



SEP 20 2016

Stephen Gemperle
Barnhart Ranch
10218 Lander Ave
Turlock, CA 95380

Re: Notice of Preliminary Decision - Authority to Construct
Facility Number: N-9091
Project Number: N-1143814

Dear Mr. Gemperle:

Enclosed for your review and comment is the District's analysis of Barnhart Ranch's application for an Authority to Construct for expansion of an existing egg laying hen ranch from 317,000 laying hens in one poultry house to 1,326,695 laying hens in four poultry houses, at 718 Barnhart Road, Ceres, 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 period, 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. Ramon Norman of Permit Services at (559) 230-5909.

Sincerely,



Arnaud Marjollet
Director of Permit Services

AM:rn

Enclosures

cc: Tung Le, CARB (w/ enclosure) via email
Michael Gemperle, Gemperle Family Farms, 10218 Lander Ave, Turlock, CA 95380

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Executive Director/Air Pollution Control Officer

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San Joaquin Valley Air Pollution Control District

Authority to Construct Application Review

Expansion of an Existing Egg Laying Hen Ranch by Constructing Three New Hen Houses

Facility Name: Barnhart Ranch

Date: August 31, 2016

Mailing Address: 10218 Lander Ave
Turlock, CA 95380

Engineer: Ramon Norman

Lead Engineer: Jerry Sandhu

Contact Person: Stephen M. Gemperle or Michael Gemperle

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Application #s: N-9091-1-1 and -2-1

Project #: N-1143814

Deemed Complete: May 31, 2016

I. Proposal

Barnhart Ranch is an egg laying hen ranch located near the city of Ceres in Stanislaus County, CA. The facility has requested Authority to Construct (ATC) permits to expand its existing egg laying hen ranch, consisting of 317,000 laying hens in one hen house, by constructing three new cage-free aviary hen houses, each with a capacity for 366,000 laying hens. However, the facility has proposed to limit the facility's total capacity to 1,326,695 laying hens in four poultry houses. The facility has a Permit to Operate (PTO) for the existing hen housing operation (PTO N-9091-1-0), and a PTO for the existing operation to handle solid manure from the hens (PTO N-9091-2-0). Although the emissions from the existing egg laying ranch are currently below the one-half major source agricultural source permitting thresholds as specified in District Rule 2020 – Exemptions, Section 6.20 – Agricultural Sources, the proposed expansion of the egg laying hen ranch will cause VOC emissions from the facility to exceed the applicable permitting threshold for agricultural sources; therefore, the facility proactively applied for PTOs for the existing egg laying ranch under Project N-1150527 and was therefore issued grandfathered PTOs for the existing operation. (See Appendix A for current in-house PTOs N-9091-1-0 & -2-0.) As discussed below, the expansion to the ranch will require the modification of the facility's permits for the laying hen ranch.

As explained above, the facility is requesting ATC permits to expand its existing egg laying hen ranch from 317,000 laying hens in one poultry house to 1,326,695 laying hens in four poultry houses, which will result in an overall increase of 1,009,695 laying hens for the facility's permitted capacity. The new hen houses will utilize fabric filters or shade cloth barriers to reduce emissions of particulate matter. The facility had previously proposed to construct five new hen houses, each with capacity for 366,000 laying hens, which would have resulted in a total increase of 1,830,000 laying hens at the facility. However, the Ambient Air Quality Analysis (AAQA) performed for the proposal for 1,830,000 laying hens in five new hen 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 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 for this ATC project to permit only three new hen houses so the AAQA for the proposed project could demonstrate that the emissions increase from the project will not cause or make worse a violation of an Ambient Air Quality Standard. In addition, the facility is proposing to limit the total number of laying hens that will be kept onsite to no more than 1,326,695 so that the total facility-wide Potential to Emit for VOC will remain below the applicable 20,000 lb/yr Major Source Emission and Emission Offset thresholds of District Rule 2201.

The facility has proposed to perform a source test to measure emissions from the proposed hen houses once they are constructed and operating, or from similar houses, to develop emissions factors that better represent the specific hen house design. For this project, initial source testing of PM emissions from one of the cage-free aviary houses, or a similar cage-free aviary house, will be required to ensure that the PM₁₀ emissions from the houses do not exceed the limit in the proposed ATC permit. The initial source test may also be used to demonstrate a lower PM emission factor for permitting any additional hen houses that have the same design. The facility has also expressed that they may explore potential control measures that may further reduce emissions from the houses. The facility has indicated that in the future they would like to construct the final two houses that were part of the previous proposal, and increase the total permitted number of laying hens to the maximum design capacity of all six houses. Prior to approval to increase the maximum number of laying hens or to construct additional hen houses at the site, the facility will be required to demonstrate that PM emissions from the overall project (this ATC project and any future ATC project(s) for the additional laying hens and/or hen houses) will not cause or make worse a violation of an Ambient Air Quality Standard.

The facility's current solid manure handling permit authorizes the existing hen house to be equipped with a manure tunnel drying system, and also authorizes the storage, removal, and land application of solid manure. The proposed expansion will result in an increase in solid manure at the facility due to the 1,009,695 additional laying hens that can be housed onsite. Additionally, the facility is proposing to install manure tunnel drying systems for the new hen houses, similar to the manure tunnel drying system in the existing hen house. After the manure is dried, it will be stored in a covered area located at the end of each hen house. The stored manure will then either be hauled offsite or applied to cropland as fertilizer. Although the facility is not proposing any changes to the way it currently handles solid manure, permit unit N-9091-2 will be modified to account for the increase in manure that is dried, stored, and applied to land.

The facility also receives and stores chicken feed in storage silos located onsite. However, as will be demonstrated in Section VIII below, total emissions from the feed storage and handling operation are less than 2.0 lb/day. Therefore, pursuant to Section 6.19 of District Rule 2020 (Exemptions, amended December 18, 2014), each storage silo is a low emitting unit, and therefore exempt from District permitting requirements.

In addition, based on its present capacity of 317,000 laying hens, the facility is currently exempt from the requirements of District Rule 4570 (Confined Animal Facilities, amended October 21, 2010). Per Section 4.0 of the rule, the applicability threshold for poultry facilities is

400,000 hens, and this threshold will be exceeded due to the proposed expansion. Therefore, as part of its ATC application, Barnhart Ranch is proposing to implement mitigation measures to comply with District Rule 4570.

The project also triggers the public notice requirements of District Rules 2201 and 4570. Therefore, the preliminary decision for the project will be submitted to the California Air Resources Board (ARB), a public notice will be published in a local newspaper of general circulation in the county of the project, and a 30-day public comment period will be completed prior to issuance of the ATCs.

The proposed modifications for each permit unit are summarized as follows:

N-9091-1 (Laying Ranch Housing):

- Expand from 317,000 laying hens in one hen house to 1,326,695 laying hens in one enriched colony laying hen house and three cage-free aviary hen houses
- Implement mitigation measures for District Rule 4570 compliance

N-9091-2 (Manure Handling):

- Construct a manure tunnel dryer for each of the three new hen houses
- Allow for an increase in solid manure due to the proposed expansion
- Implement mitigation measures for District Rule 4570 compliance

II. Applicable Rules

Rule 1070	Inspections (12/17/92)
Rule 2010	Permits Required (12/17/92)
Rule 2020	Exemptions (12/18/14)
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 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 718 Barnhart Road, Ceres, CA in Stanislaus County. The District has verified that the facility 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

Laying Hen Ranch

The primary function of Barnhart Ranch 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, these birds are referred to as pullets. Pullets that are about to start egg production are known as starter pullets.

The hens at Barnhart Ranch typically have a production life of 83 to 90 weeks. The hens are usually replaced within 90 weeks because the natural decreasing rate of egg production becomes inadequate to cover feed costs. At this point, laying hens become spent hens and are typically rendered offsite to recover any remaining value.

Layer Housing Practices

Existing Enriched Colony House

The existing hen house at Barnhart Ranch is an enriched colony house that can house up to 317,000 laying hens. In an enriched colony house laying hens are housed in climate-controlled buildings with multi-level rows of enclosures with wire mesh floors that are slightly sloped so the eggs roll down to an egg collection belt. Enriched colony houses have more space per laying hen in comparison to traditional battery cages to allow the laying hens to stand, sit, turn around, and extend their wings. Enriched colony houses include perches, nesting areas, and surfaces that allow for natural bird behaviors, such as perching, scratching, dust bathing, and nesting. The laying hens have constant access to food and water. Manure is removed from enriched colony houses by mechanized belts below the cages.¹

The existing hen house is 640 feet long by 91 feet wide by 45 feet high with automated feed distribution and egg collection. The existing house is separated vertically into three different levels (comparable to a

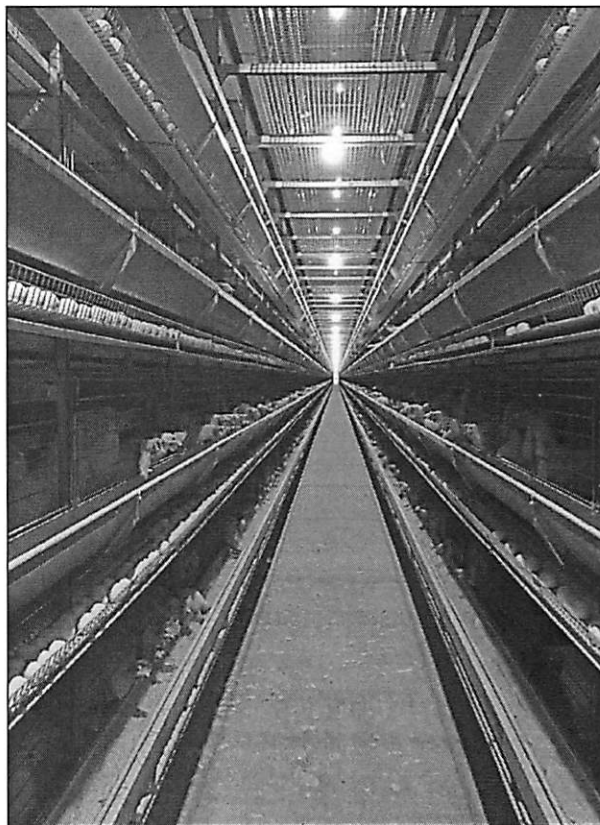


Figure 1: Level 1 of Existing Poultry House

¹ <http://www2.sustainableeggcoalition.org/resources>

three story house), with two catwalks for access to levels 2 and 3. On each level there are eight parallel rows, with each row running nearly the entire length of the house. The rows are separated with enough room for employees to walk the length of the house to monitor the birds. Vertically, each row consists of four tiers of birds housed in cages. The cages are placed side by side and extend the entire length of the row. Two adjacent rows on level 1 of the existing hen house are shown in **Figure 1** above.

Proposed Cage-Free Aviary Houses

The three proposed hen houses at Barnhart Ranch will be cage-free aviary houses, with capacity for 366,000 laying hens. 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 with bedding 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. In cage-free aviary the bedding and manure must also be periodically removed from the house floor.¹

Each of the new hen houses will be approximately 640 feet long by 193 feet wide by 30 feet high. The proposed houses will be separated lengthwise into two 73-foot bird chambers, each with a capacity of 183,000 hens. The proposed houses will also be separated vertically into two different levels with a wooden floor for access to level 2. On each level of the new hen houses there will be five rows, each with three tiers of birds. The rows are separated with enough room for employees to walk the length of the house to monitor the birds.

The existing enriched colony house and each of the proposed cage-free aviary houses will be mechanically ventilated to remove moisture and carbon dioxide produced by respiration. Exhaust fans on the north and south sides of each house will draw air out of the buildings which 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. Approximately 55% of the exhaust air will be used to dry manure in the adjacent manure dryer. The remaining air will be exhausted into the atmosphere.

Manure Management:

The manure from each house will be removed using a belt removal system, a manure dryer, and a series of conveyors. A movable belt will be located below each tier of birds. The belts will be capable of traveling the entire length of each row, from west to east. Each belt will collect the manure from the birds that are directly above them. As the belt moves east to the end of the row, the manure on each belt will drop on to a conveyor located just below ground level on level 1. The belts will be operated for only one hour each day, which equates to traveling one-third the length of the row per day. Therefore, manure on the western one-third

of the house will stay on the belt for three days before dropping onto the conveyor, whereas manure on the eastern one-third of the house will drop onto the conveyor daily.

Once on the conveyor, the manure will be transported to the top of the manure drying tunnel located in the existing hen house, but separated from where the hens are kept, or will be transported to one of the two manure drying tunnels that will be located within each of the proposed cage-free aviary hen houses. The drying tunnels for each new house will be approximately 16 feet wide by 312 feet long, and will include eight tiered conveyor belts.

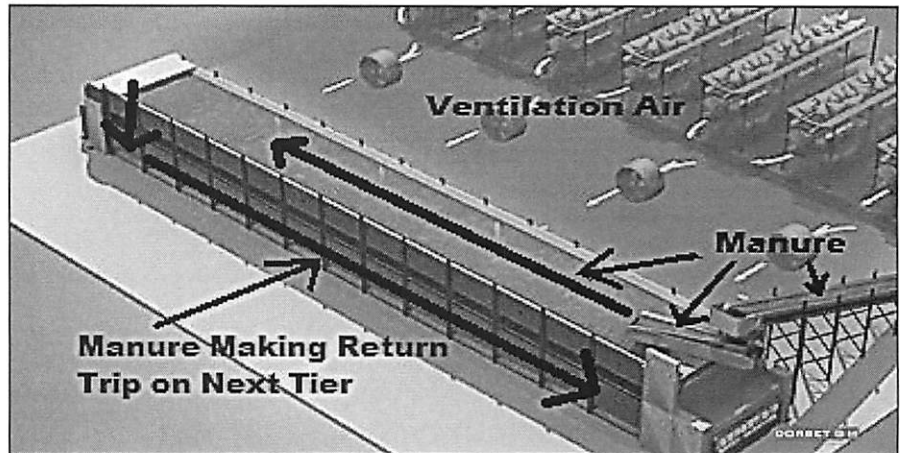


Figure 2: Manure Drying Process

Once manure drops onto the top tier, the manure will slowly be drawn along the length of the dryer. As manure is slowly conveyed, exhaust air from the ventilation fans serving the house will be vented to the dryers. The layer houses will be maintained at an average temperature of approximately 75 °F. Because the air is heated as it passes through the bird chamber, the exhaust air temperature will be slightly higher than the average of 75 °F (see **Figure 2** for a general sample of the manure drying process).

