Revised Cumulative Air Emissions

PM10 EMISSIONS FROM FUTURE DAIRY OPERATIONS (CATTLE CORRAL DUST)

1999 Scenario

		Scenario 1 (CARB Emission Factor; include rain effects; ignore calves)								
Source	Total Head Capacity	PM10 EF (tons/head-yr)	PM10 Emissions (tons/yea	PM10 Emissions (tons/month)	PM10 redn in Jan and Feb	PM10 Emissions Jan and Feb	PM10 redn in Dec & Mar	PM10 Emissions Dec & Mar	PM10 Emissions other months	Total PM10 Emissions (tons/year)
Dry Cows & bred heifers	140,325	0.02453	3,442	287	0.5	287	0.75	430	2,295	3,012
Heifers (1 yr to breeding)	449,040	0.02453	11,014	918	0.5	918	0.75	1,377	7,343	9,637
Calves (3 mos. To 1 year)	374,200	0.00000	0	0	0.5	0	0.75	0	0	0
Baby Calves (<3 months)	74,840	0.00000	0	0	0.5	0	0.75	0	0	0
Total	**1,038,404**									**12,649**

	Scenario 2 (CARB Emission Factor; ignore rain effects; include calves)	Scenario 3 (USDA AAQTF Emission Factor; include rainfall effects, exclude calves)											Scenario 4 (USDA AAQTF Emission Factor; exclude rainfall effects, include calves)		
Source	PM10 EF (tons/head-yr)	PM10 Emissions (tons/year)	PM10 EF (lb/1000hd-day)	PM10 EF (tons/head-yr)	PM10 Emissions (tons/year)	PM10 Emissions (tons/month)	PM10 redn in Jan and Feb	PM10 Emissions Jan and Feb	PM10 redn in Dec & Mar	PM10 Emissions Dec & Mar	PM10 Emissions other months	Total PM10 Emissions (tons/year)	PM10 EF (lb/1000hd-day)	PM10 EF (tons/head-yr)	PM10 Emissions (tons/year)
Dry Cows & bred heifers	0.02453	3,442	20	0.00365	512	43	0.5	43	0.75	64	341	448	20	0.00365	512
Heifers (1 yr to breeding)	0.02453	11,014	20	0.00365	1,639	137	0.5	137	0.75	205	1,093	1,434	20	0.00365	1,639
Calves (3 mos. To 1 year)	0.02453	9,178	0	0.00000	0	0	0.5	0	0.75	0	0	0	20	0.00365	1,366
Baby Calves (<3 months)	0.02453	1,836	0	0.00000	0	0	0.5	0	0.75	0	0	0	20	0.00365	273
Total		**25,470**										**1,882**			**3,790**

2010 Scenario

		Scenario 1 (CARB Emission Factor; include rain effects; ignore calves)								
Source	Total Head Capacity	PM10 EF (tons/head-yr)	PM10 Emissions (tons/yea	PM10 Emissions (tons/month)	PM10 redn in Jan and Feb	PM10 Emissions Jan and Feb	PM10 redn in Dec & Mar	PM10 Emissions Dec & Mar	PM10 Emissions other months	Total PM10 Emissions (tons/year)
Dry Cows & bred heifers	240,003	0.02453	5,887	491	0.5	491	0.75	736	3,925	5,151
Heifers (1 yr to breeding)	768,010	0.02453	18,838	1,570	0.5	1,570	0.75	2,355	12,558	16,483
Calves (3 mos. To 1 year)	640,008	0.00000	0	0	0.5	0	0.75	0	0	0
Baby Calves (<3 months)	128,002	0.00000	0	0	0.5	0	0.75	0	0	0
Total	**1,776,023**									**21,634**

	Scenario 2 (CARB Emission Factor; ignore rain effects; include calves)	Scenario 3 (USDA AAQTF Emission Factor; include rainfall effects, exclude calves)											Scenario 4 (USDA AAQTF Emission Factor; exclude rainfall effects, include calves)		
Source	PM10 EF (tons/head-yr)	PM10 Emissions (tons/year)	PM10 EF (lb/1000hd-day)	PM10 EF (tons/head-yr)	PM10 Emissions (tons/year)	PM10 Emissions (tons/month)	PM10 redn in Jan and Feb	PM10 Emissions Jan and Feb	PM10 redn in Dec & Mar	PM10 Emissions Dec & Mar	PM10 Emissions other months	Total PM10 Emissions (tons/year)	PM10 EF (lb/1000hd-day)	PM10 EF (tons/head-yr)	PM10 Emissions (tons/year)
Dry Cows & bred heifers	0.02453	5,887	20	0.00365	876	73	0.5	73	0.75	110	584	767	20	0.00365	876
Heifers (1 yr to breeding)	0.02453	18,838	20	0.00365	2,803	234	0.5	234	0.75	350	1,869	2,453	20	0.00365	2,803
Calves (3 mos. To 1 year)	0.02453	15,698	0	0.00000	0	0	0.5	0	0.75	0	0	0	20	0.00365	2,336
Baby Calves (<3 months)	0.02453	3,140	0	0.00000	0	0	0.5	0	0.75	0	0	0	20	0.00365	467
Total		**43,562**										**3,219**			**6,482**

2020 Scenario

		Scenario 1 (CARB Emission Factor; include rain effects; ignore calves)								
Source	Total Head Capacity	PM10 EF (tons/head-yr)	PM10 Emissions (tons/yea	PM10 Emissions (tons/month)	PM10 redn in Jan and Feb	PM10 Emissions Jan and Feb	PM10 redn in Dec & Mar	PM10 Emissions Dec & Mar	PM10 Emissions other months	Total PM10 Emissions (tons/year)
Dry Cows & bred heifers	390,940	0.02453	9,589	799	0.5	799	0.75	1,199	6,393	8,390
Heifers (1 yr to breeding)	1,251,007	0.02453	30,685	2,557	0.5	2,557	0.75	3,836	20,456	26,849
Calves (3 mos. To 1 year)	1,042,506	0.00000	0	0	0.5	0	0.75	0	0	0
Baby Calves (<3 months)	208,501	0.00000	0	0	0.5	0	0.75	0	0	0
Total	**2,892,954**									**35,239**

	Scenario 2 (CARB Emission Factor; ignore rain effects; include calves)		Scenario 3 (USDA AAQTF Emission Factor; include rainfall effects, exclude calves)										Scenario 4 (USDA AAQTF Emission Factor; exclude rainfall effects, include calves)		
Source	PM10 EF (tons/head-yr)	PM10 Emissions (tons/year)	PM10 EF (lb/1000hd-day)	PM10 EF (tons/head-yr)	PM10 Emissions (tons/year)	PM10 Emissions (tons/month)	PM10 redn in Jan and Feb	PM10 Emissions Jan and Feb	PM10 redn in Dec & Mar	PM10 Emissions Dec & Mar	PM10 Emissions other months	Total PM10 Emissions (tons/year)	PM10 EF (lb/1000hd-day)	PM10 EF (tons/head-yr)	PM10 Emissions (tons/year)
Dry Cows & bred heifers	0.02453	9,589	20	0.00365	1,427	119	0.5	119	0.75	178	951	1,249	20	0.00365	1,427
Heifers (1 yr to breeding)	0.02453	30,685	20	0.00365	4,566	381	0.5	381	0.75	571	3,044	3,995	20	0.00365	4,566
Calves (3 mos. To 1 year)	0.02453	25,571	0	0.00000	0	0	0.5	0	0.75	0	0	0	20	0.00365	3,805
Baby Calves (<3 months)	0.02453	5,114	0	0.00000	0	0	0.5	0	0.75	0	0	0	20	0.00365	761
Total		**70,958**										**5,244**			**10,559**

