate application within six (6) months or receiving a complete application.

The facility's ATC application form includes the required information listed above. Therefore, this section is satisfied.

Pursuant to Section 5.3, owners/operators of any CAF shall implement all VOC emission mitigation measures, as contained in the permit application, on and after 365 days from the date of issuance of either the Authority-to-Construct or the Permit-to Operate whichever is sooner.

The feed and housing mitigation measures selected by the facility will directly affect the VOC emission factor, which is used to calculate the potential to emit and determine the health risk for this project. Therefore, all of the Rule 4570 mitigation measures will be required to be implemented immediately instead of within the first 365 days of ATC or PTO issuance.

Pursuant to Section 5.4, an owner/operator may temporarily suspend use of mitigation measure(s) provided all of the following requirements are met:

- It is determined by a licensed veterinarian, certified nutritionist, CDFA, or USDA that any mitigation measure being suspended is detrimental to animal health or necessary for the animal to molt, and a signed written copy of this determination shall be retained on-site and made available for inspection upon request.
- The owner/operator notifies the District, within forty-eight (48) hours of the determination that the mitigation measure is being temporarily suspended; the specific health condition requiring the mitigation measure to be suspended; and the duration that the measure must be suspended for animal health reasons,
- The emission mitigation measure is not suspended for longer than recommended by the licensed veterinarian or certified nutritionist for animal health reasons,
- If such a situation exists, or is expected to exist for longer than thirty (30) days, the owners/operators shall, within that thirty (30) day period, submit a new emission mitigation plan designating a mitigation measure to be implemented in lieu of the mitigation measure that was suspended, and
- The APCO, ARB, and EPA approve the temporary suspension of the mitigation measure for the time period requested by the owner/operator and a signed written copy of this determination shall be retained on site.

The following condition will be placed on the ATC:

- If a licensed veterinarian or a certified nutritionist determines that any VOC mitigation measure will be required to be suspended as a detriment to animal health or necessary for the animal to molt, the owners/operators must notify the District in writing within forty-eight (48) hours of the determination including the duration and the specific health condition requiring the mitigation measure to be suspended. If the situation is expected to exist longer than a thirty-day (30) period, the permittee shall submit a new emission mitigation plan designating a mitigation measure to be implemented in lieu of the suspended mitigation measure. [District Rules 2201 and 4570]

Section 5.5 lists Phase I mitigation measures. Per the compliance schedule listed in Section 8 of this rule, the facility is subject to the Phase II mitigation measures listed in Section 5.6. Therefore, Section 5.5 no longer applies.

Central Valley Eggs has chosen the following mitigation measures to comply with Section 5.6. All conditions required for compliance with Rule 4570 for the mitigation measures selected by the applicant are shown immediately below the selected mitigation measure. These conditions will be placed on the appropriate permits.

Layer Feed

Feed according to National Research Council (NRC) guidelines.

- Permittee shall feed all animals according to National Research Council (NRC) guidelines. [District Rules 2201 and 4570]
- Permittee shall maintain records of feed content, formulation, and quantity of feed additive utilized, to demonstrate compliance with National Research Council (NRC) guidelines. Records such as feed company guaranteed analyses (feed tags), ration sheets). [District Rules 2201 and 4570]

Feed animals probiotics designed to improve digestion according to manufacturer recommendations.

- Permittee shall feed animals probiotics designed to improve digestion according to manufacturer's recommendations. [District Rules 2201 and 4570]
- Permittee shall maintain records to demonstrate animals are fed probiotics designed to improve digestion. Records such as feed company guaranteed analyses (feed tags), ration sheets, or feed purchase records may be used to meet this requirement. [District Rules 2201 and 4570]

Feed animals an amino acid supplemented diet to meet their nutrient requirements.

- Permittee shall feed animals an amino acid supplemented diet. [District Rules 2201 and 4570]
- Permittee shall maintain records to demonstrate animals are fed an amino acid supplemented diet. Records such as feed company guaranteed analyses (feed tags), ration sheets, or feed purchase records may be used to meet this. [District Rules 2201 and 4570]

Feed animals feed additives such as amylase, xylanase, and protease, designed to maximize digestive efficiency according to manufacturer recommendations.

- Permittee shall feed animals additives such as amylase, xylanase, and protease, designed to maximize digestive efficiency. [District Rules 2201 and 4570]

- Permittee shall maintain records that demonstrate animals are fed feed additives such as amylase, xylanase, and protease. Records such as feed company guaranteed analyses (feed tags), ration sheets, or feed purchase records may be used to meet this. [District Rules 2201 and 4570]

Layer Housing

Use drinkers that do not drip continuously.

- Permittee shall use drinkers that do not drip continuously. [District Rules 2201 and 4570]

Inspect water pipes and drinkers and repair leaks daily.

- Permittee shall inspect water pipes and drinkers and repair leaks daily. [District Rules 2201 and 4570]
- Permittee shall maintain records indicating that water pipes and drinkers are inspected daily, and that any leaks are repaired. [District Rules 2201 and 4570]

Solid Waste Management

Remove litter/manure from the facility within seventy-two (72) hours of removal from housing or Within seventy two (72) hours of removal of solid manure from housing, cover litter/manure outside the housing with a weatherproof covering from October through May, except for times when wind events remove the covering, not to exceed twenty-four (24) hours per event.

- Within seventy two (72) hours of removal of solid manure from housing, permittee shall either 1) remove all litter/manure from the facility, or 2) cover litter/manure outside the housing with a weatherproof covering from October through May, except for times when wind events remove the covering, not to exceed twenty-four (24) hours per event. [District Rule 4570]
- Permittee shall keep records of dates when litter/manure is removed from the facility; manure hauling invoices may be used to meet this requirement, or permittee shall maintain records to demonstrate that litter/manure piles outside the houses are covered with a weatherproof covering from October through May. [District Rule 4570]
- If weatherproof covering is used, permittee shall maintain records, such as manufacturer warranties or other documentation, demonstrating that the weatherproof covering over litter/manure are installed, used, and maintained in accordance with manufacturer recommendations and applicable standards listed in NRCS Field Office Technical Guide Code 313 or 367, or any other applicable standard approved by the APCO, ARB, and EPA. [District Rule 4570]

Section 7.1 lists recordkeeping requirements for CAFs claiming exemption pursuant to Section 4.0 of this rule. This facility is not claiming an exemption from this rule. Therefore, this section does not apply.

Section 7.2 lists the following general records for CAFs subject to Section 5.0 requirements:

- Copies of all of the facility's permits
- Copies of all laboratory tests, calculations, logs, records, and other information required to demonstrate compliance with all applicable requirements of this rule, as determined by the APCO, ARB, and EPA.
- Records of the number of animals of each species and production group at the facility on the permit issuance date. Quarterly records of any changes to this information shall also be maintained.

The following condition will be placed on the layer housing permit:

- Permittee shall maintain monthly records of the number of animals of each species and production group at the facility and records of any changes to this information. For the pullet houses, the permittee shall also maintain records of the age of birds, the growing stage the birds are in, and the total number of days each growing stage has been housed for the current rolling 12-month period. [District Rules 2201 and 4570]

Additional recordkeeping and monitoring conditions required to demonstrate compliance with this rule are shown above under the Section 5.6 discussion under the appropriate mitigation measures.

Pursuant to Section 7.9, owners/operators of a CAF subject to the requirements of Section 5.0 shall keep and maintain the required records in Sections 7.1 through 7.8.4, as applicable, for a minimum of five (5) years and the records shall be made available to the APCO and EPA upon request. Therefore, the following condition will be placed on the permit:

- Permittee shall keep and maintain all records for a minimum of five (5) years and shall make records available to the APCO and EPA upon request. [District Rules 2201 and 4570]

Section 7.10 requires specific monitoring or source testing conditions for each mitigation measure. These conditions are shown above under the Section 5.6 discussion under the appropriate mitigation measures.

California Health & Safety Code 42301.6 (School Notice)

The District has verified that this site is not located within 1,000 feet of a school. Therefore, pursuant to California Health and Safety Code 42301.6, a school notice is not required.

California Environmental Quality Act (CEQA)

CEQA requires each public agency to adopt objectives, criteria, and specific procedures consistent with CEQA Statutes and the CEQA Guidelines for administering its responsibilities under CEQA, including the orderly evaluation of projects and preparation of environmental documents. The District adopted its *Environmental Review Guidelines* (ERG) in 2001. The basic purposes of CEQA are to:

- Inform governmental decision-makers and the public about the potential, significant environmental effects of proposed activities;
- Identify the ways that environmental damage can be avoided or significantly reduced;
- Prevent significant, avoidable damage to the environment by requiring changes in projects through the use of alternatives or mitigation measures when the governmental agency finds the changes to be feasible; and
- Disclose to the public the reasons why a governmental agency approved the project in the manner the agency chose if significant environmental effects are involved.

Greenhouse Gas (GHG) Significance Determination

It is determined that no other agency has or will prepare an environmental review document for the project. Thus the District is the Lead Agency for this project.

Project specific impacts on global climate change were evaluated consistent with the adopted District policy – *Addressing GHG Emission Impacts for Stationary Source Projects Under CEQA When Serving as the Lead Agency*. The District's engineering evaluation (this document – Appendix H) demonstrates that project specific greenhouse gas emissions will be reduced by 29%, compared to business-as-usual. The District therefore concludes that the project would have a less than cumulatively significant impact on global climate change.

District CEQA Findings

The District determined that no other agency has broader discretionary approval power over the project and that the District is the first agency to act on the project, therefore establishing the District as the Lead Agency for the project (CEQA Guidelines §15051(b). An Initial Study was prepared, which demonstrated that through a combination of project design elements, compliance with District rules, permit conditions, and mitigation measures, the project would have a less than significant effect on the environment. Consistent with CEQA Guidelines §15070(b)(1), a Proposed Mitigated Negative Declaration was prepared and released for public review from September 14, 2016 to October 17, 2016. No comments were received during the public review period, and the Final Mitigated Negative Declaration was published in November 2016. The ATCs in project S-1180558 are covered under this Final Mitigated Negative Declaration.

Indemnification Agreement/Letter of Credit Determination

According to District Policy APR 2010 (CEQA Implementation Policy), when the District is the Lead or Responsible Agency for CEQA purposes, an indemnification agreement and/or a letter of credit may be required. The decision to require an indemnity agreement and/or a letter of credit is based on a case-by-case analysis of a particular project's potential for litigation risk, which in turn may be based on a project's potential to generate public concern, its potential for significant impacts, and the project proponent's ability to pay for the costs of litigation without a letter of credit, among other factors.

The criteria pollutant emissions and toxic air contaminant emissions associated with the proposed project are not significant, and there is minimal potential for public concern for this particular type of facility/operation. Therefore, an indemnification agreement and/or letter of credit will not be required for this project in the absence of expressed public concern.

The following conditions will be included on each ATC to assure compliance with the CEQA mitigation measure requirements:

- Prior to operating equipment under this Authority to Construct, permittee shall surrender VOC emission reduction credits for the following quantity of emissions: 1st quarter - 6,297 lb, 2nd quarter - 6,297 lb, 3rd quarter - 6,297 lb, and 4th quarter - 6,297 lb. These amounts include the applicable offset ratio specified in Rule 2201 Section 4.8 (as amended 2/18/16). [District Rule 2201 and Public Resources Code 21000-21177: California Environmental Quality Act]
- ERC Certificate Number S-4718-1 (or a certificate split from this certificate) shall be used to supply the required offsets, unless a revised offsetting proposal is received and approved by the District, upon which this Authority to Construct shall be reissued, administratively specifying the new offsetting proposal. Original public noticing requirements, if any, shall be duplicated prior to reissuance of this Authority to Construct. [District Rule 2201 and Public Resources Code 21000-21177: California Environmental Quality Act]
- A Qualified Biologist will conduct a focused pre-construction survey to determine the presence/absence of potential impacts on sensitive species prior to the onset of ground disturbance. The survey shall be conducted in accordance with the standard protocol of the U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Wildlife (CDFW). If more than 30 days pass before the onset of ground disturbance, an additional survey shall be conducted by a Qualified Biologist within 30 days prior to the onset of ground disturbance. Permittee shall make all biological surveys available to District staff upon request. [*Public Resources Code 21000-21177: California Environmental Quality Act*]
- A biological monitor will be present while ground-disturbing activities are occurring based on the sensitivity of the habitat in which a project occurs. [*Public Resources Code 21000-21177: California Environmental Quality Act*]

- In the event that archaeological resources are discovered during ground-disturbing activities, all work within 100 feet of the find shall cease and the Permittee shall notify and retain a qualified archaeologist to assess and provide an evaluation of the significance of the find. A qualified archaeologist shall determine whether avoidance is necessary and feasible in light of the factors such as the nature of the find, project design, costs, and other considerations, and, if necessary, develop appropriate mitigation measures in consultation with Kern County and the Native American Heritage Commission (NAHC). In addition, should archaeological resources be discovered, the Permittee shall provide the District a written report in relation to the nature of the find. [*Public Resources Code 21000-21177: California Environmental Quality Act*]
- In the event that paleontological resources are discovered during ground-disturbing activities, all work within 100 feet of the find shall cease and the Permittee shall notify and retain a qualified paleontologist to assess and provide an evaluation of the significance of the find. A qualified paleontologist shall determine whether avoidance is necessary and feasible in light of the factors such as the nature of the find, project design, costs, and other considerations, and, if necessary, develop appropriate mitigation measures in consultation with Kern County and the Native American Heritage Commission (NAHC). In addition, should paleontological resources be discovered, Permittee shall provide the District a written report in relation to the nature of the find. [*Public Resources Code 21000-21177: California Environmental Quality Act*]
- In the event that human remains are discovered during ground-disturbing activities, all work within 100 feet of the find shall cease and the discovery shall immediately be reported to the County Coroner (CC) and Native American Heritage Commission (NAHC) for further assessment. Permittee shall identify appropriate measures for treatment or disposition of the remains in consultation with the CC and NAHC. In addition, should human remains be discovered during ground-disturbing activities, Permittee shall provide the District a written report in relation to the nature of the find. [*Public Resources Code 21000-21177: California Environmental Quality Act*]
- In the event that tribal cultural resources are discovered during ground-disturbing activities, all work within 100 feet of the find shall cease and the Permittee shall notify and retain a qualified archaeologist to assess and provide an evaluation of the significance of the find. A qualified Native American Organization shall determine whether avoidance is necessary and feasible in light of the factors such as the nature of the find, project design, costs, and other considerations, and, if necessary, develop appropriate mitigation measures in consultation with Kern County and the NAHC. In addition, should tribal cultural resources be discovered, the Permittee shall provide the District a written report in relation to the nature of the find. [*Public Resources Code 21000-21177: California Environmental Quality Act*]

IX. Recommendation

Compliance with all applicable rules and regulations is expected. Pending a successful NSR Public Noticing period, issue ATC S-8841-1-3 subject to the permit conditions on the attached draft ATC in Appendix I.

X. Billing Information

Annual Permit Fees			
Permit Number	**Fee Schedule**	**Fee Description**	**Annual Fee**
S-8841-1-3	3020-01-F	561 electrical hp	$698

Appendices

A: Uncontrolled VOC Emission Factor Reference
B: Quarterly Net Emissions Change (QNEC)
C: BACT Guideline
D: BACT Analysis
E: Health Risk Assessment (HRA) and Ambient Air Quality Analysis (AAQA) Summaries
F: Statewide Compliance Certification
G: Central Valley Eggs Alternative Siting Analysis
H: Greenhouse Gas (GHG) Impacts Analysis
I: Draft ATC

APPENDIX A

Uncontrolled VOC Emission Factor Reference

FINAL REPORT: Quantification of Gaseous Emissions from California Broiler Production Houses

May 6, 2005

Project Participants:

AIRx Testing
California Air Resources Board
California Department of Food and Agriculture
California Poultry Federation
Foster Farms
University of California, Davis - Animal Science

Primary Report Author:

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Kevin Clutter
Pacific Egg and Poultry Association

Dr. Ralf Ernst
Animal Science Department, University of California, Davis

Daby Humbert
Zacky Farms

Abstract

Methods and equipment were developed to analyze emissions from a broiler production house utilizing standard source test methods. A test stack was designed and fabricated to meet engineering testing criteria for fan exhaust air from a broiler production facility. Emissions of ammonia and organic gasses were measured periodically during the 55 day poultry production cycle including 45 days of production and 10 days between broods. Several methods were used for analysis of organic gasses and it was found that a gas chromatography/mass spectrometry analysis from samples collected in evacuated summa canisters was more useful than hydrocarbon methods for the low concentrations and complex gas mixtures encountered. An emissions factor of 0.0143 lb bird^{-1} raised for ammonia and 0.0061 lb bird^{-1} raised for total organic gasses is estimated. Several compounds (including acetone, dimethyl disulfide, ethanol, methanol, propane, and vinyl acetate) dominate the mass of organic gasses emitted from the house according to the mass spectrometer analysis. These may be from distinct sources within the house. The estimated emissions factor for reactive organic gasses (organic compounds with ozone forming reactivity) is 0.0037 lb bird^{-1} raised.

Introduction

California has significant particulate matter and ozone air quality problems. To help solve these problems, it is necessary to estimate the emissions of air pollutants for all major industries. In the past, the livestock industry was not considered an important emissions source from an air quality perspective. To meet regulatory and public policy needs, a better understanding of livestock emissions is needed. The objective of this study was to estimate the gaseous emissions from a broiler production facility during the broiler growth cycle and develop emissions factors per bird of production.

