

April 16, 2003

Annette Davis
Adavco
P. O. Box 2346
Bakersfield, CA 93303

**Re: *Hageman Road and Heath Road GPA 51, Map101, Air Quality Program,
Agricultural Emissions***

Dear Ms. Davis:

Per your request, we have estimated the operational emissions from agricultural activities on the proposed project site and present that data herein.

Background

Hageman Northwest, LLP proposes a 412 unit single family residential development on the southeast corner of Hageman Road and Heath Road on approximately 160.5 gross acres in Kern County, California, just west of the city limits of Bakersfield. The project site includes the northwest quarter of Section 22, Township 29 South, Range 26 East, Mount Diablo Base and Meridian.

Existing Conditions at Project Site

The project site has been under cultivation with carrots/wheat, and corn/blackeyes. Construction of the proposed development will ultimately remove 144¹ acres of agricultural lands from cultivation. Existing sources of air pollutant emissions include agricultural equipment, land preparation, fugitive wind-blown dust, crop harvesting, unpaved farm roads, and work areas.

PM₁₀ emissions from fugitive dust are released into the atmosphere during land preparation prior to planting and after harvesting activities. Typical land preparation operations include soil disking, tilling, leveling, chiseling, plowing, and other mechanical disturbances of the earth. Soil preparation tends to be performed in the early spring and fall months when rainfall is minimal.

¹ Excludes approximately 16.5 acres of current road right-of way.

Agricultural land preparation activities at the 144-acre site generate approximately 1.09 tons per year of PM₁₀ emissions from fugitive dust (Table 1). Wind-blown dust across agricultural fields also releases PM₁₀ emissions to the environment. Up to 1.25 tons per year are released due to wind-blown dust at the project site, based on the CARB-developed emission factor for non-pasture lands, specific to soil conditions in Kern County.² These estimates were based on emission factors developed by CARB for the types of crops produced at the project site, assuming that the existing agricultural area is divided into four segments for planting. Each crop (carrots, wheat, blackeye peas, and corn) is planted once per year. Harvesting activities result in an estimated 0.08 tons of PM₁₀ per year. PM₁₀ emissions from unpaved farm roads were estimated at 0.72 tons of PM₁₀ per year.

The URBEMIS 2002 computer model derived emission factors and EPA emission factors were used to calculate emissions from agricultural equipment for the existing agricultural operation. PM₁₀ exhaust emissions from agricultural equipment were estimated at 0.34 tons per year.

ROG emissions from agricultural pesticides were estimated at 6.02 tons per year.

Total emissions resulting from the agricultural operations conducted on the project site are shown on Table 1.

TABLE 1
Emissions from Existing Project Site Agricultural Operations

Activity	ROG (ton/yr)	NO_x (ton/yr)	CO (ton/yr)	SO_x (ton/yr)	PM₁₀ (ton/yr)	PM_{2.5}⁽¹⁾ (ton/yr)
Agricultural Equipment Exhaust ⁽²⁾						
-Irrigation Pump	0.44	4.65	1.02	0.31	0.33	0.33
-Tractor	0.02	0.27	0.09	--	0.01	0.01
Fugitive Dust ⁽³⁾						
-Land Preparation ^(4a)	--	--	--	--	1.09	0.44
-Wind-blown Dust ^(4b)	--	--	--	--	1.25	0.50
-Harvesting ^(4c)	--	--	--	--	0.08	0.03
-Unpaved Roads ^(4d)	--	--	--	--	0.72	0.11
Pest Control ⁽⁵⁾	6.02	--	--	--	--	--
Total	6.48	4.92	1.11	0.31	3.48	1.42

Notes: ROG = Reactive organic gases
 PM_{10, 2.5} = Particulate matter less than or equal to 10 or 2.5 microns in diameter, respectively
 NO_x = Nitrogen oxides
 SO_x = Sulfur oxides

⁽¹⁾PM_{2.5} fractions as percentage of PM₁₀ from AP-42 as follows: 100% for combustion sources (Section 3.3, Table 3.3-1, EPA, October, 1996);

² CARB, 1997.

40% for miscellaneous sources (Section 13.2.5, EPA, January, 1995);
15% for unpaved roads (Section 13.2.2, Table 13.2.2-2, EPA, December, 2003).