Once the manure on the top tier reaches the end of the dryer, it will drop to the tier directly below for additional drying. This process is completed over the course of 16 tiers in the existing enriched colony hen house and will be completed over the course of eight tiers in each of the drying tunnels in the proposed cage-free aviary hen houses; however, the dryers will not run continuously. It takes approximately five days for manure to exit the dryer once it is loaded. As new manure is added each day, the manure that is already on the dryer will be pushed further along. However, the ventilation fans operate throughout the drying process. Additionally, the ventilation fans will operate twenty-four (24) hours per day, and the air flow will be provided by the 30 fans on each half of the house. The 16 tiered dryer in the existing hen house is shown in **Figure 3**.

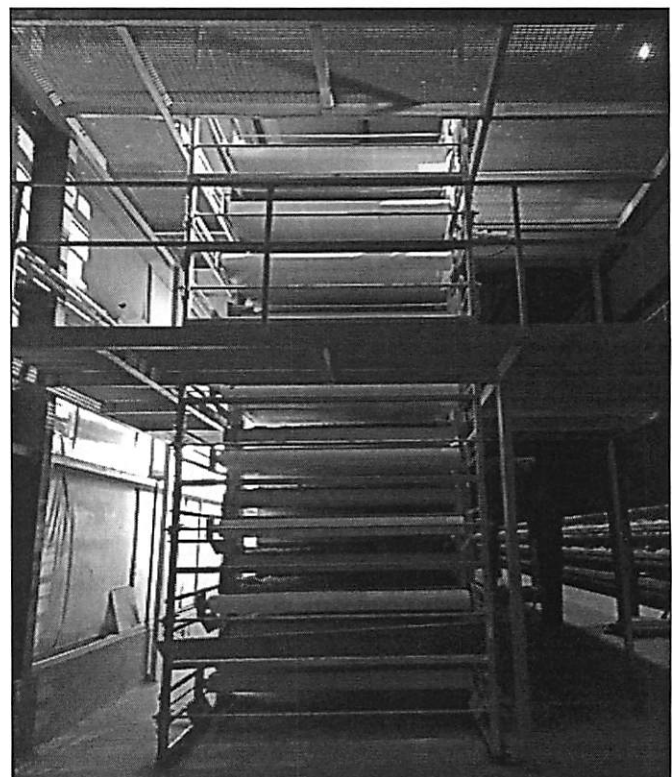


Figure 3: 16 Tiered Manure Dryer in Existing House

Once the manure has completed the drying process (after five days on the dryer), it is

conveyed to a covered storage area located at the back of each house. Manure is stored in stockpiles until it is ready to be hauled offsite or applied to cropland.

Feed Storage and Handling:

The existing hen house is connected to a series of five silos used to receive and store chicken feed. Each of the proposed hen houses will be connected to a series of six silos used to receive and store chicken feed. The feed is loaded through a screw auger, and then sent to the hen houses through a network of enclosed augers and pipes.

The facility receives feed six days per week, and each house will receive 39 tons of feed per day. Therefore, between the four hen houses, the facility receives approximately 156 tons of feed per day. As discussed in Section VIII under District Rule 2020 (Exemptions), emissions from the feed storage and handling operation are less than 2.0 lb/day. Therefore, the feed storage and handling operation is exempt from permits.

V. Equipment Listing

In-House Permits to Operate:

N-9091-1-0: 317,000 LAYING HEN RANCH CONSISTING OF ONE MECHANICALLY VENTILATED POULTRY HOUSE, INCLUDING ELECTRIC FANS TOTALING 57 HP

N-9091-2-0: SOLID MANURE HANDLING SYSTEM CONSISTING OF A MANURE DRYER AND MANURE STOCK PILES; SOLID MANURE APPLICATION TO LAND AND HAULED OFFSITE

ATC Equipment Description:

N-9091-1-1: MODIFICATION OF 317,000 LAYING HEN RANCH CONSISTING OF ONE MECHANICALLY VENTILATED POULTRY HOUSE, INCLUDING ELECTRIC FANS TOTALING 57 HP: INCREASE THE PERMITTED CAPACITY FROM 317,000 LAYING HENS TO 1,326,695 LAYING HENS BY CONSTRUCTING THREE NEW MECHANICALLY VENTILATED CAGE-FREE AVIARY LAYING HEN HOUSES, EACH WITH A CAPACITY FOR 366,000 HENS; IMPLEMENT MITIGATION MEASURES FOR COMPLIANCE WITH DISTRICT RULE 4570

N-9091-2-1: MODIFICATION OF SOLID MANURE HANDLING SYSTEM CONSISTING OF A MANURE DRYER AND MANURE STOCK PILES; SOLID MANURE APPLICATION TO LAND AND HAULED OFFSITE: ALLOW FOR AN INCREASE IN SOLID MANURE HANDLED AND CONSTRUCT TUNNEL MANURE DRYERS FOR EACH OF THE THREE NEW LAYING HEN HOUSES DUE TO THE FACILITY EXPANSION AUTHORIZED BY AUTHORITY TO CONSTRUCT (ATC) N-9091-1-1; IMPLEMENT MITIGATION MEASURES FOR COMPLIANCE WITH DISTRICT RULE 4570

Post-Project Equipment Description:

N-9091-1-1: 1,326,695 LAYING HEN RANCH CONSISTING OF ONE MECHANICALLY VENTILATED ENRICHED COLONY LAYING HEN HOUSE AND THREE MECHANICALLY VENTILATED CAGE-FREE AVIARY LAYING HEN HOUSES, INCLUDING ELECTRIC FANS TOTALING 261 HP

N-9091-2-1: SOLID MANURE HANDLING SYSTEM CONSISTING OF TUNNEL MANURE DRYER(S) LOCATED WITHIN EACH HEN HOUSE AND MANURE STOCK PILES; SOLID MANURE APPLICATION TO LAND AND/OR HAULED OFFSITE

VI. Emission Control Technology Evaluation

PM₁₀, VOC, and ammonia (NH₃) are the major pollutants of concern from poultry farms. The ventilation rate of the hen houses affects the amount of VOC, PM₁₀, and NH₃ that is emitted from the houses.

All pollutants emitted from the manure are expected to be included with the emissions from within the hen houses. Mechanical ventilation and the manure dryers will decrease the moisture content of the manure. As the moisture content of the manure decreases, volatilization of NH₃ from the manure will decrease. Once the manure is dry, emissions of VOC and NH₃ are expected to be negligible. The in-house manure drying system will also act as a filter to reduce PM emissions from the houses. One study measured a greater than 80% reduction in PM₁₀ concentrations from cage-free laying houses equipped with in-house manure drying systems and a greater than 30% reduction in PM₁₀ concentrations from laying houses with cages equipped with in-house manure drying systems.² The facility is also proposing to use a fabric filter made of shade cloth or similar material to reduce the PM in the exhaust from the proposed hen houses. The fabric filter will be suspended between adjacent hen houses and will be equipped with a burp curtain on both sides. The fabric filter will reduce PM emissions from the proposed hen houses by at least 50%.³

Additionally, the mitigation measures required by District Rule 4570 will result in reductions of VOC emissions from the various sources at this poultry farm. Many District Rule 4570 mitigation measures will also reduce NH₃ emissions. However, because of limited data, at this time this District cannot accurately apply control efficiencies to calculate the NH₃ emissions reductions attributed to the mitigation measures at this time.

² 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>

³ Iowa State University Extension and Outreach, Air Management Practices Assessment Tool: Animal Housing – Barriers. <http://www.agronext.iastate.edu/ampat/animalhousing/barriers/homepage.html>

VII. General Calculations

A. Assumptions

- 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 hen houses.
- Pre-Project Potential to Emit (PE1) for the laying hen ranch will be calculated based on the maximum number of laying hens prior to the expansion - 317,000 hens.
- A maximum of 366,000 laying hens can be kept in each of the three proposed hen houses.
- Post-Project Potential to Emit (PE2) for the laying hen ranch will be calculated based on the maximum number of hens after the proposed expansion - 1,326,695 laying hens.
- For conservative worst-case emission calculations, the laying hen ranch will be assumed to be at its maximum capacity for 24 hours per day and 365 days per year.
- The most conservative (greatest) emission factor for each type of house (existing enriched colony or proposed cage-free aviary) will be used to calculate PE2 for the laying hen ranch.
- Each hen house operates independently and has separate exhaust ventilation. Therefore, each hen house is a separate emissions unit.
- The PE1 for PM₁₀ for the existing enriched colony hen house will be calculated using the PM₁₀ control efficiency for the existing manure dryer.
- PE1 for VOC and NH₃ is assumed to be uncontrolled.
- Maximum Daily PE2 for PM₁₀ from the cage-free aviary hen houses will be calculated using the same emission factor as the annual PE2. As stated above, initial source testing of PM₁₀ emissions will be required to ensure that daily PM₁₀ emissions from the cage-free aviary hen houses do not exceed the limit in the permit.
- PE2 for PM₁₀ will be calculated using the PM₁₀ control efficiencies for the manure dryers, and the control efficiency for the fabric barrier/filter that will be used to reduce PM emissions from the proposed houses.
- PE2 for VOC will be calculated using controls applied for implementing mitigation measures for District Rule 4570 compliance.
- All Rule 4570 Phase II mitigation measures are expected to result in VOC emission reductions. A conservative 10% control efficiency will be applied to all mitigation measures unless specifically noted.

- Rule 4570 Phase II feed mitigation measures are intended to reduce enteric VOC emissions by improved digestion in the hens. These emissions reductions will take place in the hen houses. Therefore, although the facility will not be required to have a feed storage and handling permit, VOC control for feed mitigation measures will be applied to the poultry VOC emission factor.
- The Rule 4570 mitigation measures are expected to result in a decrease in NH₃ emissions. However, due to limited data, NH₃ emission reductions for these measures will not be quantified at this time.
- For New and Modified Source (NSR) purposes (public notice and BACT applicability), when calculating the potential to emit from the new hen houses, it will conservatively be assumed 100% of emissions are from hen housing for each emission factor.
- The in-house manure drying system will reduce PM₁₀ emissions from the hen houses with cages by 30% and will reduce PM₁₀ emissions from the proposed cage-free aviary houses by 80%
- The fabric barrier/filter will reduce PM emissions from the proposed hen houses by at least 50%
- The studies located indicate that PM_{2.5} emissions from cage-free aviary houses are up to 9% of PM₁₀ emissions.⁴ For more conservative PM_{2.5} emission calculations, potential to emit (PE) for PM_{2.5} from the hen houses will be assumed to be 10% of PM₁₀ emissions for purposes of this analysis. Specific PM_{2.5} PE calculations will only be performed to determine if a project is a Federal major modification for PM_{2.5}.
- 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 PM₁₀/Total Suspended Particulate (TSP). Based on this information, PM₁₀ emissions from the hen houses are assumed to be 40% of TSP emissions, and TSP emissions from the hen houses will be calculated as 250% (1/0.40 = 2.5) of PM₁₀ emissions unless otherwise noted.
- The facility currently has two 752 bhp emergency standby IC engines onsite that are not currently subject to District permits, but will require permits as a result of this project. Therefore, the potential to emit (PE) for these engines will be included in the pre-project and post-project Stationary Source Potential to Emit (SSPE) for this project and the engines will be issued grandfathered District permits under Project N-1162339.
- The potential to emit (PE) for the two existing 752 bhp emergency standby IC engines onsite are calculated Appendix B.
- The PE for PM_{2.5} from the IC engines onsite is assumed to be equal to the PE for PM₁₀

⁴ See: Shepherd, T., Y. Zhao, and H. Xin. 2014. Environmental assessment of three laying-hen housing systems—Part II: Ammonia, greenhouse gas, and particulate matter emissions. *Poultry Science* 2015 94: 534-543 <http://ps.oxfordjournals.org/content/94/3/534.full.pdf+html> and Hayes, Morgan D.; Xin, Hongwei; Li, Hong; Shepherd, Timothy A.; Zhao, Yang; and Stinn, John P., "Ammonia, Greenhouse Gas, and Particulate Matter Emissions of Aviary Layer Houses in the Midwestern U.S." (2013). *Agricultural and Biosystems Engineering Publications*. Paper 452. http://lib.dr.iastate.edu/abe_eng_pubs/452

B. Emission Factors

Uncontrolled Emission Factors for Laying Hen Houses

Uncontrolled PM₁₀ and NH₃ Emission Factors for Laying Hen Houses

The uncontrolled emission factors for PM₁₀ and NH₃ for the laying hen houses were primarily based on the study *Environmental assessment of three laying-hen housing systems—Part II: Part II: Ammonia, greenhouse gas, and particulate matter emissions (Poultry Science 2015 94: 534-543)*⁵. This study was part of the Coalition for Sustainable Egg Supply (CSES) Project. This study continuously monitored emission rates of ammonia, greenhouse gases (CO₂, CH₄, and N₂O), and particulate matter (PM₁₀ and PM_{2.5}) from three different types of laying hen houses – conventional cage, aviary, and enriched colony over a period of 27 months. The study "*Ammonia, Greenhouse Gas, and Particulate Matter Emissions of Aviary Layer Houses in the Midwestern U.S.*" (2013)⁶ also reported a similar PM₁₀ emission rate for aviary houses.

The CSES study reported average emission rates for the laying hen houses, manure storage, and farm (total emission rate for hen houses and manure storage). However, the figures from the study show that the emission rates from the laying hen houses on particular days vary from the average values reported. Therefore, the average values reported from the study will be used to calculate annual emissions while the maximum daily emissions will be based on higher emission rates from the figures in the study, except for PM₁₀ from the new cage-free aviary laying hen houses since the applicant has proposed to source test emissions to demonstrate that the maximum daily PM₁₀ emissions from the houses will not exceed the average PM₁₀ rate reported in the study. For the existing enriched colony laying hen house, maximum daily PM₁₀ emissions (0.06 g/bird-day) were estimated based on *Figure 4 - Daily mean particulate matter (PM₁₀ and PM_{2.5}) emission rates (ERs) (g/hen/d) and (mg/hen/d), respectively and their relationship to ambient temperature for the conventional cage house (CC), aviary house (AV), and enriched colony house (EC)*. For the existing enriched colony laying hen houses and the proposed aviary laying hen houses, maximum daily NH₃ emissions from the houses were estimated based on *Figure 2 - (A) Daily NH₃ emission rates (ERs) (g/hen/d) and (B) their relationship to ambient temperature for the conventional cage house (CC), aviary house (AV), and enriched colony house (EC)*. The NH₃ emission rates reported for manure storage were added to the maximum values estimated from Figure 2 to estimate the total maximum daily NH₃ emission rates for enriched colony hen houses (0.29 g NH₃/bird-day + 0.11 g NH₃/bird-day = 0.4 g-NH₃/bird-day) and aviary hen houses (0.34 g NH₃/bird-day + 0.18 g NH₃/bird-day = 0.52 g-NH₃/bird-day).