Airborne emissions from broiler production facilities have been quantified in other studies. Ammonia emissions have received the greatest amount of attention and several researchers have quantified emissions from broiler production houses. Casey et al. (2003) reported ammonia emissions from eight broiler houses in Kentucky during the winter months ranging from 0.10 – 0.98 g day^{-1} $bird^{-1}$ for birds from 11 to 56 days old. They found that emission rate increased with bird age but appeared to be a relatively constant function of bird weight with an average emissions rate of 163±56 g day^{-1} 500 kg^{-1} live weight. The high degree of variability was attributed to different litter handling and other management practices. Lacey et al. (2003) reported ammonia emissions ranging from 0.05 – 1.90 g day^{-1} $bird^{-1}$ with an average of 0.63 g day^{-1} $bird^{-1}$ for broilers raised in central Texas over a 49 day growth cycle. The average cycle emissions were estimated as 31 g $bird^{-1}$ raised. This study found that ammonia emissions were approximately linear with live weight of birds with an average emissions rate of about 300 g day^{-1} 500 kg^{-1} live weight. This was found to be higher than reported emissions from several European studies (Wathes et al., 1997; Groot Koerkamp et al., 1998; Demmers et al., 1999; Hyde et al., 2003) but in the same order of magnitude. Climate, litter management, feed, bird weight, stocking density and measurement methodology all may contribute to differences.

Quantification of volatile organic compounds from broiler houses has received minimal attention from the research community. It has been reported that animals and their waste can emit over 130 organic compounds (O'Niell and Phillips, 1992) although an abbreviated number of these may only be important when considering mass emissions (Hobbs, 2001). Gas chromatography/ mass spectrometry (GCMS) has been used to identify odor compounds related to malodor in poultry manure (Yasuhara, 1987). These malodor compounds have very low detectable threshold for human beings with some even below the detectable limits of test equipment. A recent odor study (Chang and Chen, 2003) collected samples on sorbent tubes and analyzed them using GCMS to identify compounds from broilers produced in laboratory chambers. They tentatively identified compounds with the greatest response to include ethanol, dimethyl disulfide, 2-propanone, 2-propanal, 2-butanone, and benzene with a total of 24 distinct GCMS peaks. In another study (Hobbs et al., 1995) the headspace concentrations of compounds above manure was measured. They found that dimethyl sulfides (primarily dimethyl disulfide) were highest in poultry manure, but found relatively little of the C2 to C9 organic acids found in pig and cattle manure.

Directly emitted particulate matter emissions are also a concern from poultry production houses. Particulate matter primarily originates from litter, feed, skin and feathers that can become airborne induced by animal and air movement within the poultry facility (Grubb et al. 1965). Total suspended particulate matter (TSP) and particles with diameter less that 10 μm (PM_{10}) have been measured for tunnel-ventilated broiler facilities in Texas. Using TSP and particle size distribution samplers, a resulting emissions factor of 1.3 g PM_{10} $bird^{-1}$ of production (0.0029 lb PM_{10} $bird^{-1}$) was determined (Lacey et al. 2003). The authors compared these results to two European studies (Wathes et al., 1997; Takai et al, 1998) and found that their results were somewhat higher for TSP but the PM_{10} results were comparable with respirable particulate matter measured in the other studies. These authors speculate that the differences may be due to conditions and the sampling methodologies and technology employed. Because of the complexities of sampling particulate matter, the current study was unable to generate PM_{10} emission factors. Problems were encountered with obtaining sufficient sample for quantification using standard equipment. There are also potential problems with feathers coating equipment and collecting dust that need to be addressed.

Materials and Methods

The project approach was to perform emission tests at actively producing, mechanically-ventilated broiler houses with environmental climate controls. The majority of California broiler chickens are raised in these conditions, so the testing performed can be used to directly characterize emissions for the bulk of the industry. Also, using this type of facility simplifies the testing and analysis because of the precise control of airflow within the house. Testing can be performed under representative conditions with respect to the cycles of broiler production, animal density, animal age and size, waste handling, bedding material, litter treatments, design of poultry houses, and the diet and genetics of the animals. Testing can be performed during multiple stages of the broiler growth cycle in order to capture the emission potentials from a typical production cycle.

A typical mechanically ventilated poultry house is designed to provide optimal environmental conditions for the animal growth. Outside air is pulled through the house and expelled through a series of fans on the sides of the house to control the environment. During warm months when the broilers are 4 to 7 weeks old, air is pulled through a series of evaporative cooling pads at one end of the house and expelled through fans at the opposite end of the house (known as "tunnel" ventilation). When the broilers are young or the exterior temperatures are low, air is pulled through a series of controlled openings in the sidewalls near the roof of the house and the evaporative cooling pads are covered with curtains. During early brooding, heat must be added using heaters (propane is typical) to maintain house temperature with minimum ventilation rates to maintain sufficient moisture removal and indoor air quality. A control system monitors house temperature and regulates ventilation in response to age related, preset temperature requirements of the birds. Temperature, humidity, ventilation level, static pressure and heater status are recorded for each house.

The layout of the broiler house and ventilation system is given in Figure 1. It houses 21,000 broilers and has dimensions of 48 ft by 320 ft. The ventilations system consists of 10 fans: two 36" fans at 1/3 and 2/3 the length of the house, and a series of eight 48" fans at the end of the house opposite the evaporative cooler pads (fans are numbered as shown). The fans are constant speed with the 36" fans rated at 8,000 CFM and the 48" fans at 18,300 CFM. Ventilation rate is controlled by the number of fans operating or during early brooding by intermittent operation of one fan on a 5-minute cycle. The house is always ventilated and there are a total of 17 ventilation levels. The lowest level is operation of fan #10 for 10% of a cycle (~1,830 CFM) to the highest level with all fans operating 100% of the cycle (~146,400 CFM). After Day 28 of the growth cycle, at least some of the fans are in continuous operation all day during the spring, summer and fall, and in the afternoons in winter. Fan #10 is used in all of the ventilation modes.

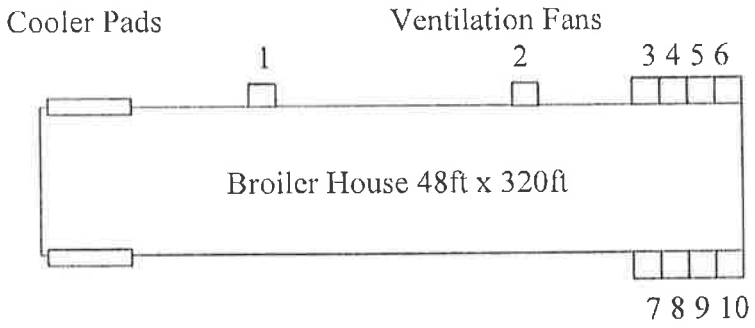

Figure 1. Components of ventilation system for mechanically-ventilated poultry house. Fans are numbered 1-10.

In order to measure airflow and concentration during a sampling cycle, a test "stack" or duct was added to the outlet of fan #10 to insure a stabilized airflow at the test equipment insertion point (Figure 2). The use of a duct is standard engineering protocol for most vent exhaust source testing methods. Airflow can be measured in the duct by performing a double transect across the diameter of the duct. A 48" diameter test duct was constructed with straightening vanes and test ports located 5 times the fan diameter from the fan with an additional 2 diameters to the opening. Pictures of the actual testing setup are given in Appendix B.

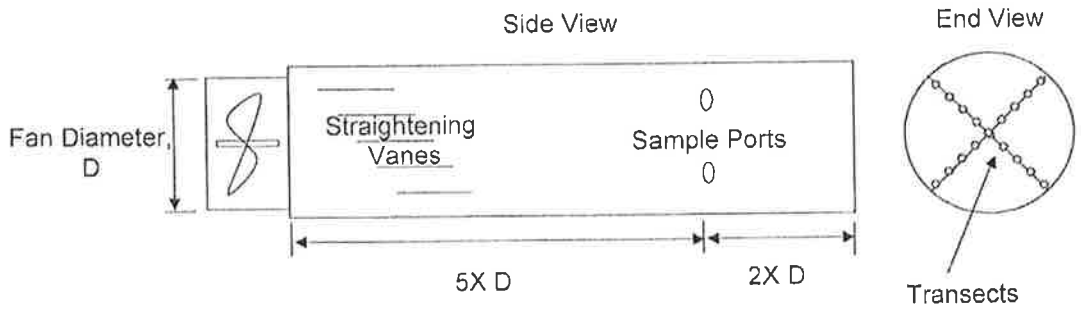

Figure 2. Schematic of test duct (not to scale) at fan outlet for insuring stabilized flow during concentration sampling. Transects of the stack are made to determine total stack airflow.

The typical daily ventilation cycle is important to consider for determining when air samples should be taken from the facility. If the ventilation levels are changing rapidly, it may be difficult to get an accurate measure of emissions because both the airflow and concentration will be changing rapidly. The ventilation system responds to outside heating load so spring, summer and fall ventilation levels increase rapidly during the morning hours from 8:00 to 12:00 and decrease rapidly from 19:00 to 23:00 in the evening. During testing the control system was set to a constant ventilation rate to control this characteristic. The house was allowed to equilibrate for several air exchanges before sampling.

Two sampling campaigns were performed, one during the late spring of 2004 and one during the fall of 2004. The first round of sampling focused on ammonia and screening level volatile organic gas evaluation using hydrocarbon methods. The second round of sampling focused on collecting more refined organic gas information. To minimize some of the environmental variables, both sample sets were performed at the same chicken house and testing was scheduled so the sampling was performed on second-run litter for both tests. The set point temperature for the house is controlled based on animal age and was similar over both tests, but ventilation rates were higher during the late spring tests due to high outdoor temperatures and the need for cooling ventilation. Propane heaters were operating to maintain house temperature during several of the sampling runs during the fall campaign. Important parameters for the broiler production house during the test sampling are given in Table 1.

Table 1. Summary of production conditions during both sampling campaigns.

House size	48' x 320'
Number of birds	~21,000
Growth cycle	45 days, 10 days between flocks
Bedding material	rice hulls
Feed	5 formulated feeds depending on bird age
Temperature	adjusted with bird age
Minimum ventilation	adjusted with bird age
Litter	second run, full removal typical after 3rd flock
Litter conditioning	floor conditioning each cycle with bedding replacement at front 1/3 of house

A goal of the project was to account for temporal differences in emissions from broiler operations as the chickens grow in size, feed intake and excretions. In California, a typical growth cycle for broiler chickens takes 45 days from the time newborn chicks enter the house to harvest. Air samples were collected and emissions evaluated several days before chicks were introduced to the house to quantify emissions from second-run litter only (called day 0). Emissions measurements were repeated on approximately the 10^{th}, 20^{th}, 30^{th}, and 40^{th} day of bird age.

Analytical Methodology

In order to determine the emissions rate of gaseous compounds from the poultry house, two elements are needed, airflow and concentration enrichment. Since ambient air may also contain pollutants, concentration measurement may be needed in inlet (ambient) and outlet (stack). This allows determination of the pollutant enrichment generated by the interior environment of the house (Figure 3). Air is sampled and concentration is determined at the ambient (C_A) and stack (C_B) locations and the difference is taken to determine enrichment. In addition, two different fan operation scenarios may exist. In the first, only the stack fan is operating and all air flows through the stack (Figure 3a). During some test runs, other fans are running because additional ventilation was needed to maintain the environment for the birds in the house (Figure 3b). To account for this additional airflow, each fan must be calibrated in relationship to the test fan. With this calibration, a ventilation level factor (VLF) can be determined for each fan configuration. The VLF is multiplied by the flow measured in the stack fan ($Flow_B$) to determine the total house flow. House emissions are determined by the following formula:

$$Emissions = (C_B - C_A) \times (Flow_B \times VLF) \qquad (1)$$

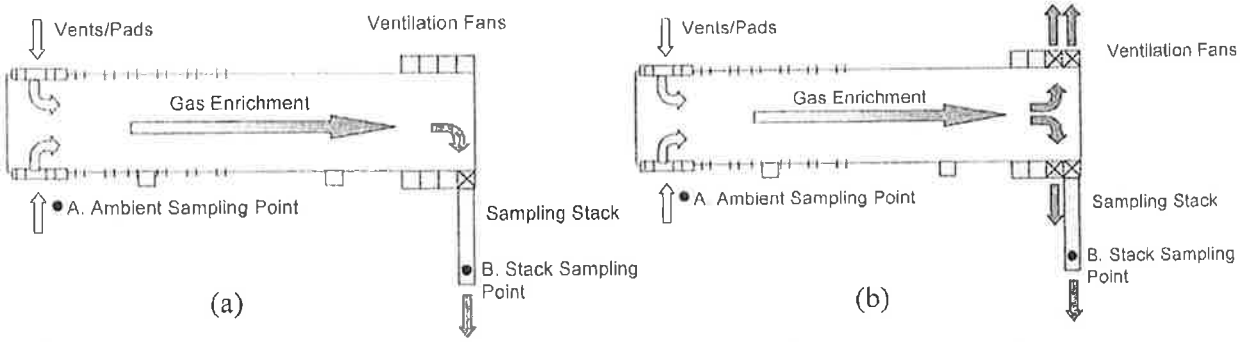

Figure 3. Schematic illustration of gas emissions enrichment from a mechanically ventilated broiler house measured with (a) only the stack fan operating, and (b) multiple fans operating.

The implicit assumption in this approach is that the concentration is the same at each fan. This assumption is reasonable because all fans are co-located at the opposite end of the house from the primary air inlets. A summary of the test methods used for flow and gas concentration is given in Table 2 and each is discussed below.

Table 2. Summary of source test methods used for flow and gaseous emissions measurement.

Measurement	*Method*	*Description*
Stack Airflow	CARB 2, CARB 4	12 point traverse of stack airspeed, temperature and humidity
Ammonia	BAAQMD Method	60 minute sample through impinger train of 0.1N HCl
Hydrocarbons	EPA Method 25A	60 minute continuous measurement with on-site FID
Hydrocarbons	EPA Method 18	Tedlar© bag collection, GC-FID for C1–C6+ compounds
Organic Gasses	EPA Method TO-15	Summa canister collection, GC-MS for 68 polar/non-polar target compounds with non-specific library search for other compounds reported relative to internal standard

Airflow Measurement

The airflow in the test stack was determined during each sampling run by using an "S" type pitot tube connected to an inclined manometer. A 12 point traverse through two ports provided average velocity and the air volumetric flow rate was determined using California Air Resources Board (CARB) Method 2. The stack temperature was determined by using a thermocouple and an indicating pyrometer. The proportion of water was determined using the wet-bulb/dry-bulb method and the dry molecular weight of the stack gas determined by CARB Method 4.

To account for this additional airflow, each fan was calibrated in relationship to the test fan with an empty house prior to the broiler cycle. The procedure used was to turn on all of the fans, set the static pressure at a high value (0.10), and measure the airflow by hand at 8 points on each fan. The procedure was repeated a low static pressure (0.05). Both a vane type and hot wire anemometer were used and gave consistent relative results. This is an abbreviated manual version of a procedure developed for quantifying absolute airflow for poultry fans (Gates et al., 2002). Since we are only interested in relative airflow we reduced the number of grid points. The relative airflow did not appear to be impacted by static pressure and the other 48 inch fans were 5-10% greater airflow than the stack fan (presumably because of the additional resistance of the stack). For the 36 inch fans the relative flow was adjusted for both the flow and the area difference of the fan.

Ammonia

Ammonia concentrations were determined according to Bay Area Air Quality Management District (BAAQMD) Method ST-1B. The exhaust gases were extracted through an impinger train containing 0.1N HCl. For each sampling run, two samples were collected at a constant rate of 0.75 cfm for approximately sixty (60) minutes. The samples were recovered in the field, placed on ice, and returned to the laboratory for analysis. The samples were sent to Calscience Environmental Laboratories for analysis. The results are reported from the laboratory as mg NH_3 $sample^{-1}$ and converted into ppmv using the flow and sample collection period.

Organic Gasses – Hydrocarbon Methods

Two screening level hydrocarbon analyses were performed during the spring 2004 sampling campaign. Continuous total hydrocarbon (THC) monitoring was performed in the stack and in the ambient air near the air intake vents at the front of the house in accordance with EPA Method 25A. The THC samples at the outlet and in the ambient air were extracted and delivered to the analyzers through a heated Teflon line. All sampling components were stainless steel or Teflon. Calibrations were performed before and after each test-run with zero gas and propane span gas. The outlet and ambient air THC concentrations were measured utilizing a California Instruments Model 300H FID (flame ionization detection) hydrocarbon analyzer. All THC data was continuously recorded on a Linseis chart recorder. Instrument data was recorded every one (1) minute, using a data-logger, and corrected for analyzer calibration drifts with spreadsheets. The method detection limit for the THC testing is 0.5 ppmv as propane.

Calibrations for the THC tests were performed with propane calibration standards. All pre and post span calibrations were performed with EPA protocol 1 gases, directly from the bottles. Initial multipoint calibrations were performed on the FID with three (3) levels of span gas and a zero gas to demonstrate linearity throughout the measurement range. Initial calibrations and the multipoint calibrations were performed at the analyzer sample inlet. Subsequent calibrations were performed through the probe tip of the sample system, (Bias calibrations). Bias calibrations were performed before and after each test-run. The initial bias checks agreed with the pretest instrument calibrations to within 3%.

Hydrocarbons were also quantified using EPA Method 18. During the sampling run, a Tedlar bag exhaust sample was collected from the outlet of the exhaust stack. An ambient sample was also collected. The bags were stored in a dark container and transported to the laboratory for low level hydrocarbon analysis (C1–C6+ compounds) by gas chromatography utilizing a flame ionization detection system. AIRx Testing, in Ventura, California, performed the analysis. Reactive hydrocarbon concentrations are estimated by taking the sum of all detected hydrocarbons and subtracting the estimated methane (C1) and ethane (C2) contents. The minimum quantification limit for this method is 0.3 ppmv for each hydrocarbon class.

