

Appendix A

Construction Exhaust Calculations

Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name: C:\Documents and Settings\klassenj\Desktop\Van Der Kooi Dairy (Site Grading).urb924

Project Name: Van Der Kooi Dairy

Project Location: Fresno County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

| | <u>ROG</u> | <u>NOx</u> | <u>CO</u> | <u>SO2</u> | <u>PM10 Dust</u> | <u>PM10 Exhaust</u> | <u>PM10</u> | <u>PM2.5 Dust</u> | <u>PM2.5 Exhaust</u> | <u>PM2.5</u> | <u>CO2</u> |
|-------------------------------------|------------|------------|-----------|------------|------------------|---------------------|-------------|-------------------|----------------------|--------------|------------|
| 2005 TOTALS (tons/year unmitigated) | 0.06 | 0.43 | 0.21 | 0.00 | 35.48 | 0.02 | 35.50 | 7.41 | 0.02 | 7.43 | 32.57 |

4/10/2008 9:39:24 AM

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

| | ROG | NOx | CO | SO2 | PM10 Dust | PM10 Exhaust | PM10 | PM2.5 Dust | PM2.5 Exhaust | PM2.5 | CO2 |
|------------------------------------|------|------|------|------|-----------|--------------|-------|------------|---------------|-------|-------|
| 2005 | 0.06 | 0.43 | 0.21 | 0.00 | 35.48 | 0.02 | 35.50 | 7.41 | 0.02 | 7.43 | 32.57 |
| Mass Grading 01/01/2005-06/30/2005 | 0.06 | 0.43 | 0.21 | 0.00 | 35.48 | 0.02 | 35.50 | 7.41 | 0.02 | 7.43 | 32.57 |
| Mass Grading Dust | 0.00 | 0.00 | 0.00 | 0.00 | 35.48 | 0.00 | 35.48 | 7.41 | 0.00 | 7.41 | 0.00 |
| Mass Grading Off Road Diesel | 0.05 | 0.43 | 0.19 | 0.00 | 0.00 | 0.02 | 0.02 | 0.00 | 0.02 | 0.02 | 30.92 |
| Mass Grading On Road Diesel | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Mass Grading Worker Trips | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.65 |

Phase Assumptions

Phase: Mass Grading 1/1/2005 - 6/30/2005 - Default Fine Site Grading Description

Total Acres Disturbed: 110

Maximum Daily Acreage Disturbed: 27.5

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Rubber Tired Loaders (164 hp) operating at a 0.54 load factor for 8 hours per day

Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name: C:\Documents and Settings\klassenj\Desktop\Van Der Kooi Dairy (Site Grading).urb924

Project Name: Van Der Kooi Dairy

Project Location: Fresno County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

| | <u>ROG</u> | <u>NOx</u> | <u>CO</u> | <u>SO2</u> | <u>PM10 Dust</u> | <u>PM10 Exhaust</u> | <u>PM10</u> | <u>PM2.5 Dust</u> | <u>PM2.5 Exhaust</u> | <u>PM2.5</u> | <u>CO2</u> |
|-------------------------------------|------------|------------|-----------|------------|------------------|---------------------|-------------|-------------------|----------------------|--------------|------------|
| 2005 TOTALS (tons/year unmitigated) | 0.13 | 1.16 | 0.71 | 0.00 | 35.48 | 0.05 | 35.53 | 7.41 | 0.05 | 7.45 | 81.99 |

Page: 2

4/10/2008 9:38:48 AM

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

| | <u>ROG</u> | <u>NOx</u> | <u>CO</u> | <u>SO2</u> | <u>PM10 Dust</u> | <u>PM10 Exhaust</u> | <u>PM10</u> | <u>PM2.5 Dust</u> | <u>PM2.5 Exhaust</u> | <u>PM2.5</u> | <u>CO2</u> |
|--|------------|------------|-----------|------------|------------------|---------------------|-------------|-------------------|----------------------|--------------|------------|
| 2005 | 0.13 | 1.16 | 0.71 | 0.00 | 35.48 | 0.05 | 35.53 | 7.41 | 0.05 | 7.45 | 81.99 |
| Mass Grading 01/01/2005- 06/30/2005 | 0.13 | 1.16 | 0.71 | 0.00 | 35.48 | 0.05 | 35.53 | 7.41 | 0.05 | 7.45 | 81.99 |
| Mass Grading Dust | 0.00 | 0.00 | 0.00 | 0.00 | 35.48 | 0.00 | 35.48 | 7.41 | 0.00 | 7.41 | 0.00 |
| Mass Grading Off Road Diesel | 0.13 | 1.16 | 0.68 | 0.00 | 0.00 | 0.05 | 0.05 | 0.00 | 0.05 | 0.05 | 80.34 |
| Mass Grading On Road Diesel | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Mass Grading Worker Trips | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.65 |

Phase Assumptions

Phase: Mass Grading 1/1/2005 - 6/30/2005 - Default Fine Site Grading Description

Total Acres Disturbed: 110

Maximum Daily Acreage Disturbed: 27.5

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name: C:\Documents and Settings\klassen\Desktop\Van Der Kooi Dairy (Site Grading).urb924