Notes:

d Determined from Table No. 5, Nitrogen & Salt Generation Calculation Table.

f PM10 Emission factor obtained from CARB's Section 7.6 (Cattle Feedlot Dust), March 1989, Emission Inventory Procedural Manual and from USEPA AP42 4th edition; Emission factor assumes a PM10 percent of 48%, based on CARB's Section 7.6. PM10EF = (280lb/1000head-day) x (0.48 PM10) x (365 day/yr) / (2000 lb/ton) = 0.024528 tons/head-year. The emission factor used is for beef cattle in cattle feedlots since PM10 emission factors for support stock at dairy facilities are not available.

i, k According to CARB (personal communication between Mr. Patrick Gaffney), CARB and Ms. Rhodora Del Rosario, BASELINE, on 8/30/99, CARB has not published data that identifies the rainfall volume that would reduce reduce PM10 emissions from feedlot corrals. Based on the lack of data, CARB suggested that published PM10 reductions applied for land preparation be used for feedlot calculations.

q PM10 Emission factor obtained from Confined Livestock Air Quality Committee of the USDA Agricultural Air Quality Committee of the USDA Agricultural Air Quality Task Force, Air Quality Research & Technology Transfer Programs for Concentrated Animal Feeding Operations Air Quality Research and Technoloy Transfer White Paper and Recommendations for Concentrated Animal Feeding Operations, Adopted by USDA Agricultural Air Quality Task Force, Washington D.C., July 19, 2000; emission factor reflects non-annualized value since rainfall effects in Texas would different compared to California.

Summary	Scenario (tons per year)			
Year	**1**	**2**	**3**	**4**
1999	12,649	25,470	1,882	3,790
2010	21,634	43,562	3,219	6,482
2020	35,239	70,958	5,244	10,559

ROG & Methane Emissions from Manure Decomposition

1999 Scenario

Source	Head	Head	emission factors (lb/head-year)			emission (lb/year)			emission (ton/year)		
			TOG	Methane	ROG	TOG	Methane	ROG	TOG	Methane	ROG
	c=axb	c	g	h	I	j=gxf	k=hxf	l=Ixf	m=j/2000	n=k/2000	0=l/2000
Milk cows	935,499	935,499	160.8	112.56	12.88	150,428,239	105,299,767	12,049,302	75,214	52,650	6,025
Dry Cows & bred heifers	140,325	140,325	160.8	112.56	12.88	22,564,236	15,794,965	1,807,395	11,282	7,897	904
Heifers (1 yr to breeding)	449,040	449,040	160.8	112.56	12.88	72,205,555	50,543,888	5,783,665	36,103	25,272	2,892
Calves (3 mos. To 1 year)	374,200	374,200	160.8	112.56	12.88	60,171,296	42,119,907	4,819,721	30,086	21,060	2,410
Baby Calves (<3 months)	74,840	74,840	160.8	112.56	12.88	12,034,259	8,423,981	963,944	6,017	4,212	482
Total	**1,973,903**	**1,973,903**				317,403,585	222,182,509	25,424,027	**158,702**	**111,091**	**12,712**

2010 Scenario

Source	Projected Head	AU	emission factors (lb/head-year)			emission (lb/year)			emission (ton/year)		
			TOG	Methane	ROG	TOG	Methane	ROG	TOG	Methane	ROG
	c	f=exc	g	h	I	j=gxf	k=hxf	l=Ixf	m=j/2000	n=k/2000	0=l/2000
Milk cows	1,600,021	1,600,021	160.8	112.56	12.88	257,283,338	180,098,337	20,608,395	128,642	90,049	10,304
Dry Cows & bred heifers	240,003	240,003	160.8	112.56	12.88	38,592,501	27,014,750	3,091,259	19,296	13,507	1,546
Heifers (1 yr to breeding)	768,010	768,010	160.8	112.56	12.88	123,496,002	86,447,202	9,892,030	61,748	43,224	4,946
Calves (3 mos. To 1 year)	640,008	640,008	160.8	112.56	12.88	102,913,335	72,039,335	8,243,358	51,457	36,020	4,122
Baby Calves (<3 months)	128,002	128,002	160.8	112.56	12.88	20,582,667	14,407,867	1,648,672	10,291	7,204	824
Total	**3,376,044**	**3,376,044**				542,867,843	380,007,490	43,483,714	**271,434**	**190,004**	**21,742**

2020 Scenario

Source	Projected Head	equivalent head	emission factors (lb/head-year)			emission (lb/year)			emission (ton/year)		
			TOG	Methane	ROG	TOG	Methane	ROG	TOG	Methane	ROG
	c	f=exc	g	h	I	j=gxf	k=hxf	l=Ixf	m=j/2000	n=k/2000	0=l/2000
Milk cows	2,606,265	2,606,265	160.8	112.56	12.88	419,087,447	293,361,213	33,568,905	209,544	146,681	16,784
Dry Cows & bred heifers	390,940	390,940	160.8	112.56	12.88	62,863,117	44,004,182	5,035,336	31,432	22,002	2,518
Heifers (1 yr to breeding)	1,251,007	1,251,007	160.8	112.56	12.88	201,161,975	140,813,382	16,113,074	100,581	70,407	8,057
Calves (3 mos. To 1 year)	1,042,506	1,042,506	160.8	112.56	12.88	167,634,979	117,344,485	13,427,562	83,817	58,672	6,714
Baby Calves (<3 months)	208,501	208,501	160.8	112.56	12.88	33,526,996	23,468,897	2,685,512	16,763	11,734	1,343
Total	**5,499,220**	**5,499,220**				884,274,513	618,992,159	70,830,388	**442,137**	**309,496**	**35,415**

Summary

	emission (lb/year)			**emission (ton/year)**		
Scenario	**TOG**	**Methane**	**ROG**	**TOG**	**Methane**	**ROG**
1999	317,403,585	222,182,509	25,424,027	158,702	111,091	12,712
2010	542,867,843	380,007,490	43,483,714	271,434	190,004	21,742
2,020	884,274,513	618,992,159	70,830,388	442,137	309,496	35,415

Notes:
d From Table No. 5 (Theoretical Dairy Herd Capacity in Kings County)
e From Table No. 5 (Theoretical Dairy Herd Capacity in Kings County)
g, h, I From CARB Livestock Waste Methodology and 1988, Radian.

Ammonia Emissions Generated from Manure Decomposition

Cattle	head	emission factor (lb/animal/yr) NH3	emission (lb/year) NH3	emissions (tons/year) NH3
1999 Scenario				
milk cows	935,499	28.37	26,543,102	13,272
dry cows&bred	140,325	28.37	3,981,465	1,991
heifers (1yr-bred)	449,040	8.54	3,833,549	1,917
3mo-1yr calves	374,200	3.53	1,320,775	660
baby calves	74,840	3.53	264,155	132
Total	1,973,903		35,943,046	17,972
2010 Scenario				
milk cows	1,600,021	28.37	45,397,712	22,699
dry cows&bred	240,003	28.37	6,809,657	3,405
heifers (1yr-bred)	768,010	8.54	6,556,670	3,278
3mo-1yr calves	640,008	3.53	2,258,973	1,129
baby calves	128,002	3.53	451,795	226
Total	3,376,044		61,474,807	30,737
2020 Scenario				
milk cows	2,606,265	28.37	73,948,089	36,974
dry cows&bred	390,940	28.37	11,092,213	5,546
heifers (1yr-bred)	1,251,007	8.54	10,680,125	5,340
3mo-1yr calves	1,042,506	3.53	3,679,629	1,840
baby calves	208,501	3.53	735,926	368
Total	5,499,220		100,135,983	50,068

Notes:
Emission factors obtained from 1994 Battye Report; emission factors reflect stable & storage emission factor components only.
Table No. 5 (Theoretical Dairy Capacity of Kings County).