Organic Gasses – Gas Specific GCMS Method

During both the spring and fall sampling campaigns, samples were taken and analyzed for specific gas composition using EPA Method TO-15, a gas chromatograph/mass spectrometer (GCMS) method. This method was chosen because it offered low levels of detection (ppbv range) for 69 specific target compounds and the opportunity to tentatively identify and estimate other organic compounds in the samples. This method is also commonly specified for indoor air quality testing where the gas profile is unknown. The sampling train is specified to allow detection of both polar and non-polar compounds. The target species list includes alcohols and ketones that may be expected from a biological source.

Samples were collected using sanitized, evacuated summa canisters and submitted to Atmospheric Analysis & Consulting for analysis by EPA Method TO-15. The results are reported in units of ppbv. The laboratory also performed a non-target compound library search to tentatively identify other compounds present in the canister sample. The confidence level in the identification was computed along with the total area of the peak. This area was compared with the internal calibration to estimate the concentration of the tentatively identified compound in ppbv.

Quality Assurance/ Quality Control

All samples were taken following the aforementioned standard procedures by a licensed emissions testing firm (AirX Testing) that operates within the San Joaquin Valley Unified Air Pollution Control District. Standard sample handling and record keeping practices were maintained for all samples collected during the two sampling campaigns. Fan operations data was recorded by the house control system and verified in the field at the time of sampling. Complete reports including all measurements, calibrations and laboratory analysis were generated by AirX Testing and a list of these reports is contained in Appendix C. As an additional assurance, the California Air Resources Board, Monitoring and Laboratory Division performed a review of the field collection and laboratory practices used during the second sampling run for volatile organic gasses. This review is included in Appendix D.

Results and Discussion

The measured concentrations of ammonia in the test stack during the testing are shown in Table 3. Ammonia results showed an increase in ammonia emissions with broiler age ranging from 0.48×10^{-4} lb day^{-1} bird^{-1} (0.02 g day^{-1} bird^{-1}) on day 17 to 10.9×10^{-4} lb day^{-1} bird^{-1} (0.49 g day^{-1} bird^{-1}) on day 43. This is in a reasonably consistent but somewhat lower than the range reported in other recent studies on broiler emissions of ammonia in the United States mentioned above (Casey et. al., 2003; Lacey et. al., 2003).

Table 3. Concentration and flow data for ammonia during spring sampling campaign.

Bird Age (days)	Date	Time	Ammonia Conc. (ppmv)	House Flow (dscfm)	House Emissions (lb/hr)
0 (litter)	4/26	11:28	5.9	15,743	0.25
0 (litter)	4/26	12:00	6.3	15,907	0.27
0 (litter)	4/26	13:37	6.5	16,070	0.28
18	5/17	10:23	0.8	18,098	0.04
18	5/17	13:03	0.7	29,071	0.06
28	5/27	6:15	2.2	27,464	0.16
28	5/27	8:32	1.6	43,739	0.19
28	5/27	11:05	0.8	65,394	0.14
28	5/27	13:00	0.4	104,591	0.12
42	6/11	6:00	3.4	67,394	0.61
42	6/11	11:08	2.5	131,269	0.90
42	6/11	13:10	2.4	128,910	0.82

The amount of ammonia emission appears to correlate to the size and amount of excretion of the broilers as discussed above. An exponential expression is used to fit this growth related phenomenon. Figure 4 shows the emissions rate per animal relative to age along with the equations for the best fit. Integrating under the exponential curve gives a cycle emission of 0.0112 lb bird^{-1} (5.1 g bird^{-1}) during the growth cycle. Ammonia emissions from the litter continue after the birds are removed until the litter is either dried during house heating for the next broiler cycle or when the litter is cleaned and removed from the house. Using the day 0 data, the estimated daily emissions for the second run litter tested before the birds were placed was 3.13×10^{-4} lb day^{-1} bird^{-1} (0.14 g day^{-1} bird^{-1}) giving an estimated 55 day production cycle ammonia emissions of 0.0143 lb bird^{-1} (6.5 g bird^{-1}). This is lower than the 31 g bird^{-1} reported by Lacey et al. (2003) for broiler houses in Texas, but these authors found that their results were higher than several European studies of poultry emissions. Differences may be attributable to cycle length, litter management, feed, climate and other process factors along with differences in methodology. As noted by the National Research Council (NRC, 2003), further work is needed to determine how these process factors affect emissions.

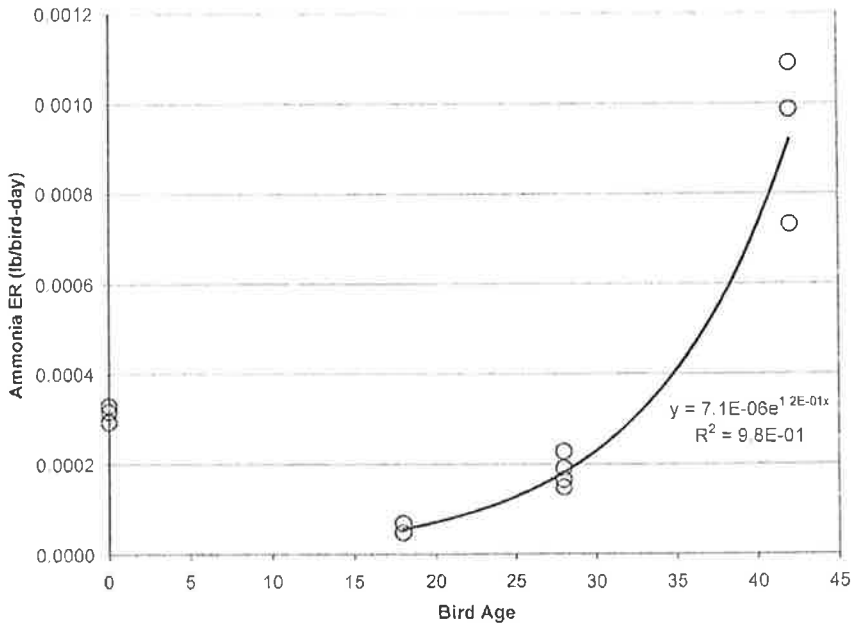

Figure 4. Ammonia emissions rate as a function of bird age for with exponential curve fit. Note that day 0 data represents emissions between cycles before litter is dried during initial house heating, not included in fit.

The results of the hydrocarbon analyses from the spring sampling run are shown in Table 4. All concentrations measured were near the minimum quantification limit of the method. For EPA Method 25A, the stack results were typically somewhat larger than the ambient for most sampling runs. For EPA Method 25A, the C1 (methane) response was

detected for all samples but was often greater in the ambient air than in the stack air. One conclusion would be that methane emissions do not appear to be significant for poultry production. A C4 response was present in both the stack and ambient on the day 0 (litter only) sampling run and a C2 response in both on the day 18 sampling run. For all other compounds and runs the response was non-detect above the minimum quantification limit for the method of 0.3 ppmv.

Table 4. Concentration and flow data for hydrocarbons during spring sampling campaign.

				Method>	EPA25A	EPA18*		
					THC	C1	C2	C4
				CalGas>	Propane	Methane	Ethane	Butane
BirdAge (days)	Date	Time	House Flow (dscfm)	MQL>	0.5 (ppmv)	0.3 (ppmv)	0.3 (ppmv)	0.3 (ppmv)
0 (litter)	4/26	12:15	15,743	Stack	*NS*	2.4		0.6
				Ambient	*NS*	3.6		2.0
0 (litter)	4/26	14:15	16,070	Stack	2.0	2.2		2.3
				Ambient	2.0	4.1		1.9
18	5/17	12:00	18,098	Stack	4.6	2.1	1.0	
				Ambient	2.0	2.1	0.4	
18	5/17	13:30	29,071	Stack	4.8	1.6	0.4	
				Ambient	1.2	2.0	0.6	
28	5/27	6:40	27,464	Stack	1.7	2.3		
				Ambient	1.3	1.7		
28	5/27	8:32	43,739	Stack	1.7	2.0		
				Ambient	1.3	2.9		
43	6/11	10:00	67,394	Stack	1.4	2.8		
				Ambient	1.1	4.3		
43	6/11	14:00	128,910	Stack	0.6	2.5		
				Ambient	1.3	3.0		

*Non-detect is indicated by blank space. C3, C5, C6, C6+ compounds were not detected (MQL = 0.3 ppmv) for all sampling runs and are not shown.
MQL = Minimum quantification limit
NS = Not sampled during this run

An estimate of total organic gas emissions was made based on this screening analysis by subtracting the ambient concentration from the stack concentration and using the house flow and mass properties of the calibration gas to estimate emissions. Figure 5 shows the results for house emissions. The trend between the EPA Method 25A and EPA Method 18 appears to correspond somewhat, but Method 18 shows negative emissions because of greater response in the ambient air than the stack air. This phenomenon is difficult to explain, but the low level of detection indicates that these hydrocarbon methods may have limited suitability for this type of testing. It appears that these methods may not be sensitive enough to detect the compounds or low concentrations present in the poultry air.

Additionally, these methods assume that the response of the flame ionization detector to the compound mix is comparable to a standard hydrocarbon compound like methane or propane. This may not be the case for the compounds in the poultry air. This makes the results only semi-quantitative and may not provide useful information on total mass

emissions. Because of these shortcomings, efforts after the spring sampling run concentrated on the more sensitive and specific EPA Method TO-15.

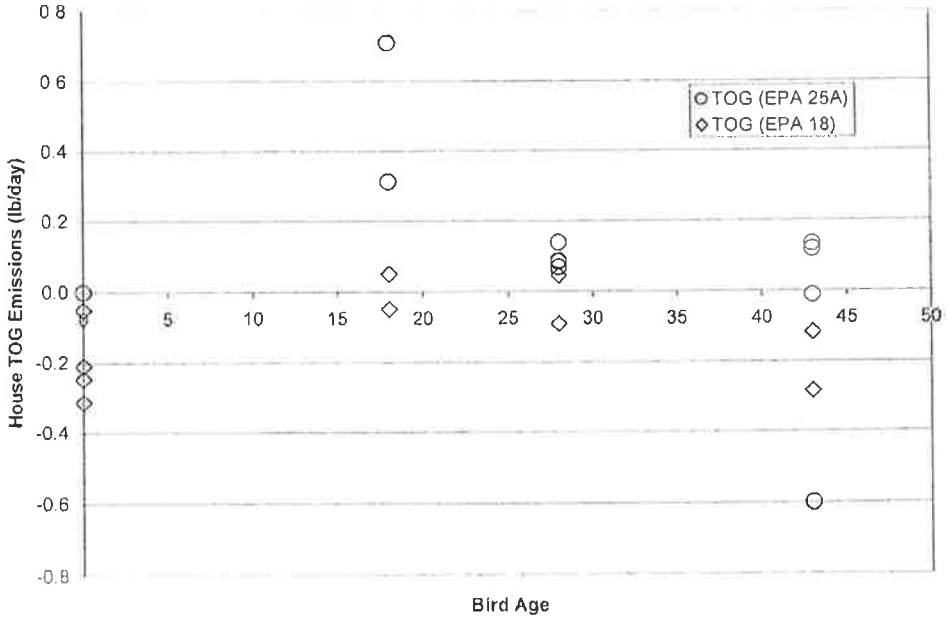

Figure 5. Broiler house total organic gas emissions as estimated by EPA Method 25A and EPA Method 18 reported as lb/day. Results may not be quantitative.

The EPA Method TO-15 utilizing GCMS has much higher sensitivity and can identify specific compounds in the air mixture, alleviating some of the problems with the hydrocarbon methods. Only a limited number of TO-15 samples were collected during the spring run and ambient samples were not always taken to correct for compounds in the outside air. An additional run in the same house under the same litter conditions was performed in the fall to collect additional organic gas data. Results are shown in Table 5 including the ambient and stack concentrations of the target compounds and the tentatively identified compounds that were positively detected during the sampling campaigns. Only the detected target compounds are shown on Table 5. A complete list of the target compounds and detection limits from the calibration standard are shown in Appendix A. It should be noted that the identification and quantification of the tentatively identified compounds is approximate because the GCMS response is compared to an internal standard and not a calibration standard for the specific gas.

Table 5. Organic gas concentrations from broiler house quantified using EPA Method TO-15 (concentrations in ppbv).

			Black									Ambient					
	Date>		5/17	5/27	6/11AM	6/11PM	10/15	10/20	11/9	11/18	11/29	6/11	10/15	10/20	11/9	11/18	11/29
	Bird Age (days)>		16	26	43	43	0	5	20	29	40	43	0	5	20	29	40
	Flowrate (dscfm)>		18,008	27,260	67,362	128,919	14,205	16,031	15,294	26,451	28,222	67,362	14,205	16,031	15,294	26,451	28,222
Chemical Compound	Molecular Wt.	MDL															
Methanol	32.04	20.0	379	171	91	78			301	353			77				
Propylene	42.06	0.5					17				3.1		4.3				4.2
Ethanol	46.07	2.5	114		27	17		40	110	43	10		59	9.4		2.8	8.2
Acetone*	58.08	1.0	50	1194	20		13	1313	69	50	6.5		13	22	19		5.0
Isopropyl Alcohol	60.1	1.0					20										
Carbon Disulfide	76.2	0.5		2.8						0.5							
Benzene	78.1	0.5					1.6						7.8				1
Cyclohexane	84.2	0.5											3.4				
Methylene Chloride*	84.9	1.0		11			1.4	12	6		0.9		1.4	5.6		2.9	1.4
Vinyl Acetate	86.09	0.5	173	27		5	1.2	14	62	35	5.3		1.6			1.6	1.3
Hexane	86.18	0.5	5.2	4.3			1.5	16	0.3	3.8	0.7		2				1
Chlorobenzotrifluoride*	80.48	1.0											1				
Toluene	92.08	0.5	2.5	2.1			3.2	4.6					6.2				3.7
n-propyl	100.2	0.5											1.4				
m- & p-xylenes	106.2	0.5											1.5				1.4
4-Methyl-2-Pentanone (MIBK)	100.2	0.5					1.3										
Dichlorodifluoromethane*	120.93	0.5	2.3	2.2	3	4						3.3	1.1				
Ethylene Oxide	44	TIC				11											
Acetaldehyde	44.05	TIC	99		9.6				24				23		13	9.2	8.2
Propane	44.1	TIC	24	53					318	340					856	31	
2-methyl-1-propene	56.08	TIC															3.4
Isovaleraldehyde	57.05	TIC		83													
Propanal	58.08	TIC	11														
Isobutane	58.12	TIC	11		13	14	17		227		4.4	4397			280		
Butane	58.12	TIC					20		42		4.7	87			44		4
Methyl Formate	60.1	TIC	76														
Dimethyl Sulfide	62.13	TIC	7.5														
Bromomethane	64.00	TIC													6.9	4.5	
2-Butanone	72.1	TIC							6.2		0.7						
Pentane (Pentanes)	72.12	TIC											13				
2,2-dimethyl Propane	72.12	TIC														2.9	
2-methylbutane	72.2	TIC			4		26		20		4.3		37		24		3.9
Methyl acetic Acid	74.1	TIC	5.6													3.6	
Thiourea	76.1	TIC															
1-hexene	84.16	TIC										54					
Methylcyclopentane	84.2	TIC											17				
2-methylpentane	86.18	TIC	5.1														
3-methylpentane	86.2	TIC											7.5				
2,2-dimethylbutane	86.2	TIC							10								
Dimethyl disulfide	94.2	TIC	22		46	19				237	16						
3-Pentanethanol	98.1	TIC								51							
Methylcyclohexane	98.19	TIC											12				
2-Methylhexane	100.2	TIC											3.1				
3-Methylhexane	100.2	TIC											3.9				
Heptanal	114.2	TIC				5.9											5.1
2,2,3-Trimethylbutane	114.28	TIC											3.1				
Alpinene	136.19	TIC											8.3				
Trichlorotrifluoroethane*	137.7	TIC															
diethoxymethylsilane	162	TIC				3.1											
Hydrogen sulfate (1-methylbutyl)	172.15	TIC	6.9													19	
Hexamethyl Cyclotrisiloxane*	222.54	TIC				28											

*Compound is an isomer of the same name. TIC = Tentatively Identified Compound. MDL = Method Detection Limit. Blank spaces indicate compound at less than MDL.

See Appendix A for complete target list.

Total organic gas was calculated as the sum of all of the identified target compounds and the tentatively identified compounds for each sampling run. Figure 6 shows the total organic gas emitted from the house from the spring and winter runs without correction for ambient concentrations. The corrected fall data is given in Figure 7 subtracting ambient from house concentration. To compute the emissions factor per bird produced the average emissions rate for the five sampling runs was multiplied by the number of days of production (55 total including 45 days with growing birds in the house and 10 days between cycles) and divided by the number of birds produced. An average total organic gas (TOG) emissions rate of 0.095 lb hr^{-1} for the house is obtained and a production cycle emissions of 0.0061 lb $bird^{-1}$ (2.83 g $bird^{-1}$) is estimated.

The types of gasses detected were fairly consistent and were dominated by a few compounds. The average emissions rate for organic gasses that showed positive emissions over the cycle are shown in Table 6. Total organic gas and the reactive organic gas are also computed from each sampling run and the average from the 5 sampling runs is reported in Table 6. The mass composition of the organic gas generated in the house is also determined. Note that the quantification and identification of the compounds in italics are tentative because they were detected by GCMS but not part of the available TO-15 target standard.

