



**TECHNICAL REVIEW AND EVALUATION
OF APPLICATION FOR
AIR QUALITY PERMIT NO. 71539**

Rose Acre Farms, Inc.

I. INTRODUCTION

This Class II permit is issued to Rose Acre Farms, Inc., the Permittee, for the Lone Cactus Egg Farm and Feed Terminal located at 48993 Highway 72, Bouse, Arizona 85235.

A. Company Information

1. Facility Name: Lone Cactus Egg Farm and Feed Terminal
2. Facility Location: 48993 Highway 72, Bouse, Arizona 85235
3. Mailing Address: 1657 West Tipton, Seymour, Indiana 47274

B. Attainment Classification

This facility is located in an area that is in attainment or unclassified for all criteria pollutants.

II. PROCESS DESCRIPTION

A. Facility Operations

The Lone Cactus Egg Farm and Feed Terminal produces and processes eggs from chickens. The egg farm operation consists of six separate layer houses each which house approximately 385,000 egg laying chickens. The egg farm consists of a feed mill; a feed storage and distribution system; and an egg processing plant which consists of a propane fired boiler which is used to process eggs for consumer use. Chickens are fed grain that is primarily comprised of corn. The Lone Cactus Egg Farm and the Lone Cactus Feed Terminal receive, store, and process primarily corn grain, along with soybean meal and dried distiller's grains (DDGs). The egg farm can receive and process 15,000 bushels per hour of grain feed and the feed terminal can receive up to 50,000 bushels per hour of feed and process 16,000 bushels per hour from the feed mill for distribution. An alternate rail receiving location can receive an additional 7,500 bushels per hour for storage direct loading into trucks for distribution.

The site is operated on grid power. Due to the sensitive nature of laying chickens the site is equipped with 13 back up diesel generators for use in case of power loss. In addition, 16 portable propane heaters are moved to various locations as needed during winter months and used only when temperatures drop below 60 degrees to heat layer houses. Propane heaters may also be used to warm young chicks if needed. The heaters are only used to ensure a safe controlled temperature climate for housed chickens and the generators are only used to ensure power supply for feed mill and processing operations.



B. Control Devices

The Permittee operates an in-house manure drying system at all times. In addition, the exhaust of each layer house is fully-enclosed with an approximately 75-foot extension with fine mesh screening.

Emissions from haul roads are controlled using water, dust suppressants, and a mandatory speed limit of 10 mile per hour.

III. LEARNING SITES EVALUATION

In accordance with ADEQ's Environmental Permits and Approvals Near Learning Sites Policy, the Department conducted an evaluation to determine if any nearby learning sites would be adversely impacted by the facility. Learning sites consist of all existing public schools, charter schools and private schools the K-12 level, and all planned sites for schools approved by the Arizona School Facilities Board. The learning sites policy was established to ensure that the protection of children at learning sites is considered before a permit approval is issued by ADEQ.

Upon review of ADEQ's database, it was determined that there are no learning sites within two miles of the facility.

IV. EMISSIONS

Table 1: Potential Emissions

Pollutant	Emissions (tons per year)	Minor NSR Thresholds	Minor NSR Triggered?
PM ₁₀	55.71	15	Yes
PM _{2.5}	9.95	10	No
NO _x	33.02	40	No
CO	8.71	100	No
SO ₂	0.07	40	No
VOC	1.84	N/A	N/A

V. MINOR NEW SOURCE REVIEW (Minor NSR)

Minor NSR is triggered because the emissions of PM₁₀ is greater than the corresponding Minor NSR threshold for PM₁₀. However, to show compliance with the National Ambient Air Quality Standards (NAAQS), the facility modeled not only PM₁₀ but also PM_{2.5}. The modeling results show compliance with both NAAQS. Refer to Section VIII, Ambient Air Impact Analysis, for specific modeling results.



VI. APPLICABLE REGULATIONS

Table 2 displays the applicable requirements for each permitted piece of equipment along with an explanation of why the requirement is applicable.

Table 2: Verification of Applicable Regulations

Unit	Control Device	Rule	Discussion
Boiler and Heaters	N/A	A.A.C. R18-2-724	The boiler and heaters are all less than 10MMBTU/hr, and are therefore not subject to 40 CFR 60 Subpart Dc. Instead, they are subject to A.A.C. R18-2-724, Standards of Performance for Fossil-fuel Fired Industrial and Commercial Equipment.
Internal Combustion Engines (Emergency Generators)	N/A	40 CFR 60 Subpart IIII	The internal combustion engines were manufactured after 2007 and therefore are subject to 40 CFR 60 Subpart IIII.
Feed Storage and Distribution System	Receiving hopper underground inside enclosed building open on each end.	A.A.C. R18-2-730	These standards are applicable to the feed storage and distribution system.
Rail Feed Terminal Requirements	Grain receiving hopper underground inside enclosed building open on each end. Alternate grain receiving controlled by rubber or alternative dust shroud.	40 CFR 60 Subpart DD	These standards are applicable to the rail feed terminal.