Uncontrolled VOC Emission Factors for Laying Hen Houses

Because of limited information available on VOC emissions from laying hen houses, the maximum daily and annual uncontrolled VOC emission factors from the laying hen

⁵ Shepherd, T., Y. Zhao, and H. Xin. 2014. Environmental assessment of three laying-hen housing systems—Part II: Part II: Ammonia, greenhouse gas, and particulate matter emissions. *Poultry Science* 2015 94: 534-543 <http://ps.oxfordjournals.org/content/94/3/534.full.pdf+html>

⁶ http://lib.dr.iastate.edu/abe_eng_pubs/452

houses were based on the study "*Final Report: Quantification of Gaseous Emissions from California Broiler Production Houses*" (May 6, 2005)⁷. In this study source tests were conducted on mechanically ventilated broiler houses during the spring and fall of 2004. The participants in the project included: AIRx Testing; California ARB; California Department of Food and Agriculture; California Poultry Federation; Foster Farms; & University of California, Davis - Animal Science

Enriched Colony Laying Hen House

Uncontrolled Emission Factors for Enriched Colony Laying Hen House				
	Max Daily EF	Ave. Annual EF		Source
	g/bird-day	g/bird-day	lb/bird-yr*	
PM ₁₀	0.06	0.0156	0.0126	Environmental assessment of three laying-hen housing systems—Part II: Air emissions. Poultry Science 2015 94: 534-543
VOC	0.031	0.031	0.025	"Quantification of Gaseous Emissions from California Broiler Production Houses" - Source tests were conducted on mechanically ventilated broiler houses during the spring and fall of 2004.
NH ₃	0.40	0.16	0.13	Environmental assessment of three laying-hen housing systems—Part II: Air emissions. Poultry Science 2015 94: 534-543

* Ave. Annual lb/bird-yr EF = Ave. Annual g/bird-day EF x 365 day/yr ÷ 453.59 g/lb

Cage-Free Aviary Laying Hen Houses

Uncontrolled Emission Factors for Cage-Free Aviary Laying Hen Houses				
	Max Daily EF	Ave. Annual EF		Source
	g/bird-day	g/bird-day	lb/bird-yr	
PM ₁₀	0.103 (source testing required)	0.103	0.0829	Environmental assessment of three laying-hen housing systems—Part II: Air emissions. Poultry Science 2015 94: 534-543 ^{Error! Bookmark not defined.} and "Ammonia, Greenhouse Gas, and Particulate Matter Emissions of Aviary Layer Houses in the Midwestern U.S." (2013). <i>Agricultural and Biosystems Engineering Publications</i> . Paper 452 (The average PM ₁₀ EF from the respective studies was 0.1003 g/bird-day and 0.105 g/bird-day, resulting in an average PM ₁₀ EF of 0.103 g/bird-day)
VOC	0.031	0.031	0.025	"Quantification of Gaseous Emissions from California Broiler Production Houses" - Source tests were conducted on mechanically ventilated broiler houses during the spring and fall of 2004.
NH ₃	0.52	0.30	0.24	Environmental assessment of three laying-hen housing systems—Part II: Air emissions. Poultry Science 2015 94: 534-543

⁷ Summers, M.D. (2005) FINAL REPORT: Quantification of Gaseous Emissions from California Broiler Production Houses. Report to the California Department of Food and Agriculture, May 6, 2005. Available at: <https://www.arb.ca.gov/ag/cafpoulemissrpt.pdf>

Controlled Emission Factors

PM₁₀

Existing Enriched Colony Hen House

As discussed above, the manure drying system in the existing enriched colony hen house will reduce PM₁₀ emissions from the houses by 30%. Therefore, the controlled PM₁₀ emission factors for the existing hen house are calculated as follows:

$$EF = EF \times (1 - \text{Total Control Efficiency})$$

Controlled Daily PM₁₀ EF

$$0.06 \text{ g-PM}_{10}/\text{bird-day} \times (1 - 0.3) = 0.042 \text{ g-PM}_{10}/\text{bird-day}$$

Controlled Annual PM₁₀ EF

$$0.0126 \text{ lb-PM}_{10}/\text{bird-yr} \times (1 - 0.3) = 0.00882 \text{ lb-PM}_{10}/\text{bird-yr}$$

The controlled PM₁₀ emission factors shown above will be used to calculate both the pre-project potential to emit (PE1) and post-project potential to emit (PE2) from the existing enriched colony hen house.

Proposed Cage-Free Aviary Hen Houses

As discussed above, the manure drying system in the proposed cage-free aviary hen houses will reduce PM₁₀ emissions from the houses by 80%. Additionally, the proposed aviary hen houses will be equipped with fabric barriers or filters constructed of shade cloth or similar material that will reduce the PM exhausted from the houses. The fabric filter will be suspended between adjacent hen houses and will reduce PM emissions from the houses by at least 50%. Therefore, the controlled PM₁₀ emission factors for the proposed hen houses are calculated as follows:

$$EF = EF \times (1 - \text{Total Control Efficiency})$$

Controlled Daily EF

$$0.103 \text{ g-PM}_{10}/\text{bird-day} \times (1 - 0.8) \times (1 - 0.5) = 0.0103 \text{ g-PM}_{10}/\text{bird-day}$$

Controlled Annual EF

$$0.0829 \text{ lb-PM}_{10}/\text{bird-yr} \times (1 - 0.8) \times (1 - 0.5) = 0.00829 \text{ lb-PM}_{10}/\text{bird-yr}$$

The controlled PM₁₀ emission factors shown above will be used to calculate the post-project potential to emit (PE2) from the proposed cage-free aviary hen houses.

VOC

As discussed above, the increase in the maximum number of birds that can be kept at the facility as a result of this project will cause all of the hen houses at the facility to be subject to the requirements of District Rule 4570.

The mitigation measures that the applicant has selected to comply with Rule 4570 and the VOC control efficiency for each of the measures 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%
Solid Manure/Litter Mitigation Measures	Control Efficiency
Within seventy-two (72) hours of removal from housing, either: a) Remove all litter/manure from the facility; or b) 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.	0*
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%

*No control efficiency has been established for this mitigation measure, although emissions reductions are expected.

The control efficiencies for the selected mitigation measures discussed above will only be applied to VOC emissions for post-project calculations.

The controlled VOC emission factors are calculated as follows:

$$EF = EF \times (1 - \text{Total Control Efficiency})$$

Controlled Daily VOC EF

$$(0.025 \text{ lb-VOC/bird-yr}) \times (1 - 0.41) = 0.015 \text{ lb-VOC/bird-yr} \times 453.59 \text{ g/lb} \div 365 \text{ day/yr} = 0.0186 \text{ g-VOC/bird-day}$$

Controlled Annual VOC EF

$$(0.025 \text{ lb-VOC/bird-yr}) \times (1 - 0.41) = 0.015 \text{ lb-VOC/bird-yr}$$

NH₃

As stated above, because of limited data, no control for NH₃ emissions will be calculated for the practices and measures at the facility.

As discussed above, the uncontrolled NH₃ emission factors for each type of house are taken from the study, Environmental assessment of three laying-hen housing systems–Part II: Ammonia, greenhouse gas, and particulate matter emissions (Poultry Science 2015 94: 534-543). This study quantified NH₃, greenhouse gas (GHG), and PM emissions from conventional cage, enriched colony, and cage-free aviary houses for laying hens over a 27-months. The study presented average emissions, but also showed that on specific days emissions could vary from the average.

The NH₃ emission factors for the existing enriched colony hen house and the proposed cage-free aviary hen houses are summarized in the tables below.

Existing Enriched Colony Hen House

Controlled Emission Factors for Enriched Colony Hen House			
	Max Daily EF (g/bird-day)	Annual EF (lb/bird-yr)	Control
PM ₁₀	0.042	0.00882	30% Control for in-house manure drying system; pre-project and post-project EF
VOC	0.0186	0.015	41% Control for Rule 4570 Mitigation Measures; post-project EF
NH ₃	0.40	0.13	Uncontrolled NH ₃ EF for enriched colony houses from Shepherd, T., Y. Zhao, and H. Xin. 2014. Environmental assessment of three laying-hen housing systems–Part II: Air emissions

Proposed Cage-Free Aviary Hen Houses

Controlled Emission Factors for Cage-Free Aviary Hen Houses			
	Max Daily EF (g/bird-day)	Annual EF (lb/bird-yr)	Control
PM ₁₀	0.0103	0.00829	80% Control for in-house manure drying system and 50% Control for fabric Barrier Filter; post-project EF
VOC	0.0186	0.015	41% Control for Rule 4570 Mitigation Measures; post-project EF
NH ₃	0.52	0.24	Uncontrolled NH ₃ EF for cage-free aviary houses from Shepherd, T., Y. Zhao, and H. Xin. 2014. Environmental assessment of three laying-hen housing systems–Part II: Air emissions

C. Calculations

1. Pre-Project Potential to Emit (PE1)

As discussed above, 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 each emission factor. Therefore, when calculating emissions from the laying hen ranch, the emissions from these distinct operations are calculated together.

Pre-Project Potential to Emit (PE1) for Permits N-9091-1-0 and -2-0:

PE1 for the existing hen house will be calculated below based on the maximum number of birds that can be kept in the existing house prior to the modification.

PE1 for Existing Enriched Colony Hen House

Max Daily Pre-Project Potential to Emit (PE1) for the Existing Hen House						
Pollutant	# of Birds	x	Max Daily EF (g/bird-day)	÷	453.59 g/lb	= PE1 (lb/day)
PM ₁₀	317,000	x	0.042	÷	453.59	= 29.4
VOC	317,000	x	0.031	÷	453.59	= 21.7
NH ₃	317,000	x	0.40	÷	453.59	= 279.5

Annual Pre-Project Potential to Emit (PE1) for the Existing Hen House						
Pollutant	# of Birds	x	Annual EF (lb/bird-yr)	÷	365 day/yr	= PE1 (lb/yr)
PM ₁₀	317,000	x	0.00882	÷	365	= 2,796
VOC	317,000	x	0.025	÷	365	= 7,925
NH ₃	317,000	x	0.13	÷	365	= 41,210

2. Post-Project Potential to Emit (PE2)

Post-Project Potential to Emit (PE2) for Permits N-9091-1-1 and -2-1:

PE2 from the existing and proposed hen houses will be calculated below based on the maximum number of birds that can be kept in each type of house after the modification.

PE2 for Existing Enriched Colony Hen House

Max Daily Post-Project Potential to Emit (PE2) for the Existing Hen House						
Pollutant	# of Birds	x	Max Daily EF (g/bird-day)	÷	453.59 g/lb	= PE2 (lb/day)
PM ₁₀	317,000	x	0.042	÷	453.59	= 29.4
VOC	317,000	x	0.0186	÷	453.59	= 13.0
NH ₃	317,000	x	0.40	÷	453.59	= 279.5

Annual Post-Project Potential to Emit (PE2) for the Existing Hen House						
Pollutant	# of Birds	x	Annual EF (lb/bird-yr)	÷	365 day/yr	= PE2 (lb/yr)
PM ₁₀	317,000	x	0.00882	÷	365	= 2,796
VOC	317,000	x	0.015	÷	365	= 4,755
NH ₃	317,000	x	0.13	÷	365	= 41,210

PE2 for Each Proposed Cage-Free Aviary Hen House

Max Daily Post-Project Potential to Emit (PE2) for Each Proposed Hen House						
Pollutant	# of Birds	x	Max Daily EF (g/bird-day)	÷	453.59 g/lb	= PE2 (lb/day)
PM ₁₀	366,000	x	0.0103	÷	453.59	= 8.3
VOC	366,000	x	0.0186	÷	453.59	= 15.0
NH ₃	366,000	x	0.52	÷	453.59	= 419.6

Annual Post-Project Potential to Emit (PE2) for Each Proposed Hen House						
Pollutant	# of Birds	x	Annual EF (lb/bird-yr)	÷	365 day/yr	= PE2 (lb/yr)
PM ₁₀	366,000	x	0.00829	÷	365	= 3,034
VOC	366,000	x	0.015	÷	365	= 5,490
NH ₃	366,000	x	0.24	÷	365	= 87,840

Total PE2 for Laying Hen Ranch (Permits N-9091-1-1 and -2-1)

As discussed above, the facility has proposed to limit the total number of laying hens that will be housed onsite to no more than 1,326,695 so that the total facility-wide Potential to Emit for VOC will remain below the 20,000 lb/yr offset and major source thresholds of District Rule 2201. Therefore, the PE2 for the laying hen ranch will be calculated based on the maximum emissions from 1,326,695 birds that can be housed in the existing and proposed hen houses.

PE2_{PM10}

The facility has proposed to limit the total number of laying hens kept onsite to no more than 1,326,695. Because the controlled PM₁₀ emission factor for the existing enriched colony house is greater than the controlled PM₁₀ emission factor for the proposed cage-free aviary houses, the total PE2 for PM₁₀ from the laying hen ranch will be calculated assuming that the existing enriched colony house will be populated with the maximum capacity of 317,000 laying hens with the remaining 1,009,695 laying hens (1,326,695 - 317,000) kept in the proposed cage-free aviary houses.

Max Daily Emissions = $[317,000 \text{ birds} \times 0.042 \text{ g-PM}_{10}/\text{bird-day} + (1,326,695 \text{ birds} - 317,000 \text{ birds}) \times 0.0103 \text{ g-PM}_{10}/\text{bird-day}] \div 453.59 \text{ g/lb} = \mathbf{52.3 \text{ lb-PM}_{10}/\text{day}}$

Annual Emissions = $317,000 \text{ birds} \times 0.00882 \text{ lb-PM}_{10}/\text{bird-yr} + (1,326,695 \text{ birds} - 317,000 \text{ birds}) \times 0.00829 \text{ lb-PM}_{10}/\text{bird-yr} = \mathbf{11,166 \text{ lb-PM}_{10}/\text{yr}}$

PE2_{VOC}

Daily Emissions = $1,326,695 \text{ birds} \times 0.0186 \text{ g-VOC}/\text{bird-day} \div 453.59 \text{ g/lb} = \mathbf{54.4 \text{ lb-PM}_{10}/\text{day}}$

Annual Emissions = $1,326,695 \text{ birds} \times 0.015 \text{ lb-VOC}/\text{bird-yr} = \mathbf{19,900 \text{ lb-VOC}/\text{yr}}$

PE2_{NH3}

The facility has proposed to limit the total number of laying hens kept onsite to no more than 1,326,695. Because the NH₃ emission factor for the existing enriched colony house is lower than the NH₃ emission factor for the proposed cage-free aviary houses, the total PE2 for NH₃ from the laying hen ranch will be calculated assuming that each of the proposed cage-free aviary houses will be populated with the maximum capacity of 366,000 laying hens with the remaining 228,695 laying hens (1,326,695 – (3 x 366,000)) kept in the existing enriched colony house.