Some of the compounds detected as part of TOG are excluded compounds in terms of ozone formation and regulation. Because the TOG species are identified we can readily determine from the speciation profile the reactive portion or the reactive organic gasses (ROG) as named by the California Air Resources Board. Here the average house ROG emission for the fall is 0.057 lb hr^{-1} with estimated production cycle emissions of 0.0037 lb $bird^{-1}$ (1.70 g $bird^{-1}$).

The key compounds in terms of mass emissions that were part of the TO-15 standard were acetone, methanol, vinyl acetate, and ethanol. Dimethyl disulfide, and propane were tentatively identified during multiple sampling runs by GCMS analysis. The compound 3-Furanmethanol was tentatively identified in a large quantity on only one sampling event and may not be a reliable result. Figure 8 shows the house emissions rates for some of the consistently detected compounds over both sampling campaigns.

The source of the compounds detected in the house was not investigated but may not exclusively be from birds or manure. Many of the organic compounds detected have been noted in other studies that focused on odors from birds and manure (Chang and Chen, 2003; Hobbs et al., 1995). Propane heaters, feed and supplements, and off gassing from house materials and equipment are other potential sources of emissions. Propane and vinyl acetate, not noted in the odor studies, may come from these other sources.

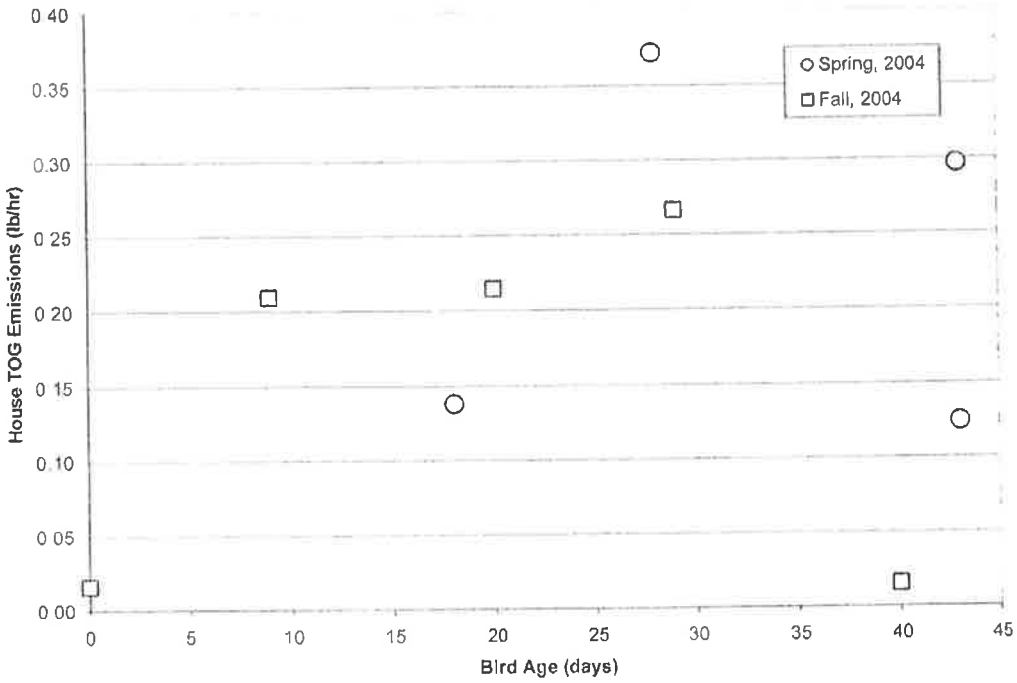

Figure 6. House total organic gas emissions as estimated from EPA Method TO-15 for spring and fall sample runs (not corrected for ambient concentrations).

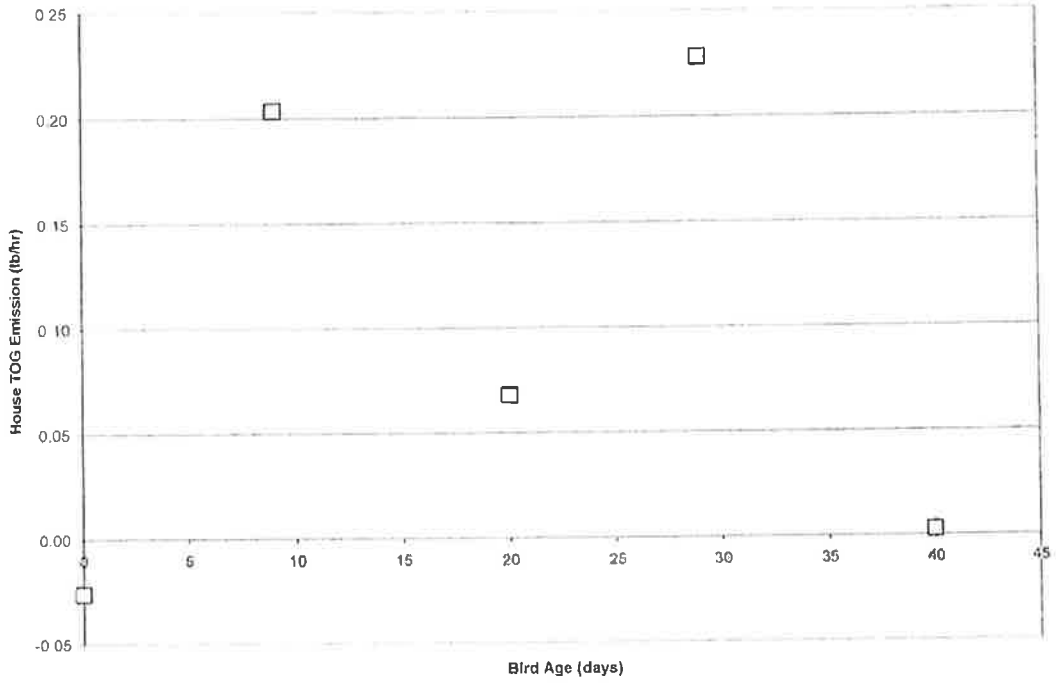

Figure 7. Ambient corrected house organic gas emissions as estimated by EPA Method TO-15 for fall sample run.

Table 6. Average organic gas emissions rate per unit of production during a 55-day broiler cycle (Fall 2004). As detected by EPA Method TO-15 with tentatively identified and quantified compounds in italics.

Organic Compound	Average (g/bird)	St. Dev. (g/bird)	Speciation (% mass)
Acetone*	1.246	2.467	39.3
Methanol	0.419	0.722	13.2
Vinyl Acetate	0.175	0.182	5.5
Ethanol	0.111	0.212	3.5
Hexane	0.035	0.044	1.1
Carbon Disulifde	0.012	0.028	0.4
Methylene Chloride*	0.009	0.029	0.3
Propylene	0.006	0.017	0.2
Isopropyl Alcohol	0.002	0.005	0.1
4-Methyl-2-Pentanone (MiBK)	0.002	0.005	0.1
Dimethyl disulfide	*0.595*	*1.222*	*18.7*
Propane	*0.379*	*0.740*	*12.0*
3-Furanmethanol	*0.124*	*0 278*	*3.9*
Butane	*0.020*	*0 046*	*0.6*
Isobutane	*0.018*	*0.032*	*0.6*
2,2-dimethylbutane	*0.012*	*0.028*	*0.4*
2-Butanone	*0.008*	*0.014*	*0.2*
Total Organic Gas	**2.83**	**3.43**	
Reactive Organic Gas	**1.70**	**3.08**	

Averages of five measurements taken over a 55-day broiler cycle in Fall 2004.
Compounds with negative enrichment are not shown or included in speciation.
* signifies exempt compounds (not ROG)

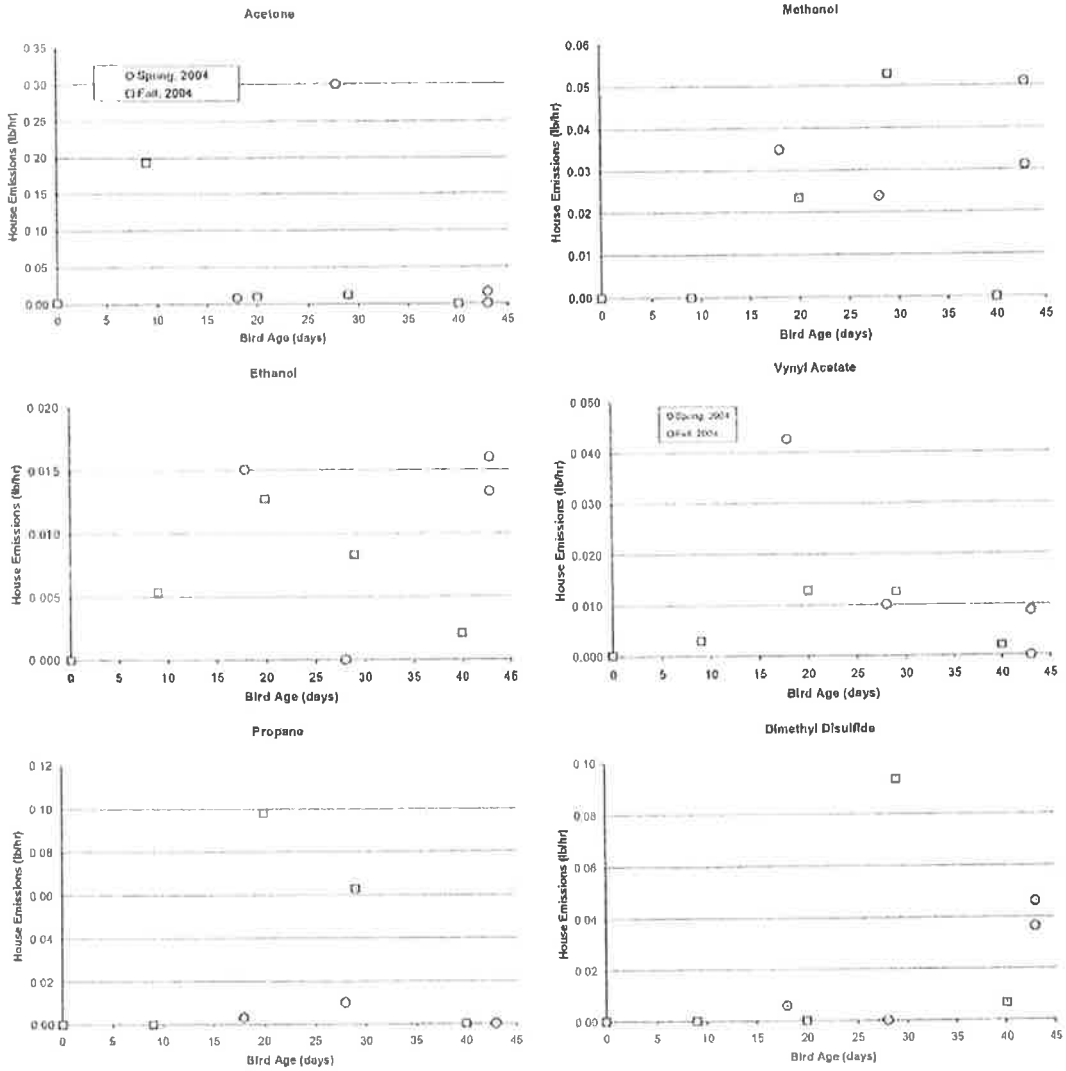

Figure 8. Broiler house emissions of key organic gasses detected by GCMS (EPA TO-15) as a function of bird age for spring and fall campaigns. Note that emissions rates are not corrected for ambient concentrations.

Conclusion

This study was able to generate ammonia and organic gas emissions estimates for a typical broiler production cycle, expressed on a per bird of production basis. The study did not look at the effects of location, seasonal variability or other parameters on cycle emissions. However, annual emissions factors are needed in order to calculate the facility emissions of California broiler facilities given their capacity. Annualized emissions factors for broiler production in California can be estimated from the cycle emissions developed in this study. To achieve this, the emissions measured during the spring and fall campaigns of this study are assumed to represent the entire year. Cycle time was a total of 55 days (45 days of broiler growth and 10 days between broods) so the house has the potential of raising 6.7 broods per year. The annual emissions factor is therefore 6.7 times the per bird estimates. A summary of emissions factors for broiler production developed in this study is given in Table 7 including the production and annual capacity estimates.

Table 7. Gas emissions factors for broiler production as estimated by this study.

Compound	Production Emission Factor (lb bird^{-1})	Capacity Emission Factor (lb bird^{-1} yr^{-1})
Ammonia	0.0143	0.096
Total Organic Gas*	0.0061	0.041
Reactive Organic Gas	0.0037	0.025

*Gas speciation profile is given in Table 6 and includes tentatively identified compounds.

Acknowledgements

The California Poultry Federation research program provided funding for this study. AIR$_X$ Testing of Madera, CA performed all of the gas sampling. Many thanks to the planning committee members for their contributions in developing the study protocol and coordinating the field work. Special thanks to Bob Meyers and Dan Terwilliger of Foster Farms and Angus MacPherson of California Air Resources Board whose dedication and cooperation in the field made the sampling campaigns possible.

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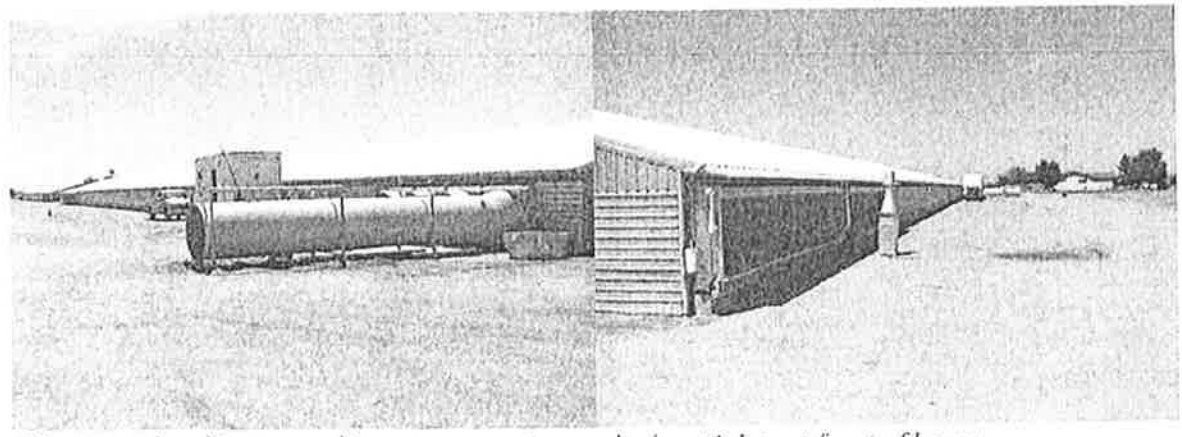
Appendices

Appendix A. Target compounds for EPA Method TO-15 Analysis

Chemical Compound	Method Detection Limit
Chlorodifluoromethane	1.0
Propylene	0.5
Dichlorodifluoromethane	0.5
Chloromethane	0.5
1,2-Dichloro-1,1,2,2-Tetrafluoroethane	0.5
Vinyl Cloride	0.5
Methanol	20.0
1,3-Butadiene	0.5
Bromomethane	0.5
Chloroethane	0.5
Dichlorofluoromethane	0.5
Ethanol	2.5
Vinyl Bromide	0.5
Acetone	1.0
Trichlorofluoromethane	0.5
Isopropyl Alcohol	1.0
Acrylonitrile	0.5
1,1-Dichloroethylene	0.5
Methylene Chloride	1.0
Allyl Chloride (Chloroprene)	0.5
Carbon Disulifde	0.5
1,1,2-Trichloro-1,2,2-Trifluoroethane	0.5
t-1,2-Dichloroethylene	0.5
1,1-Dichloroethane	0.5
MTBE	0.5
Vinyl Acetate	0.5
2-Butanone (MEK)	1.0
cis-1,2-Dichloroethene	0.5
Hexane	0.5
Chloroform	0.5
Ethyl Acetate	0.5
Tetrahydrofuran	0.5
1,2-Dichloroethane	1.0
1,1,1-Trichloroethane	0.5
Benzene	0.5
Carbon Tetracloride	0.5
Cyclohexane	0.5
1,2-Dichloropropane	0.5
Bromodichloromethane	0.5
1,4-Dioxane	1.0
Trichloroethene	1.0
2,2,4-Trimethylpentane	0.5
Heptane	0.5
cis-1,3-Dichloropropene	0.5
4-Methyl-2-Pentanone (MiBK)	0.5
t-1,3-Dichloropropene	0.5
1,1,2-Trichloroethane	0.5
Toluene	0.5
2-Hexanone	1.0
Dibromochloromethane	0.5
1,2-Dibromoethane	0.5
Tetrachloroethylene	0.5
Chlorobenzene	0.5
Ethylbenzene	0.5
m- & p-Xylenes	0.5
Bromoform	0.5
Styrene	0.5
1,1,2,2-Tetrachloroethane	0.5
o-Xylene	0.5
4-Ethyltoluene	0.5
1,3,5-Trimethylbenzene	0.5
1,2,4-Trimethylbenzene	0.5
Benzyl Cloride	1.0
1,3-Dichlorobenzene	0.5
1,4-Dichlorobenzene	0.5
1,2-Dichlorobenzene	0.5
1,2,4-Trichlorobenzene	1.0
Hexachlorobutadiene	1.0

Appendix B. Photos of field testing setup

Figure A1. Broiler production house showing sampling stack attached to Fan#10 at back of house and ambient sampling at evaporative cooler/vent inlets at front of house.