- ⁽²⁾Emissions from agricultural stationary diesel equipment were calculated using AP-42 Section 3.3, Table 3.3-1, EPA, October, 1996 for pre-Tier 1-2-3 equipment. Emissions from agricultural diesel mobile equipment (tractors) were calculated using URBEMIS 2002 Version 7.4, Appendix H for pre-1996 emission factors.
- ⁽³⁾Fugitive dust emissions were calculated for the existing 144-acre project site based on emission factors and methodologies in the Emission Inventory Procedural Manual, Methods for Assessing Area Source Emissions (CARB, 1997), as follows:
- ⁽⁴⁾(a) Land preparation emission factor developed from emissions data for Kern County and crop-specific data presented in Table 1 of Section 7.4 (Agricultural Land Preparation), August, 1997.
(b) Wind-blown dust emission factor is for non-pasture agricultural lands in Kern County, from Section 7.12 (Wind-Blown Dust – Agricultural Lands), Attachment A, July, 1997.
(c) Harvesting emission factor is for cotton harvesting in California, from Section 7.5 (Agricultural Harvest Operations), August, 1997.
(d) CARB default values used per Section 7.11 (Unpaved Road Dust, Farm Roads), August, 1997.
- ⁽⁵⁾California Environmental Protection Agency, Department of Pesticide Regulation, “Methodology for Determining VOC Emission Potentials of Pesticide Products”, Spurlock, Frank, Sacramento, California, January 7, 2002.

Methodology

Agricultural equipment exhaust emissions were based on the “Farmer Information” sheet provided by the client. This information indicated that the equipment, one irrigation pump and one tractor, are “not updated”, therefore pre-Tier 1-2-3 Emission Standards factors (“updated”) were used for the stationary diesel engine and URBEMIS 2002 PRE-1996 emission factors were used for the diesel tractor. Operating hours were provided for the irrigation pump. No data were provided for the tractor. Tractor operating time was estimated at 200 hours per year and the URBEMIS 2002 Off-Highway Tractor horsepower of 255 was used. Cultivated acres were estimated at 144 acres by deducting the current road right-of-way acres from the 160.5 project gross acres.

Fugitive dust emissions were based on crop information provided by the client and emission factors were obtained from U.S. EPA AP-42 Document, Sections 7.4, 7.5, and Section 7.11.

Pesticide emissions were based on the materials applied list provided by the client and limited to the soil fumigant Metam Sodium where volatile release data and application rates are available. ROG/VOC emissions were estimated at 56.6% of the weight of the product (EPA, Spurlock, 2002). The application rate used was the average annual Kern County application rate of 147.7 pounds per acre for 2002 (PAN Pesticide Database website).

Worksheets are included in Appendix 1. Copies of references are included in Appendix 2.

If you have any questions, please call me at (661) 326-1112.

Sincerely yours

Al Rubbert

Sr. Engineering Advisor

References

United States Environmental Protection Agency (EPA) AP-42, Section 3.3, Table 3.3-1, October, 1996, Section 13.2.5, EPA, January, 1995, Section 13.2.2, Table 13.2.2-2, EPA, December, 2003).

URBEMIS 2002 Version 7.4, Appendix H, May 2003

California Air Resources Board (CARB), Emission Inventory Procedural Manual, Methods for Assessing Area Source Emissions, 1997, Table 1 of Section 7.4 (Agricultural Land Preparation), August, 1997, Section 7.12 (Wind-Blown Dust – Agricultural Lands), Attachment A, July, 1997, Section 7.5 (Agricultural Harvest Operations), August, 1997, and Section 7.11 (Unpaved Road Dust, Farm Roads), August, 1997.

California Environmental Protection Agency, Department of Pesticide Regulation, “Methodology for Determining VOC Emission Potentials of Pesticide Products”, Spurlock, Frank, Sacramento, California, January 7, 2002.

PAN Pesticides Database, “Pesticide Use in Kern in 2002, San Joaquin Valley Region,” website:

Air Emissions Hageman Road and Heath Road

APPENDIX 1

Air Emissions Hageman Road and Heath Road

APPENDIX 2

Air Emissions Hageman Road and Heath Road