Max Daily Emissions = $[(1,326,695 \text{ birds} - 3 \times 366,000 \text{ birds}) \times 0.40 \text{ g-NH}_3/\text{bird-day} + (3 \times 366,000 \text{ birds}) \times 0.52 \text{ g-NH}_3/\text{bird-day}] \div 453.59 \text{ g/lb} = \mathbf{1,460.4 \text{ lb-NH}_3/\text{day}}$

Annual Emissions = $(1,326,695 \text{ birds} - 3 \times 366,000 \text{ birds}) \times 0.13 \text{ lb-NH}_3/\text{bird-yr} + (3 \times 366,000 \text{ birds}) \times 0.24 \text{ lb-NH}_3/\text{bird-yr} = \mathbf{293,250 \text{ lb-NH}_3/\text{yr}}$

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.

SSPE1 (lb/year)						
Permit Unit	NO _x	SO _x	PM ₁₀	CO	VOC	NH ₃
N-9091-1-0 (Laying Hen Ranch)	0	0	2,796	0	7,925	41,210
N-9091-2-0 (Solid Manure Handling)						
N-9091-3-0 (752 bhp emergency engine) ⁸	720	1	23	148	35	0
N-9091-4-0 (752 bhp emergency engine) ⁸	720	1	23	148	35	0
SSPE1	1,440	2	2,842	296	7,995	41,210

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	NH ₃
N-9091-1-1 (Laying Hen Ranch)	0	0	11,166	0	19,900	293,250
N-9091-2-1 (Solid Manure Handling)						
N-9091-3-0 (752 bhp emergency engine) ⁸	720	1	23	148	35	0
N-9091-4-0 (752 bhp emergency engine) ⁸	720	1	23	148	35	0
SSPE2	1,440	2	11,212	296	19,970	293,250

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

⁸ Existing emergency standby IC engines that are currently exempt from District permits, but will become subject to permits as a result of this project; District permits for the engines will be issued under Project N-1162339. See Appendix B for PE calculations for the engines.

Rule 2201 Major Source Determination (lb/year)						
	NO _x	SO _x	PM ₁₀	PM _{2.5} *	CO	VOC
SSPE1	1,440	2	2,842	326	296	7,995
SSPE2	1,440	2	11,212	1,163	296	19,970
Major Source Threshold	20,000	140,000	140,000	140,000	200,000	20,000
Major Source?	No	No	No	No	No	No

*Note: PM_{2.5} from the hen houses assumed to be 10% of PE for PM₁₀; PM_{2.5} from the engines assumed to equal PE for PM₁₀

As seen in the table above, the facility is not an existing Major Source and is not becoming a Major Source 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 tons per year (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	0.7	4.0	0	0.1	3.5	1.4
PSD Major Source Thresholds	250	250	250	250	250	250
PSD Major Source ? (Y/N)	N	N	N	N	N	N

* PM from hen houses assumed to be equal to be 250% of PM₁₀

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.

As shown in Section VII.C.5 above, the facility is not a Major Source for any pollutant.

Therefore BE = PE1.

N-9091-1-1 and -2-1:

As calculated in Section VII.C.1 above, PE1 is summarized in the following table:

BE (lb/year)						
	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO	VOC
N-9091-1-1	0	0	2,796	280	0	7,925
N-9091-2-1						

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 a 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 a Major Source for any pollutants, this project does not constitute a Federal Major Modification.

9. 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
- PM10

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 tons per year (tpy) for any regulated NSR pollutant.

PSD Major Source Determination: Potential to Emit (tons/year)						
	NO2	VOC	SO2	CO	PM*	PM10
Total PE from New and Modified Units	0	8.2	0	0	11.4	4.6
PSD Major Source threshold	250	250	250	250	250	250
New PSD Major Source?	N	N	N	N	N	N

* PM from poultry houses assumed to be equal to be 250% of PM₁₀

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 C.

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:

- {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]

- {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]

Rule 2010 Permits Required

The provisions of this rule apply to any person who plans to or does operate, construct, alter, or replace any source operation, which may emit air contaminants or may reduce the emission of air contaminants.

Pursuant to Section 4.0, a written permit shall be obtained from the APCO. No Permit to Operate shall be granted either by the APCO or the Hearing Board for any source operation described in Section 3.0, constructed or installed without authorization as required by Section 3.0 until the information required is presented to the APCO and such source operation is altered, if necessary, and made to conform to the standards set forth in Rule 2070 (Standards for Granting Applications) and elsewhere in District rules and regulations.

The applicant has applied for ATC permits under the current project for the proposed expansion. Therefore, compliance with this rule is expected.

Rule 2020 Exemptions

This rule specifies emissions units that are not required to obtain an ATC or PTO. This rule also specifies the recordkeeping requirements to verify the exemption and outlines the compliance schedule for emissions units that lose the exemption after installation.

Section 3.10 defines a low emitting unit as an emissions unit with an uncontrolled emissions rate of each air contaminant less than 2 lb/day or if greater than 2 lb/day, is less than or equal to 75 lb/yr.

Section 6.19 states that low emitting units, except those which belong to a source category listed in Section 6.1 through 6.18, shall not require an ATC or PTO.

Emissions from Feed Receiving and Storage:

The following calculations demonstrate that emissions from the feed storage and handling operation are less than 2.0 lb/day, and therefore the feed storage and handling operation is exempt from permitting requirements.

Due to limited data, there are no VOC and NH₃ emission factors for the feed itself. Therefore, VOC and NH₃ emissions directly from the feed cannot be calculated. However, PM₁₀ emissions from feed receiving can be calculated.

AP-42 Table 9.9.1-2 lists an uncontrolled PM₁₀ emission factor for grain receiving at animal feed mills as 0.0025 lb/ton.

In order for PM₁₀ emissions from feed receiving to reach 2.0 lb/day, the entire facility would need to receive 800 tons of feed per day, as shown in the following calculation.

$$(800 \text{ ton/day of feed received}) \times (0.0025 \text{ lb-PM}_{10}/\text{ton}) = 2.0 \text{ lb-PM}_{10}/\text{day}$$

The facility receives approximately 156 tons of feed per day, resulting 0.4 lb-PM₁₀/day as shown in the following calculation.

$$(156 \text{ ton/day of feed received}) \times (0.0025 \text{ lb-PM}_{10}/\text{ton}) = 0.4 \text{ lb-PM}_{10}/\text{day}$$

Once the feed is received and stored in silos, it is sent to each hen house, as needed, through a series of enclosed augers and pipes. It is then dispensed onto a belt in front of the birds. Thus, after the feed is received and stored, PM₁₀ emissions are expected to be negligible.

As calculated above, PM₁₀ emissions from feed receiving and storage for the *entire* facility are expected to be 0.4 lb/day. Therefore, no single emissions unit (i.e. storage silo) could have emissions in excess of 2.0 lb/day. Therefore, in accordance with Section 6.19 of the rule, the feed storage and handling operation is exempt from permits.

Rule 2201 New and Modified Stationary Source Review Rule

A. Best Available Control Technology (BACT)

1. BACT Applicability

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 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 install three new hen houses, each with a PE greater than 2.0 lb/day for PM₁₀, VOC, and NH₃. Therefore, BACT is triggered for PM₁₀, VOC, and NH₃.

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 for relocation of an emissions unit.

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

As discussed in Section I above, the applicant is proposing to modify the solid manure handling permit for the expansion of the hen ranch. However, as previously discussed, all emissions from solid manure are expected to be confined inside the hen houses. As determined in Section A.1.a above, BACT is triggered for each new hen house. Therefore, emissions from solid manure will be addressed under the BACT guideline for poultry layer houses, which includes requirements for manure handling.

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. Therefore BACT is not triggered for any pollutant for an SB 288 or Federal Major Modification.

2. BACT Guideline

BACT Guideline 5.7.2 applies to poultry layer houses. (See Appendix D)

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:

PM₁₀: 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.

NH3: 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 conditions listed below will be added to ATC N-9091-1-1 to ensure compliance with BACT requirements. Although BACT was not triggered for the existing hen house, the applicant has stated that BACT requirements will be implemented at the existing hen house as well. Therefore, the conditions below will apply to all four hen houses.

- 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 drying and removal system with manure removal at least twice per week. [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

Offset requirements shall be triggered on a pollutant by pollutant basis and shall be required if the SSPE2 equals to 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	1,440	2	11,212	296	19,970
Offset Thresholds	20,000	54,750	29,200	200,000	20,000
Offsets triggered?	No	No	No	No	No

2. Quantity of Offsets Required

As seen above, the SSPE2 is not greater than the offset thresholds for any pollutants. Additionally, pursuant to District Rule 2201, Section 4.6.9, emission offsets shall not be required for criteria pollutants from agricultural sources if emissions reductions from that source would not meet the criteria for real, permanent, quantifiable, and enforceable emission reductions. District Rule 2201, Section 4.6.9.1 states *"In no case shall the offset exemption in Section 4.6.9 apply to an agricultural source that is also a major stationary source for the pollutant for which the offset exemption is sought."*

Emissions reductions from agricultural sources have not yet been determined to satisfy the criteria to be real, permanent, quantifiable, and enforceable and the facility is not a major stationary source for any pollutant. Therefore, offset calculations are not necessary and offsets will not be required for this project.

C. Public Notification

1. Applicability

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 SSPE 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 Major Sources. Since this is not a new facility, public noticing is not 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

As discussed above, this project includes three new hen houses, each with a capacity of 366,000 laying hens.

The PE2 for each new unit (hen house) is compared to the daily PE Public Notice thresholds in the following table:

Each Proposed Cage-Free Aviary Hen House

PE > 100 lb/day Public Notice Thresholds			
Pollutant	PE2 (lb/day)	Public Notice Threshold	Public Notice Triggered?
NO _x	0	100 lb/day	No
SO _x	0	100 lb/day	No
PM ₁₀	24.2	100 lb/day	No
CO	0	100 lb/day	No
VOC	15.0	100 lb/day	No
NH ₃	274.3	100 lb/day	Yes

Therefore, public noticing for PE > 100 lb/day purposes is required.

c. Offset Threshold

The SSPE1 and SSPE2 are compared to the offset thresholds in the following table.

Offset Thresholds				
Pollutant	SSPE1 (lb/year)	SSPE2 (lb/year)	Offset Threshold	Public Notice Required?
NO _x	1,440	1,440	20,000 lb/year	No
SO _x	2	2	54,750 lb/year	No
PM ₁₀	2,842	11,212	29,200 lb/year	No
CO	296	296	200,000 lb/year	No
VOC	7,995	19,970	20,000 lb/year	No

As detailed above, there were no thresholds surpassed with this project; therefore public noticing is not required for surpassing an offset threshold.

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	1,440	1,440	0	20,000 lb/year	No
SO _x	2	2	0	20,000 lb/year	No
PM ₁₀	11,212	2,842	8,370	20,000 lb/year	No
CO	296	296	0	20,000 lb/year	No
VOC	19,970	7,995	11,975	20,000 lb/year	No
NH ₃	293,250	41,210	252,040	20,000 lb/year	Yes

As demonstrated above, the SSIPE for NH₃ was 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 for a Title V Significant Modification.

2. Public Notice Action

As discussed above, public noticing is required for this project for NH₃ emissions from an emissions unit in excess of 100 lb/day and for an SSIPE for NH₃ that exceeds 20,000 lb/yr. Therefore, public notice documents will be submitted to the California Air Resources Board (ARB) 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.

Proposed Rule 2201 (DEL) Conditions:

N-9091-1-1 (Laying Ranch Housing):

The following conditions will be added to the ATC to satisfy the DEL and BACT requirements.

- The maximum number of hens kept onsite at any time shall not exceed 1,326,695. [District Rule 2201]

- No more than 317,000 hens shall be kept in the enriched-colony hen house at any time. [District Rule 2201]
- Maximum daily emissions from the enriched colony hen house shall not exceed any of the following limits: 29.4 lb-PM10/day (or 0.042 g-PM10/bird-day), 13.0 lb-VOC/day (or 0.0186 g-VOC/bird-day), or 279.5 lb-NH3/day (or 0.40 g-NH3/bird-day). [District Rule 2201]
- Annual emissions from the enriched colony hen house shall not exceed any of the following limits: 0.00882 lb-PM10/bird-year, 0.015 lb-VOC/bird-year, or 0.13 lb-NH3/bird-year. [District Rule 2201]
- No more than 366,000 hens shall be kept in each of the three cage-free aviary hen houses at any time. [District Rule 2201]
- The three cage-free aviary hen houses shall utilize fabric filters or barriers made of shade cloth or similar material designed to reduce particulate matter (PM) emissions from the exhaust fans. [District Rule 2201]
- Maximum daily emissions from each cage-free aviary hen house shall not exceed any of the following limits: 8.3 lb-PM10/day (or 0.0103 g-PM10/bird-day), 15.0 lb-VOC/day (or 0.0186 g-VOC/bird-day), or 419.6 lb-NH3/day (or 0.52 g-NH3/bird-day). [District Rule 2201]
- Annual emissions from each cage-free aviary hen house shall not exceed any of the following limits: 0.00829 lb-PM10/bird-year, 0.015 lb-VOC/bird-year, or 0.24 lb-NH3/bird-year. [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]

N-9091-2-1 (Manure Handling):

The following condition will be added to the ATC:

- Each manure dryer shall utilize exhaust air from the ventilation fans serving the hen house. Combustible fuel shall not be used as a source of heat for the manure dryers. [District Rule 2201]

E. Compliance Assurance

1. Source Testing

N-9091-1-1 (Laying Ranch Housing):

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. The facility is proposing to install cage-free aviary style hen houses at this site. The facility has indicated that cage-free aviary houses are expected to have lower PM₁₀ emission rates as compared to other similar hen 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. Therefore, initial source testing for PM₁₀ emissions will be required to ensure that daily PM₁₀ do not exceed the limit in the proposed ATC permit.

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. As discussed above, the facility is proposing to operate each hen house with up to 68 exhaust fans that will direct air to the manure dryers prior to exiting each house. The houses are not equipped with exhaust stacks. In addition, the potentially large volume of airflow exiting each house makes it hard to capture and monitor the emission rates being generated. Because this type of operation does not lend itself readily to source testing, periodic annual source testing to verify the PM₁₀ emission factors will not be required for this operation.