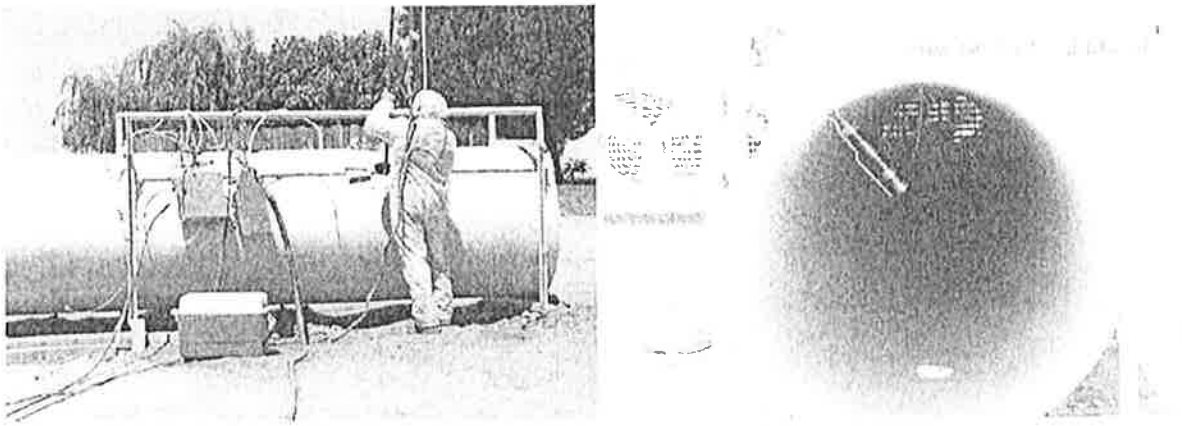


Figure A2. Sampling stack shown during airflow measurement and sampling.

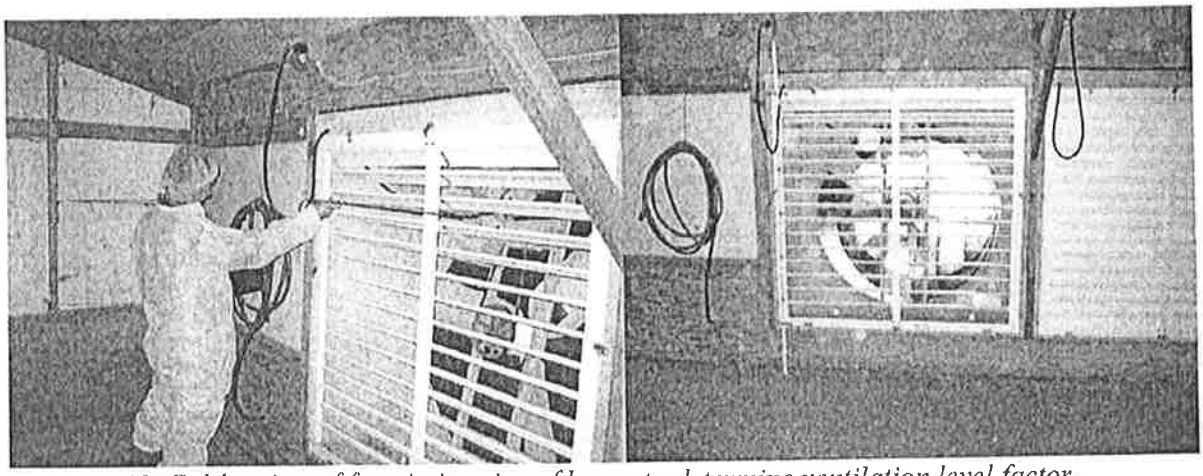


Figure A3. Calibration of fans in interior of house to determine ventilation level factor.

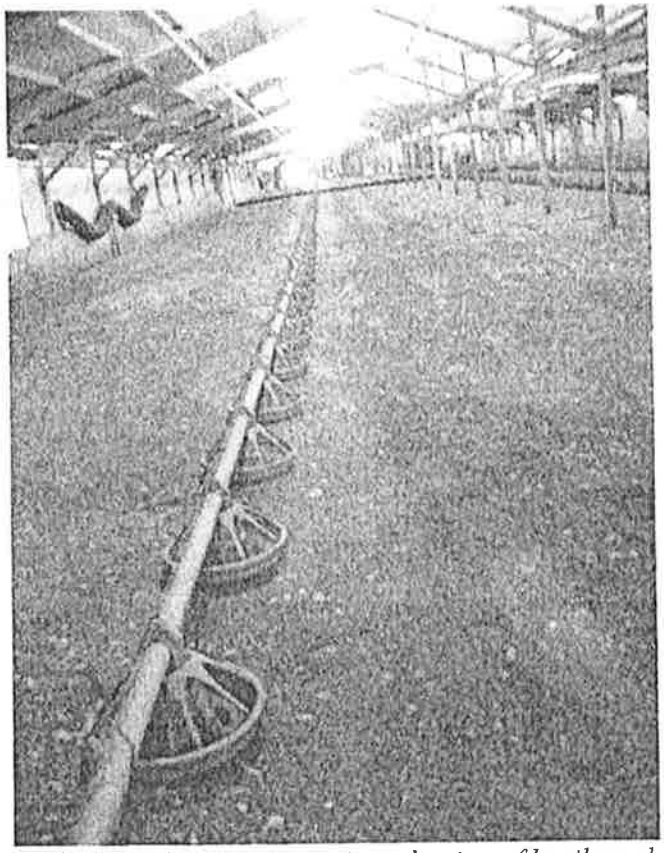


Figure A4. Interior of poultry house prior to introduction of broilers showing bedding, animal feeders, and open vents along roofline.

Appendix C. Source test reports

Complete list of data and quality assurance reports referenced by this study. Reports were prepared by:

AIRx Testing
P.O. Box 1077
17331 Sharon Blvd.
Madera, CA 93639

- Engineering Testing of Chicken House Stack
  Tested On: April 26, 2004
- Engineering Testing of Chicken House Stack
  Tested On: May 17, 2004
- Engineering Testing of Chicken House Stack
  Tested On: May 27, 2004
- Engineering Testing of Chicken House Stack
  Tested On: June 11, 2004
- Engineering Testing of Chicken House Stack
  Tested On: October 15, 2004
- Engineering Testing of Chicken House Stack
  Tested On: October 29, 2004
- Engineering Testing of Chicken House Stack
  Tested On: November 9, 2004
- Engineering Testing of Chicken House Stack
  Tested On: November 18, 2004
- Engineering Testing of Chicken House Stack
  Tested On: November 29, 2004

Appendix D. VOC sampling and analysis audit

Attachment.

APPENDIX B

Quarterly Net Emissions Change (QNEC)

Quarterly Net Emissions Change (QNEC)

The Quarterly Net Emissions Change is used to complete the emission profile screen for the District's PAS database. For each of the new emission units within this project, the QNEC shall be calculated as follows:

QNEC = PE2 - PE1, where:

QNEC = Quarterly Net Emissions Change for each emissions unit, lb/qtr.
PE2 = Post Project Potential to Emit for each emissions unit, lb/qtr.
PE1 = Pre-Project Potential to Emit for each emissions unit, lb/qtr.

Using the values in Sections VII.C.2 and VII.C.1 in the evaluation above, quarterly PE2 and quarterly PE1 can be calculated as follows (sample shown for PM_{10} emissions):

$PE2_{quarterly}$ = $PE2_{annual}$ ÷ 4 quarters/year
= 25,046 lb-PM_{10}/year ÷ 4 qtr/year
= 6,262 lb PM_{10}/qtr

$PE1_{quarterly}$= $PE1_{annual}$ ÷ 4 quarters/year
= 0 lb-PM_{10}/year ÷ 4 qtr/year
= 0 lb PM_{10}/qtr

Quarterly NEC [QNEC]			
Pollutant	**PE2 (lb/qtr)**	**PE1 (lb/qtr)**	**QNEC (lb/qtr)**
NO_X	0	0	0
SO_X	0	0	0
PM_{10}	6,262	0	6,262
CO	0	0	0
VOC	9,198	0	9,198

APPENDIX C

BACT Guideline 5.7.2

San Joaquin Valley
Unified Air Pollution Control District

Best Available Control Technology (BACT) Guideline 5.7.2*

Last Update: 02/05/2013

Poultry Layer House

Pollutant	Achieved in Practice or contained in the SIP	Technologically Feasible	Alternate Basic Equipment
VOC	19% control - completely enclosed mechanically ventilated layer housing with evaporative cooling pads, mixing fans, and a computer control system; belt manure aeration/drying and removal system with manure removal at least twice per week; all birds fed in accordance with NRC or other District-approved guidelines; and all mortality removed from houses once per day.	1) 98% control - Thermal Incineration 2) 95% control - Catalytic Incineration 3) 95% control - Carbon Adsorption 4) 80% control – Biofiltration	
PM10	50% control - completely enclosed mechanically ventilated layer housing with evaporative cooling pads, mixing fans, and a computer control system; and belt manure aeration/drying and removal system with manure removal at least twice per week.	1) 99% control - Electrostatic Precipitator 2) 99% control - Baghouse 3) 95% control - Wet Scrubber 4) 60% control - High Efficiency Cyclones	
NH3	55% control - completely enclosed mechanically ventilated layer housing with evaporative cooling pads, mixing fans, and a computer control system; belt manure aeration/drying and removal system with manure removal at least twice per week; all birds fed in accordance with NRC or other District-approved guidelines; and all mortality removed from houses once per day.	1) 99% control - Wet Scrubber 2) 80% control - Biofiltration	

BACT is the most stringent control technique for the emissions unit and class of source. Control techniques that are not achieved in practice or contained in a State Implementation Plan must be cost effective as well as feasible. Economic analysis to demonstrate cost effectiveness is required for all determinations that are not achieved in practice or contained in an EPA approved State Implementation Plan.

***This is a Summary Page for this Class of Source**

APPENDIX D

Top-Down BACT Analysis for the Proposed Poultry Layer Houses

I. Top Down BACT Analysis for VOC Emissions

a. Step 1 - Identify all control technologies

BACT Guideline 5.7.2 lists the following control technology options:

1) 98% Control – Thermal Incineration (Technologically Feasible)
2) 95% Control – Catalytic Incineration (Technologically Feasible)
3) 95% Control – Carbon Adsorption (Technologically Feasible)
4) 80% Control - Biofiltration (Technologically Feasible)
5) 19% Control - Layer House Design and Management Practices (Achieved in Practice), including:
   a. Animals fed in accordance with National Research Council (NRC) or other District accepted guidelines utilizing routine nutritional analysis for rations.
   b. Completely enclosed mechanically ventilated layer housing
   c. Mortality removed at least once per day
   d. Evaporative cooling pads to regulate house temperature
   e. Mixing fans
   f. Belt manure aeration/drying and removal system with manure removal at least twice per week

b. Step 2 - Eliminate technologically infeasible options

There are no technologically infeasible options to eliminate from step 1.

c. Step 3 - Rank remaining options by control effectiveness

VOC Emission Control Technology Rankings			
Rank	Control Technology	Control Efficiency	Status
1	Thermal Incineration	98%	Technologically Feasible
2	Catalytic Incineration	95%	Technologically Feasible
3	Carbon Adsorption	95%	Technologically Feasible
4	Biofiltration	80%	Technologically Feasible
5	Layer House Design and Management Practices	19%	Achieved in Practice

d. Step 4 - Cost Effectiveness Analysis

Options 1 and 2 – Thermal and Catalytic Incineration (98% Control):

The following cost analysis demonstrates that the cost of the control equipment alone, not including installation labor and materials and operational costs, causes incineration to exceed the District's VOC cost effectiveness threshold.

According to the applicant, each of the cage-free laying hen houses are equipped with 48 ventilation fans each rated at 26,200 cfm. Each of the pullet houses are equipped with 38 ventilation fans each rated at 26,200 cfm. The number of fans running at any one time varies, depending mostly on ambient temperature and other weather factors. Assuming that under extreme weather conditions all fans will be running (for a pullet house as the most conservative estimate), the maximum air flow rate from each house will be 995,600 cfm (38 fans x 26,200 cfm/fan).

Because there is no thermal oxidizer available for handling such a large air flow rate, exhaust concentrators must be used to reduce the volume of air to be treated. According to the estimates obtained by the District[5], four concentrators, each at a capital cost of $2.5 million, would be required to reduce the air flow rate from the layer house ten-fold to about 80,000 cfm. The concentrated air flow rate can then be treated using two 40,000 cfm oxidizers, each at a capital cost of $450,000.

The estimate obtained by the District shows the expected total capital costs as follows:

4 exhaust concentrators @ $2,500,000 = $10,000,000
2 oxidizers @ $450,000 = $900,000
Total = $10,900,000

Annualized Capital Cost

Pursuant to District Policy APR 1305, Section X (11/09/99), the incremental capital cost for the purchase of the fuel cell system will be spread over the expected life of the system using the capital recovery equation. The expected life of the entire system will be estimated at 10 years. A 10% interest rate is assumed in the equation and the assumption will be made that the equipment has no salvage value at the end of the ten-year cycle.

[5] Estimate provided by Curt Jordan of Catalytic Products International (Telephone: (847) 438-0334; url: http://cpilink.com/).

$A = [P \times i(I+1)^n]/[(I+1)^n-1]$

Where: A = Annual Cost
P = Present Value
I = Interest Rate (10%)
N = Equipment Life (10 years)
A = $[\$10,900,000 \times 0.1(1.1)^{10}]/[(1.1)^{10}-1]$
= $1,773,925/year

VOC Emission Reductions

Pursuant to the District's Revised BACT Cost Effectiveness Thresholds (May 2008), the methodology for determining the emission reduction used in cost effectiveness analyses is calculated as follows:

Emission Reductions = District Standard Emissions - Emissions with Tech Feasible BACT

District Standard Emissions:

District Standard Emissions serve as a baseline from which to estimate potential emissions reductions achievable by technologically feasible controls. According to the District's office memorandum for revised BACT cost effectiveness thresholds, if there is no SJVAPCD prohibitory rule emission limit that applies to the particular new emission unit or if the existing emission unit does not have permitted emission limits, District standard emissions for the unit are equal to the emissions from similar equipment that is commonly available in the District. In no case shall the emissions used be higher than that allowed by State or Federal requirements. If insufficient information is available to make a determination regarding emissions from common available equipment in the District, District standard emissions will be estimated based on EPA's Compilation of Air Pollutant Emission Factors (AP-42), or other references as determined by the SJVAPCD to be appropriate.

Rule 4570 applies to the poultry facility and requires mitigation measures to be performed. Therefore, the District Standard emissions will be equal to the controlled VOC emissions from the cage-free poultry houses. The controlled VOC emissions from the cage-free poultry houses are discussed in Section VII of this evaluation. These emissions already include the control efficiency for the Achieved in Practice BACT option.

Thus:

District standard emissions for the poultry layer houses = 4,866 lb-VOC/house-year (as calculated in Section VII.C.2 of the application review)

Annual VOC Emission Reductions = PE x 0.98
= 4,866 lb-VOC/year x 0.98
= 4,769 lb-VOC/year
= 2.38 tons-VOC/year

Cost Effectiveness Calculation:

Cost of Reduction ($/ton) = Annual O&M Cost / VOC Reductions
= $1,773,925/yr ÷ (2.38 tons-VOC/year)
= $745,347/ton

The analysis demonstrates that the initial capital cost of thermal or catalytic incineration, not including the operation and maintenance costs, will exceed the District's BACT Cost Effectiveness Threshold for VOC of $17,500/ton. Therefore, these options are not cost-effective and will not be required for the proposed project.

Option 3 – Carbon Adsorption (95% Control):

Carbon adsorption occurs when air that contains pollutants is blown through an activated carbon unit and the pollutants are adsorbed onto the surfaces in the pores of the activated carbon particles.

The following cost analysis demonstrates that the cost of activated carbon and the annual labor costs cause carbon adsorption to exceed the District's cost effectiveness threshold.

In addition to controlling VOC emissions, treated activated carbon can also control ammonia emissions. Although this technology can control both pollutants, a cost effectiveness threshold has not been established for ammonia. Therefore, only achieved-in-practice options will be considered for ammonia at this time and a multi-pollutant cost effectiveness analysis for VOC and ammonia will not be performed.

Amount of Activated Carbon Required for VOC Control

Carbon can adsorb 20% of its weight in VOCs[6].

Carbon required = (4,866 lb-VOC/year x 0.95) x 1 lb-Carbon/0.2 lb-VOC
= 23,114 lb-carbon/year

Cost of Activated Carbon Required for VOC Control

On May 18, 2016, Rebecca Alward of Calgon Carbon Corporation provided a price estimate of $1.35 per lb of carbon plus freight for District Project N-1143210.

Per the EPA Air Pollution Control Cost Manual, Sixth Edition (January 2002), freight costs for the carbon will be estimated as 5% of the carbon capital cost.

This facility is located in Kern County, which has a current sales tax rate of 7.25%. However, pollution control equipment may qualify for CA tax partial exemption[7]. The exemption rate is 3.9375%, so the reduced sales tax rate for Kern County equals 3.5625% (7.5% - 3.9375%).

[6] District GEAR 9 - Soil Remediation Project Utilizing an Activated Carbon System.
[7] https://www.boe.ca.gov/lawguides/business/current/btlg/vol1/sutr/1525-4.html

Total Carbon cost = 23,114 lb-carbon/yr x $1.35/lb x $1.085625_{(taxes\ and\ freight)}$ = $33,875/house-year

Annual Labor Costs for Activated Carbon System

The annual labor costs for the carbon adsorption system are estimated based on information from the EPA Air Pollution Control Cost Manual, Sixth Edition (January 2002), Section 3.1: VOC Recapture Controls, Chapter 1: Carbon Adsorbers (September 1999)[8] and is summarized in the table below.