Ammonia Emissions Generated from Manure Decomposition

Cattle	head	emission factor (lb/animal/yr) NH3	emission (lb/year) NH3	emissions (tons/year) NH3
1999 Scenario				
milk cows	935,499	74.00	69,226,926	34,613
dry cows&bred	140,325	74.00	10,384,039	5,192
heifers (1yr-bred)	449,040	74.00	33,228,924	16,614
3mo-1yr calves	374,200	74.00	27,690,770	13,845
baby calves	74,840	74.00	5,538,154	2,769
Total	1,973,903		146,068,814	**73,034**
2010 Scenario				
milk cows	1,600,021	74.00	118,401,536	59,201
dry cows&bred	240,003	74.00	17,760,230	8,880
heifers (1yr-bred)	768,010	74.00	56,832,737	28,416
3mo-1yr calves	640,008	74.00	47,360,614	23,680
baby calves	128,002	74.00	9,472,123	4,736
Total	3,376,044		249,827,241	124,914
2020 Scenario				
milk cows	2,606,265	74.00	192,863,626	96,432
dry cows&bred	390,940	74.00	28,929,544	14,465
heifers (1yr-bred)	1,251,007	74.00	92,574,541	46,287
3mo-1yr calves	1,042,506	74.00	77,145,450	38,573
baby calves	208,501	74.00	15,429,090	7,715
Total	5,499,220		406,942,251	203,471

Notes:
Emission factors obtained from James, et al.; emission factor does not speciate between the different cattle types (e.g., heifers, calves, cows) as it reflects the average emission factor for all cattle types; estimate assumes that ratios of cattle types are similar to the dairy studied by UC Davis in developing the emission factor.

Methane Generation from Dairy Cattle

Animal type	#cows	Emission Factor (lb CH4/head/year)	Emissions (tons CH4/year)	Notes
1999 Scenario				
milk cows	935,499	262.5	122,784	considered mature cows
dry cows&bred	140,325	152	10,665	used beef cattle mature cows since these cows are not milk cows
heifers (1yr-bred)	449,040	134.6	30,220	considered replacement cows from 12 -24 months
3mo-1yr calves	374,200	45.5	8,513	considered replacement cows from 0-12 months
baby calves	74,840	45.5	1,703	considered replacement cows from 0-12 months
Total	1,973,903		**173,885**	
2010 Scenario				
milk cows	1,600,021	262.5	210,003	considered mature cows
dry cows&bred	240,003	152	18,240	used beef cattle mature cows since these cows are not milk cows
heifers (1yr-bred)	768,010	134.6	51,687	considered replacement cows from 12 -24 months
3mo-1yr calves	640,008	45.5	14,560	considered replacement cows from 0-12 months
baby calves	128,002	45.5	2,912	considered replacement cows from 0-12 months
Total	3,376,044		**297,402**	
2020 Scenario				
milk cows	2,606,265	262.5	342,072	considered mature cows
dry cows&bred	390,940	152	29,711	used beef cattle mature cows since these cows are not milk cows
heifers (1yr-bred)	1,251,007	134.6	84,193	considered replacement cows from 12 -24 months
3mo-1yr calves	1,042,506	45.5	23,717	considered replacement cows from 0-12 months
baby calves	208,501	45.5	4,743	considered replacement cows from 0-12 months
Total	5,499,220		**484,437**	

Notes:
Emission factors obtained from CARB and Radian Report

PM10 EMISSIONS FROM FUTURE DAIRY OPERATIONS (CATTLE CORRAL DUST)

1999 Scenario

		Scenario 1 (CARB Emission Factor; include rain effects; ignore calves)								
Source	Total Head Capacity	PM10 EF (tons/head-yr)	PM10 Emissions (tons/yea	PM10 Emissions (tons/month)	PM10 redn in Jan and Feb	PM10 Emissions Jan and Feb	PM10 redn in Dec & Mar	PM10 Emissions Dec & Mar	PM10 Emissions other months	Total PM10 Emissions (tons/year)
Dry Cows & bred heifers	18,700	0.02453	459	38	0.5	38	0.75	57	306	401
Heifers (1 yr to breeding)	59,841	0.02453	1,468	122	0.5	122	0.75	183	979	1,284
Calves (3 mos. To 1 year)	49,867	0.00000	0	0	0.5	0	0.75	0	0	0
Baby Calves (<3 months)	9,973	0.00000	0	0	0.5	0	0.75	0	0	0
Total	**138,381**									**1,686**

	Scenario 2 (CARB Emission Factor; ignore rain effects; include calves)	Scenario 3 (USDA AAQTF Emission Factor; include rainfall effects, exclude calves)											Scenario 4 (USDA AAQTF Emission Factor; exclude rainfall effects, include calves)		
Source	PM10 EF (tons/head-yr)	PM10 Emissions (tons/year)	PM10 EF (lb/1000hd-day)	PM10 EF (tons/head-yr)	PM10 Emissions (tons/year)	PM10 Emissions (tons/month)	PM10 redn in Jan and Feb	PM10 Emissions Jan and Feb	PM10 redn in Dec & Mar	PM10 Emissions Dec & Mar	PM10 Emissions other months	Total PM10 Emissions (tons/year)	PM10 EF (lb/1000hd-day)	PM10 EF (tons/head-yr)	PM10 Emissions (tons/year)
Dry Cows & bred heifers	0.02453	459	20	0.00365	68	6	0.5	6	0.75	9	46	60	20	0.00365	68
Heifers (1 yr to breeding)	0.02453	1,468	20	0.00365	218	18	0.5	18	0.75	27	146	191	20	0.00365	218
Calves (3 mos. To 1 year)	0.02453	1,223	0	0.00000	0	0	0.5	0	0.75	0	0	0	20	0.00365	182
Baby Calves (<3 months)	0.02453	245	0	0.00000	0	0	0.5	0	0.75	0	0	0	20	0.00365	36
Total		**3,394**										**251**			**505**

2010 Scenario

		Scenario 1 (CARB Emission Factor; include rain effects; ignore calves)								
Source	Total Head Capacity	PM10 EF (tons/head-yr)	PM10 Emissions (tons/yea	PM10 Emissions (tons/month)	PM10 redn in Jan and Feb	PM10 Emissions Jan and Feb	PM10 redn in Dec & Mar	PM10 Emissions Dec & Mar	PM10 Emissions other months	Total PM10 Emissions (tons/year)
Dry Cows & bred heifers	31,984	0.02453	784	65	0.5	65	0.75	98	523	686
Heifers (1 yr to breeding)	102,348	0.02453	2,510	209	0.5	209	0.75	314	1,674	2,197
Calves (3 mos. To 1 year)	85,290	0.00000	0	0	0.5	0	0.75	0	0	0
Baby Calves (<3 months)	17,058	0.00000	0	0	0.5	0	0.75	0	0	0
Total	**236,679**									**2,883**