Unit	Control Device	Rule	Discussion
Solid Manure Handling	In-house Drying System And Fine Mesh Screening at Layer House Exhausts	A.A.C. R18-2-730	Solid manure handling is subject to these requirements because it is considered an unclassified source.
Fugitive dust sources	Water Trucks Dust Suppressants	A.A.C. R18-2 Article 6 A.A.C. R18-2-702	These standards are applicable to all fugitive dust sources at the facility.
Abrasive Blasting	Wet blasting; Dust collecting equipment; Other approved methods	A.A.C. R-18-2-702 A.A.C. R-18-2-726	These standards are applicable to any abrasive blasting operation.
Spray Painting	Enclosures	A.A.C. R18-2-702 A.A.C. R-18-2-727	This standard is applicable to any spray painting operation.
Demolition/renovation operations	N/A	A.A.C. R18-2-1101.A.8	This standard is applicable to any asbestos related demolition or renovation operations.
Mobile sources	None	A.A.C. R18-2-801	These are applicable to off-road mobile sources, which either move while emitting air pollutants or are frequently moved during the course of their utilization.

VII. MONITORING REQUIREMENTS

A. Emergency Internal Combustion Engines

1. The Permittee is required to record the date, time, duration of generator operation, and the reason the engine was operated. The Permittee is required to maintain monthly and 12-month rolling totals of time operated and the reason for operation.
2. The Permittee is required to maintain engine certifications as well as fuel supplier certifications.

B. Feed Storage and Distribution Systems and Rail Feed Terminals

1. The Permittee is required to show compliance with the opacity standards by conducting a monthly survey of visible emission. If the results of the initial survey appear on an instantaneous basis to exceed the applicable standard, then the



Permittee is required to conduct a six-minute observation.

2. The Permittee is required to keep records of the name of the observer, the time, the date, the location of the observation, and the results of all surveys and observations.
3. The Permittee is required to keep records of any corrective action taken to lower the opacity of any emission point and any excess emission reports.

C. Solid Manure Handling

1. The Permittee is required to record each date that manure is removed from the hen houses.
2. The Permittee is required to record the corresponding date that the manure is either removed from the site or stored outside under a weather proof covering.

D. Fugitive Dust

1. The Permittee is required to record the dates and types of dust control measures employed.
2. The Permittee is required to show compliance with the opacity standards by conducting a monthly survey of visible emission from fugitive dust sources. If the results of the initial survey appear on an instantaneous basis to exceed the applicable standard, then the Permittee is required to conduct a six-minute observation.
3. The Permittee is required to keep records of the name of the observer, the time, the date, the location of the observation, and the results of all surveys and observations.
4. The Permittee is required to keep records of any corrective action taken to lower the opacity of any emission point and any excess emission reports.
5. The Permittee is required to keep records of the dates that water is applied to haul roads in addition to the amount of water that is applied.
6. The Permittee is required to keep records of the dates that chemical dust suppressants are applied to haul roads, the amount of dust suppressants applied to haul roads, the name of the dust suppressant applied to the haul roads, and the manufacturer's recommendation regarding quantity and frequency of application.

E. Periodic Activities

1. The Permittee is required to record the date, duration, and pollution control measures of any abrasive blasting project.
2. The Permittee is required to record the date, duration, quantity of paint used, any applicable SDS, and pollution control measures of any spray painting project.
3. The Permittee is required to maintain records of all asbestos related demolition or renovation projects. The required records include the "NESHAP Notification for Renovation and Demolition Activities" form and all supporting documents.



VIII. AMBIENT AIR IMPACT ANALYSIS

This section summarizes ADEQ's findings regarding the ambient assessment submitted by Rose Acre Farms Inc. (hereafter "Rose Acre") in support of its Lone Cactus Egg Farm and Lone Cactus Feed Terminal Class II permit. ADEQ requested Rose Acre perform dispersion modeling to demonstrate that the facility's emissions will not interfere with attainment and maintenance of the National Ambient Air Quality Standards (NAAQS). The pollutants subject to this ambient assessment review are PM₁₀ and PM_{2.5}.