Project Name: Van Der Kooi Dairy

Project Location: Fresno County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

| | ROG | NOx | CO | SO2 | PM10 Dust | PM10 Exhaust | PM2.5 Dust | PM2.5 Exhaust | PM2.5 | CO2 |
|-------------------------------------|------|------|------|------|-----------|--------------|------------|---------------|-------|--------|
| 2005 TOTALS (tons/year unmitigated) | 0.29 | 2.76 | 1.43 | 0.00 | 35.48 | 0.12 | 7.41 | 0.11 | 7.52 | 213.10 |

4/10/2008 9:36:51 AM

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

| | ROG | NOX | CO | SO2 | PM10 Dust | PM10 Exhaust | PM2.5 Dust | PM2.5 Exhaust | PM2.5 | CO2 |
|------------------------------------|------|------|------|------|-----------|--------------|------------|---------------|-------|--------|
| 2005 | 0.29 | 2.76 | 1.43 | 0.00 | 35.48 | 0.12 | 7.41 | 0.11 | 7.52 | 213.10 |
| Mass Grading 01/01/2005-06/30/2005 | 0.29 | 2.76 | 1.43 | 0.00 | 35.48 | 0.12 | 7.41 | 0.11 | 7.52 | 213.10 |
| Mass Grading Dust | 0.00 | 0.00 | 0.00 | 0.00 | 35.48 | 0.00 | 7.41 | 0.00 | 7.41 | 0.00 |
| Mass Grading Off Road Diesel | 0.29 | 2.76 | 1.38 | 0.00 | 0.00 | 0.12 | 0.00 | 0.11 | 0.11 | 209.80 |
| Mass Grading On Road Diesel | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Mass Grading Worker Trips | 0.00 | 0.00 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3.31 |

Phase Assumptions

Phase: Mass Grading 1/1/2005 - 6/30/2005 - Default Fine Site Grading Description

Total Acres Disturbed: 110

Maximum Daily Acreage Disturbed: 27.5

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

2 Scrapers (313 hp) operating at a 0.72 load factor for 8 hours per day

Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name: C:\Documents and Settings\klassenj\Desktop\Van Der Kooi Dairy (Site Grading).urb924

Project Name: Van Der Kooi Dairy

Project Location: Fresno County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

| | <u>ROG</u> | <u>NOx</u> | <u>CO</u> | <u>SO2</u> | <u>PM10 Dust</u> | <u>PM10 Exhaust</u> | <u>PM10</u> | <u>PM2.5 Dust</u> | <u>PM2.5 Exhaust</u> | <u>PM2.5</u> | <u>CO2</u> |
|-------------------------------------|------------|------------|-----------|------------|------------------|---------------------|-------------|-------------------|----------------------|--------------|------------|
| 2005 TOTALS (tons/year unmitigated) | 0.08 | 0.58 | 0.28 | 0.00 | 35.48 | 0.03 | 35.51 | 7.41 | 0.03 | 7.44 | 43.51 |

4/10/2008 9:37:45 AM

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

| | <u>ROG</u> | <u>NOx</u> | <u>CO</u> | <u>SO2</u> | <u>PM10 Dust</u> | <u>PM10 Exhaust</u> | <u>PM10</u> | <u>PM2.5 Dust</u> | <u>PM2.5 Exhaust</u> | <u>PM2.5</u> | <u>CO2</u> |
|------------------------------------|------------|------------|-----------|------------|------------------|---------------------|-------------|-------------------|----------------------|--------------|------------|
| 2005 | 0.08 | 0.58 | 0.28 | 0.00 | 35.48 | 0.03 | 35.51 | 7.41 | 0.03 | 7.44 | 43.51 |
| Mass Grading 01/01/2005-06/30/2005 | 0.08 | 0.58 | 0.28 | 0.00 | 35.48 | 0.03 | 35.51 | 7.41 | 0.03 | 7.44 | 43.51 |
| Mass Grading Dust | 0.00 | 0.00 | 0.00 | 0.00 | 35.48 | 0.00 | 35.48 | 7.41 | 0.00 | 7.41 | 0.00 |
| Mass Grading Off Road Diesel | 0.07 | 0.58 | 0.26 | 0.00 | 0.00 | 0.03 | 0.03 | 0.00 | 0.03 | 0.03 | 41.86 |
| Mass Grading On Road Diesel | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Mass Grading Worker Trips | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.65 |

Phase Assumptions

Phase: Mass Grading 1/1/2005 - 6/30/2005 - Default Fine Site Grading Description

Total Acres Disturbed: 110

Maximum Daily Acreage Disturbed: 27.5

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day

Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name: C:\Documents and Settings\klassenj\Desktop\Van Der Kooi Dairy (Site Grading).urb924

Project Name: Van Der Kooi Dairy

Project Location: Fresno County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

| | <u>ROG</u> | <u>NOx</u> | <u>CO</u> | <u>SO2</u> | <u>PM10 Dust</u> | <u>PM10 Exhaust</u> | <u>PM10</u> | <u>PM2.5 Dust</u> | <u>PM2.5 Exhaust</u> | <u>PM2.5</u> | <u>CO2</u> |
|-------------------------------------|------------|------------|-----------|------------|------------------|---------------------|-------------|-------------------|----------------------|--------------|------------|
| 2005 TOTALS (tons/year unmitigated) | 0.09 | 0.90 | 0.27 | 0.00 | 35.48 | 0.03 | 35.51 | 7.41 | 0.03 | 7.44 | 72.95 |