	Scenario 2 (CARB Emission Factor; ignore rain effects; include calves)	Scenario 3 (USDA AAQTF Emission Factor; include rainfall effects, exclude calves)											Scenario 4 (USDA AAQTF Emission Factor; exclude rainfall effects, include calves)		
Source	PM10 EF (tons/head-yr)	PM10 Emissions (tons/year)	PM10 EF (lb/1000hd-day)	PM10 EF (tons/head-yr)	PM10 Emissions (tons/year)	PM10 Emissions (tons/month)	PM10 redn in Jan and Feb	PM10 Emissions Jan and Feb	PM10 redn in Dec & Mar	PM10 Emissions Dec & Mar	PM10 Emissions other months	Total PM10 Emissions (tons/year)	PM10 EF (lb/1000hd-day)	PM10 EF (tons/head-yr)	PM10 Emissions (tons/year)
Dry Cows & bred heifers	0.02453	784	20	0.00365	117	10	0.5	10	0.75	15	78	102	20	0.00365	117
Heifers (1 yr to breeding)	0.02453	2,510	20	0.00365	374	31	0.5	31	0.75	47	249	327	20	0.00365	374
Calves (3 mos. To 1 year)	0.02453	2,092	0	0.00000	0	0	0.5	0	0.75	0	0	0	20	0.00365	311
Baby Calves (<3 months)	0.02453	418	0	0.00000	0	0	0.5	0	0.75	0	0	0	20	0.00365	62
Total		**5,805**										**429**			**864**

2020 Scenario

		Scenario 1 (CARB Emission Factor; include rain effects; ignore calves)								
Source	Total Head Capacity	PM10 EF (tons/head-yr)	PM10 Emissions (tons/yea	PM10 Emissions (tons/month)	PM10 redn in Jan and Feb	PM10 Emissions Jan and Feb	PM10 redn in Dec & Mar	PM10 Emissions Dec & Mar	PM10 Emissions other months	Total PM10 Emissions (tons/year)
Dry Cows & bred heifers	52,098	0.02453	1,278	106	0.5	106	0.75	160	852	1,118
Heifers (1 yr to breeding)	166,714	0.02453	4,089	341	0.5	341	0.75	511	2,726	3,578
Calves (3 mos. To 1 year)	138,928	0.00000	0	0	0.5	0	0.75	0	0	0
Baby Calves (<3 months)	27,786	0.00000	0	0	0.5	0	0.75	0	0	0
Total	**385,526**									**4,696**

	Scenario 2 (CARB Emission Factor; ignore rain effects; include calves)	Scenario 3 (USDA AAQTF Emission Factor; include rainfall effects, exclude calves)											Scenario 4 (USDA AAQTF Emission Factor; exclude rainfall effects, include calves)		
Source	PM10 EF (tons/head-yr)	PM10 Emissions (tons/year)	PM10 EF (lb/1000hd-day)	PM10 EF (tons/head-yr)	PM10 Emissions (tons/year)	PM10 Emissions (tons/month)	PM10 redn in Jan and Feb	PM10 Emissions Jan and Feb	PM10 redn in Dec & Mar	PM10 Emissions Dec & Mar	PM10 Emissions other months	Total PM10 Emissions (tons/year)	PM10 EF (lb/1000hd-day)	PM10 EF (tons/head-yr)	PM10 Emissions (tons/year)
Dry Cows & bred heifers	0.02453	1,278	20	0.00365	190	16	0.5	16	0.75	24	127	166	20	0.00365	190
Heifers (1 yr to breeding)	0.02453	4,089	20	0.00365	609	51	0.5	51	0.75	76	406	532	20	0.00365	609
Calves (3 mos. To 1 year)	0.02453	3,408	0	0.00000	0	0	0.5	0	0.75	0	0	0	20	0.00365	507
Baby Calves (<3 months)	0.02453	682	0	0.00000	0	0	0.5	0	0.75	0	0	0	20	0.00365	101
Total		**9,456**										**699**			**1,407**

Notes:

d Determined from Table No. 5, Nitrogen & Salt Generation Calculation Table.

f PM10 Emission factor obtained from CARB's Section 7.6 (Cattle Feedlot Dust), March 1989, Emission Inventory Procedural Manual and from USEPA AP42 4th edition; Emission factor assumes a PM10 percent of 48%, based on CARB's Section 7.6. PM10EF = (280lb/1000head-day) x (0.48 PM10) x (365 day/yr) / (2000 lb/ton) = 0.024528 tons/head-year. The emission factor used is for beef cattle in cattle feedlots since PM10 emission factors for support stock at dairy facilities are not available.

i, k According to CARB (personal communication between Mr. Patrick Gaffney), CARB and Ms. Rhodora Del Rosario, BASELINE, on 8/30/99, CARB has not published data that identifies the rainfall volume that would reduce reduce PM10 emissions from feedlot corrals. Based on the lack of data, CARB suggested that published PM10 reductions applied for land preparation be used for feedlot calculations.

q PM10 Emission factor obtained from Confined Livestock Air Quality Committee of the USDA Agricultural Air Quality Committee of the USDA Agricultural Air Quality Task Force, Air Quality Research & Technology Transfer Programs for Concentrated Animal Feeding Operations Air Quality Research and Technoloy Transfer White Paper and Recommendations for Concentrated Animal Feeding Operations, Adopted by USDA Agricultural Air Quality Task Force, Washington D.C., July 19, 2000; emission factor reflects non-annualized value since rainfall effects in Texas would different compared to California.

Summary	Scenario (tons per year)			
Year	**1**	**2**	**3**	**4**
1999	1,686	3,394	251	505
2010	2,883	5,805	429	864
2020	4,696	9,456	699	1,407

ROG & Methane Emissions from Manure Decomposition

1999 Scenario

Source	Head		emission factors (lb/head-year)			emission (lb/year)			emission (ton/year)		
			TOG	Methane	ROG	TOG	Methane	ROG	TOG	Methane	ROG
	c=axb	f=exc	g	h	I	j=gxf	k=hxf	l=lxf	m=j/2000	n=k/2000	0=l/2000
Milk cows	124,668	124,668	160.8	112.56	12.88	20,046,614	14,032,630	1,605,734	10,023	7,016	803
Dry Cows & bred heifers	18,700	18,700	160.8	112.56	12.88	3,006,992	2,104,895	240,860	1,503	1,052	120
Heifers (1 yr to breeding)	59,841	59,841	160.8	112.56	12.88	9,622,375	6,735,662	770,752	4,811	3,368	385
Calves (3 mos. To 1 year)	49,867	49,867	160.8	112.56	12.88	8,018,646	5,613,052	642,294	4,009	2,807	321
Baby Calves (<3 months)	9,973	9,973	160.8	112.56	12.88	1,603,729	1,122,610	128,459	802	561	64
Total	**263,049**	**263,049**				42,298,356	29,608,849	3,388,098	**21,149**	**14,804**	**1,694**

2010 Scenario

Source	Projected Head		emission factors (lb/head-year)			emission (lb/year)			emission (ton/year)		
			TOG	Methane	ROG	TOG	Methane	ROG	TOG	Methane	ROG
	c	f=exc	g	h	I	j=gxf	k=hxf	l=lxf	m=j/2000	n=k/2000	0=l/2000
Milk cows	213,225	213,225	160.8	112.56	12.88	34,286,514	24,000,560	2,746,350	17,143	12,000	1,373
Dry Cows & bred heifers	31,984	31,984	160.8	112.56	12.88	5,142,977	3,600,084	411,952	2,571	1,800	206
Heifers (1 yr to breeding)	102,348	102,348	160.8	112.56	12.88	16,457,527	11,520,269	1,318,248	8,229	5,760	659
Calves (3 mos. To 1 year)	85,290	85,290	160.8	112.56	12.88	13,714,605	9,600,224	1,098,540	6,857	4,800	549
Baby Calves (<3 months)	17,058	17,058	160.8	112.56	12.88	2,742,921	1,920,045	219,708	1,371	960	110
Total	**449,904**	**449,904**				72,344,544	50,641,181	5,794,798	**36,172**	**25,321**	**2,897**