ADEQ reviewed the ambient air impact analysis following the EPA's Guideline on Air Quality Models (40 CFR Part 51 Appendix W) and ADEQ's Modeling Guidelines for Arizona Air Permits (hereafter "ADEQ Guidelines").

A. Model Selection

The American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) model is the EPA-preferred model for estimating impacts at receptors located in simple terrain and complex terrain (within 50 km of a source) due to emissions from industrial sources. Rose Acre used AERMOD for the ambient impact analysis.

The AERMOD Modeling System consists of three major components: AERMAP, used to process terrain data and develop elevations for receptors; AERMET, used to process the meteorological data; and AERMOD, used to estimate the ambient pollutant concentrations. Rose Acre used AERMAP version 18081; AERMET version 18081; and AERMOD version 18081. These are the most recent versions of the AERMOD Modeling System.

B. Source Inputs

This section provides a discussion on source characterization to develop appropriate source inputs, including modeled emissions, source configuration and source types, Good Engineering Practice (GEP) stack heights, urban/rural determination of the sources, and off-site sources.

1. Sources of Emissions

Rose Acre Farms owns and operates the Lone Cactus Egg Farm which produces and processes eggs from chickens. The egg farm operation consists of six separate layer houses, a feed mill, feed storage and distribution system, and an egg processing plant which consists of a propane fired boiler used to process eggs for consumer use. The Lone Cactus Feed Terminal will receive, store and process primarily corn grain, along with soybean meal and dried distiller's grains.

The emission sources for PM₁₀ and PM_{2.5} include: egg farm feed mill and distribution system, rail terminal and feed mill, heaters, boiler, and emergency generators; and fugitive emissions from egg layer houses as well as grain transport trailers traveling on haul roads.

2. Modeled Emission Rates

Rose Acre estimated emissions from rail terminal, feed mill and distribution system based on maximum hourly capacity of process. Rose Acre estimated fugitive emissions from grain transport trailers based on maximum hourly production rate. To estimate the fugitive emission from chicken layer houses, Rose



Acre used an emission factor from Central Valley Eggs permit issued by San Joaquin Valley Authority, considering a similar design for the chicken layer houses and best PM management practices. Maximum hourly emission rates for heaters, boiler, and emergency generators were also modeled.

3. Source Configurations and Source Types

Rose Acre modeled the emissions from the boiler, grain bin vents, emergency generators and propane heaters as point sources. The release parameters for the point sources were based on manufacturer supplied data.

Rose Acre characterized the emissions from road ways as a series of volume sources. Rose Acre also characterized the fugitive emissions from chicken layer houses as volume sources. The volume source parameters, including initial lateral dimension (σ_{y0}), initial vertical dimension (σ_{z0}) and release height, were estimated based on the horizontal and vertical dimensions of the volume source, following ADEQ Guidelines and the AERMOD User's Guide.

Rose Acre characterized the emissions from the rail receiving building, alternate grain storage building, and flat grain storage building as area sources based on the dimensions of the buildings.

4. Good Engineering Practice (GEP) stack heights

Rose Acre modeled all stacks with actual heights. Rose Acre evaluated building downwash effects based on building and stack location and dimensions, and the EPA's Building Profile Input Program Plume Rise Model Enhancements (BPIP-PRME).

5. Urban/rural Determination

The rural/urban classification of an area is determined by either the dominance of a specific land use or by population data in the study area. Rose Acre determined the project site area as "Rural" based on the land use method.

6. Off-site (nearby) Sources

The EPA recommends that all nearby sources that are not adequately represented by background ambient monitoring data, should be explicitly modeled as part of the NAAQS analysis. To determine which nearby sources should be explicitly modeled in the air quality analysis, the EPA has established "a significant concentration gradient in the vicinity of the source under consideration" as the sole criterion for this determination. There are no off-site stationary sources near Rose Acre that would cause a significant concentration gradient within the vicinity of the project site. Therefore, there are no near-by sources that should be explicitly modeled. The impact from distant off-site sources are represented by background ambient monitoring data as discussed in Section E, Background Concentrations.



C. Meteorological Data

1. Meteorological Data Selection

For regulatory dispersion modeling analyses, 5 years of National Weather Service (NWS) station meteorological data, or at least 1 year of site-specific meteorological data, or at least 3 years of prognostic meteorological data should be used.

Since representative NWS data are not available, ADEQ recommended Rose Acre to use 3 years of prognostic meteorological data generated by EPA (Mesoscale Model Interface Program processed data for each 12km grid cell). The prognostic meteorological data for the cell where the Rose Acre facility is located were used for modeling.