As discussed above, the facility may request to further increase the maximum number of laying hens that may be housed at this facility or to construct additional hen houses. The results of the initial source test may be used to demonstrate that the PM₁₀ emissions from the overall facility (this ATC project and any additional laying hens and/or hen houses proposed in the future) will not cause or make worse a violation of an Ambient Air Quality Standard.

In accordance with these requirements, the following conditions will be included on the ATC:

- Initial source testing to demonstrate compliance with the PM₁₀ emission rate from at least one of the cage-free aviary hen houses, or a hen house with a similar design approved by the District, shall be initiated within 365 days after initial start-up of any cage-free aviary hen house at this facility (i.e. when birds are first placed in any laying hen house). [District Rule 2201]
- Source testing shall be conducted using the methods and procedures approved by the District. The District must be notified at least 60 days prior to any compliance source test and a source test plan shall be submitted to the District for approval by the Permit Services and Compliance Divisions at least 30 days prior to testing. The source test plan shall include a detailed description of how testing will be conducted, the proposed duration of the test, and the methodology to be used. [District Rule 2201]
- All emission measurements shall be made with the hen house operating either at conditions representative of normal operations or conditions specified in the Authority to Construct. To the maximum extent possible that still allows for normal operation, emission measurements shall be taken in conditions that represent the maximum emission rates from the hen house. These conditions shall include, but are not limited to the hen house being filled at, or near, maximum capacity with a majority of the exhaust fans turned on, and the emission measurements occurring during the summer season (i.e. between June 1 and August 31). [District Rule 2201]
- The following test methods shall for source testing of PM₁₀ emission rates (filterable and condensable): EPA Method 201 and 202, EPA Method 201a and 202, ARB Method 5 in combination with Method 501, or South Coast Air Quality Management District (SCAQMD) Method 5.1. If it is determined that these test methods are not appropriate to measure the PM₁₀ emissions from this type of operation or other methods are more appropriate, PM₁₀ emissions shall be measured using alternative test method(s) that are approved by the District. [District Rule 2201]
- The results of the source test shall be submitted to the District within 60 days after completion of the test. [District Rule 1081]

2. Monitoring

The expansion of the laying hen ranch under this project will result in the facility becoming subject to District Rule 4570 - *Confined Animal Facilities*. Also, as explained above, the proposed cage-free aviary hen houses will be required to utilize fabric filters or barriers to reduce PM emissions from the exhaust fans.

N-9091-1-1 (Laying Ranch Housing):

The following monitoring conditions will be listed on the ATC permit:

- Permittee shall inspect water pipes and drinkers and repair leaks daily. [District Rules 2201 and 4570]
- Fabric filters or barriers used to reduce particulate matter (PM) emissions from the exhaust fans shall be inspected on a quarterly basis. The filters/barriers shall be inspected thoroughly for rips, tears, holes, or any evidence of structural failures that result in excessive PM leaks 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 conditions will be listed on the ATC permits:

N-9091-1-1 (Laying Ranch Housing):

- Records of inspections, maintenance, repair, and replacement of the filters/barriers used to reduce PM emissions from the exhaust fans shall be maintained. The records shall include the dates of inspections 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 monthly records of the number of animals of each species and production group at the facility and records of any changes to this information. [District Rules 2201 and 4570]
- 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]

N-9091-2-1 (Manure Handling):

- 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 coverings are used, permittee shall maintain records, such as manufacturer warranties or other documentation, demonstrating that the weatherproof covering over dry 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]
- 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 Rule 4570]

4. Reporting

No reporting is required to demonstrate compliance with Rule 2201.

F. Ambient Air Quality Analysis (AAQA)

An AAQA shall 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. The proposed project 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 PM₁₀ as well as federal and state PM_{2.5} thresholds. As shown by the AAQA summary sheet the proposed project will not cause a violation of an air quality standard for PM₁₀ and PM_{2.5}. The results of the Criteria Pollutant Modeling conducted for the AAQA are summarized in the following table:

PM₁₀ & 2.5 Pollutant Modeling Results*		
Values are in µg/m ³		
Category	24 Hours	Annual
Net Value	9.18	1.64
Interim Significance Level	10.4 ^{1&2}	2.08 ^{1&2}
Result	Pass	Pass

¹ Per District Policy 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.

² On January 22, 2013, the United States Court of Appeals for the District of Columbia Circuit (Court) granted a request from the Environmental Protection Agency (EPA) to vacate and remand to the EPA the portions of two Prevention of Significant Deterioration (PSD) PM_{2.5} rules (40 CFR 51.166 and 40 CFR 52.21) addressing the Significant Impact Levels (SILs) for PM_{2.5} so that the EPA could voluntarily correct an error in these provisions. Until EPA establishes new SILs for PM_{2.5}, the District will consider compliance with the PM₁₀ standards as a surrogate for compliance with the PM_{2.5} standards.

As discussed above, the facility has indicated that they would like to construct additional hen houses in the future to further expand the egg laying ranch and increase the number of laying hens. Prior to the approval for increasing the maximum number of laying hens that may be kept at the site or construction of additional hen houses at the site, the facility will be required to demonstrate that PM emissions from the overall project (this ATC project and any future ATC project(s) for the additional laying hens and/or hen houses) will not cause or make worse a violation of an Ambient Air Quality Standard for the entire overall project. The following condition will be listed on the ATC permit:

N-9091-1-1 (Laying Ranch Housing):

- Issuance of any Authority to Construct (ATC) permit(s) or any construction that results in a further increase in the number of laying hens or hen houses at this facility such as described in the original proposal for District ATC Project N-1143814, or the District CEQA document prepared for the project shall be treated and analyzed as part of the same project as ATC N-9091-1-1 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]

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

Since this facility's potential emissions do not exceed any major source thresholds of Rule 2201, this facility is not a major source, and Rule 2520 does not apply.

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 PM10 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.

An 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 health risk assessment are summarized in the table below.

RMR Summary			
Categories	3 New Poultry Layer Houses Each with 366,000 Birds (N-9091-1-1)	Project Totals	Facility Totals
Prioritization Score	11.8	11.8	>1.0
Acute Hazard Index	0.68	0.68	0.68
Chronic Hazard Index	0.16	0.16	0.16
Maximum Individual Cancer Risk (10 ⁻⁶)	1.94E-06	1.94E-06	1.94E-06
T-BACT Required?	No		
Special Permit Conditions?	No		

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.

Particulate matter concentration from the hen houses is not expected to exceed the applicable limit as demonstrated below:

$$\text{PM Conc. (gr/scf)} = \frac{(\text{PM emission rate}) \times (7,000 \text{ gr/lb})}{(\text{Air flow rate}) \times (60 \text{ min/hr}) \times (24 \text{ hr/day})}$$

Existing Enriched Colony Hen House

PM emission rate for existing house (Assuming PM is 250% of PM₁₀)

$$= 7.7 \text{ lb-PM}_{10}/\text{day} \times 2.5 \text{ lb-PM/lb-PM}_{10} = 19.25 \text{ lb-PM/day}$$

The existing hen house is equipped with 57 exhaust fans, each capable of an air flow rate of 19,000 cfm. Although multiple fans will always be operating for the health of the hens, for the purpose of Rule 4201 compliance calculations, it will conservatively be assumed

that only one fan is operating in the house, resulting in a minimum air flow rate of 19,000 cfm for the house.

Minimum house ventilation rate: = 19,000 scfm

PM Conc. (gr/scf) = $[(19.25 \text{ lb/day}) \times (7,000 \text{ gr/lb})] \div [(19,000 \text{ ft}^3/\text{min}) \times (60 \text{ min/hr}) \times (24 \text{ hr/day})]$ = 0.005 gr/scf

PM Conc. = 0.005 gr/scf < 0.1 gr/scf

Three Proposed Cage-Free Aviary Hen Houses

PM emission rate for each proposed house (Assuming PM is 250% of PM₁₀)

= 8.3 lb-PM₁₀/day x 2.5 lb-PM/lb-PM₁₀ = 20.75 lb-PM/day

Each of the proposed hen houses will be equipped with 68 exhaust fans, each capable of an air flow rate of 19,000 cfm. Although multiple fans will always be operating for the health of the hens, 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 19,000 cfm for each house.

Minimum house ventilation rate: = 19,000 scfm

PM Conc. (gr/scf) = $[(20.75 \text{ lb/day}) \times (7,000 \text{ gr/lb})] \div [(19,000 \text{ ft}^3/\text{min}) \times (60 \text{ min/hr}) \times (24 \text{ hr/day})]$ = 0.005 gr/scf

PM Conc. = 0.005 gr/scf < 0.1 gr/scf

As shown above, PM emissions concentrations from each of the hen 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. The facility currently has 317,000 laying hens and is also proposing to increase the number of laying hens kept at the facility under this project. 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.

This facility became subject to District Rule 4550 on April 16, 2015 by reaching the 82,000 laying hen regulatory threshold on that date. The facility has submitted a CMP application to the District.

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 already obtained PTOs. 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 expansion will result in Barnhart Ranch becoming a large CAF. Therefore, a 30-day public notice and commenting period for Rule 4570 compliance is required prior to issuance of the ATCs.

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, 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 each ATC:

- {4452} 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.

Barnhart Ranch 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. [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 F) 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 identified impacts on air quality and cultural resources as the project's potential significant environmental effects.

The District's engineering evaluation of the project (this document) and the Initial Study demonstrates that compliance with District rules and permit conditions and Project design elements would reduce and mitigate the project's potential environmental impacts to less than significant. Consistent with CEQA Guidelines §15070, a Proposed Mitigated Negative Declaration was prepared and released for public review from July 8, 2016 to August 8, 2016.

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 proposed CEQA project (which includes the current ATC project and additional poultry houses and laying hens for which the facility may be issued ATCs in the future) has a Stationary Source Increase in Potential to Emit (SSIPE) greater than the District's CEQA significance thresholds; however, it has been determined to have a less than significant environmental impact with mitigation (for the CEQA project, which includes the current ATC project and potential future ATC project(s), the applicant is proposing offsets in the form of emission reduction credits to mitigate air quality impacts). The proposed project is also a potential operation of public concern in the Valley (poultry), triggers Best Available Control Technology (BACT), and triggers public notice. As such, the District has determined that an Indemnification Agreement and Letter of Credit are required.

IX. Recommendation

Compliance with all applicable rules and regulations is expected. Pending a successful NSR Public Noticing period, issue ATC permits N-9091-1-1 and -2-1 subject to the permit conditions on the attached draft ATCs in Appendix G.

X. Billing Information

Annual Permit Fees			
Permit Number	Fee Schedule	Fee Description	Annual Fee
N-9091-1-1	3020-01-E	261 Electric hp	\$451.00
N-9091-2-1	3020-06	Solid Manure Handling - Miscellaneous	\$116.00

Appendixes

- A: In-House Permits N-9091-1-0 & -2-0
- B: PE Calculations for Permit Units N-9091-3-0 & -4-0
- C: Quarterly Net Emissions Change (QNEC)
- D: BACT Guideline 5.7.2 & BACT Analysis for the Proposed Poultry Layer Houses
- E: Summary of Health Risk Assessment (HRA) and Ambient Air Quality Analysis (AAQA)
- F: Greenhouse Gas Emission Impacts
- G: Draft ATCs N-9091-1-1 & -2-1

APPENDIX A
In-House Permits N-9091-1-0 & -2-0

San Joaquin Valley
Air Pollution Control District

In-house PERMIT TO OPERATE

PERMIT NO: N-9091-1-0

ISSUANCE DATE: 07/23/2015

LEGAL OWNER OR OPERATOR: BARNHART RANCH
MAILING ADDRESS: 10218 LANDER AVE
TURLOCK, CA 95380

LOCATION: 718 BARNHART RD
CERES, CA 95307

EQUIPMENT DESCRIPTION:
317,000 LAYING HEN RANCH CONSISTING OF ONE MECHANICALLY VENTILATED POULTRY HOUSE, INCLUDING ELECTRIC FANS TOTALING 57 HP

CONDITIONS

1. 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]
2. 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]
3. This permit does not authorize the violation of any conditions established for this facility in the Conditional Use Permit (CUP), Special Use Permit (SUP), Site Approval, Site Plan Review (SPR), or other approval documents issued by a local, state, or federal agency. [Public Resources Code 21000-21177: California Environmental Quality Act]
4. Permittee shall maintain a record of the number of animals of each species and production group at the facility and shall maintain quarterly records of any changes to this information. [District Rule 4570]
5. 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 Rule 4570]

THIS IS AN INTERNAL DISTRICT DOCUMENT ONLY. Forward a copy to the Compliance Division and file the original in the premises files. A final Permit can only be issued upon verification of compliance with all applicable local, state, and federal regulations by the Compliance Division. Upon verification of compliance, a recommendation to issue the Permit to Operate will be forwarded to the Permit Services Division by the Compliance Division staff.

San Joaquin Valley
Air Pollution Control District

In-house PERMIT TO OPERATE

PERMIT NO: N-9091-2-0

ISSUANCE DATE: 07/23/2015

LEGAL OWNER OR OPERATOR: BARNHART RANCH
MAILING ADDRESS: 10218 LANDER AVE
TURLOCK, CA 95380

LOCATION: 718 BARNHART RD
CERES, CA 95307

EQUIPMENT DESCRIPTION:

SOLID MANURE HANDLING SYSTEM CONSISTING OF A MANURE DRYER AND MANURE STOCK PILES; SOLID MANURE APPLICATION TO LAND AND HAULED OFFSITE

CONDITIONS

1. 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]
2. 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]
3. This permit does not authorize the violation of any conditions established for this facility in the Conditional Use Permit (CUP), Special Use Permit (SUP), Site Approval, Site Plan Review (SPR), or other approval documents issued by a local, state, or federal agency. [Public Resources Code 21000-21177: California Environmental Quality Act]

THIS IS AN INTERNAL DISTRICT DOCUMENT ONLY. Forward a copy to the Compliance Division and file the original in the premises files. A final Permit can only be issued upon verification of compliance with all applicable local, state, and federal regulations by the Compliance Division. Upon verification of compliance, a recommendation to issue the Permit to Operate will be forwarded to the Permit Services Division by the Compliance Division staff.