4/10/2008 9:40:18 AM

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

| | <u>ROG</u> | <u>NOx</u> | <u>CO</u> | <u>SO2</u> | <u>PM10 Dust</u> | <u>PM10 Exhaust</u> | <u>PM10</u> | <u>PM2.5 Dust</u> | <u>PM2.5 Exhaust</u> | <u>PM2.5</u> | <u>CO2</u> |
|------------------------------------|------------|------------|-----------|------------|------------------|---------------------|-------------|-------------------|----------------------|--------------|------------|
| 2005 | 0.09 | 0.90 | 0.27 | 0.00 | 35.48 | 0.03 | 35.51 | 7.41 | 0.03 | 7.44 | 72.95 |
| Mass Grading 01/01/2005-06/30/2005 | 0.09 | 0.90 | 0.27 | 0.00 | 35.48 | 0.03 | 35.51 | 7.41 | 0.03 | 7.44 | 72.95 |
| Mass Grading Dust | 0.00 | 0.00 | 0.00 | 0.00 | 35.48 | 0.00 | 35.48 | 7.41 | 0.00 | 7.41 | 0.00 |
| Mass Grading Off Road Diesel | 0.09 | 0.90 | 0.23 | 0.00 | 0.00 | 0.03 | 0.03 | 0.00 | 0.03 | 0.03 | 69.65 |
| Mass Grading On Road Diesel | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Mass Grading Worker Trips | 0.00 | 0.00 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3.31 |

Phase Assumptions

Phase: Mass Grading 1/1/2005 - 6/30/2005 - Default Fine Site Grading Description

Total Acres Disturbed: 110

Maximum Daily Acreage Disturbed: 27.5

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

2 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Appendix B

Operational Emissions Calculations

Green House Gas Emissions Calculations

| Animal Type | # of Animals | Uncontrolled Emission Factors ¹ | | | | | | |
|---------------------|----------------|--|-------------------------------------|-------------------------|-----------------------------------|------------------------|-------------------------|-----------------------------------|
| | Expanded Dairy | CH4 (Manure) lbs-hd/yr | CH4 (Manure) lbs-hd/yr ² | CH4 (Enteric) lbs-hd/yr | CO2 Equivalent multiplier for CH4 | N20 (Manure) lbs-hd/yr | N20 (Enteric) lbs-hd/yr | CO2 Equivalent multiplier for N20 |
| Milk Cows | 3200 | 377.2 | 226.3 | 283.2 | 21 | 0.534 | 0 | 310 |
| Dry Cows | 480 | 377.2* | 226.3 | 283.2* | 21 | 0.534* | 0 | 310 |
| Heifers (15-24 mo) | 860 | 5.4 | 3.2 | 139.4 | 21 | 3.2 | 0 | 310 |
| Heifers (7-14 mo) | 960 | 5.4 | 3.2 | 88.7 | 21 | 3.2 | 0 | 310 |
| Heifers (4-6 mo) | 240 | 5.4 | 3.2 | 88.7 | 21 | 3.2 | 0 | 310 |
| Calves (under 3 mo) | 380 | 5.4** | 3.2 | 88.7** | 21 | 3.2** | 0 | 310 |
| Bulls | 0 | 6.2 | 3.7 | 116.8 | 21 | 0.0 | 0 | 310 |
| Total | 6120 | | | | | | | |

¹ GHG Emission Factors were obtained from ARB's document entitled "Draft Documentation of California's Greenhouse Gas Inventory" <http://www.arb.ca.gov/cc/ccei/inventory/inventory.php>

² Since the existing lagoons at Charles Van Der Kooi Dairy are currently not subject to New Source Review requirements such as Best Available Control Technology, it is assumed that they are not being operated as proper treatment lagoons. Lagoons that are not properly designed or operated have the potential of emitting large amounts of VOC emissions but inhibit methane production. Therefore, the ARB methane Emission Factor of 377.2 lbs-CH₄/yr will be reduced by 40% when calculating emissions from the existing (grandfathered) phase of the operation. For post-project calculations, it is assumed that all liquid manure is treated in a properly designed and properly operated treatment lagoon that maximizes Methane production while minimizing VOC production. Charles Van Der Kooi dairy has proposed to use phototrophic treatment lagoons. Due to lack of data specific to the efficacy of phototrophic treatment lagoons, it is assumed that these types of lagoons are similar to NRCS-designed anaerobic treatment lagoons in treatment efficiency.

*Dry Cow EF was assumed to be similar to milk cows.