2. Meteorological Data Processing

ADEQ provided all metrological data input and output files to Rose Acre. Rose Acre re-processed the three-years of prognostic meteorological data using the adjusted surface friction velocity (ADJ_U*) option. Based on the EPA's Guidance, the ADJ_U* option in AERMET is a regulatory option for sources using prognostic meteorological inputs derived from prognostic meteorological models.

D. Ambient Air Boundary and Receptor Network

Public access is restricted by fencing on all sides with guard shacks located along the access roads to both the egg farm and feed terminal. Any persons trying to enter the facility must first stop and sign in at the guard shacks before proceeding to the facility. Rose Acre used the facility fence line and proposed guard locations as the ambient air boundary for modeling purposes.

Following ADEQ Guidelines, Rose Acre set up a receptor network to determine areas of maximum predicted concentrations. The grid spacing utilized for the receptors are as follows: 25 meter increments along the ambient air boundary; 100 meter increments extending 2.3 km from the facility centroid; 250 meter increments extending from 2.3 to 4 km from the facility centroid; 500 meter increments extending from 4 to 6 km from the facility centroid; and 1,000 meter increments extending from 6 to 10 km from the facility centroid. Rose acre used the AERMAP terrain processor (version 18081) to process the National Elevation Data (NED) data to generate the receptor elevations and hill heights.

E. Background Concentration

Background concentrations should be representative of regional air quality in the vicinity of a facility. Typically, background concentrations should be determined based on the air quality data collected in the vicinity of the proposed project site. However, if there are no monitors located in the vicinity of the project, a "regional site" may be used to determine background concentrations. Per Appendix W Section 8.3.2 b, a regional site is "*one that is located away from the area of interest but is impacted by similar or adequately representative sources.*"

There are no monitoring sites in the immediate vicinity of the proposed Rose Acre project site. Therefore, a "regional site" must be selected to determine the background concentration based on similar/representative source impacts. Rose Acre selected the



Alamo Lake site as a representative site for the background determination because both of the project site and Alamo Lake site are located at relatively remote areas. Moreover, the Alamo Lake site is the only active monitoring site for PM₁₀ and PM_{2.5} in La Paz County.

Following ADEQ Guidelines, Rose Acre calculated the 24-hour background PM₁₀ concentration based on the average of the 2nd highest 24-hour values measured over the last three years. Rose Acre calculated the 24-hour background PM_{2.5} value based on the average of the 98th percentile 24-hour values measured over the last three years.

F. Model Results

Table 3 summaries the modeled results for PM₁₀ and PM_{2.5}. Representative background concentrations were added to modeled impacts and the total concentrations were then compared to the NAAQS. As shown in Table 3, emissions from the Rose Acre project will not cause or contribute to a violation of the NAAQS under the operational limits/conditions as proposed in the draft permit. The AERMOD modeling analysis also revealed that the modeled design concentrations for PM₁₀ and PM_{2.5} occurred within or near the ambient air boundary.

Table 3 Modeled Results for PM₁₀ and PM_{2.5}

Pollutant	Averaging Period	Modeled Concentration (µg/m ³)	Background Concentration (µg/m ³)	Maximum Ambient Concentration (µg/m ³)	NAAQS (µg/m ³)
PM ₁₀	24-hour	63.8	74.0	137.8	150
PM _{2.5}	24-hour	16.7	9.2	25.9	35
	Annual	3.8	3.3	7.1	12

IX. LIST OF ABBREVIATIONS

- AAB.....Ambient Air Boundary
- A.A.C.....Arizona Administrative Code
- ADEQ.....Arizona Department of Environmental Quality
- ADJ_U*.....Adjusted Surface Friction Velocity
- AERMAP.....Terrain data preprocessor for AERMOD
- AERMET.....Meteorological data preprocessor for AERMOD
- AERMOD.....American Meteorological Society/EPA Regulatory Model
- AQD.....Air Quality Division
- BPIP.....Building Profile Input Program
- CO.....Carbon Monoxide
- GEP.....Good Engineering Practice
- hp.....Horsepower
- hr.....Hour
- ICE.....Internal Combustion Engine
- lb.....Pound
- MMBtu.....Million British Thermal Units
- NAAQS.....National Ambient Air Quality Standard



NED National Elevation Dataset
NO_x Nitrogen Oxide
NWS National Weather Service
PM..... Particulate Matter
PM_{2.5} Particulate Matter Nominally less than 2.5 Micrometers
PM₁₀..... Particulate Matter Nominally less than 10 Micrometers
PRIME Plume Rise Model Enhancements
PTE Potential-to-Emit
SO₂..... Sulfur Dioxide
TPY Tons per Year
USEPA United States Environmental Protection Agency
VOC..... Volatile Organic Compound
yr Year