2020 Scenario

Source	Projected Head		emission factors (lb/head-year)			emission (lb/year)			emission (ton/year)		
			TOG	Methane	ROG	TOG	Methane	ROG	TOG	Methane	ROG
	c	f=exc	g	h	I	j=gxf	k=hxf	l=lxf	m=j/2000	n=k/2000	0=l/2000
Milk cows	347,320	347,320	160.8	112.56	12.88	55,849,118	39,094,382	4,473,514	27,925	19,547	2,237
Dry Cows & bred heifers	52,098	52,098	160.8	112.56	12.88	8,377,368	5,864,157	671,027	4,189	2,932	336
Heifers (1 yr to breeding)	166,714	166,714	160.8	112.56	12.88	26,807,577	18,765,304	2,147,287	13,404	9,383	1,074
Calves (3 mos. To 1 year)	138,928	138,928	160.8	112.56	12.88	22,339,647	15,637,753	1,789,406	11,170	7,819	895
Baby Calves (<3 months)	27,786	27,786	160.8	112.56	12.88	4,467,929	3,127,551	357,881	2,234	1,564	179
Total	**732,846**	**732,846**				117,841,639	82,489,147	9,439,115	**58,921**	**41,245**	**4,720**

Summary

	emission (lb/year)			**emission (ton/year)**		
Scenario	**TOG**	**Methane**	**ROG**	**TOG**	**Methane**	**ROG**
1999	42,298,356	29,608,849	3,388,098	21,149	14,804	1,694
2010	72,344,544	50,641,181	5,794,798	36,172	25,321	2,897
2,020	117,841,639	82,489,147	9,439,115	58,921	41,245	4,720

Notes:
d From Table No. 5 (Theoretical Dairy Herd Capacity in Kings County)
e From Table No. 5 (Theoretical Dairy Herd Capacity in Kings County)
g, h, I From CARB Livestock Waste Methodology and 1988, Radian.

Ammonia Emissions Generated from Manure Decomposition

Cattle	head	emission factor (lb/animal/yr) NH3	emission (lb/year) NH3	emissions (tons/year) NH3
1999 Scenario				
milk cows	124,668	28.37	3,537,230	1,769
dry cows&bred	18,700	28.37	530,585	265
heifers (1yr-bred)	59,841	8.54	510,873	255
3mo-1yr calves	49,867	3.53	176,011	88
baby calves	9,973	3.53	35,202	18
Total	263,049		4,789,901	2,395
2010 Scenario				
milk cows	213,225	28.37	6,049,864	3,025
dry cows&bred	31,984	28.37	907,480	454
heifers (1yr-bred)	102,348	8.54	873,766	437
3mo-1yr calves	85,290	3.53	301,039	151
baby calves	17,058	3.53	60,208	30
Total	449,904		8,192,356	4,096
2020 Scenario				
milk cows	347,320	28.37	9,854,591	4,927
dry cows&bred	52,098	28.37	1,478,189	739
heifers (1yr-bred)	166,714	8.54	1,423,272	712
3mo-1yr calves	138,928	3.53	490,361	245
baby calves	27,786	3.53	98,072	49
Total	732,846		13,344,485	6,672

Notes:
Emission factors obtained from 1994 Battye Report; emission factors reflect stable & storage emission factor components only.
Table No. 5 (Theoretical Dairy Capacity of Kings County).

Ammonia Emissions Generated from Manure Decomposition

Cattle	head	emission factor (lb/animal/yr) NH3	emission (lb/year) NH3	emissions (tons/year) NH3
1999 Scenario				
milk cows	124,668	74.00	9,225,432	4,613
dry cows&bred	18,700	74.00	1,383,815	692
heifers (1yr-bred)	59,841	74.00	4,428,207	2,214
3mo-1yr calves	49,867	74.00	3,690,173	1,845
baby calves	9,973	74.00	738,035	369
Total	263,049		19,465,662	**9,733**
2010 Scenario				
milk cows	213,225	74.00	15,778,619	7,889
dry cows&bred	31,984	74.00	2,366,793	1,183
heifers (1yr-bred)	102,348	74.00	7,573,737	3,787
3mo-1yr calves	85,290	74.00	6,311,448	3,156
baby calves	17,058	74.00	1,262,290	631
Total	449,904		33,292,887	16,646
2020 Scenario				
milk cows	347,320	74.00	25,701,708	12,851
dry cows&bred	52,098	74.00	3,855,256	1,928
heifers (1yr-bred)	166,714	74.00	12,336,820	6,168
3mo-1yr calves	138,928	74.00	10,280,683	5,140
baby calves	27,786	74.00	2,056,137	1,028
Total	732,846		54,230,605	27,115

Notes:
Emission factors obtained from James, et al.; emission factor does not speciate between the different cattle types (e.g., heifers, calves, cows) as it reflects the average emission factor for all cattle types; estimate assumes that ratios of cattle types are similar to the dairy studied by UC Davis in developing the emission factor.

Methane Generation from Dairy Cattle

Animal type	#cows	Emission Factor (lb CH4/head/year)	Emissions (tons CH4/year)	Notes
1999 Scenario				
milk cows	124,668	262.5	16,363	considered mature cows
dry cows&bred	18,700	152	1,421	used beef cattle mature cows since these cows are not milk cows
heifers (1yr-bred)	59,841	134.6	4,027	considered replacement cows from 12 -24 months
3mo-1yr calves	49,867	45.5	1,134	considered replacement cows from 0-12 months
baby calves	9,973	45.5	227	considered replacement cows from 0-12 months
Total	263,049		**23,173**	
2010 Scenario				
milk cows	213,225	262.5	27,986	considered mature cows
dry cows&bred	31,984	152	2,431	used beef cattle mature cows since these cows are not milk cows
heifers (1yr-bred)	102,348	134.6	6,888	considered replacement cows from 12 -24 months
3mo-1yr calves	85,290	45.5	1,940	considered replacement cows from 0-12 months
baby calves	17,058	45.5	388	considered replacement cows from 0-12 months
Total	449,904		**39,633**	
2020 Scenario				
milk cows	347,320	262.5	45,586	considered mature cows
dry cows&bred	52,098	152	3,959	used beef cattle mature cows since these cows are not milk cows
heifers (1yr-bred)	166,714	134.6	11,220	considered replacement cows from 12 -24 months
3mo-1yr calves	138,928	45.5	3,161	considered replacement cows from 0-12 months
baby calves	27,786	45.5	632	considered replacement cows from 0-12 months
Total	732,846		**64,558**	

Notes:
Emission factors obtained from CARB and Radian Report

PM10 EMISSIONS FROM FUTURE DAIRY OPERATIONS (CATTLE CORRAL DUST)

1999 Scenario

		Scenario 1 (CARB Emission Factor; include rain effects; ignore calves)								
Source	Total Head Capacity	PM10 EF (tons/head-yr)	PM10 Emissions (tons/yea	PM10 Emissions (tons/month)	PM10 redn in Jan and Feb	PM10 Emissions Jan and Feb	PM10 redn in Dec & Mar	PM10 Emissions Dec & Mar	PM10 Emissions other months	Total PM10 Emissions (tons/year)
Dry Cows & bred heifers	18,700	0.02453	459	38	0.5	38	0.75	57	306	401
Heifers (1 yr to breeding)	59,841	0.02453	1,468	122	0.5	122	0.75	183	979	1,284
Calves (3 mos. To 1 year)	49,867	0.00000	0	0	0.5	0	0.75	0	0	0
Baby Calves (<3 months)	9,973	0.00000	0	0	0.5	0	0.75	0	0	0
Total	**138,381**									**1,686**