**Calf EF was assumed to be similar to medium and small heifers.

Methane Emissions Calculations

Pre-Project Potential to Emit (PE1)

| PE1 Enteric Emissions Existing Dairy | | | | | | |
|--------------------------------------|-------------|--|--|--|--|-----------------|
| Type of Cow | # of Cows | Enteric EF (lbs-hd-yr) ¹ | | | | tons- CH4/yr |
| Milking Cow | 1700 | 283.2 | | | | 240.72 |
| Dry Cow | 250 | 283.2 | | | | 35.40 |
| Heifer (15-24 mo) | 0 | 139.4 | | | | 0.00 |
| Heifer (7-14 mo) | 0 | 88.7 | | | | 0.00 |
| Heifer (4-6 mo) | 0 | 88.7 | | | | 0.00 |
| Calf (under 3 mo) | 0 | 88.7 | | | | 0.00 |
| Bulls | 0 | 116.8 | | | | 0.00 |
| Total | 1950 | | | | | 276.12 |

| PE1 Manure Emissions (Liquid) - Existing Dairy | | | | | | |
|--|-------------|--------------------------------------|----------------------------|--|----------------------------------|-----------------|
| Type of Cow | # of Cows | Manure (lbs-hd-yr) ⁽¹⁾ | % of Manure ⁽²⁾ | | Manure removal at least Daily | tons- CH4/yr |
| Milking Cow | 1700 | 226.3 | 71% | | 7.1% | 126.88 |
| Dry Cow | 250 | 226.3 | 48% | | 7.1% | 12.61 |
| Heifer (15-24 mon) | 0 | 3.2 | 48% | | 7.1% | 0.00 |
| Heifer (7-14 mon) | 0 | 3.2 | 48% | | 7.1% | 0.00 |
| Heifer (4-6 mon) | 0 | 3.2 | 48% | | 7.1% | 0.00 |
| Calf (under 3 mon) | 0 | 3.2 | 100% | | 7.1% | 0.00 |
| Feedlot Cattle/Bulls | 0 | 3.7 | 48% | | 7.1% | 0.00 |
| Total | 1950 | | | | | 139.49 |

| PE1 Manure Emissions (Solid) - Existing Dairy | | | | | | |
|---|-------------|--------------------|-------------|--|--|---------------|
| Type of Cow | # of Cows | Manure (lbs-hd-yr) | % of Manure | | | tons-CH4/yr |
| Milking Cow | 1700 | 377.2 | 29% | | | 92.98 |
| Dry Cow | 250 | 377.2 | 52% | | | 24.52 |
| Heifer (15-24 mon) | 0 | 5.4 | 52% | | | 0.00 |
| Heifer (7-14 mon) | 0 | 5.4 | 52% | | | 0.00 |
| Heifer (4-6 mon) | 0 | 5.4 | 52% | | | 0.00 |
| Calf (under 3 mon) | 0 | 5.4 | 0% | | | 0.00 |
| Feedlot Cattle/Bulls | 0 | 6.2 | 52% | | | 0.00 |
| Total | 1950 | | | | | 117.50 |

Total Pre-Project Emissions =

**533.11
11,195.25**

**tons-CH4/yr
tons-CO2e**

Post-Project Potential to Emit (PE2)

Post-Project Emissions Prior to Mitigation

| PE2 Enteric Emissions - Existing Dairy | | | | | | |
|--|-------------|---------------------|--|--|--|---------------|
| Type of Cow | # of Cows | Enteric (lbs/hd-yr) | | | | tons-CH4/yr |
| Milking Cow | 1700 | 283.2 | | | | 240.72 |
| Dry Cow | 250 | 283.2 | | | | 35.40 |
| Heifer (15-24 mon) | | 139.4 | | | | 0.00 |
| Heifer (7-14 mon) | | 88.7 | | | | 0.00 |
| Heifer (4-6 mon) | | 88.7 | | | | 0.00 |
| Calf (under 3 mon) | | 88.7 | | | | 0.00 |
| Feedlot Cattle/Bulls | | 116.8 | | | | 0.00 |
| Total | 1950 | | | | | 276.12 |

PE2 Manure Emissions (Liquid) - Existing Dairy

| Type of Cow | # of Cows | Manure (lbs-hd-yr) ^[1] | % of Manure ^[2] | Manure removal at least Daily | tons-CH4/yr |
|----------------------|-------------|-----------------------------------|----------------------------|-------------------------------|---------------|
| Milking Cow | 1700 | 377.2 | 71% | 7.1% | 211.48 |
| Dry Cow | 250 | 377.2 | 48% | 7.1% | 21.03 |
| Heifer (15-24 mon) | 0 | 5.4 | 48% | 7.1% | 0.00 |
| Heifer (7-14 mon) | 0 | 5.4 | 48% | 7.1% | 0.00 |
| Heifer (4-6 mon) | 0 | 5.4 | 48% | 7.1% | 0.00 |
| Calf (under 3 mon) | 0 | 5.4 | 100% | 7.1% | 0.00 |
| Feedlot Cattle/Bulls | 0 | 5.4 | 48% | 7.1% | 0.00 |
| Total | 1950 | | | | 232.50 |