Carbon Adsorption Annual Labor Costs			
Direct Annual Costs (DAC)			
Operating Labor			
Operator	½ hr per shift	$18.50/hr x 0.5 hr/shift x 3 shift/day x 365 days/year	$10,129
Supervisor	15% of operator		$1,519
Maintenance			
Labor	½ hr per shift	$18.50/hr x 0.5 hr/shift x 3 shift/day x 365 days/year	$10,129
Maintenance Materials	100% of labor		$10,129
Total Annual Labor Costs			**$31,906**

VOC Emission Reductions

District standard emissions for the proposed poultry layer houses = 4,866 lb-VOC/house-year (as calculated in Section VII.C.2 of the application review)

Annual VOC Emission Reductions = PE x 0.95
= 4,866 lb-VOC/year x 0.95
= 4,623 lb-VOC/year
= 2.31 tons-VOC/year

Cost Effectiveness Calculation:

Cost of Reduction ($/ton) = Annual O&M Cost / VOC Reductions
= ($33,875 + 31,906)/yr ÷ (2.31 tons-VOC/year)
= $28,477/ton

[8] EPA Air Pollution Control Cost Manual, Sixth Edition (January 2002), Section 3.1: VOC Recapture Controls, Chapter 1: Carbon Adsorbers (September 1999). United States Environmental Protection Agency Office of Air Quality Planning and Standards. Research Triangle Park, North Carolina 27711. EPA/452/B-02-001. http://epa.gov/ttn/catc/dir1/cs3-1ch1.pdf

The analysis demonstrates that the annual costs of the purchase of carbon and the annual labor costs, not including the initial capital cost for the system, will exceed the District's BACT Cost Effectiveness Threshold for VOC of $17,500/ton. Therefore, this option is not cost-effective and will not be required for the proposed project.

Option 4 – Biofilter (80% Control):

Biofiltration is a method of reducing pollutants in which exhaust air that contains contaminants is blown through a media (e.g., soil, compost, wood chips) that supports a microbial population. The microbes utilize the pollutants such as VOCs and ammonia as nutrients and oxidize the compounds as they pass through the filter. Although biofiltration can control both VOC and ammonia emissions, a cost effectiveness threshold has not been established for ammonia. Therefore, only achieved-in-practice options will be considered for ammonia at this time and a multi-pollutant cost effectiveness analysis for VOC and ammonia will not be performed.

The following cost analysis demonstrates that the capital cost of biofiltration alone, not including installation labor and materials and operational costs, causes incineration to exceed the District's VOC cost effectiveness threshold.

Cost of Biofiltration:

The cost of a biofilter includes the cost of the blowers, pretreatment systems such as humidifiers, air treatment media, ductwork, plenums, and labor.

Based on case studies of biofilters already in operation the U.S. EPA, Clean Air Technology Center (CATC) technical bulletin "Using Bioreactors to Control Air Pollution" (September 2003)[9] lists capital costs ranging from $2.35 per cfm to $7.74 per cfm, not including the installation of duct work, for biofilters with capacities of 50,000 cfm or greater and lists capital costs of $20.20 per cfm and $30.00 per cfm for Biotrickling filters, excluding the more expensive Hyperion unit, which was intended to be used as a research device.

For purposes of this analysis, the lowest capital cost value for biofilters given in the EPA document of $2.35 per scfm will be used for the most conservative estimate. Adjusting for inflation, $2.35/scfm (2003 dollars) is equivalent to $3.27/scfm (current 2018 dollars) (US Bureau of Labor Statistics, http://www.bls.gov/data/inflation_calculator.htm)

As previously discussed the maximum air flow rate for each poultry house is 1,257,600 cfm (48 fans x 26,200 cfm/fan).

The capital cost of the biofilter is calculated as follows:

$3.21/cfm x 1,257,600 cfm = $4,036,896

[9] U.S. Environmental Protection Agency, Clean Air Technology Center (CATC), "Using Bioreactors to Control Air Pollution" EPA-456/R-03-003, (E143-03), September 2003, http://www.epa.gov/ttn/catc/dir1/fbiorect.pdf.

Pursuant to District Policy APR 1305, Section X (11/09/99), the cost for the purchase of the biofilter will be spread over the expected life of the system using the capital recovery equation. Although the biofilter media (e.g., soil, compost, wood chips) must be replaced after 3-5 years, this additional cost will not be considered in this analysis. Therefore, the expected life of the system (fans, ductwork, plenum, etc.) is estimated at 10 years. A 10% interest rate is assumed in the equation and the assumption will be made that the equipment has no salvage value at the end of the ten-year cycle. The cost is annualized as follows:

$$A = [P \times i(I+1)^n]/[(I+1)^n-1]$$

Where: A = Annual Cost
P = Present Value
I = Interest Rate (10%)
N = Equipment Life (10 years)
A = $[\$4,036,896 \times 0.1(1.1)^{10}]/[(1.1)^{10}-1]$
= \$656,986/year

VOC Emission Reductions

District standard emissions for the proposed poultry layer houses = 4,866 lb-VOC/house-year (as calculated in Section VII.C.2 of the application review)

Annual VOC Emission Reductions = PE x 0.80
= 4,866 lb-VOC/year x 0.80
= 3,893 lb-VOC/year
= 1.95 tons-VOC/year

Cost Effectiveness Calculation:

Cost of Reduction (\$/ton) = Annual O&M Cost / VOC Reductions
= \$628,333/yr ÷ 1.95 tons-VOC/year
= \$337,539/ton

The analysis demonstrates that the initial capital cost of biofiltration, not including the operation and maintenance costs, will exceed the District's BACT Cost Effectiveness Threshold for VOC of \$17,500/ton. Therefore, this option is not cost-effective and will not be required for the proposed project.

Option 5 – Poultry Layer House Design and Management Practices (19% Control):

The only remaining control option in step 3 above has been deemed AIP for this class and category of source and per the District BACT policy is required regardless of the cost. In addition, the applicant has proposed this option. Therefore, a cost effectiveness analysis is not required.

e. Step 5 - Select BACT

BACT for VOC for this operation is poultry layer house design and management practices consisting of the following: completely enclosed mechanically ventilated layer housing with evaporative cooling pads, mixing fans, and a computer control system; belt manure aeration/drying and removal system with manure removal at least twice per week; all birds fed in accordance with NRC or other District-approved guidelines; and all mortality removed from houses at least once per day. The applicant has proposed these requirements for the poultry houses. Therefore, BACT is satisfied.

II. Top Down BACT Analysis for PM_{10} Emissions

a. Step 1 - Identify all control technologies

BACT Guideline 5.7.2 list the following control technology options:

1) 99% Control - Electrostatic Precipitator (Technologically Feasible)
2) 99% Control – Baghouse (Technologically Feasible)
3) 95% Control - Wet Scrubber (Technologically Feasible)
4) 60% Control - High Efficiency Cyclones (Technologically Feasible)
5) 50% Control - Completely enclosed mechanically ventilated layer housing with evaporative cooling pads, mixing fans, and a computer control system; and belt manure aeration/drying and removal system with manure removal at least twice per week (Achieved in Practice)

b. Step 2 - Eliminate technologically infeasible options

Option 2 (Baghouse) will be eliminated from consideration as a technologically feasible control option. Previous BACT determinations have concluded that this option is not practical for poultry facilities because feathers adhere strongly to the filter media and, unlike dust or other granular materials, cannot be dislodged using the available bag cleaning technologies such as mechanical shaking and reverse pulse jets.

c. Step 3 - Rank remaining options by control effectiveness

PM10 Emission Control Technology Rankings			
Rank	Control Technology	Control Efficiency	Status
1	Electrostatic Precipitator	99%	Technologically Feasible
2	Wet Scrubber	95%	Technologically Feasible
3	High Efficiency Cyclones	60%	Technologically Feasible
4	Completely enclosed mechanically ventilated layer housing with evaporative cooling pads, mixing fans, and a computer control system; and belt manure aeration/drying and removal system with manure removal at least twice per week	50%	Achieved in Practice

d. Step 4 - Cost Effectiveness Analysis

Option 1 - Electrostatic Precipitator (99% Control):

The following cost analysis demonstrates that the annual operating & maintenance (O&M) costs alone, not including the initial capital costs, causes the electrostatic precipitator to exceed the District PM_{10} cost effectiveness threshold.

According to the EPA-CICA Air Pollution Control Technology Fact Sheet on Dry Electrostatic Precipitator (ESP) – Wire-Plate Type (EPA-452/F-03-028)[10], the annual O&M cost for a Wire-Plate Type ESP ranges from $3 to $35 per scfm (in 2002 dollars)

For purposes of this analysis, the lowest O&M cost value given of $3 per scfm will be used for the most conservative estimate.

Annual O&M cost = $3/scfm (in 2002 dollars)

Adjusting for inflation, $3/scfm (2002 dollars) is equivalent to $4.20/scfm (current 2016 dollars) (US Bureau of Labor Statistics, http://www.bls.gov/data/inflation_calculator.htm)

The air flow rate is conservatively assumed to be 628,800 acfm/house[11] (the temperature was not specified so assume that acfm = scfm).

Annual O&M cost per house = 628,800 scfm x $4.20 /scfm-year = $2,640,960/year

PM_{10} Emission Reductions:

Pursuant to the District's Revised BACT Cost Effectiveness Thresholds (May 2008), the methodology for determining the emission reduction used in cost effectiveness analyses is calculated as follows:

Emission Reductions = District Standard Emissions - Emissions with Tech Feasible BACT

[10] http://www.epa.gov/ttncatc1/products.html#aptecfacts

[11] Each proposed house will be equipped with 48 exhaust fans, each with an air flow rate of 26,200 cfm. The number of fans running at any one time may vary. However, the applicant has stated that during summer months, all of the fans would need to be operating in order to maintain each house at an optimal temperature. However, for more conservative BACT calculations, it will be assumed 50% of the fans will be in operation (24 x 26,200 cfm = 628,800 cfm/house).

District Standard Emissions:

There are no prohibitory rule emission limits applicable to layer houses. Therefore, the District Standard emissions will be equal to the uncontrolled PM_{10} emissions from the cage-free poultry houses. In previous projects S-1161654 and S-1180558 it was established that the control efficiency of the in-house manure drying system, a tarp covering the top 40% of the open end of each house and water sprays over the open house ends will reduce the overall PM_{10} emissions from the houses by 90%. Therefore, the uncontrolled PM_{10} emissions from the cage-free poultry houses can be calculated as follows: 0.02712 lb-PM_{10}/bird-day ÷(1 – 0 = 0.2712 lb-PM_{10}/bird-day.

Thus:

PM_{10} Emission Reductions = District Standard Emissions - Emissions with Tech Feasible Controlled Emissions

District standard emissions = 330,000 bird/house x 0.2712 lb-PM_{10}/bird-day x 365 days/year = 32,666 lb-PM_{10}/year/house

PM_{10} Emission Reductions

Annual PM_{10} Emission Reductions = PE x 0.99
= 32,666 lb-PM_{10}/year x 0.99
= 32,339 lb-PM_{10}/year
= 16.2 tons-PM_{10}/year

Cost Effectiveness Calculation:

Cost of Reduction ($/ton) = Annual O&M Cost / PM_{10} Reductions
= $2,638,440/yr ÷ 16.2 tons-PM_{10}/year
= $162,867/ton

The analysis demonstrates that the operation and maintenance cost of an electrostatic precipitator, not including the initial capital cost, will exceed the District's BACT Cost Effectiveness Threshold for PM_{10} of $11,400/ton. Therefore, this option is not cost-effective and will not be required for the proposed project.

Option 2 – Wet Scrubber (95% Control):

The following cost analysis demonstrates that the annual operating & maintenance (O&M) costs alone, not including the initial capital costs, causes the wet scrubber to exceed the District PM_{10} cost effective threshold.

According to the EPA-CICA Air Pollution Control Technology Fact Sheet on Venturi Scrubbers (EPA-452/F-03-017)[12], the annual O&M cost for a Venturi wet scrubber ranges from $4.4 to $120 per scfm (in 2002 dollars)

For purposes of this analysis, the lowest O&M cost value given of $4.4 per scfm will be used for the most conservative estimate.

Annual O&M cost = $4.4/scfm (in 2002 dollars)

Adjusting for inflation, $4.4/scfm (2002 dollars) is equivalent to $6.16/scfm (current 2018 dollars) (US Bureau of Labor Statistics, http://www.bls.gov/data/inflation_calculator.htm)

As previously calculated, the proposed air flow rate is conservatively assumed to be 628,200 acfm/house (the temperature was not specified so assume that acfm = scfm).

Annual O&M cost per house = 628,800 scfm x $5.85/scfm-year = $3,678,480/year

PM_{10} Emission Reductions

Annual PM_{10} Emission Reductions = PE x 0.95
= 32,666 lb-PM_{10}/year x 0.95
= 31,033 lb-PM_{10}/year
= 15.52 tons-PM_{10}/year

Cost Effectiveness Calculation:

Cost of Reduction ($/ton) = Annual O&M Cost / PM_{10} Reductions
= $3,678,480/yr ÷ 15.52 tons-PM_{10}/year
= $237,015/ton

The analysis demonstrates that the operation and maintenance cost of a wet scrubber, not including the initial capital cost, will exceed the District's BACT Cost Effectiveness Threshold for PM_{10} of $11,400/ton. Therefore, this option is not cost-effective and will not be required for the proposed project.

Option 3 – High Efficiency Cyclones (60% Control):

The following cost analysis demonstrates that the annual operating & maintenance (O&M) cost alone, not including the initial capital cost, causes the cyclones to exceed the District PM10 cost effective threshold.

According to the EPA-CICA Air Pollution Control Technology Fact Sheet on Cyclones (EPA-452/F-03-005)[13], the annual O&M cost for a cyclone ranges from $0.70 to $8.50 per scfm (in 2002 dollars)

[12] http://www.epa.gov/ttncatc1/products.html#aptecfacts
[13] http://www.epa.gov/ttncatc1/products.html#aptecfacts

For purposes of this analysis, the lowest O&M cost value given of $0.70 per scfm will be used for the most conservative estimate.

Annual O&M cost = $0.70/scfm (in 2002 dollars)
Adjusting for inflation, $0.70/scfm (2002 dollars) is equivalent to $0.98/scfm (current 2018 dollars) (US Bureau of Labor Statistics, http://www.bls.gov/data/inflation_calculator.htm)

As previously calculated, the proposed air flow rate is conservatively assumed to be 628,800 acfm/house (the temperature was not specified so assume that acfm = scfm).

Annual O&M cost per house = 628,800 scfm x $0.98/scfm-year = $616,224/year

PM_{10} Emission Reductions

Annual PM_{10} Emission Reductions = PE x 0.60
= 32,666 lb-PM_{10}/year x 0.60
= 19,600 lb-PM_{10}/year
= 9.80 tons-PM_{10}/year

Cost Effectiveness Calculation:

Cost of Reduction ($/ton) = Annual O&M Cost / PM_{10} Reductions
= $616,224/yr ÷ 9.80 tons-$PM_{10}$/year
= $62,880/ton

The analysis demonstrates that the operation and maintenance cost of high efficiency cyclones, not including the initial capital cost, will exceed the District's BACT Cost Effectiveness Threshold for PM_{10} of $11,400/ton. Therefore, this option is not cost-effective and will not be required for the proposed project.

Option 4 – Completely Enclosed Mechanically Ventilated Layer Housing and Belt Manure System with Manure Removed Twice per Week (50% Control):

The only remaining control option in step 3 above has been deemed AIP for this class and category of source and per the District BACT policy is required regardless of the cost. In addition, the applicant has proposed this option. Therefore, a cost effectiveness analysis is not required.

e. Step 5 - Select BACT

BACT for PM_{10} for this operation is completely enclosed mechanically ventilated layer housing with evaporative cooling pads, mixing fans, and a computer control system; and belt manure aeration/drying and removal system with manure removal at least twice per week. The applicant has proposed these requirements for each of the poultry houses. Therefore, BACT is satisfied for PM_{10} emissions.

III. Top Down BACT Analysis for NH_3 Emissions

a. Step 1 - Identify all control technologies

The control technology options include:

1) 99% Control – Wet Scrubber (Technologically Feasible)
2) 80% Control – Biofiltration (Technologically Feasible)
1) 55% Control - Poultry Layer House Design and Management Practices (Achieved in Practice), including:
   a. Animals fed in accordance with National Research Council (NRC) or other District accepted guidelines utilizing routine nutritional analysis for rations.
   b. Completely enclosed mechanically ventilated layer housing
   c. Mortality removed at least once per day
   d. Evaporative cooling pads to regulate house temperature
   e. Mixing fans
   f. Belt manure aeration/drying and removal system with manure removal at least twice per week

b. Step 2 - Eliminate technologically infeasible options

A cost effectiveness threshold has not been established for ammonia. Therefore, only options that meet the District's definition of Achieved-in-Practice controls will be evaluated and wet scrubber and biofiltration will be removed from consideration as control alternatives for the purposes of this top down BACT analysis.

c. Step 3 - Rank remaining options by control effectiveness

NH_3 Emission Control Technology Rankings			
Rank	Control Technology	Control Efficiency	Status
1	Poultry Layer House Design and Management Practices	55%	Achieved in Practice

d. Step 4 - Cost Effectiveness Analysis

The applicant has proposed the only control option from step 3 above; therefore a cost effectiveness analysis is not required.

e. Step 5 - Select BACT

BACT for NH_3 for this operation is poultry layer house design and management practices consisting of the following: completely enclosed mechanically ventilated layer housing with evaporative cooling pads, mixing fans, and a computer control system; belt manure aeration/drying and removal system with manure removal at least twice per week; all birds fed in accordance with NRC or other District-approved guidelines; and all mortality removed from houses at least once per day. The applicant has proposed these requirements for the poultry houses. Therefore, BACT is satisfied.