	Scenario 2 (CARB Emission Factor; ignore rain effects; include calves)	Scenario 3 (USDA AAQTF Emission Factor; include rainfall effects, exclude calves)											Scenario 4 (USDA AAQTF Emission Factor; exclude rainfall effects, include calves)		
Source	PM10 EF (tons/head-yr)	PM10 Emissions (tons/year)	PM10 EF (lb/1000hd-day)	PM10 EF (tons/head-yr)	PM10 Emissions (tons/year)	PM10 Emissions (tons/month)	PM10 redn in Jan and Feb	PM10 Emissions Jan and Feb	PM10 redn in Dec & Mar	PM10 Emissions Dec & Mar	PM10 Emissions other months	Total PM10 Emissions (tons/year)	PM10 EF (lb/1000hd-day)	PM10 EF (tons/head-yr)	PM10 Emissions (tons/year)
Dry Cows & bred heifers	0.02453	459	20	0.00365	68	6	0.5	6	0.75	9	46	60	20	0.00365	68
Heifers (1 yr to breeding)	0.02453	1,468	20	0.00365	218	18	0.5	18	0.75	27	146	191	20	0.00365	218
Calves (3 mos. To 1 year)	0.02453	1,223	0	0.00000	0	0	0.5	0	0.75	0	0	0	20	0.00365	182
Baby Calves (<3 months)	0.02453	245	0	0.00000	0	0	0.5	0	0.75	0	0	0	20	0.00365	36
Total		**3,394**										**251**			**505**

2010 Scenario

		Scenario 1 (CARB Emission Factor; include rain effects; ignore calves)								
Source	Total Head Capacity	PM10 EF (tons/head-yr)	PM10 Emissions (tons/yea	PM10 Emissions (tons/month)	PM10 redn in Jan and Feb	PM10 Emissions Jan and Feb	PM10 redn in Dec & Mar	PM10 Emissions Dec & Mar	PM10 Emissions other months	Total PM10 Emissions (tons/year)
Dry Cows & bred heifers	31,984	0.02453	784	65	0.5	65	0.75	98	523	686
Heifers (1 yr to breeding)	102,348	0.02453	2,510	209	0.5	209	0.75	314	1,674	2,197
Calves (3 mos. To 1 year)	85,290	0.00000	0	0	0.5	0	0.75	0	0	0
Baby Calves (<3 months)	17,058	0.00000	0	0	0.5	0	0.75	0	0	0
Total	**236,679**									**2,883**

	Scenario 2 (CARB Emission Factor; ignore rain effects; include calves)	Scenario 3 (USDA AAQTF Emission Factor; include rainfall effects, exclude calves)											Scenario 4 (USDA AAQTF Emission Factor; exclude rainfall effects, include calves)		
Source	PM10 EF (tons/head-yr)	PM10 Emissions (tons/year)	PM10 EF (lb/1000hd-day)	PM10 EF (tons/head-yr)	PM10 Emissions (tons/year)	PM10 Emissions (tons/month)	PM10 redn in Jan and Feb	PM10 Emissions Jan and Feb	PM10 redn in Dec & Mar	PM10 Emissions Dec & Mar	PM10 Emissions other months	Total PM10 Emissions (tons/year)	PM10 EF (lb/1000hd-day)	PM10 EF (tons/head-yr)	PM10 Emissions (tons/year)
Dry Cows & bred heifers	0.02453	784	20	0.00365	117	10	0.5	10	0.75	15	78	102	20	0.00365	117
Heifers (1 yr to breeding)	0.02453	2,510	20	0.00365	374	31	0.5	31	0.75	47	249	327	20	0.00365	374
Calves (3 mos. To 1 year)	0.02453	2,092	0	0.00000	0	0	0.5	0	0.75	0	0	0	20	0.00365	311
Baby Calves (<3 months)	0.02453	418	0	0.00000	0	0	0.5	0	0.75	0	0	0	20	0.00365	62
Total		**5,805**										**429**			**864**

2020 Scenario

		Scenario 1 (CARB Emission Factor; include rain effects; ignore calves)								
Source	Total Head Capacity	PM10 EF (tons/head-yr)	PM10 Emissions (tons/yea	PM10 Emissions (tons/month)	PM10 redn in Jan and Feb	PM10 Emissions Jan and Feb	PM10 redn in Dec & Mar	PM10 Emissions Dec & Mar	PM10 Emissions other months	Total PM10 Emissions (tons/year)
Dry Cows & bred heifers	52,098	0.02453	1,278	106	0.5	106	0.75	160	852	1,118
Heifers (1 yr to breeding)	166,714	0.02453	4,089	341	0.5	341	0.75	511	2,726	3,578
Calves (3 mos. To 1 year)	138,928	0.00000	0	0	0.5	0	0.75	0	0	0
Baby Calves (<3 months)	27,786	0.00000	0	0	0.5	0	0.75	0	0	0
Total	**385,526**									**4,696**

	Scenario 2 (CARB Emission Factor; ignore rain effects; include calves)		Scenario 3 (USDA AAQTF Emission Factor; include rainfall effects, exclude calves)										Scenario 4 (USDA AAQTF Emission Factor; exclude rainfall effects, include calves)		
Source	PM10 EF (tons/head-yr)	PM10 Emissions (tons/year)	PM10 EF (lb/1000hd-day)	PM10 EF (tons/head-yr)	PM10 Emissions (tons/year)	PM10 Emissions (tons/month)	PM10 redn in Jan and Feb	PM10 Emissions Jan and Feb	PM10 redn in Dec & Mar	PM10 Emissions Dec & Mar	PM10 Emissions other months	Total PM10 Emissions (tons/year)	PM10 EF (lb/1000hd-day)	PM10 EF (tons/head-yr)	PM10 Emissions (tons/year)
Dry Cows & bred heifers	0.02453	1,278	20	0.00365	190	16	0.5	16	0.75	24	127	166	20	0.00365	190
Heifers (1 yr to breeding)	0.02453	4,089	20	0.00365	609	51	0.5	51	0.75	76	406	532	20	0.00365	609
Calves (3 mos. To 1 year)	0.02453	3,408	0	0.00000	0	0	0.5	0	0.75	0	0	0	20	0.00365	507
Baby Calves (<3 months)	0.02453	682	0	0.00000	0	0	0.5	0	0.75	0	0	0	20	0.00365	101
Total		**9,456**										**699**			**1,407**

Notes:

d Determined from Table No. 5, Nitrogen & Salt Generation Calculation Table.

f PM10 Emission factor obtained from CARB's Section 7.6 (Cattle Feedlot Dust), March 1989, Emission Inventory Procedural Manual and from USEPA AP42 4th edition; Emission factor assumes a PM10 percent of 48%, based on CARB's Section 7.6. PM10EF = (280lb/1000head-day) x (0.48 PM10) x (365 day/yr) / (2000 lb/ton) = 0.024528 tons/head-year. The emission factor used is for beef cattle in cattle feedlots since PM10 emission factors for support stock at dairy facilities are not available.