PE2 Manure Emissions (Solid) - Existing Dairy

| Type of Cow | # of Cows | Manure (lbs-hd-yr) | % of Manure | tons-CH4/yr |
|----------------------|-------------|--------------------|-------------|---------------|
| Milking Cow | 1700 | 377.2 | 29% | 92.98 |
| Dry Cow | 250 | 377.2 | 52% | 24.52 |
| Heifer (15-24 mon) | 0 | 5.4 | 52% | 0.00 |
| Heifer (7-14 mon) | 0 | 5.4 | 52% | 0.00 |
| Heifer (4-6 mon) | 0 | 5.4 | 52% | 0.00 |
| Calf (under 3 mon) | 0 | 5.4 | 0% | 0.00 |
| Feedlot Cattle/Bulls | 0 | 6.2 | 52% | 0.00 |
| Total | 1950 | | | 117.50 |

PE2 Enteric Emissions - Expansion Dairy

| Type of Cow | # of Cows | Enteric (lbs-hd-yr) | tons-CH4/yr |
|-------------------|-------------|---------------------|---------------|
| Milking Cow | 1500 | 283.2 | 212.40 |
| Dry Cow | 230 | 283.2 | 32.57 |
| Heifer (15-24 mo) | 860 | 139.4 | 59.94 |
| Heifer (7-14 mo) | 960 | 88.7 | 42.58 |
| Heifer (4-6 mo) | 240 | 88.7 | 10.64 |
| Calf (under 3 mo) | 380 | 88.7 | 16.85 |
| Bulls | 0 | 116.8 | 0.00 |
| Total | 4170 | | 374.98 |

| PE2 Manure Emissions (Liquid) Expansion Dairy | | | | | |
|---|-----------|--------------------|--------------------------|--|---------------|
| Type of Cow | # of Cows | Manure (lbs-hd-yr) | % of Manure ² | | tons-CH4/yr |
| Milking Cow | 1500 | 377.2 | 71% | | 200.86 |
| Dry Cow | 230 | 377.2 | 48% | | 20.82 |
| Heifer (15-24 mo) | 860 | 5.4 | 48% | | 1.11 |
| Heifer (7-14 mo) | 960 | 5.4 | 48% | | 1.24 |
| Heifer (4-6 mo) | 240 | 5.4 | 48% | | 0.31 |
| Calf (under 3 mo) | 380 | 5.4 | 100% | | 1.03 |
| Total | | | | | 225.38 |

| PE2 Manure Emissions (Solid) Expansion Dairy | | | | | |
|--|-----------|--------------------|-------------|--|---------------|
| Type of Cow | # of Cows | Manure (lbs-hd-yr) | % of Manure | | tons-CH4/yr |
| Milking Cow | 1500 | 377.2 | 29% | | 82.04 |
| Dry Cow | 230 | 377.2 | 52% | | 22.56 |
| Heifer (15-24 mo) | 860 | 5.4 | 52% | | 1.21 |
| Heifer (7-14 mo) | 960 | 5.4 | 52% | | 1.35 |
| Heifer (4-6 mo) | 240 | 5.4 | 52% | | 0.34 |
| Calf (under 3 mo) | 380 | 5.4 | 0% | | 0.00 |
| Total | | | | | 107.49 |

Total Emissions from Existing Dairy

Total Emission from Expansion

Total Post-Project Emissions w/o mitigation

626.12 tons-CH4/yr

707.85 tons-CH4/yr

1,333.97 tons-CH4/yr

28,013.36 tons-CO2e

Post-Project Emissions Post Mitigation

| PE2 Enteric Emissions - Existing Dairy | | | | | | |
|--|-------------|---------------------|------------|--|--|---------------|
| Type of Cow | # of Cows | Enteric (lbs/hd-yr) | Cottonseed | | | tons-CH4/yr |
| Milking Cow | 1700 | 283.2 | 12% | | | 211.83 |
| Dry Cow | 250 | 283.2 | 12% | | | 31.15 |
| Heifer (15-24 mon) | 0 | 139.4 | 12% | | | 0.00 |
| Heifer (7-14 mon) | 0 | 88.7 | 12% | | | 0.00 |
| Heifer (4-6 mon) | 0 | 88.7 | 12% | | | 0.00 |
| Calf (under 3 mon) | 0 | 88.7 | 12% | | | 0.00 |
| Feedlot Cattle/Bulls | 0 | 116.8 | 12% | | | 0.00 |
| Total | 1950 | | | | | 242.99 |

33.13

| PE2 Manure Emissions (Liquid) - Existing Dairy | | | | | | |
|--|-------------|-----------------------------------|----------------------------|-------------------------------|--|---------------|
| Type of Cow | # of Cows | Manure (lbs-hd-yr) ^[1] | % of Manure ^[2] | Manure removal at least Daily | | tons-CH4/yr |
| Milking Cow | 1700 | 377.2 | 71% | 7.1% | | 211.48 |
| Dry Cow | 250 | 377.2 | 48% | 7.1% | | 21.03 |
| Heifer (15-24 mon) | 0 | 5.4 | 48% | 7.1% | | 0.00 |
| Heifer (7-14 mon) | 0 | 5.4 | 48% | 7.1% | | 0.00 |
| Heifer (4-6 mon) | 0 | 5.4 | 48% | 7.1% | | 0.00 |
| Calf (under 3 mon) | 0 | 5.4 | 100% | 7.1% | | 0.00 |
| Feedlot Cattle/Bulls | 0 | 5.4 | 48% | 7.1% | | 0.00 |
| Total | 1950 | | | | | 232.50 |