APPENDIX B
PE Calculations for Permit Units N-9091-3-0 & -4-0

Equipment Listing

N-9091-3-0: 752 BHP (INTERMITTENT) MTU MODEL 10V1600G805 TIER 2
CERTIFIED DIESEL-FIRED EMERGENCY STANDBY IC ENGINE
POWERING AN ELECTRICAL GENERATOR

N-9091-4-0: 752 BHP (INTERMITTENT) MTU MODEL 10V1600G805 TIER 2
CERTIFIED DIESEL-FIRED EMERGENCY STANDBY IC ENGINE
POWERING AN ELECTRICAL GENERATOR

Potential to Emit (PE) Calculations

A. Assumptions

The engines only use very low-sulfur diesel fuel (0.0015% by weight sulfur maximum) as required by the California Air Toxics Control measure (ATCM).

Emergency operating schedule: 24 hours/day

Non-emergency operating schedule of engines: 100 hours/year (maximum operation and maintenance for agricultural emergency IC engines per California ATCM)

B. Emission Factors

EFs for Existing Diesel-fired IC Engines N-9091-3-0 & -4-0			
Pollutant	EF (g/kW-hr)	EF (g/bhp-hr)	Source
NO _x	5.82	4.34	EPA Certificate of Conformity FMDDL21.0ZWR-001
SO _x	---	0.0051	Ultra-Low Sulfur Fuel See Mass Balance Equation Below
PM ₁₀	0.19	0.14	EPA Certificate of Conformity FMDDL21.0ZWR-001
CO	1.2	0.89	EPA Certificate of Conformity FMDDL21.0ZWR-001
VOC	0.28	0.21	EPA Certificate of Conformity FMDDL21.0ZWR-001

$$\frac{0.000015 \text{ lb} \cdot \text{S}}{\text{lb} \cdot \text{fuel}} \times \frac{7.1 \text{ lb} \cdot \text{fuel}}{\text{gallon}} \times \frac{2 \text{ lb} \cdot \text{SO}_2}{1 \text{ lb} \cdot \text{S}} \times \frac{1 \text{ gal}}{137,000 \text{ Btu}} \times \frac{1 \text{ hp input}}{0.35 \text{ hp out}} \times \frac{2,542.5 \text{ Btu}}{\text{hp} \cdot \text{hr}} \times \frac{453.6 \text{ g}}{\text{lb}} = 0.0051 \frac{\text{g} \cdot \text{SO}_x}{\text{hp} \cdot \text{hr}}$$

C. Calculations

Potential to Emit (PE) for Existing Engines N-9091-3-0 & -4-0

The daily and annual PE for each of the existing IC engines are calculated as follows:

Daily PE for Existing IC Engines N-9091-3-0 & -4-0									
NO _x	4.34	(g/bhp-hr) x	752	(bhp) x	24	(hr/day) ÷	453.59 (g/lb) =	172.7	(lb/day)
SO _x	0.0051	(g/bhp-hr) x	752	(bhp) x	24	(hr/day) ÷	453.59 (g/lb) =	0.2	(lb/day)
PM ₁₀	0.14	(g/bhp-hr) x	752	(bhp) x	24	(hr/day) ÷	453.59 (g/lb) =	5.6	(lb/day)
CO	0.89	(g/bhp-hr) x	752	(bhp) x	24	(hr/day) ÷	453.59 (g/lb) =	35.4	(lb/day)
VOC	0.21	(g/bhp-hr) x	752	(bhp) x	24	(hr/day) ÷	453.59 (g/lb) =	8.4	(lb/day)
Annual PE for Existing IC Engines N-9091-3-0 & -4-0									
NO _x	4.34	(g/bhp-hr) x	752	(bhp) x	100	(hr/yr) ÷	453.59 (g/lb) =	720	(lb/yr)
SO _x	0.0051	(g/bhp-hr) x	752	(bhp) x	100	(hr/yr) ÷	453.59 (g/lb) =	1	(lb/yr)
PM ₁₀	0.14	(g/bhp-hr) x	752	(bhp) x	100	(hr/yr) ÷	453.59 (g/lb) =	23	(lb/yr)
CO	0.89	(g/bhp-hr) x	752	(bhp) x	100	(hr/yr) ÷	453.59 (g/lb) =	148	(lb/yr)
VOC	0.21	(g/bhp-hr) x	752	(bhp) x	100	(hr/yr) ÷	453.59 (g/lb) =	35	(lb/yr)

APPENDIX C

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. 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:

N-9091-1-1 (Laying Ranch Hen Housing)

PE1 (lb/qtr) N-9091-1-0					
	PE1 (lb/year)	÷	4 qtr/year	=	PE1 (lb/qtr)
NO _x	0	÷	4 qtr/year	=	0.0
SO _x	0	÷	4 qtr/year	=	0.0
PM ₁₀	2,796	÷	4 qtr/year	=	699.0
CO	0	÷	4 qtr/year	=	0.0
VOC	7,925	÷	4 qtr/year	=	1,981.3

PE2 (lb/qtr) N-9091-1-1					
	PE2 (lb/year)	÷	4 qtr/year	=	PE2 (lb/qtr)
NO _x	0	÷	4 qtr/year	=	0.0
SO _x	0	÷	4 qtr/year	=	0.0
PM ₁₀	11,166	÷	4 qtr/year	=	2,791.5
CO	0	÷	4 qtr/year	=	0.0
VOC	19,900	÷	4 qtr/year	=	4,975.0

Quarterly NEC [QNEC] N-9091-1-1					
	PE2 (lb/qtr)	-	PE1 (lb/qtr)	=	QNEC (lb/qtr)
NO _x	0.0	-	0.0	=	0.0
SO _x	0.0	-	0.0	=	0.0
PM ₁₀	2,791.5	-	699.0	=	2,092.5
CO	0.0	-	0.0	=	0.0
VOC	4,975.0	-	1,981.3	=	2,993.7

N-9091-2-1 (Laying Ranch Solid Manure Handling)

As stated in the evaluation, emissions from solid manure are considered negligible once the manure is dried.

PE1 (lb/qtr) N-9091-2-0					
	PE1 (lb/year)	÷	4 qtr/year	=	PE1 (lb/qtr)
NO _x	0	÷	4 qtr/year	=	0.0
SO _x	0	÷	4 qtr/year	=	0.0
PM ₁₀	0	÷	4 qtr/year	=	0.0
CO	0	÷	4 qtr/year	=	0.0
VOC	0	÷	4 qtr/year	=	0.0

PE2 (lb/qtr) N-9091-2-1					
	PE2 (lb/year)	÷	4 qtr/year	=	PE2 (lb/qtr)
NO _x	0	÷	4 qtr/year	=	0.0
SO _x	0	÷	4 qtr/year	=	0.0
PM ₁₀	0	÷	4 qtr/year	=	0.0
CO	0	÷	4 qtr/year	=	0.0
VOC	0	÷	4 qtr/year	=	0.0

Quarterly NEC [QNEC] N-9091-2-1					
	PE2 (lb/qtr)	-	PE1 (lb/qtr)	=	QNEC (lb/qtr)
NO _x	0.0	-	0.0	=	0.0
SO _x	0.0	-	0.0	=	0.0
PM ₁₀	0.0	-	0.0	=	0.0
CO	0.0	-	0.0	=	0.0
VOC	0.0	-	0.0	=	0.0

APPENDIX D
BACT Guideline 5.7.2 &
BACT Analysis for the Proposed Poultry Layer Houses

SJVAPCD Best Available Control Technology (BACT) Guideline 5.7.2*
Last Update: 2/5/2013

Poultry Layer House

Pollutant	Achieved in Practice or contained in SIP	Technologically Feasible	Alternate Basic Equipment
VOC	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) 98% control - Thermal Incineration 2) 95% control - Catalytic Incineration 3) 95% control - Carbon Adsorption 4) 80% control – Biofiltration	
PM ₁₀	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	
Ammonia (NH ₃)	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**

5.7.2

Top-Down BACT Analysis for Project N-1143814 Poultry Layer Houses

Current District BACT Guideline 5.7.2 applies to the proposed poultry houses. In accordance with the District BACT policy, information from District BACT Guideline 5.7.2 will be utilized for the BACT analysis for the poultry layer houses proposed under this project.

I. Proposal and Process Description

Barnhart Ranch is an egg laying hen ranch located near the city of Ceres in Stanislaus County, CA. The facility has requested Authority to Construct (ATC) permits to expand its existing laying hen ranch, consisting of 317,000 laying hens in one hen house, by constructing three new cage-free hen houses, which will each have capacity to house up to 366,000 laying hens.

II. BACT Applicability

New emissions units – PE > 2.0 lb/day

New Emissions Unit BACT Applicability for N-9091-1-1 Each Proposed Cage-Free Aviary Hen House				
Pollutant	PE2 for each unit (lb/day)	BACT Threshold (lb/day)	SSPE2 (lb/yr)	BACT Triggered?
NO _x	0	> 2.0	N/A	No
SO _x	0	> 2.0	N/A	No
PM ₁₀	24.2	> 2.0	N/A	Yes
CO	0	> 2.0 and SSPE2 ≥ 200,000 lb/yr	0	No
VOC	15.0	> 2.0	N/A	Yes
NH ₃	419.6	> 2.0	N/A	Yes

* BACT is not required for CO from a new or modified emissions unit at a Stationary Source with an SSPE2 of less than 200,000 pounds per year of CO.

III. Top-Down BACT Analyses for the Poultry Layer Houses

As stated above, the information from the existing District BACT Guideline 5.7.2 for Poultry Layer Houses will be utilized for the BACT analysis for the proposed poultry houses.

1. BACT Analysis for PM10 Emissions from the Poultry Layer Houses

a. Identify all control technologies

The control technology options include:

- 1) Electrostatic Precipitator
- 2) Baghouse
- 3) Wet Scrubber
- 4) High Efficiency Cyclones

- 5) 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

b. 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. Rank remaining options by control effectiveness

PM10 Emission Control Technology Rankings		
Rank	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. Cost Effectiveness Analysis

1) Electrostatic Precipitator:

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 PM₁₀ 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)⁹, 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 \$3.99/scfm (current 2016 dollars) (US Bureau of Labor Statistics, http://www.bls.gov/data/inflation_calculator.htm)

⁹ <http://www.epa.gov/ttn/catc1/products.html#aptectfacts>

The air flow rate is conservatively assumed to be 646,000 acfm/house¹⁰ (the temperature was not specified so assume that acfm = scfm).

Annual O&M cost per house = 646,000 scfm x \$3.99/scfm-year = \$2,577,540/year

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.

There are no prohibitory rule emission limits applicable to layer houses. Therefore, the District Standard emissions will be equal to the uncontrolled PM₁₀ emissions from the proposed cage-free poultry houses. The uncontrolled PM₁₀ emissions from the proposed 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:

PM₁₀ Emission Reductions = District Standard Emissions - Emissions with Tech Feasible Controlled Emissions

District standard emissions = 366,000 bird/house x 0.0829 lb-PM₁₀/bird-yr = 30,341 lb-PM₁₀/year/house (as calculated in Section VII.C.2 of the application review)

¹⁰ Each proposed house will be equipped with 68 exhaust fans, each with an air flow rate of 19,000 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 (34 x 19,000 cfm = 646,000 cfm/house).

PM₁₀ Emission Reductions

$$\begin{aligned}\text{Annual PM}_{10} \text{ Emission Reductions} &= \text{PE} \times 0.99 \\ &= 30,341 \text{ lb-PM}_{10}/\text{year} \times 0.99 \\ &= 30,038 \text{ lb-PM}_{10}/\text{year} \\ &= 15.02 \text{ tons-PM}_{10}/\text{year}\end{aligned}$$

Cost Effectiveness Calculation:

$$\begin{aligned}\text{Cost of Reduction (\$/ton)} &= \text{Annual O\&M Cost} / \text{PM}_{10} \text{ Reductions} \\ &= \$2,577,540/\text{yr} \div (15.02 \text{ tons-PM}_{10}/\text{year}) \\ &= \$171,607/\text{ton}\end{aligned}$$

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 PM₁₀ of \$11,400/ton. Therefore, this option is not cost-effective and will not be required for the proposed project.

2) Wet Scrubber:

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 PM₁₀ cost effective threshold.

According to the EPA-CICA Air Pollution Control Technology Fact Sheet on Venturi Scrubbers (EPA-452/F-03-017)¹¹, 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.

$$\text{Annual O\&M cost} = \$4.4/\text{scfm (in 2002 dollars)}$$

Adjusting for inflation, \$4.4/scfm (2002 dollars) is equivalent to \$5.85/scfm (current 2016 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 646,000 acfm/house (the temperature was not specified so assume that acfm = scfm).

$$\text{Annual O\&M cost per house} = 646,000 \text{ scfm} \times \$5.85/\text{scfm-year} = \$3,779,100/\text{year}$$

¹¹ <http://www.epa.gov/ttn/catc1/products.html#aptecfacts>

PM₁₀ Emission Reductions

$$\begin{aligned}\text{Annual PM}_{10} \text{ Emission Reductions} &= \text{PE} \times 0.95 \\ &= 30,341 \text{ lb-PM}_{10}/\text{year} \times 0.95 \\ &= 28,824 \text{ lb-PM}_{10}/\text{year} \\ &= 14.41 \text{ tons-PM}_{10}/\text{year}\end{aligned}$$

Cost Effectiveness Calculation:

$$\begin{aligned}\text{Cost of Reduction (\$/ton)} &= \text{Annual O\&M Cost} / \text{PM}_{10} \text{ Reductions} \\ &= \$3,779,100/\text{yr} \div (14.41 \text{ tons-PM}_{10}/\text{year}) \\ &= \$262,255/\text{ton}\end{aligned}$$

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 PM₁₀ of \$11,400/ton. Therefore, this option is not cost-effective and will not be required for the proposed project.

3) High Efficiency Cyclones:

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)¹², the annual O&M cost for a cyclone ranges from \$0.70 to \$8.50 per scfm (in 2002 dollars)

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.

$$\text{Annual O\&M cost} = \$0.70/\text{scfm (in 2002 dollars)}$$

Adjusting for inflation, \$0.70/scfm (2002 dollars) is equivalent to \$0.93/scfm (current 2016 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 646,000 acfm/house (the temperature was not specified so assume that acfm = scfm).

$$\text{Annual O\&M cost per house} = 646,000 \text{ scfm} \times \$0.93/\text{scfm-year} = \$600,780/\text{year}$$

¹² <http://www.epa.gov/ttn/catc1/products.html#aptecfacts>

PM₁₀ Emission Reductions

$$\begin{aligned}\text{Annual PM}_{10} \text{ Emission Reductions} &= \text{PE} \times 0.60 \\ &= 30,341 \text{ lb-PM}_{10}/\text{year} \times 0.60 \\ &= 18,205 \text{ lb-PM}_{10}/\text{year} \\ &= 9.10 \text{ tons-PM}_{10}/\text{year}\end{aligned}$$

Cost Effectiveness Calculation:

$$\begin{aligned}\text{Cost of Reduction (\$/ton)} &= \text{Annual O\&M Cost} / \text{PM}_{10} \text{ Reductions} \\ &= \$600,780/\text{yr} \div (9.10 \text{ tons-PM}_{10}/\text{year}) \\ &= \$66,020/\text{ton}\end{aligned}$$

The analysis demonstrates that the operation and maintenance cost of cyclones, not including the initial capital cost, will exceed the District's BACT Cost Effectiveness Threshold for PM₁₀ of \$11,400/ton. Therefore, this option is not cost-effective and will not be required for the proposed project.