APPENDIX E

Health Risk Assessment (HRA) and Ambient Air Quality Analysis (AAQA) Summaries

San Joaquin Valley Air Pollution Control District
Risk Management Review

To:	Jesse Garcia – Permit Services
From:	Kyle Melching – Technical Services
Date:	October 16, 2018
Facility Name:	Central Valley Egg
Location:	Gun Club Rd & Hannawalt Ave., Wasco
Application #(s):	S-8841-1-3
Project #:	S-1183494

A. RMR SUMMARY

Chicken Egg Production	Prioritization Score	Acute Hazard Index	Chronic Hazard Index	Maximum Individual Cancer Risk	T-BACT Required?	Special Permit Conditions?
1-3	>1	0.45	0.08	2.69E-06	See Conclusion	No
Project Totals	**>1**	**0.45**	**0.08**	**2.69E-06**		
Facility Totals	**>1**	**0.45**	**0.08**	**3.62E-06**		

[1]Emission factors from the manure storage are built into the emission factors for the hen and pullet houses. Therefore, the risks from this unit will be captured in (Unit 1-0) chicken housing.

Proposed Permit Requirements

To ensure that human health risks will not exceed District allowable levels; the following shall be included as requirements for:

Units # 1-3

No special requirements are required.

B. REPORT

I. Project Description

Technical Services received a request on September 27, 2018, to perform an Ambient Air Quality Analysis and a Risk Management Review for the modification of 7 new layer hen houses (barns) and three pullet houses (barns) consisting of a total of 3,218,690 birds in all. This modification will update emission for all houses. This analysis will take the place of the previous analysis for the poultry houses.

II. Analysis

RMR

VOC toxic emissions for this proposed unit were calculated using emission factors generated from a 2004 source test conducted on a Broiler House in the District. PM based toxic emissions for this proposed unit were calculated using emission factors based on the table, "Mineral Composition of Manures" (page iv in Apendix III) in 1990 *A Review of Poultry Manure Management:Directions for the Future,*Agriculture and Agri-Food Canada Poultry Section. The toxic emissions were input into the San Joaquin Valley APCD's Hazard Assessment and Reporting Program (SHARP). In accordance with the District's Risk Management Policy for Permitting New and Modified Sources (APR 1905, May 28, 2015), risks from the proposed unit's toxic emissions were prioritized using the procedure in the 2016 CAPCOA Facility Prioritization Guidelines. The prioritization score for the facility is greater than 1.0 (see RMR Summary Table). Therefore, a refined health risk assessment was required. The AERMOD model was used, with the parameters outlined below and meteorological data for 2007-2011 from Wasco to determine the dispersion factors (i.e., the predicted concentration or X divided by the normalized source strength or Q) for a receptor grid. These dispersion factors were input into the SHARP Program, which then used the Air Dispersion Modeling and Risk Tool (ADMRT) of the Hot Spots Analysis and Reporting Program Version 2 (HARP 2) to calculate the chronic and acute hazard indices and the carcinogenic risk for the project. Each modeled barn PM10 emission's used was a variable emission factor (by month/hour/day). This emission factor was derived to reflect the operations of the exhaust fans utilization rate based on the temperature outside; which utilizes met data temperature values. For the acute risk, a refined ammonia (NH3) analysis was ran since it was determined the ammonia accounted for over 99% of the total acute risk. Hourly lb/ammonia toxicity was modeled from each barn to determine the refined acute risk associated with the project.

The following parameters were used for the review:

Unit ID	Unit Description	PM10 Emissions (lb/hr)	PM10 Emissions (lb/yr)	NH3 Emissions (lb/hr)	NH3 Emissions (lb/yr)	Increase # of Hen*
1-3 (LH1)	Hen Housing	0.37	3,267	3.44	30,113	330,000
1-3 (LH2)	Hen Housing	0.37	3,267	3.44	30,113	330,000
1-3 (LH3)	Hen Housing	0.37	3,267	3.44	30,113	330,000
1-3 (LH4)	Hen Housing	0.37	3,267	3.44	30,113	330,000
1-3 (LH5)	Hen Housing	0.37	3,267	3.44	30,113	330,000
1-3 (LH6)	Hen Housing	0.37	3,267	3.44	30,113	330,000
1-3 (LH7)	Hen Housing	0.37	3,267	3.44	30,113	330,000
1-3 (PHA)	Pullet Housing	0.167	1,079	4.1	26,319	350,000
1-3 (PHB)	Pullet Housing	0.167	1,079	4.1	26,319	350,000
1-3 (PHC)	Pullet Housing	0.167	1,079	4.1	26,319	350,000

*Number of head account for VOC TAC emissions

Modeled Source ID	Unit Description	Release Height (m)	Length of Side (m)	Initial Lat. Dim. (m)	Initial Vert. Dim. (m)
LH1 thru LH7	Barns 1-7 Emissions	5.3	2.89	0.67	4.96
PHA thru PHC	Barns A-C Emissions	5.3	2.89	0.67	4.96

AAQA. In addition to the RMR, Technical Services performed modeling for the criteria pollutants associated with the project.

The results from the Criteria Pollutant Modeling for the **barns** are as follows:

Each layer barn's maximum hourly emission rate is 0.37 lb-PM_{10}/hr and average hourly emission rate based on the max annual emissions is 0.35. Each pullet barn maximum hourly emission rate and average hourly emission rate based on the max annual emissions is 0.14 lb-PM_{10}/hr. PM10 from the barns were modeled with a variable emission factor (by month/hour/day). This emission factor was derived to reflect the operations of the exhaust fans utilization rate based on the temperature outside; which utilizes met data temperature values.

$PM_{10\ \&\ 2.5}$ Pollutant Modeling Results*
Values are in $\mu g/m^3$

Category	24 Hours	Annual
Net Value	9.56	2.00
Interim Significance Level	10.4[1]	2.08[1]
Result	Pass	Pass

[1]Per District 1925 the SIL threshold for fugitive dust sources is 10.4 µg/m3 for the 24-hour average concentration and 2.08 µg/m3 for the annual concentration.

III. Conclusion

Unit 1-3 Barns

The acute and chronic indices are below 1.0 and the cancer risk factor associated with each barn is less than 1.0 in a million. **In accordance with the District's Risk Management Policy, the project is approved without Toxic Best Available Control Technology (T-BACT).**

To ensure that human health risks will not exceed District allowable levels; the permit requirements listed on page 1 of this report must be included for this proposed unit.

These conclusions are based on the data provided by the applicant and the project engineer. Therefore, this analysis is valid only as long as the proposed data and parameters do not change.

The emissions from the proposed equipment will not cause or contribute significantly to a violation of the State and National AAQS.

The ambient air quality impacts from PM_{10} emissions from the poultry ranch do not exceed the District's 24-hour or Annual interim threshold for fugitive dust sources.

IV. Attachments

A. RMR request from the project engineer
B. Additional information from the applicant/project engineer
C. Prioritization score w/ toxic emissions summary.
D. Facility Summary
E. Variable Emission Rates

APPENDIX F

Statewide Compliance Certification

13606 Gun Club Road Wasco, CA 93280

October 22, 2018

Errol Villegas
Permit Services Manager
San Joaquin Valley APCD
1990 E. Gettysburg Ave.
Fresno, CA 93726

RE: New Federal Major Source Statewide Compliance Certification
Facility S-8841

Dear Mr. Villegas,

In accordance with Rule 2201, Section 4.15, "Additional Requirements for New Major Sources and Federal Major Modifications, Central Valley Eggs, LLC is pleased to provide this compliance statement regarding our egg production and processing facility in northwestern Kern County.

I hereby certify that neither Central Valley Eggs, nor any entity controlling, controlled by, or under common control with Central Valley Eggs, own or operate any major Stationary Sources in California. This certification shall speak to the date of its execution.

If you have any questions or need additional information for this project, please contact Ms. Kathy Parker of Insight Environmental Consultants at 661-282-2200 or me at 712-339-0209.

Sincerely,

Jeff Peterson
General Manager / CEO

cc: Insight Environmental Consultants

APPENDIX G

Central Valley Eggs Alternative Siting Analysis

Alternative Siting Requirement

Rule 2201, 4.15.1 Alternative siting: For those sources for which an analysis of alternative sites, sizes, and production processes is required under Section 173 of the Federal Clean Air Act, the applicant shall prepare an analysis functionally equivalent to the requirements of Division 13, Section 21000 et. seq. of the Public Resources Code.

Alternative Siting Analysis

Alternative siting analysis is required for any project which constitutes a New Major Source or a Federal Major Modification.

In addition to three (3) mechanically ventilated pullet houses and seven (7) mechanically ventilated layer houses, the operation of an egg production and processing facility requires thirteen (13) backup generators, water treatment system, water storage, wastewater handling, storm drainage storage, associated structures (1,800 square foot (sf) office, 18,000 sf egg processing plant, 12,000 sf cooler, and 6,000 sf dry storage), access and on-site paving, 53 employees, 112 parking spaces, vehicle wash station and perimeter and facility fencing.

The Project involves air permits for construction and operation of a new egg production and processing facility, including the three (3) mechanically ventilated pullet houses, the seven (7) mechanically ventilated layer houses, the associated manure handling systems for the layer houses, and the thirteen (13) backup generators.

Kern County Zoning Ordinance Chapter 19.12.130, Section E states that: "Commercial poultry farms are permitted is all the following criteria are satisfied:

1. No portion of the proposed site lies within two (2) miles of the City of Bakersfield or within one (1) miles of any other incorporated city.

2. The General Plan designation of the entire site is 8.1 or 8.3 and no portion of the site is designated 2.3 (Shallow Groundwater) or is located in a floodway.

3. There is no property zoned or designated by the General Plan or applicable Specific Plan for residential development (E or R-1, R-2, and R-3) within three (3) miles from the exterior boundary of the site.

4. There is no property designated 4.2 (Rural Community) within one (1) mile from the exterior boundary of the site from the exterior boundary of the site and no property designated 4.3 (Specific Plan Required) within three (3) miles from the exterior boundary of the site.

5. There are no areas zoned or designated by the General Plan or applicable Specific Plan for commercial uses and no retail commercial uses, including hotels and motels, within a one (1) mile radius from the exterior project boundary.

6. There are no residential facilities, community care facilities, hospitals, recreational vehicle parks, or public or private schools within a two (2) mile radius from the exterior project boundary.

7. The facility operator obtains all local, State, and federal approvals, licenses, and permits prior to the commencement of operations."

Kern County prepared a Kern County Poultry Siting Map identifying sites which meet the above criteria and is accessible on-line at: http://www.arcgis.com/home/webmap/viewer.html?webmap=65e82441d2f34f2988126502d4e5737a&extent=-120.5919,34.1619,-117.2191,36.4126.

In addition, the applicant has a minimum facility size of 150 acres and a requirement for adequate water supplies. Based on a review of this Kern County Siting Map, over 80 sites were identified as appropriate for a new egg production and processing facility and met the minimum size and water requirements. Only two of these sites were available for sale; the applicant purchased both sites. All other available properties for sale did not meet the siting criteria outlined by Kern County. The Project is located on APN 059-130-11 which meets all of the Kern County buffering requirements as well as the applicant's size and water requirements. The other alternative site also meets the above requirements and will be subject to a future egg production facility application. Because: 1) the available agricultural properties for sale only produced a limited selection of sites which met the Kern County Poultry siting requirements; 2) the applicant additionally has size and water requirements which also must be met; 3) the applicant purchased and is pursuing the two sites which meet the above requirements; the District can conclude that the Project meets its alternative siting analysis requirements outlined in its District Rule 2201, 4.15.1.

APPENDIX H

Greenhouse Gas (GHG) Analysis

Greenhouse Gas Emissions Impacts:

On December 17, 2009, the San Joaquin Valley Air Pollution Control District (District) adopted *District Policy APR 2005 — Addressing Greenhouse Gas (GHG) Emission Impacts for Stationary Source Projects Under CEQA When the District is Serving as the Lead Agency.* The policy was developed to assist Lead Agencies, project proponents, permit applicants, and interested parties in assessing and reducing the impacts of project specific GHG emissions on global climate change. The District policy uses an approach intended to streamline the process of determining if project specific GHG emissions would have a significant effect.

The District Policy for GHG emissions states a project is considered to have a less than significant impact for GHG emissions when:

1. The project is exempt from CEQA.

2. The project equipment is designed and operated in accordance with Best Performance Standards (BPS) established by the District. BPS are adopted by the District after review and consideration of possible environmental effects. The District has determined that the operation of equipment that includes BPS results in less than significant cumulative impacts.

3. The project is designed to achieve a 29% reduction in GHG emissions compared to the business as usual (BAU) design case. The District has determined that projects that achieve a 29% reduction in GHG emissions compared to BAU design case result in less than significant cumulative impacts.

4. The project complies with an approved GHG emission reduction plan or GHG mitigation program. The District has determined that such plans or programs result in less than significant cumulative impacts.

BPS has not been established for poultry operations. Therefore, a 29% GHG emission reduction compared to BAU will be calculated.

The California Air Resources Board (ARB) used its emission inventory to establish a three-year average for GHG emissions occurring by sector during the baseline period of 2002-2004. This three-year average baseline emissions inventory was projected to the year 2020 using assumptions about potential growth. CARB designated the baseline emissions inventory projected to the year 2020 as BAU. Therefore, BAU is considered the baseline period if Central Valley Eggs was operating from 2002-2004.

Thus, the percent reduction in GHG emissions is calculated as follow:

$$\%\ \text{Reduction in GHG emissions} = \frac{(\text{2002 - 2004 baseline GHG emissions}) - (\text{Proposed project GHG emissions})}{\text{2002 – 2004 baseline GHG emissions}} \text{x100\%}$$

Proposed Project GHG Emissions:

In order to determine a 29% reduction in GHG emissions, the GHG from the proposed project will first be calculated.

Basis and Assumptions

- The maximum number of hens that will be kept in the seven poultry houses proposed under this project is 2,289,000 hens for the seven houses (proposed by the applicant).
- The maximum number of pullets that will be kept in each of the three pullet houses proposed under this project is 350,000, resulting in a total of 1,050,000 pullets for the three houses (proposed by the applicant).
- Emission factors are based on the documentation for ARB's 2015 Edition of the GHG Emission Inventory (Released June 2015):
    - *Emission factor for CH_4 = 647 g of CO_2eq/head of hens 1+ yr*[14]
    - *Emission factor for N_2O = 1,070 g of CO_2eq/head of hens 1+ yr*[15]
- Emission factors for pullets will be determined using similar assumptions to the PM_{10}, VOC and NH_3 emission rates in Section VII.B above (uncontrolled emission factors) that pullets will generate approximately 61.8% of the emissions that adult laying hens generate (comparison of an uncontrolled emission factors between laying hens and the sum of chick starters plus pullet growers).

Calculations

Total Laying Hen Emissions (CH_4+N_2O) = 647 + 1,070 g of CO_2eq/head of hens/year
= 1,717 g of CO_2eq/head of hens/year
= 1.717 kg of CO_2eq/head of hens/year

Total Pullet Emissions (CH_4+N_2O) = 1.717 kg of CO_2eq/head of hens/year x 0.618 kg-pullet/kg-hen
= 1.061 g of CO_2eq/head of pullets/year

Proposed GHG Emissions = Number of hens x 1.717 kg of CO_2eq/head of hens/year + Number of Pullets x 1.061 kg of CO_2eq/head of pullets/year

Proposed GHG Emissions = 2,289,000 hens x 1.717 kg of CO_2eq/head of hens/year + 1,050,000 pullets x 1.061 kg of CO_2eq/head of pullets/year

[14] http://www.arb.ca.gov/cc/inventory/doc/docs3/3a2i_manuremanagement_poultrywobedding_livestockpopulation_hens1+yr_ch4_2013.htm

[15] http://www.arb.ca.gov/cc/inventory/doc/docs3/3a2i_manuremanagement_poultrywobedding_livestockpopulation_hens1+yr_n2o_2013.htm

Proposed GHG Emissions = 5,044,263 kg of CO_2eq/year

Converting to Metric Ton = 5,044,263 kg of CO_2eq/year x 1 metric ton/1,000 kg

Total Proposed GHG emissions = 5,044 metric ton of CO_2eq/year

Baseline GHG Emissions:

The baseline GHG emissions from an operating period of 2002-2004 will now be calculated.

On November 4, 2008, California voters passed ballot Proposition 2, known as the Standards for Confining Farm Animals initiative[16]. Proposition 2 required calves raised for veal, egg-laying hens, and pregnant pigs be confined in ways that allow these animals to lie down, stand up, fully extend their limbs and turn around freely[17].

In response, the California Department of Food and Agriculture adopted Section 1350 (Shell Egg Food Safety) of Title 3 of the California Code of Regulations which lists stocking density guidelines for all chickens whose eggs are sold in California[18].

# of Hens	1	2	3	4	5	6	7	8	≥9
Square Inches/Hen	322	205	166	146	135	127	121	117	116

Central Valley Eggs is designed in accordance with the stocking densities required by Section 1350, which went into effect on January 1, 2015. However, if the facility were operating between the baseline period of 2002-2004, the facility would not be subject to current stocking density requirements. Therefore, the facility would be able to house more birds in the same amount of space.