17.77

| PE2 Manure Emissions (Solid) - Existing Dairy | | | | | | |
|---|-----------|--------------------|-------------|--|--|---------------|
| Type of Cow | # of Cows | Manure (lbs-hd-yr) | % of Manure | | | tons-CH4/yr |
| Milking Cow | 1700 | 377.2 | 29% | | | 92.98 |
| Dry Cow | 250 | 377.2 | 52% | | | 24.52 |
| Heifer (15-24 mon) | 0 | 5.4 | 52% | | | 0.00 |
| Heifer (7-14 mon) | 0 | 5.4 | 52% | | | 0.00 |
| Heifer (4-6 mon) | 0 | 5.4 | 52% | | | 0.00 |
| Calf (under 3 mon) | 0 | 5.4 | 0% | | | 0.00 |
| Feedlot Cattle/Bulls | 0 | 6.2 | 52% | | | 0.00 |
| Total | | | | | | 117.50 |

| PE2 Enteric Emissions - Expansion Dairy | | | | | | |
|---|-----------|---------------------|--|------------|--|---------------|
| Type of Cow | # of Cows | Enteric (lbs-hd-yr) | | Cottonseed | | tons-CH4/yr |
| Milking Cow | 1500 | 283.2 | | 12% | | 186.91 |
| Dry Cow | 230 | 283.2 | | 12% | | 28.66 |
| Heifer (15-24 mo) | 860 | 139.4 | | 12% | | 52.75 |
| Heifer (7-14 mo) | 960 | 88.7 | | 12% | | 37.47 |
| Heifer (4-6 mo) | 240 | 88.7 | | 12% | | 9.37 |
| Calf (under 3 mo) | 380 | 88.7 | | 12% | | 14.83 |
| Total | | | | | | 329.99 |

44.99

| PE2 Manure Emissions (Liquid) Expansion Dairy | | | | | | |
|---|-----------|--------------------|----------------------------|--|-------------------------------|---------------|
| Type of Cow | # of Cows | Manure (lbs-hd-yr) | % of Manure ^[2] | | Manure removal at least Daily | tons-CH4/yr |
| Milking Cow | 1500 | 377.2 | 71% | | 7.1% | 186.60 |
| Dry Cow | 230 | 377.2 | 48% | | 7.1% | 19.34 |
| Heifer (15-24 mo) | 860 | 5.4 | 48% | | 7.1% | 1.04 |
| Heifer (7-14 mo) | 960 | 5.4 | 48% | | 7.1% | 1.16 |
| Heifer (4-6 mo) | 240 | 5.4 | 48% | | 7.1% | 0.29 |
| Calf (under 3 mo) | 380 | 5.4 | 100% | | 7.1% | 0.95 |
| Total | | | | | | 209.37 |

16.01

| PE2 Manure Emissions (Solid) Expansion Dairy | | | | | | |
|--|-----------|--------------------|-------------|--|----------------------|--------------|
| Type of Cow | # of Cows | Manure (lbs-hd-yr) | % of Manure | | Manure Incorporation | tons-CH4/yr |
| Milking Cow | 1500 | 377.2 | 29% | | 29.0% | 58.25 |
| Dry Cow | 230 | 377.2 | 52% | | 29.0% | 16.02 |
| Heifer (15-24 mo) | 860 | 5.4 | 52% | | 29.0% | 0.86 |
| Heifer (7-14 mo) | 960 | 5.4 | 52% | | 29.0% | 0.96 |
| Heifer (4-6 mo) | 240 | 5.4 | 52% | | 29.0% | 0.24 |
| Calf (under 3 mo) | 380 | 5.4 | 0% | | 29.0% | 0.00 |
| Total | | | | | | 76.32 |

31.17

Total Emissions from Existing Dairy 592.99 tons-CH4/yr

Total Emissions from Expansion 615.68 tons-CH4/yr

Total Post-Project Emissions = 1,208.66 tons-CH4/yr

25,381.93 tons-CO2e

Total Increase in

Emissions Post-Project Pre-Project

1,208.66

533.11

=

675.56 tons-CH4/yr

14,186.68 tons-CO2e

Reductions from feeding cottonseed

78.13

tons-CH4/yr

1,640.72 tons-CO2e

Reductions from at least daily manure removal from concrete feedlanes

33.77

tons-CH4/yr

709.23 tons-CO2e

Reductions from Manure Incorporation

31.17

tons-CH4/yr

654.62 tons-CO2e

⁽¹⁾ CARB Emission Factor

⁽²⁾ The %manure was taken from Table 3-1 of the California Regional Water Quality Control Board Document "Managing Dairy Manure in the Central Valley of California", UC Davis, June 2005. This document estimated that 21-48% of the manure in open corral dairies is handled as a liquid. Therefore, as a worst case assumption, 48% will be used for all cows housed in open corrals with flush lanes. The document also estimates a range of 42-100% manure handled as a liquid in the freestalls. For freestalls without exercise pens, 100% of manure as a liquid in the flush will be used and for freestalls with exercise pens the average of the range $((100+42)/2 = 71\%)$ will be used. (<http://groundwater.ucdavis.edu/Publications/uc-committee-of-experts-final-report%202006.pdf>)