4) Completely Enclosed Mechanically Ventilated Layer Housing and Belt Manure System with Manure Removed Twice per Week:

The applicant has proposed this option; therefore a cost effectiveness analysis is not required.

e. Select BACT

BACT for PM₁₀ 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 new poultry houses. Therefore, BACT is satisfied.

2. BACT Analysis for VOC Emissions from the Poultry Layer Houses

a. Identify all control technologies

The control technology options include:

- 1) Emissions from Layer House controlled by Thermal Incineration
- 2) Emissions from Layer House controlled by Catalytic Incineration
- 3) Emissions from Layer House controlled by Carbon Adsorption
- 4) Emissions from Layer House controlled by a Biofilter capable of achieving 80% control
- 5) Layer House Design and Management Practices, 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. Eliminate technologically infeasible options

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

c. Rank remaining options by control effectiveness

VOC Emission Control Technology Rankings		
Rank	Control Efficiency	Status
1) Thermal Incineration	98% ¹³	Technologically Feasible
2) Catalytic Incineration	95% ¹⁴	Technologically Feasible
3) Carbon Adsorption	95% ¹⁵	Technologically Feasible
4) Biofiltration	80% ¹⁶	Technologically Feasible
5) Layer House Design and Management Practices	23% ¹⁷	Achieved in Practice

d. Cost Effectiveness Analysis

1) Thermal and Catalytic Incineration:

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.

¹³ EPA Air Pollution Control Cost Manual, Sixth Edition (January 2002), Section 3.2: VOC Destruction Controls, Chapter 2: Incinerators (September 2000). United States Environmental Protection Agency Office of Air Quality Planning and Standards. Research Triangle Park, North Carolina 27711. EPA/452/B-02-001. <https://www3.epa.gov/ttn/catc1/dir1/cs3-2ch2.pdf>

¹⁴ Survey of Control Technologies for Low Concentration Organic Vapor Gas Streams (May 1995), Section 2.1, Catalytic Incineration. Prepared for U.S. Environmental Protection Agency Control Technology Center. EPA-456/R-95-00. https://www3.epa.gov/ttn/catc/dir1/low_vo.pdf The 95% value used is based upon EPA permit No. 23GS-93-0T-1 for 3M Company in St. Paul for an ARI, Econ-Abator catalytic oxidizer, Emission Point No. 2.

¹⁵ Survey of Control Technologies for Low Concentration Organic Vapor Gas Streams (May 1995), Section 3, Adsorption. Prepared for U.S. Environmental Protection Agency Control Technology Center. EPA-456/R-95-003. https://www3.epa.gov/ttn/catc/dir1/low_vo.pdf

¹⁶ According to the SCAQMD Rule 1133.2 final staff report (page 18) "Technology Assessment Report states a well-designed, well operated, and well-maintained biofilter is capable of achieving 80% destruction efficiency for VOC and NH₃."

¹⁷ Total control efficiency of management practices and feeding with NRC guidelines = $1 - [(1 - 0.15) \times (1 - 0.10)] = 23\%$. Feeding the birds in accordance with National Research Council (NRC) guidelines minimizes undigested protein and other undigested nutrients in the manure, which emit VOCs upon decomposition. Therefore, feeding the birds in accordance with NRC guidelines is assumed to provide 10% control efficiency. The proposed layer houses will be completely enclosed, mechanically ventilated and computer-controlled. Both humidity and water usage are monitored in the houses. Past ARB source test results for another poultry operation have demonstrated that the type of management practices proposed result in very low VOC emissions. These management practices will therefore be conservatively assigned a control efficiency of 15%.

According to the applicant, each of the proposed cage-free hen houses will measure approximately 640' long x 193' wide with a roof that slopes from approximately 23' high to approximately 30' high (approximately 3,273,280 cubic feet in volume), and will be equipped with 68 ventilation fans each rated at 19,000 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, the maximum air flow rate from the house will be 1,292,000 cfm (68 fans x 19,000 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 District¹⁸, 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.

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

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

District standard emissions for the proposed poultry layer houses = 5,490 lb-VOC/house-year (as calculated in Section VII.C.2 of the application review)

¹⁸ Estimate provided by Curt Jordan of Catalytic Products International (Telephone: (847) 438-0334; url: <http://cpilink.com/>).

$$\begin{aligned}\text{Annual VOC Emission Reductions} &= \text{PE} \times 0.98 \\ &= 5,490 \text{ lb-VOC/year} \times 0.98 \\ &= 5,380 \text{ lb-VOC/year} \\ &= 2.69 \text{ tons-VOC/year}\end{aligned}$$

Cost Effectiveness Calculation:

$$\begin{aligned}\text{Cost of Reduction (\$/ton)} &= \text{Annual O\&M Cost} / \text{VOC Reductions} \\ &= \$1,773,925/\text{yr} \div (2.69 \text{ tons-VOC/year}) \\ &= \$659,452/\text{ton}\end{aligned}$$

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.

2) Carbon Adsorption:

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 VOCs¹⁹.

$$\begin{aligned}\text{Carbon required} &= (5,490 \text{ lb-VOC/year} \times 0.95) \times 1 \text{ lb-Carbon}/0.2 \text{ lb-VOC} \\ &= 26,078 \text{ lb-carbon/year}\end{aligned}$$

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.

¹⁹ District GEAR 9 - Soil Remediation Project Utilizing an Activated Carbon System.

The facility is located in Stanislaus County, which has a sales tax rate of 7.625%²⁰. However, pollution control equipment may qualify for CA tax partial exemption. The exemption rate is 4.1875%, so the reduced sales tax rate for Stanislaus County equals 3.4375% (7.625% - 4.1875%).

Total Carbon cost = 26,078 lb-carbon/yr x \$1.35/lb x 1.084375_(taxes and freight) = \$38,176/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)²¹ 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 = 5,490 lb-VOC/house-year (as calculated in Section VII.C.2 of the application review)

Annual VOC Emission Reductions = PE x 0.95
= 5,490 lb-VOC/year x 0.95
= 5,216 lb-VOC/year
= 2.61 tons-VOC/year

Cost Effectiveness Calculation:

Cost of Reduction (\$/ton) = Annual O&M Cost / VOC Reductions
= (\$38,176 + 31,906)/yr ÷ (2.61 tons-VOC/year)
= \$26,851/ton

²⁰ http://www.boe.ca.gov/sutax/manufacturing_exemptions.htm#Purchasers

²¹ 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.

3) Biofiltration:

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)²² 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 \$3.07/scfm (current 2016 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 1,292,000 cfm (68 fans x 19,000 cfm/fan).

The capital cost of the biofilter is calculated as follows:

$$\text{\$3.07/cfm} \times 1,292,000 \text{ cfm} = \text{\$3,966,440}$$

²² 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:

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

Where: A = Annual Cost
P = Present Value
I = Interest Rate (10%)
N = Equipment Life (10 years)
A = $[\$3,966,440 \times 0.1(1.1)^{10}] / [(1.1)^{10} - 1]$
= \$645,520/year

VOC Emission Reductions

District standard emissions for the proposed poultry layer houses = 5,490 lb-VOC/house-year (as calculated in Section VII.C.2 of the application review)

Annual VOC Emission Reductions = PE x 0.80
= 5,490 lb-VOC/year x 0.80
= 4,392 lb-VOC/year
= 2.20 tons-VOC/year

Cost Effectiveness Calculation:

Cost of Reduction (\$/ton) = Annual O&M Cost / VOC Reductions
= \$645,520/yr ÷ (2.20 tons-VOC/year)
= \$293,418/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.

5) Poultry Layer House Design and Management Practices:

The applicant has proposed this option; therefore a cost effectiveness analysis is not required.

e. 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 new hen houses. Therefore, BACT is satisfied.

3. BACT Analysis for NH₃ Emissions from the Poultry Layer Houses

a. Identify all control technologies

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.

The following control technology has been determined to be Achieved-in-Practice:

- 1) Poultry Layer House Design and Management Practices, including:
 1. Animals fed in accordance with National Research Council (NRC) or other District accepted guidelines utilizing routine nutritional analysis for rations.
 2. Completely enclosed mechanically ventilated layer housing
 3. Mortality removed at least once per day
 4. Evaporative cooling pads to regulate house temperature
 5. Mixing fans
 6. Belt manure aeration/drying and removal system with manure removal at least twice per week

b. Eliminate technologically infeasible options

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

c. Rank remaining options by control effectiveness

Only one option remains:

- 1) Poultry Layer House Design and Management Practices, including:
 1. Animals fed in accordance with National Research Council (NRC) or other District accepted guidelines utilizing routine nutritional analysis for rations.
 2. Completely enclosed mechanically ventilated layer housing
 3. Mortality removed at least once per day
 4. Evaporative cooling pads to regulate house temperature
 5. Mixing fans
 6. Belt manure aeration/drying and removal system with manure removal at least twice per week

d. Cost Effectiveness Analysis

The applicant has proposed the only remaining option; therefore a cost effectiveness analysis is not required.

e. Select BACT

BACT for NH₃ 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 new hen houses. Therefore, BACT is satisfied.

APPENDIX E
Summary of Health Risk Assessment (HRA) and
Ambient Air Quality Analysis (AAQA)

San Joaquin Valley Air Pollution Control District

Risk Management Review

To: Ramon Norman – Permit Services
From: Kyle Melching – Technical Services
Date: September 8, 2016
Facility Name: Barnhart Ranch
Location: 718 Barnhart Road, Ceres
Application #(s): N-9091-1-1
Project #: N-1143814

A. RMR SUMMARY

RMR Summary			
Categories	3 Hen Houses (Unit 1-1)	Project Totals	Facility Totals
Prioritization Score	11.8	11.8	>1.0
Acute Hazard Index	0.68	0.68	0.68
Chronic Hazard Index	0.16	0.16	0.16
Maximum Individual Cancer Risk	1.94E-06	1.94E-06	1.94E-06
T-BACT Required?	See Conclusion		
Special Permit Requirements?	No		

B. REPORT

I. Project Description

Technical Services received a request on January 1, 2015, to perform an Ambient Air Quality Analysis and a Risk Management Review for the installation of 3 new hen houses (barns) consisting of 366,000 hens in each barn.

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 the from Livestock Dust were calculated using emission factors generated from using the worst case composite of the 1997 EPA speciation of Kern County feedlot soil. 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 1990 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 2010-2014 from Modesto 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 source ID 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.

The following parameters were used for the review:

Unit ID	Unit Description	MAX PM10 Emissions (lb/hr)	MAX Ammonia Emissions (lb/hr)	Increase # of Hen*
Barn 2	Hen Housing	0.35	17.48	366,000
Barn 3	Hen Housing	0.35	17.48	366,000
Barn 4	Hen Housing	0.35	17.48	366,000

*Number of head account for VOC TAC emissions

Modeled Source ID	Unit Description	Release Height (m)	Length of Side (m)	Length of side (m)	Area (m ²)
AREA4	½ Barn 2 & ½ Barn 4 Emissions	10.67	177	18	3186
AREA5	½ Barn 2 Emissions	10.67	177	18	3186
AREA6	½ Barn 3 Emissions	10.67	177	18	3186
AREA7	½ Barn 3 Emissions	10.67	177	18	3186
AREA8	½ Barn 4	10.67	177	18	3186

AAQA. In addition to the RMR, Technical Services performed modeling for the criteria pollutant PM₁₀ using AERMOD. Each barn's maximum hourly emission rate of 0.35 lb-PM₁₀/hr was 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.

The results from the Criteria Pollutant Modeling are as follows:

PM₁₀ & 2.5 Pollutant Modeling Results*

Values are in µg/m³

Category	24 Hours	Annual
Net Value	9.18	1.64
Interim Significance Level	10.4 ^{1&2}	2.08 ^{1&2}
Result	Pass	Pass

¹Per 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.

²On January 22, 2013, the United States Court of Appeals for the District of Columbia Circuit (Court) granted a request from the Environmental Protection Agency (EPA) to vacate and remand to the EPA the portions of two Prevention of Significant Deterioration (PSD) PM_{2.5} rules (40 CFR 51.166 and 40 CFR 52.21) addressing the Significant Impact Levels (SILs) for PM_{2.5} so that the EPA could voluntarily correct an error in these provisions. Until EPA establishes new SILs for PM_{2.5}, the District will consider compliance with the PM₁₀ standards as a surrogate for compliance with the PM_{2.5} standards.

III. Conclusion

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 ambient air quality impacts from PM₁₀ emissions at the proposed egg laying ranch does 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

Greenhouse Gas Emission Impacts

Greenhouse Gas Emissions Impacts:

On December 17, 2009, the San Joaquin Valley Air Pollution Control District (District) adopted *District Policy APR 2005 — Addressing GHG Emission Impacts for Stationary Source Projects Under CEQA When 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 greenhouse gas (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 Barnhart Ranch was operating from 2002-2004.