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Summary	Scenario (tons per year)			
Year	1	2	3	4
1999	1,686	3,394	251	505
2010	2,883	5,805	429	864
2020	4,696	9,456	699	1,407

Future Capacity PM10 Emissions from Corrals

Assumes All New Future and Expanded Dairies Subject to Dairy Element 50% Reduction Control Measure
1999 Scenario

	Uncontrolled Emissions					50% Controlled Emission Reduction from Future New and Expanded Dairies						Controlled Future Conditions		
Animal Type	Existing Head	1999 Total Head Capacity	Emissons from Existing Head (tons/year)	1999 Herd Capacity Emissions	Net Increase in Emissons (tons per year)	Emissions from Future Expanded and New Dairies (tons/year)	Emissions from Future Expanded and New Dairies (tons/month)	Zero % reduction in Jan and Feb (tons/2months)	25% further reduction in Dec. & Mar. (tons/2 months)	50% reduction from Apr through Nov (tons/8 months)	50% reduction year round (tons/year)	Total Controlled Emission Reduction (tons/year)	Total Conditions (tons/year)	Total Net Emission Increase (tons/year)
Scenario 1														
Milk cows	124,668	124,668	-	-	-	-	-	-	-	-	NA	-	-	-
Dry Cows & bred heifers	18,700	18,700	401	401	-	-	-	-	-	-	NA	-	401	-
Heifers (1 yr to breeding)	59,841	59,841	1,284	1,284	-	-	-	-	-	-	NA	-	1,284	-
Calves (3 mos. To 1 year)	49,867	49,867	-	-	-	-	-	-	-	-	NA	-	-	-
Baby Calves (<3 months)	9,973	9,973	-	-	-	-	-	-	-	-	NA	-	-	-
Total	263,049	263,049	1,686	1,686	0	0	0	0	0	0	NA	0	1,686	**0**
Scenario 2														
Milk cows	124,668	124,668	-	-	-	-	-	NA	NA	NA	-	-	-	-
Dry Cows & bred heifers	18,700	18,700	459	459	-	-	-	NA	NA	NA	-	-	459	-
Heifers (1 yr to breeding)	59,841	59,841	1,468	1,468	-	-	-	NA	NA	NA	-	-	1,468	-
Calves (3 mos. To 1 year)	49,867	49,867	1,223	1,223	-	-	-	NA	NA	NA	-	-	1,223	-
Baby Calves (<3 months)	9,973	9,973	245	245	-	-	-	NA	NA	NA	-	-	245	-
Total	263,049	263,049	3,394	3,394	0	0	0	NA	NA	NA	0	0	3,394	**0**
Scenario 3														
Milk cows	124,668	124,668	-	-	-	-	-	-	-	-	NA	-	-	-
Dry Cows & bred heifers	18,700	18,700	60	60	-	-	-	-	-	-	NA	-	60	-
Heifers (1 yr to breeding)	59,841	59,841	191	191	-	-	-	-	-	-	NA	-	191	-
Calves (3 mos. To 1 year)	49,867	49,867	-	-	-	-	-	-	-	-	NA	-	-	-
Baby Calves (<3 months)	9,973	9,973	-	-	-	-	-	-	-	-	NA	-	-	-
Total	263,049	263,049	251	251	0	0	0	0	0	0	NA	0	251	**0**
Scenario 4														
Milk cows	124,668	124,668	-	-	-	-	-	NA	NA	NA	-	-	-	-
Dry Cows & bred heifers	18,700	18,700	68	68	-	-	-	NA	NA	NA	-	-	68	-
Heifers (1 yr to breeding)	59,841	59,841	218	218	-	-	-	NA	NA	NA	-	-	218	-
Calves (3 mos. To 1 year)	49,867	49,867	182	182	-	-	-	NA	NA	NA	-	-	182	-
Baby Calves (<3 months)	9,973	9,973	36	36	-	-	-	NA	NA	NA	-	-	36	-
Total	263,049	263,049	505	505	0	0	0	NA	NA	NA	0	0	505	**0**

2010 Scenario

	Uncontrolled Emissions					50% Controlled Emission Reduction from Future New and Expanded Dairies						Controlled Future Conditions		
Animal Type	Existing Head	Future 2010 Total Head Capacity	Emissons from Existing Head (tons/year)	Emissons from 2010 Total Head Capacity (tons/year)	Net Increase in Emissons under 2010 Future Conditions (tons per year)	Emissions from Future Expanded and New Dairies (tons/year)	Emissions from Future Expanded and New Dairies (tons/month)	Zero % reduction in Jan and Feb (tons/2months)	25% further reduction in Dec. & Mar. (tons/2 months)	50% reduction from Apr through Nov (tons/8 months)	50% reduction year round (tons/year)	Total Controlled Emission Reduction (tons/year)	Total Future Conditions (tons/year)	Total Net Emission Increase under Future Conditions (tons/year)
Scenario 1														
Milk cows	124,668	213,225	-	-	-	-	-	-	-	-	NA	-	-	-
Dry Cows & bred heifers	18,700	31,984	401	686	285	285	24	48	31	95	NA	174	575	174
Heifers (1 yr to breeding)	59,841	102,348	1,284	2,197	912	912	76	152	100	304	NA	556	1,841	556
Calves (3 mos. To 1 year)	49,867	85,290	-	-	-	-	-	-	-	-	NA	-	-	-
Baby Calves (<3 months)	9,973	17,058	-	-	-	-	-	-	-	-	NA	-	-	-
Total	263,049	**449,904**	1,686	2,883	1,197	1,197	100	200	132	399	NA	730	2,416	**730**
Scenario 2														
Milk cows	124,668	213,225	-	-	-	-	-	NA	NA	NA	-	-	-	-
Dry Cows & bred heifers	18,700	31,984	459	784	326	326	27	NA	NA	NA	163	163	622	163
Heifers (1 yr to breeding)	59,841	102,348	1,468	2,510	1,043	1,043	87	NA	NA	NA	521	521	1,989	521
Calves (3 mos. To 1 year)	49,867	85,290	1,223	2,092	869	869	72	NA	NA	NA	434	434	1,658	434
Baby Calves (<3 months)	9,973	17,058	245	418	174	174	14	NA	NA	NA	87	87	332	87
Total	263,049	**449,904**	3,394	5,805	2,411	2,411	201	NA	NA	NA	1,206	1,206	4,600	**1,206**
Scenario 3														
Milk cows	124,668	213,225	-	-	-	-	-	-	-	-	NA	-	-	-
Dry Cows & bred heifers	18,700	31,984	60	102	42	42	4	7	5	14	NA	26	86	26
Heifers (1 yr to breeding)	59,841	102,348	191	327	136	136	11	23	15	45	NA	83	274	83
Calves (3 mos. To 1 year)	49,867	85,290	-	-	-	-	-	-	-	-	NA	-	-	-
Baby Calves (<3 months)	9,973	17,058	-	-	-	-	-	-	-	-	NA	-	-	-
Total	263,049	**449,904**	251	429	178	178	15	30	20	59	NA	109	360	**109**
Scenario 4														
Milk cows	124,668	213,225	-	-	-	-	-	NA	NA	NA	-	-	-	-
Dry Cows & bred heifers	18,700	31,984	68	117	48	48	4	NA	NA	NA	24	24	92	24
Heifers (1 yr to breeding)	59,841	102,348	218	374	155	155	13	NA	NA	NA	78	78	296	78
Calves (3 mos. To 1 year)	49,867	85,290	182	311	129	129	11	NA	NA	NA	65	65	247	65
Baby Calves (<3 months)	9,973	17,058	36	62	26	26	2	NA	NA	NA	13	13	49	13
Total	263,049	**449,904**	505	864	359	359	30	NA	NA	NA	179	179	684	**179**