| PE2 Emissions from Expanded Dairy | | | | | | |
|-----------------------------------|-------------|---------------------|--|--|--|-------------|
| Type of Cow | # of Cows | Enteric (lbs/hd-yr) | | | | tons-N2O/yr |
| Milking Cow | 1500 | 0.534 | | | | 0.4 |
| Dry Cow | 230 | 0.534 | | | | 0.1 |
| Heifer (15-24 mo) | 860 | 3.2 | | | | 1.4 |
| Heifer (7-14 mo) | 960 | 3.2 | | | | 1.5 |
| Heifer (4-6 mo) | 240 | 3.2 | | | | 0.4 |
| Calf (under 3 mo) | 380 | 3.2 | | | | 0.6 |
| Total | 4170 | | | | | 4.37 |

Total Post-Project Emissions = 4.37 tons-N2O/yr
 1,353.43 tons-CO2 Equivalent

Increase in Emissions = Post-pr - Pre-project = 4.37 tons-N2O/yr
 4.37 - - - - - = 4.37 tons-N2O/yr
 1,353.43 tons-CO2 Equivalent

Appendix C

Proposed Greenhouse Gas Threshold

Proposed Significance Threshold for Greenhouse Gases

Introduction:

Federal and state laws require emission control measures in areas where air pollution exceeds ambient air quality standards. The San Joaquin Valley is one of these areas. The San Joaquin Valley Unified Air District (District) consists of the following eight counties: San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and the Valley portion of Kern. The District's primary focus is taking action to improve the health and quality of life of people living in the Valley, while striving to meet health based state and federal ambient air quality standards. This is achieved through adopting and implementing cost-effective air pollution control measures, providing meaningful incentives for reducing emissions, and by developing creative alternatives for achieving emissions reductions. The District's statutory authority and strategies focus on reducing Criteria Pollutants to meet federal and state standards, and regulating stationary source emissions. Recent concerns over global warming have created a greater interest in greenhouse gases (GHG) and their contribution to global climate change (GCC). However, at this time there are no generally accepted thresholds of significance for determining the impact of GHG emissions from an individual project on GCC. Thus, permitting agencies are in the position of developing policy and guidance to ascertain and mitigate to the extent feasible the effects of GHG, without the normal degree of accepted guidance and case law.

GHG Emissions and CEQA

The California Environmental Quality Act (CEQA) requires that public agencies refrain from approving projects with significant adverse environmental impact if there are feasible alternatives or mitigation measures that can substantially reduce or avoid those impacts. With growing concerns about global impacts of GHG emissions, public agencies with California are looking for guidance on how to adequately address the potential climate change impacts in meeting their CEQA obligations. Regulation of GHG emissions from all sources is under the purview of California Air Resources Board (CARB) and as such may be eventually regulated, no matter how small the source. However, a decision by CARB to regulate a class of sources does not necessarily mean that an individual source of emissions within that class would constitute a project with significant GHG impacts under CEQA.

Threshold Options:

The California Air Pollution Control Officers Association (CAPCOA) prepared a white paper on GHG emissions, titled *CEQA and Climatic Change*. Within the document, CAPCOA reviews GHG policy choices, analytical tools, and mitigation strategies. CAPCOA also discusses the following three options for assessing significance of GHG emissions: establish no significance threshold, establish a zero threshold, and establish a non-zero threshold.

A lack of any applicable significance thresholds for GHGs is not an acceptable option. Project proponents are then left wondering whether their specific project will be considered significant when it arrives at an agency's office for review, and proponents and agencies will be subject to the vagaries and pressures of individual significance decisions with each permit application.

A "zero" threshold would result in most, if not all, proposed projects to be considered "significant", thus triggering CEQA review of even the most mundane and limited of projects. For instance, adding a parking space to a parking lot of a retail sales establishment would encourage additional visits to the store, increasing CO₂ emissions for the area marginally. Subjecting this to CEQA as a significant adverse environmental

impact is patently wrong, has no environmental benefit, and certainly creates impediments to commerce that the authors of CEQA never envisioned. In fact, CEQA regulations contain a multitude of exemptions that reflect the authors' vision that minor projects should be treated as such, and not be subjected to the onerous and time consuming requirements of CEQA. On the other hand, there is an equal case to be made that CEQA's authors envisioned that projects with potentially significant environmental impact should be fully analyzed, and those significant affects should be mitigated to the extent feasible.

Therefore, after considering the merits of each approach, the District concludes that establishing a non-zero threshold of significance for GHG emissions best serves the needs of the residents of the San Joaquin Valley air basin by providing project proponents, the public, and local agencies a useful tool to be used in efforts to evaluate and address potential environmental impacts associated with GHG emissions.

Implementing a GHG Non-zero Significance Threshold:

Air Districts have the primary authority to regulate global warming pollutants from non-vehicular sources. Although California AB 32 gives wide responsibility to CARB to regulate GHG emissions from all sources, including non-vehicular sources, it does not preempt the air districts.