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

$$\% \text{ Reduction in GHG emissions} = \frac{(\text{2002 - 2004 baseline GHG emissions}) - (\text{Proposed project GHG emissions})}{\text{2002 - 2004 baseline GHG emissions}} \times 100\%$$

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 each of the three poultry houses proposed under this project is 366,000 hens, resulting in a total of 1,098,000 hens for the three poultry 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 CH₄ = 647 g of CO₂eq/head of hens 1+ yr²³*
 - *Emission factor for N₂O = 1,070 g of CO₂eq/head of hens 1+ yr²⁴*

Calculations

$$\begin{aligned}\text{Total emissions (CH}_4\text{+N}_2\text{O)} &= 647 + 1,070 \text{ g of CO}_2\text{eq/head of hens/year} \\ &= 1,717 \text{ g of CO}_2\text{eq/head of hens/year} \\ &= 1.717 \text{ kg of CO}_2\text{eq/head of hens/year}\end{aligned}$$

$$1,098,000 \text{ hens} \times 1.717 \text{ kg of CO}_2\text{eq/head of hens/year} = 1,885,266 \text{ kg of CO}_2\text{eq/year}$$

$$1,885,266 \text{ kg of CO}_2\text{eq/year} \times 1 \text{ metric ton}/1,000 \text{ kg}$$

$$\text{Total GHG emissions} = 1,885 \text{ metric ton of CO}_2\text{eq/year}$$

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.²⁵ 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 without touching the sides of the enclosure.²⁶ In response, the California Department of Food and Agriculture (CDFA) commissioned a study "Determination of Space Use by Laying Hens" by Dr. Joy Mench of University of California, Davis.²⁷ The original study report indicated that the space required to perform Proposition 2

²³ http://www.arb.ca.gov/cc/inventory/doc/docs3/3a2i_manuremanagement_poultrywobedding_livestockpopulation_hens1+yr_ch4_2013.htm

²⁴ http://www.arb.ca.gov/cc/inventory/doc/docs3/3a2i_manuremanagement_poultrywobedding_livestockpopulation_hens1+yr_n2o_2013.htm

²⁵ <http://elections.cdn.sos.ca.gov/sov/2008-general/ssov/10-ballot-measures-statewide-summary-by-county.pdf>

²⁶ <http://vig.cdn.sos.ca.gov/2008/general/text-proposed-laws/text-of-proposed-laws.pdf#prop2>

²⁷ Mench J.A. (2011) Determination of space use by laying hens. Final report-CDFA Agreement 09-0854. https://www.cdfa.ca.gov/ahfss/pdfs/regulations/Attach21FinalReportCDFAAgreement09_0854.pdf and Mench, J. A., and R. A. Blatchford. (2014) Determination of space use by laying hens using kinematic analysis. Poultry Science 93:794–798. <http://ps.oxfordjournals.org/content/93/4/794.abstract>

behaviors varies with the number of hens in the confined area and can be estimated from the following equation:

$$\text{Required Floor Space per Hen (in}^2\text{)} = [322 + [(n - 1) \times 87.3]/n]$$

Where n = the number of birds in the enclosure

Based on the equation given above, the amount of floor space required for each hen ranges from approximately 90 in² per hen for 100 hens in a single enclosure up to approximately 322 in² if there is a single one hen in an enclosure.

Subsequently, 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 California²⁸. Egg Producers generally use this regulation as a guide for compliance with California Proposition 2.

The following table specifies the minimum floor space per the number of hens in an enclosure:

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

Barnhart Ranch 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)²⁹ indicates that 72 in² of floor space per hen was associated with the highest egg production but that with good management, 50-60 in² 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 in² per bird), results in approximately 61 in² 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.

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 Barnhart Ranch would have been capable of housing approximately 864,000 hens (based on 366,000 ft² of total space for laying hens in each cage-free house, 1.0 ft² of space per bird, as provided by the applicant), for a total of 2,592,000 hens in the three proposed poultry houses.

²⁸ Animal Care Series: Egg-type Layer Flock Care Practices (1998) California Poultry Workgroup, University of California Cooperative Extension, Davis CA. http://www.vetmed.ucdavis.edu/vetext/local-assets/pdfs/pdfs_animal_welfare/eggCarePrax.pdf

²⁹ <https://www.cdffa.ca.gov/ahfss/mpes/pdfs/eggsafetyrule.pdf>

Basis and Assumptions

- Facility capacity is 2,592,000 hens (estimated based on the housing area of the proposed facility and pre-Proposition 2 housing practices)
- Emission factors are based on the documentation for ARB's 2015 Edition of the GHG Emission Inventory (Released June 2015)
 - *Emission factor for CH₄ = 647 g of CO₂eq/head of hens 1+ yr*
 - *Emission factor for N₂O = 1,070 g of CO₂eq/head of hens 1+ yr*

Calculations

$$\begin{aligned}\text{Total emissions (CH}_4\text{+N}_2\text{O)} &= 647 + 1,070 \text{ g of CO}_2\text{eq/head of hens/year} \\ &= 1,717 \text{ g of CO}_2\text{eq/head of hens/year} \\ &= 1.717 \text{ kg of CO}_2\text{eq/head of hens/year}\end{aligned}$$

$$2,592,000 \text{ hens} \times 1.717 \text{ Kg of CO}_2\text{eq/head of hens/year} = 4,450,464 \text{ kg of CO}_2\text{eq/year}$$

$$4,450,464 \text{ kg of CO}_2\text{eq/year} \times 1 \text{ metric ton}/1,000 \text{ kg}$$

$$\text{Total GHG emissions} = 4,450 \text{ metric ton of CO}_2\text{eq/year}$$

Reduction in GHG Emissions:

As calculated above,

- Proposed Project GHG Emissions = 1,885 metric tons of CO₂eq/year
- 2002-2004 Baseline GHG Emissions = 4,450 metric tons of CO₂eq/year

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

$$\% \text{ Reduction in GHG emissions} = \frac{(4,450 \text{ tons - CO}_2\text{e/yr}) - (1,885 \text{ tons - CO}_2\text{e/yr})}{4,450 \text{ tons - CO}_2\text{e/yr}} \times 100\%$$

$$\% \text{ Reduction in GHG Emissions} = 57.6\%$$

As calculated above, the proposed project results in GHG emissions reductions of 57.6% compared to BAU. Therefore, the project is considered to have a less than significant impact for GHG emissions.

APPENDIX G
Draft ATCs N-9091-1-1 & -2-1

San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

ISSUANCE DATE: DRAFT

PERMIT NO: N-9091-1-1

LEGAL OWNER OR OPERATOR: BARNHART RANCH
MAILING ADDRESS: 10218 LANDER AVE
TURLOCK, CA 95380

LOCATION: 718 BARNHART RD
CERES, CA 95307

EQUIPMENT DESCRIPTION:

MODIFICATION OF 317,000 LAYING HEN RANCH CONSISTING OF ONE MECHANICALLY VENTILATED POULTRY HOUSE, INCLUDING ELECTRIC FANS TOTALING 57 HP: INCREASE THE PERMITTED CAPACITY FROM 317,000 LAYING HENS TO 1,326,695 LAYING HENS BY CONSTRUCTING THREE NEW MECHANICALLY VENTILATED CAGE-FREE AVIARY LAYING HEN HOUSES, EACH WITH A CAPACITY FOR 366,000 HENS; IMPLEMENT MITIGATION MEASURES FOR COMPLIANCE WITH DISTRICT RULE 4570

CONDITIONS

1. {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]
2. {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]
3. {3658} This permit does not authorize the violation of any conditions established for this facility in the Conditional Use Permit (CUP), Special Use Permit (SUP), Site Approval, Site Plan Review (SPR), or other approval documents issued by a local, state, or federal agency. [Public Resources Code 21000-21177: California Environmental Quality Act]

CONDITIONS CONTINUE ON NEXT PAGE

YOU **MUST** NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (209) 557-6400 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.

Seyed Sadredin, Executive Director / APCO

Arnaud Marjollet, Director of Permit Services

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4. 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]
5. Particulate matter emissions from each poultry house shall not exceed 0.1 grains/dscf in concentration. [District Rule 4201]
6. The maximum number of hens kept onsite at any time shall not exceed 1,326,695. [District Rule 2201]
7. No more than 317,000 hens shall be kept in the enriched-colony hen house at any time. [District Rule 2201]
8. Maximum daily emissions from the enriched colony hen house shall not exceed any of the following limits: 29.4 lb-PM10/day (or 0.042 g-PM10/bird-day), 13.0 lb-VOC/day (or 0.0186 g-VOC/bird-day), or 279.5 lb-NH3/day (or 0.40 g-NH3/bird-day). [District Rule 2201]
9. Annual missions from the enriched colony hen house shall not exceed any of the following limits: 0.00882 lb-PM10/bird-year, 0.015 lb-VOC/bird-year, or 0.13 lb-NH3/bird-year. [District Rule 2201]
10. No more than 366,000 hens shall be kept in each of the three cage-free aviary hen houses at any time. [District Rule 2201]
11. The three cage-free aviary hen houses shall utilize fabric filters or barriers made of shade cloth or similar material designed to reduce particulate matter (PM) emissions from the exhaust fans. [District Rule 2201]
12. Fabric filters or barriers used to reduce particulate matter (PM) emissions from the exhaust fans shall be inspected on a quarterly basis. The filters/barriers shall be inspected thoroughly for rips, tears, holes, or any evidence of structural failures that result in excessive PM leaks and shall be repaired or replaced as needed. [District Rule 2201]
13. Records of inspections, maintenance, repair, and replacement of the filters/barriers used to reduce PM emissions from the exhaust fans shall be maintained. The records shall include the dates of inspections and a description of any corrective actions taken. [District Rule 2201]
14. Maximum daily emissions from each cage-free aviary hen house shall not exceed any of the following limits: 8.3 lb-PM10/day (or 0.0103 g-PM10/bird-day), 15.0 lb-VOC/day (or 0.0186 g-VOC/bird-day), or 419.6 lb-NH3/day (or 0.52 g-NH3/bird-day). [District Rule 2201]
15. Annual emissions from each cage-free aviary hen house shall not exceed any of the following limits: 0.00829 lb-PM10/bird-year, 0.015 lb-VOC/bird-year, or 0.24 lb-NH3/bird-year. [District Rule 2201]
16. Each poultry house shall be completely enclosed and mechanically ventilated with evaporative cooling pads, fans, and a computer control system. [District Rule 2201]
17. Each poultry house shall be equipped with a belt manure drying and removal system with manure removal at least twice per week. [District Rule 2201]
18. Permittee shall maintain records of dates manure is removed from each poultry house. [District Rule 2201]
19. All mortality in each poultry house shall be removed at least once per day. [District Rule 2201]
20. Permittee shall maintain daily records of mortality removal in each poultry house. [District Rule 2201]
21. Permittee shall feed all animals according to National Research Council (NRC) guidelines. [District Rules 2201 and 4570]
22. 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]
23. Permittee shall use drinkers that do not drip continuously. [District Rules 2201 and 4570]
24. Permittee shall inspect water pipes and drinkers and repair leaks daily. [District Rules 2201 and 4570]

CONDITIONS CONTINUE ON NEXT PAGE

25. Permittee shall maintain records indicating that water pipes and drinkers are inspected daily, and that any leaks are repaired. [District Rules 2201 and 4570]
26. Permittee shall feed animals probiotics designed to improve digestion according to manufacturer recommendations. [District Rules 2201 and 4570]
27. 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]
28. Permittee shall feed animals an amino acid supplemented diet. [District Rules 2201 and 4570]
29. 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]
30. Permittee shall feed animals additives such as amylase, xylanase, and protease, designed to maximize digestive efficiency. [District Rules 2201 and 4570]
31. 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]
32. Initial source testing to demonstrate compliance with the PM10 emission rate from at least one of the cage-free aviary poultry houses, or a poultry house with a similar design approved by the District, shall be initiated within 365 days after initial start-up of any cage-free aviary poultry house at this facility (i.e. when birds are first placed in any laying hen house). [District Rule 2201]
33. Source testing shall be conducted using the methods and procedures approved by the District. The District must be notified at least 60 days prior to any compliance source test and a source test plan shall be submitted to the District for approval by the Permit Services and Compliance Divisions at least 30 days prior to testing. The source test plan shall include a detailed description of how testing will be conducted, the proposed duration of the test, and the methodology to be used. [District Rule 2201]
34. All emission measurements shall be made with the poultry house operating either at conditions representative of normal operations or conditions specified in the Authority to Construct. To the maximum extent possible that still allows for normal operation, emission measurements shall be taken in conditions that represent the maximum emission rates from the poultry house. These conditions shall include, but are not limited to the poultry house being filled at, or near, maximum capacity with a majority of the exhaust fans turned on, and the emission measurements occurring during the summer season (i.e. between June 1 and August 31). [District Rule 2201]
35. The following test methods shall for source testing of PM10 emission rates (filterable and condensable): EPA Method 201 and 202, EPA Method 201a and 202, ARB Method 5 in combination with Method 501, or South Coast Air Quality Management District (SCAQMD) Method 5.1. If it is determined that these test methods are not appropriate to measure the PM10 emissions from this type of operation or other methods are more appropriate, PM10 emissions shall be measured using alternative test method(s) that are approved by the District. [District Rule 2201]
36. The results of the source test shall be submitted to the District within 60 days after completion of the test. [District Rule 1081]
37. 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. [District Rules 2201 and 4570]
38. 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]
39. Issuance of any Authority to Construct (ATC) permit(s) or any construction that results in a further increase in the number of laying hens or poultry houses at this facility such as described in the original proposal for District ATC Project N-1143814, or the District CEQA document prepared for the project shall be treated and analyzed as part of the same project as ATC N-9091-1-1 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]

San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

PERMIT NO: N-9091-2-1

LEGAL OWNER OR OPERATOR: BARNHART RANCH
MAILING ADDRESS: 10218 LANDER AVE
TURLOCK, CA 95380

LOCATION: 718 BARNHART RD
CERES, CA 95307

ISSUANCE DATE: DRAFT

EQUIPMENT DESCRIPTION:

MODIFICATION OF SOLID MANURE HANDLING SYSTEM CONSISTING OF A MANURE DRYER AND MANURE STOCK PILES; SOLID MANURE APPLICATION TO LAND AND HAULED OFFSITE; ALLOW FOR AN INCREASE IN SOLID MANURE HANDLED AND CONSTRUCT TUNNEL MANURE DRYERS FOR EACH OF THE THREE NEW LAYING HEN HOUSES DUE TO THE FACILITY EXPANSION AUTHORIZED BY AUTHORITY TO CONSTRUCT (ATC) N-9091-1-1; IMPLEMENT MITIGATION MEASURES FOR COMPLIANCE WITH DISTRICT RULE 4570

CONDITIONS

1. {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]
2. {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]
3. {4452} 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 Rule 4570]
4. Each manure dryer shall utilize exhaust air from the ventilation fans serving the poultry house. Combustible fuel shall not be used as a source of heat for the manure dryers. [District Rule 2201]

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (209) 557-6400 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.

Seyed Sadredin, Executive Director, APCO

Arnaud Marjollet, Director of Permit Services

N-9091-2-1 Sep 19 2016 1:07PM - NORMANR : Joint Inspection NOT Required

5. {4573} 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]
6. 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]
7. {4528} If weatherproof coverings are used, permittee shall maintain records, such as manufacturer warranties or other documentation, demonstrating that the weatherproof covering over dry 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]
8. {4453} 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 Rule 4570]
9. {3658} This permit does not authorize the violation of any conditions established for this facility in the Conditional Use Permit (CUP), Special Use Permit (SUP), Site Approval, Site Plan Review (SPR), or other approval documents issued by a local, state, or federal agency. [Public Resources Code 21000-21177: California Environmental Quality Act]

DRAFT