The University of California Cooperative Extension, California Poultry Workgroup publication "Animal Care Series: Egg-Type Layer Flock" (May 1998)[19] indicates that 72 in^2 of floor space per hen was associated with the highest egg production but that with good management, 50-60 in^2 of floor space per hen can give comparable results. Assuming the average value of the required floor space range given for laying hens in this document (50-72 in^2 per bird), results in approximately 61 in^2 per hen. This value is 47% less than the minimum space requirement required by Section 1350 of Title 3 of the California Code of Regulations and can be used to calculate the number of hens that the proposed houses would have been capable of housing before this regulation became effective.

[16] http://elections.cdn.sos.ca.gov/sov/2008-general/ssov/10-ballot-measures-statewide-summary-by-county.pdf
[17] http://vig.cdn.sos.ca.gov/2008/general/text-proposed-laws/text-of-proposed-laws.pdf#prop2
[18] http://ucanr.edu/sites/CESonomaAgOmbuds/files/174478.pdf
[19] https://www.cdfa.ca.gov/ahfss/mpes/pdfs/eggsafetyrule.pdf

Based on the typical floor space requirements for laying hens that were in effect prior to California Proposition 2 and Section 1350 of Title 3 of the California Code of Regulations, it is estimated that each of the proposed hen houses at Central Valley Eggs would have been capable of housing approximately 777,886 hens (based on 329,521 ft^2 of total space for laying hens in each cage-free house, 145.11 in^2 of space per bird, as provided by the applicant), for a total of 5,445,202 hens in the seven proposed poultry houses. Pursuant to information provided from the applicant, the pullet houses are not subject to California Proposition 2 requirements. Therefore, it will be assumed that the three pullet houses would have been capable of housing the same number of birds in 2002-2004 that they are proposing to house in this project, 1,050,000 pullets.

Basis and Assumptions

- Laying hen capacity is 5,445,202 hens (estimated based on the housing area of the proposed facility and pre-Proposition 2 housing practices).
- The pullet houses are not required to comply with Proposition 2 requirements. Therefore, the maximum number of pullets that will be kept in each of the three pullet houses will be set equal to the numbers proposed by Central Valley Eggs under this project, 350,000, resulting in a total of 1,050,000 pullets for the three houses (proposed by the applicant).
- Emission factors for hens are based on the documentation for ARB's 2015 Edition of the GHG Emission Inventory (Released June 2015):
    - *Emission factor for CH_4 = 647 g of CO_2eq/head of hens 1+ yr*
    - *Emission factor for N_2O = 1,070 g of CO_2eq/head of hens 1+ yr*
- Emission factors for pullets will be determined using similar assumptions to the PM_{10}, VOC and NH_3 emission rates in Section VII.B above (uncontrolled emission factors) that pullets will generate approximately 61.8% of the emissions that adult laying hens generate (comparison of an uncontrolled emission factors between laying hens and the sum of chick starters plus pullet growers).

Calculations

Total Laying Hen Emissions (CH_4+N_2O) = 647 + 1,070 g of CO_2eq/head of hens/year
= 1,717 g of CO_2eq/head of hens/year
= 1.717 kg of CO_2eq/head of hens/year

Total Pullet Emissions (CH_4+N_2O) = 1.717 kg of CO_2eq/head of hens/year x 0.618 kg-pullet/kg-hen
= 1.061 g of CO_2eq/head of pullets/year

Baseline GHG Emissions = Number of hens x 1.717 kg of CO_2eq/head of hens/year + Number of Pullets x 1.061 kg of CO_2eq/head of pullets/year

Baseline GHG Emissions = 5,445,202 hens x 1.717 kg of CO_2eq/head of hens/year + 1,050,000 pullets x 1.061 kg of CO_2eq/head of pullets/year

Baseline GHG Emissions = 10,463,461 kg of CO_2eq/year

Converting to Metric Ton = 10,463,461 *kg of CO_2eq/year x 1 metric ton/1,000 kg*

Total Proposed GHG emissions = 10,463 metric ton of CO_2eq/year

Reduction in GHG Emissions:

As calculated above,

- Proposed Project GHG Emissions = 5,044 metric tons of CO_2eq/year
- 2002-2004 Baseline GHG Emissions = 10,463 metric tons of CO_2eq/year

Therefore, the percent reduction in GHG emissions is calculated as follows:

$$\%\ \text{Reduction in GHG emissions} = \frac{(10{,}463\ \text{tons - CO2e/yr}) - (5{,}044\ \text{tons - CO2e/yr})}{10{,}463\ \text{tons - CO2e/yr}} \text{x}100\%$$

% Reduction in GHG Emissions = 51.8%

As calculated above, the proposed project results in GHG emissions reductions of 51.8% compared to BAU. Therefore, the project is considered to have a less than significant impact for GHG emissions.

APPENDIX I

Draft ATC

San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

PERMIT NO: S-8841-1-3

ISSUANCE DATE: DRAFT

LEGAL OWNER OR OPERATOR: CENTRAL VALLEY EGGS LLC
MAILING ADDRESS: 13606 GUN CLUB RD
WASCO, CA 93280

LOCATION: 13606 GUN CLUB RD
WASCO, CA 93280

EQUIPMENT DESCRIPTION:
3,339,000 POULTRY RANCH CONSISTING OF SEVEN MECHANICALLY VENTILATED CAGE-FREE AVIARY LAYING HEN HOUSES AND THREE MECHANICALLY VENTILATED PULLET HOUSES

CONDITIONS

1. This Authority to Construct (ATC) cancels and supersedes ATCs S-8841-1-0, -1-1 and -1-2. [District Rule 2201]
2. Prior to operating equipment under this Authority to Construct, permittee shall surrender VOC emission reduction credits for the following quantity of emissions: 1st quarter - 6,297 lb, 2nd quarter - 6,297 lb, 3rd quarter - 6,297 lb, and 4th quarter - 6,297 lb. These amounts include the applicable offset ratio specified in Rule 2201 Section 4.8 (as amended 2/18/16). [District Rule 2201 and Public Resources Code 21000-21177: California Environmental Quality Act]
3. ERC Certificate Number S-4718-1 (or a certificate split from this certificate) shall be used to supply the required offsets, unless a revised offsetting proposal is received and approved by the District, upon which this Authority to Construct shall be reissued, administratively specifying the new offsetting proposal. Original public noticing requirements, if any, shall be duplicated prior to reissuance of this Authority to Construct. [District Rule 2201 and Public Resources Code 21000-21177: California Environmental Quality Act]
4. {3215} Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to enter the permittee's premises where a permitted source is located or emissions related activity is conducted, or where records must be kept under condition of the permit. [District Rule 1070]
5. {3216} Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit. [District Rule 1070]

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (661) 392-5500 WHEN CONSTRUCTION IS COMPLETED AND PRIOR TO OPERATING THE EQUIPMENT OR MODIFICATIONS AUTHORIZED BY THIS AUTHORITY TO CONSTRUCT. This is NOT a PERMIT TO OPERATE. Approval or denial of a PERMIT TO OPERATE will be made after an inspection to verify that the equipment has been constructed in accordance with the approved plans, specifications and conditions of this Authority to Construct, and to determine if the equipment can be operated in compliance with all Rules and Regulations of the San Joaquin Valley Unified Air Pollution Control District. Unless construction has commenced pursuant to Rule 2050, this Authority to Construct shall expire and application shall be cancelled two years from the date of issuance. The applicant is responsible for complying with all laws, ordinances and regulations of all other governmental agencies which may pertain to the above equipment.

Samir Sheikh, Executive Director / APCO

DRAFT

Arnaud Marjollet, Director of Permit Services

Southern Regional Office • 34946 Flyover Court • Bakersfield, CA 93308 • (661) 392-5500 • Fax (661) 392-5585

6. If a licensed veterinarian or a certified nutritionist determines that any VOC mitigation measure will be required to be suspended as a detriment to animal health or necessary for the animal to molt, the owners/operators must notify the District in writing within forty-eight (48) hours of the determination including the duration and the specific health condition requiring the mitigation measure to be suspended. If the situation is expected to exist longer than a thirty-day (30) period, the owner/operator shall submit a new emission mitigation plan designating a mitigation measure to be implemented in lieu of the suspended mitigation measure. [District Rules 2201 and 4570]
7. Particulate matter emissions from each poultry house shall not exceed 0.1 grains/dscf in concentration. [District Rule 4201]
8. No more than 330,000 birds shall be kept in each of the seven laying hen houses at any time. [District Rule 2201]
9. No more than a combined total of 2,289,000 birds shall be kept in all of the seven laying hen houses at any time. [District Rule 2201]
10. No more than a combined total of 2,168,690 birds shall be kept in all of the seven laying hen houses at any time based on a rolling 365 day average. [District Rule 2201]
11. No more than 350,000 birds (chick starters or pullet growers) shall be kept in each of the three pullet houses at any time. For the purposes of this permit, chick starters are defined as birds from zero to six weeks of age and pullet growers are defined as birds from six weeks to 16 weeks of age. [District Rule 2201]
12. Each pullet house shall not contain chick starters for more than 126 days per rolling 12-month period and pullet growers for more than 210 days per rolling 12-month period. [District Rule 2201]
13. Emissions from each laying hen house shall not exceed any of the following limits: 0.02712 lb-PM10/1,000 birds-day, 0.0404 lb-VOC/1,000 birds-day, or 0.250 lb-NH3/1,000 birds-day. [District Rule 2201]
14. Emissions from each pullet house shall not exceed any of the following limits: 1) Chick Starters: 0.00526 lb-PM10/1,000 birds-day, 0.00784 lb-VOC/1,000 birds-day, or 0.1283 lb-NH3/1,000 birds-day; and 2) Pullet Growers: 0.01152 lb-PM10/1,000 birds-day, 0.01711 lb-VOC/1,000 birds-day, or 0.2811 lb-NH3/1,000 birds-day. [District Rule 2201]
15. Each poultry house shall be completely enclosed and mechanically ventilated with evaporative cooling pads, fans, and a computer control system. [District Rule 2201]
16. Each poultry house shall be equipped with a belt manure aeration and removal system that advances by a minimum of half the length of the belt every 24 hours. [District Rule 2201]
17. Permittee shall maintain records to demonstrate that the belt advances by a minimum of half of its length every 24 hours. [District Rule 2201]
18. Permittee shall maintain quarterly records of maintenance and repair activities associated with the belt manure aeration and removal system that includes the dates of maintenance and repair, and a description of any corrective actions taken. [District Rule 2201]
19. The open end of each poultry house shall be equipped with a tarp covering approximately 40% of the upper part of the opening. The open end shall also be equipped with water sprays installed under the bottom edge of the tarp to reduce particulate matter (PM) emissions from the exhaust fans. The water sprays shall operate at all times, except during periods of actual rainfall. [District Rule 2201]
20. The tarp used to reduce PM emissions from the exhaust fans shall be inspected on a quarterly basis. The tarp shall be inspected thoroughly for rips, tears, leaks, or any evidence of structural failures that result in excessive PM emissions and shall be repaired or replaced as needed. [District Rule 2201]
21. The water sprays used to reduce PM emissions from the exhaust fans shall be inspected on a quarterly basis. The water spray nozzles shall be inspected thoroughly for leaks, clogs, or any evidence of structural failures that result in excessive PM emissions and shall be repaired or replaced as needed. [District Rule 2201]
22. Permittee shall maintain records of inspections, maintenance, repair, and replacement of the tarps and water spray nozzles used to reduce PM emissions from the exhaust fans. The records shall include the dates of inspections and a description of any corrective actions taken. [District Rule 2201]

CONDITIONS CONTINUE ON NEXT PAGE

23. No bedding or litter materials shall be used on the bottom floor of the poultry houses at this facility. [District Rule 2201]
24. All mortality in each poultry house shall be removed at least once per day. [District Rule 2201]
25. Permittee shall maintain daily records of mortality removal in each poultry house. [District Rule 2201]
26. Permittee shall feed all animals according to National Research Council (NRC) guidelines. [District Rules 2201 and 4570]
27. Permittee shall maintain records of feed content, formulation, and quantity of feed additive utilized, to demonstrate compliance with National Research Council (NRC) guidelines. Records such as feed company guaranteed analyses (feed tags), ration sheets, or feed purchase records may be used to meet this requirement. [District Rules 2201 and 4570]
28. Permittee shall use drinkers that do not drip continuously. [District Rules 2201 and 4570]
29. Permittee shall inspect water pipes and drinkers and repair leaks daily. [District Rules 2201 and 4570]
30. Permittee shall maintain records indicating that water pipes and drinkers are inspected daily, and that any leaks are repaired. [District Rules 2201 and 4570]
31. Permittee shall feed animals probiotics designed to improve digestion according to manufacturer recommendations. [District Rules 2201 and 4570]
32. Permittee shall maintain records to demonstrate animals are fed probiotics designed to improve digestion. Records such as feed company guaranteed analyses (feed tags), ration sheets, or feed purchase records may be used to meet this requirement. [District Rules 2201 and 4570]
33. Permittee shall feed animals an amino acid supplemented diet. [District Rules 2201 and 4570]
34. Permittee shall maintain records to demonstrate animals are fed an amino acid supplemented diet. Records such as feed company guaranteed analyses (feed tags), ration sheets, or feed purchase records may be used to meet this. [District Rules 2201 and 4570]
35. Permittee shall feed animals additives such as amylase, xylanase, and protease, designed to maximize digestive efficiency. [District Rules 2201 and 4570]
36. Permittee shall maintain records that demonstrate animals are fed feed additives such as amylase, xylanase, and protease. Records such as feed company guaranteed analyses (feed tags), ration sheets, or feed purchase records may be used to meet this. [District Rules 2201 and 4570]
37. Permittee shall maintain daily records of the number of animals of each species and production group at the facility and records of any changes to this information. For the pullet houses, the permittee shall also maintain records of the age of birds, the growing stage the birds are in, and the total number of days each growing stage has been housed for the current rolling 12-month period. [District Rules 2201 and 4570]
38. Permittee shall maintain daily records of the total number of birds kept in all seven laying hen houses. [District Rule 2201]
39. Permittee shall maintain daily records of the rolling 365-day average of total number of birds kept in all seven laying hen houses. [District Rule 2201]
40. Permittee shall keep and maintain all records for a minimum of five (5) years and shall make records available to the APCO and EPA upon request. [District Rules 2201 and 4570]
41. Issuance of any Authority to Construct (ATC) permit(s) or any construction that results in a further increase in the number of laying hens, pullets, or poultry houses at this facility such as described in the proposal for District ATC Project S-1180558, or the District CEQA document prepared for the project, shall be treated and analyzed as a part of ATC Project S-1180558 for New and Modified Source Review (NSR) purposes to ensure that the cumulative emissions from the overall project will not cause or make worse a violation of an Ambient Air Quality Standard. [District Rule 2201 and California Environmental Quality Act]

CONDITIONS CONTINUE ON NEXT PAGE

42. A Qualified Biologist will conduct a focused pre-construction survey to determine the presence/absence of potential impacts on sensitive species prior to the onset of ground disturbance. The survey shall be conducted in accordance with the standard protocol of the U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Wildlife (CDFW). If more than 30 days pass before the onset of ground disturbance, an additional survey shall be conducted by a Qualified Biologist within 30 days prior to the onset of ground disturbance. Permittee shall make all biological surveys available to District staff upon request. [Public Resources Code 21000-21177: California Environmental Quality Act]

43. A biological monitor will be present while ground-disturbing activities are occurring based on the sensitivity of the habitat in which a project occurs. [Public Resources Code 21000-21177: California Environmental Quality Act]

44. In the event that archaeological resources are discovered during ground-disturbing activities, all work within 100 feet of the find shall cease and the Permittee shall notify and retain a qualified archaeologist to assess and provide an evaluation of the significance of the find. A qualified archaeologist shall determine whether avoidance is necessary and feasible in light of the factors such as the nature of the find, project design, costs, and other considerations, and, if necessary, develop appropriate mitigation measures in consultation with Kern County and the Native American Heritage Commission (NAHC). In addition, should archaeological resources be discovered, the Permittee shall provide the District a written report in relation to the nature of the find. [Public Resources Code 21000-21177: California Environmental Quality Act]

45. In the event that paleontological resources are discovered during ground-disturbing activities, all work within 100 feet of the find shall cease and the Permittee shall notify and retain a qualified paleontologist to assess and provide an evaluation of the significance of the find. A qualified paleontologist shall determine whether avoidance is necessary and feasible in light of the factors such as the nature of the find, project design, costs, and other considerations, and, if necessary, develop appropriate mitigation measures in consultation with Kern County and the Native American Heritage Commission (NAHC). In addition, should paleontological resources be discovered, Permittee shall provide the District a written report in relation to the nature of the find. [Public Resources Code 21000-21177: California Environmental Quality Act]

46. In the event that human remains are discovered during ground-disturbing activities, all work within 100 feet of the find shall cease and the discovery shall immediately be reported to the County Coroner (CC) and Native American Heritage Commission (NAHC) for further assessment. Permittee shall identify appropriate measures for treatment or disposition of the remains in consultation with the CC and NAHC. In addition, should human remains be discovered during ground-disturbing activities, Permittee shall provide the District a written report in relation to the nature of the find. [Public Resources Code 21000-21177: California Environmental Quality Act]

47. In the event that tribal cultural resources are discovered during ground-disturbing activities, all work within 100 feet of the find shall cease and the Permittee shall notify and retain a qualified archaeologist to assess and provide an evaluation of the significance of the find. A qualified Native American Organization shall determine whether avoidance is necessary and feasible in light of the factors such as the nature of the find, project design, costs, and other considerations, and, if necessary, develop appropriate mitigation measures in consultation with Kern County and the NAHC. In addition, should tribal cultural resources be discovered, the Permittee shall provide the District a written report in relation to the nature of the find. [Public Resources Code 21000-21177: California Environmental Quality Act]