Under state law, it is the purview of each lead agency to determine what, if any, significance thresholds will be established to guide its review of projects under CEQA. The state CEQA guidelines have left the decision of whether to establish thresholds, and if so, at what level, to individual lead agencies. Traditionally, the District has provided local lead agencies technical guidance for assessing a project's potential impact on air quality, including establishment of significance thresholds for criteria pollutants. By establishing a GHG significance level for its own use, the District is hopeful that other agencies will accede to its usefulness, and implement it uniformly throughout, at least, the San Joaquin Valley, thus providing uniform and consistent consideration of GHG significance.

Establishing a Non-zero GHG Significance Threshold:

In *CEQA and Climate Change*, CAPCOA evaluates several conceptual approaches for developing GHG significance thresholds. The District, after dutiful consideration of the various conceptual approaches presented by CAPCOA, concludes that establishing GHG significance thresholds is fundamentally analogous to establishing significance thresholds for criteria pollutants. As noted by CAPCOA, most California air districts have developed CEQA significance thresholds for NO_x and ROG emissions to try to reduce emissions of ozone precursors from proposed sources that are not subject to New Source Review (NSR) pre-construction air quality permitting. The historical management of ozone nonattainment issues is somewhat analogous to today's concerns with greenhouse gas emissions in that regional ozone concentrations are a cumulative air quality problem caused by relatively small amounts of NO_x and ROG emissions from thousands of individual sources, few of which emit enough by themselves to cause elevated ozone concentrations. Those same conditions apply to global climate change where the environmental problem is caused by emissions from a countless number of individual sources, none of which is large enough by itself to cause the problem.

As presented in CAPCOA's *CEQA and Climate Change*, the steps each agency would follow in developing their GHG emissions significance threshold based on the NO_x/ROG analogy ("Regulated Emissions Inventory Capture" methodology) are as follows:

- Define regional NO_x/ROG CEQA thresholds
- Define the regional NO_x/ROG emission inventory the agency is trying to regulate with its NO_x/ROG thresholds
- Calculate the percentage of the total emissions inventory for NO_x represented by the agency's CEQA significance thresholds. That value represents the "minimum

percentage of regulated inventory” for NOx.

- The current (2004) California-wide GHG emission inventory is 499 million metric tons per year of CO₂ equivalent (MMT CO₂e). Apply the typical “minimum percentage of regulated inventory” value to the statewide GHG inventory, to develop a range of analogous GHG CEQA thresholds.

The District agrees with the concept of establishing a GHG significance threshold based on the ratio of an existing criteria pollutant to the total emissions inventory being regulated. However, the District disagrees that local ozone attainment status is relevant. Unlike criteria pollutants where individual districts’ attainment status are characterized by varying levels of pollutant concentrations and sources types, GHG emissions and their attendant climate change ramifications are a global problem. The actions of GHG emissions are global in nature, rather than local, or regional, or even statewide or national. Therefore, establishment of significance thresholds for GHG emissions requires a broader approach to ensure that progress in reducing global impact of GHG emissions is equitable. Therefore, rather than using the local CEQA significance threshold for NOx, we propose to use a broader, more widely applicable threshold, as discussed below.

Establishing a GHG Significance Threshold:

Thus, the GHG significance threshold will be based on:

- a. The United States Environmental Protection Agency’s (EPA’s) major source threshold for NOx, as specified in the federal Clean Air Act. This serves as a surrogate significance threshold that is independent of an area’s ozone attainment status,
- b. The CARB statewide emissions inventory for NOx, and
- c. The CARB statewide emissions inventory for greenhouse gases.

The GHG significance threshold is calculated as follows:

$$\frac{\text{CARB Statewide Criteria Pollutant Emissions Inventory}}{\text{EPA Criteria Pollutant Significance Threshold}} = \frac{\text{CARB Statewide GHG Emissions Inventory}}{\text{GHG Significance Threshold}}$$

Calculation:

GHG California wide EI (2004): 499 million metric tons/year (CO₂e)
CARB Statewide NOx EI (2005): 3,555.8 ton/day
EPA NOx Significance Threshold (major source level): 100 tons NOx/year

$$\text{GHG Significance Threshold} = (499,000,000 \text{ metric t/y} \times 100 \text{ t/y}) / (3,555.8 \text{ t/d} \times 365\text{d/y})$$
$$= 38,447 \text{ metric tons/year (CO}_2\text{e)}$$

$$\text{GHG Significance Threshold} = 42,370 \text{ ton (US)/year (CO}_2\text{e)}$$

Therefore, after appropriate and conservative rounding, we will consider an emissions increase of 38,000 metric ton per year or 42,000 tons per year of CO₂ equivalents to be significant.

The CAPCOA “Regulated Emissions Inventory Capture” methodology described in their *CEQA and Climate Change* report resulted in a calculated significance threshold for the San Joaquin Valley of 46,000 metric tons per year. So our approach is both more conservative (as it results in a lower significance threshold), and more consistent with an analysis of global impacts, as it uses a variable independent of local or regional ozone attainment status upon which to base the regulated emissions inventory comparison.