2020 Scenario

	Uncontrolled Emissions					50% Controlled Emission Reduction from Future New and Expanded Dairies						Controlled Future Conditions		
Animal Type	Existing Head	Future 2020 Total Head Capacity	Emissons from Existing Head (tons/year)	Emissons from 2020 Total Head Capacity (tons/year)	Net Increase in Emissons under 2020 Future Conditions (tons per year)	Emissions from Future Expanded and New Dairies (tons/year)	Emissions from Future Expanded and New Dairies (tons/month)	Zero % reduction in Jan and Feb (tons/2months)	25% further reduction in Dec. & Mar. (tons/2 months)	50% reduction from Apr through Nov (tons/8 months)	50% reduction year round (tons/year)	Total Controlled Emission Reduction (tons/year)	Total Future Conditions (tons/year)	Total Net Emission Increase under Future Conditions (tons/year)
Scenario 1														
Milk cows	124,668	347,320	-	-	-	-	-	-	-	-	NA	-	-	-
Dry Cows & bred heifers	18,700	52,098	401	1,118	717	717	60	119	79	209	NA	407	809	407
Heifers (1 yr to breeding)	59,841	166,714	1,284	3,578	2,294	2,294	191	382	252	669	NA	1,304	2,588	1,304
Calves (3 mos. To 1 year)	49,867	138,928	-	-	-	-	-	-	-	-	NA	-	-	-
Baby Calves (<3 months)	9,973	27,786	-	-	-	-	-	-	-	-	NA	-	-	-
Total	263,049	**732,846**	1,686	4,696	3,010	3,010	251	502	331	878	NA	1,711	3,397	**1,711**
Scenario 2														
Milk cows	124,668	347,320	-	-	-	-	-	NA	NA	NA	-	-	-	-
Dry Cows & bred heifers	18,700	52,098	459	1,278	819	819	68	NA	NA	NA	410	410	868	410
Heifers (1 yr to breeding)	59,841	166,714	1,468	4,089	2,621	2,621	218	NA	NA	NA	1,311	1,311	2,778	1,311
Calves (3 mos. To 1 year)	49,867	138,928	1,223	3,408	2,184	2,184	182.04	NA	NA	NA	1,092	1,092	2,315	1,092
Baby Calves (<3 months)	9,973	27,786	245	682	437	437	36.41	NA	NA	NA	218	218	463	218
Total	263,049	**732,846**	3,394	9,456	6,062	6,062	505	NA	NA	NA	3,031	3,031	6,425	**3,031**
Scenario 3														
Milk cows	124,668	347,320	-	-	-	-	-	-	-	-	NA	-	-	-
Dry Cows & bred heifers	18,700	52,098	60	166	107	107	9	18	12	31	NA	61	120	61
Heifers (1 yr to breeding)	59,841	166,714	191	532	341	341	28	57	38	100	NA	194	385	194
Calves (3 mos. To 1 year)	49,867	138,928	-	-	-	-	-	-	-	-	NA	-	-	-
Baby Calves (<3 months)	9,973	27,786	-	-	-	-	-	-	-	-	NA	-	-	-
Total	263,049	**732,846**	251	699	448	448	37	75	49	131	NA	255	505	**255**
Scenario 4														
Milk cows	124,668	347,320	-	-	-	-	-	NA	NA	NA	-	-	-	-
Dry Cows & bred heifers	18,700	52,098	68	190	122	122	10	NA	NA	NA	61	61	129	61
Heifers (1 yr to breeding)	59,841	166,714	218	609	390	390	33	NA	NA	NA	195	195	413	195
Calves (3 mos. To 1 year)	49,867	138,928	182	507	325	325	27.09	NA	NA	NA	163	163	345	163
Baby Calves (<3 months)	9,973	27,786	36	101	65	65	5.42	NA	NA	NA	33	33	69	33
Total	263,049	**732,846**	505	1,407	902	902	75	NA	NA	NA	451	451	956	**451**

2010 Scenario Controlled ROG Emissions from Manure Decomposition

Assumes Only New Future Dairies Subject to Dairy Element 50% ROG Reduction Control Measure; Existing Dairies and Expansion Limits are Exempt from Dairy Element ROG Control Measures

Animal Type	Future Theoretical Total Head Capacity	2010 Herd Capacity
Milk cows	381,980	213,225
Dry Cows & bred heifers	57,297	31,984
Heifers (1 yr to breeding)	183,351	102,348
Calves (3 mos. To 1 year)	152,792	85,290
Baby Calves (<3 months)	30,558	17,058
Total	**805,978**	**449,904**

Animal Type	Emission Factor (lb/head-yr)	Existing Dairies					
		Existing Head	Future Expansion Head Limit[1]	Total Dairy Head (Expansion and Existing)	Emissons from Existing Head (tons/year)	Emissons from Expanded Head (tons/year)	Total Uncontrolled Emissions[2] (tons/yr)
Milk cows	12.88	124,668	24,559	149,227	803	158	961
Dry Cows & bred heifers	12.88	18,700	3,684	22,384	120	24	144
Heifers (1 yr to breeding)	12.88	59,841	11,788	71,629	385	76	461
Calves (3 mos. To 1 year)	12.88	49,867	9,824	59,691	321	63	384
Baby Calves (<3 months)	12.88	9,973	1,965	11,938	64	13	77
Total		263,049	51,820	314,868	1,694	334	2,028

Animal Type	Emission Factor (lb/head-yr)	New Dairies/Dairy Expansion[3]				
		2010 Total Head Capacity[4]	Uncontrolled Total Emission (lb/yr)	Uncontrolled Total Emission (ton/yr)	50% Emission Control (ton/yr)	Total Controlled Emissions (ton/yr)
Milk cows	12.88	63,998	824,298	412	206	206
Dry Cows & bred heifers	12.88	9,600	123,645	62	31	31
Heifers (1 yr to breeding)	12.88	30,719	395,660	198	99	99
Calves (3 mos. To 1 year)	12.88	25,599	329,719	165	82	82
Baby Calves (<3 months)	12.88	5,120	65,946	33	16	16
Total		135,035	1,739,267	870	435	435

	Future Conditions	
Animal Type	Total Emissions w/Implementation of Control Measure[5]	Total Net Increase in Emissions
Milk cows	**1,167**	**364**
Dry Cows & bred heifers	**175**	**55**
Heifers (1 yr to breeding)	**560**	**175**
Calves (3 mos. To 1 year)	**467**	**146**
Baby Calves (<3 months)	**93**	**29**
Total	**2,463**	**769**

Notes:

[1] Future expansion head limit reflects the cumulative maximum number of head that existing individual dairies can expand to, without exceeding the ROG threshold limit of 10 tons/year. Expansion of existing dairies which currently exceed the ROG threshold limit would be subject to the 50% ROG Reduction Control Measure.

[2] Existing dairies which currently exceed the ROG threshold limit would not be subject to the 50% ROG Reduction Control Measure.

[3] New dairies also include the expansion of existing dairies which currently exceed the ROG threshold limit.

[4] Total head reflects total 10% reduced future capacity minus head from existing dairies and head from expansion of existing dairies that are not required to implement the 50% ROG Control Measure.

[5] The 50% ROG Control Measure would be required for all new dairies and expansion of existing dairies which currently exceed the ROG threshold limit.

2020 Scenario Controlled ROG Emissions from Manure Decomposition

Assumes Only New Future Dairies Subject to Dairy Element 50% ROG Reduction Control Measure; Existing Dairies and Expansion Limits are Exempt from Dairy Element ROG Control Measures

Animal Type	Future Theoretical Total Head Capacity	2020 Herd Capacity
Milk cows	381,980	347,320
Dry Cows & bred heifers	57,297	52,098
Heifers (1 yr to breeding)	183,351	166,714
Calves (3 mos. To 1 year)	152,792	138,928
Baby Calves (<3 months)	30,558	27,786
Total	**805,978**	**732,846**

Animal Type	Emission Factor (lb/head-yr)	Existing Dairies					
		Existing Head	Future Expansion Head Limit[1]	Total Dairy Head (Expansion and Existing)	Emissons from Existing Head (tons/year)	Emissons from Expanded Head (tons/year)	Total Uncontrolled Emissions[2] (tons/yr)
Milk cows	12.88	124,668	24,559	149,227	803	158	961
Dry Cows & bred heifers	12.88	18,700	3,684	22,384	120	24	144
Heifers (1 yr to breeding)	12.88	59,841	11,788	71,629	385	76	461
Calves (3 mos. To 1 year)	12.88	49,867	9,824	59,691	321	63	384
Baby Calves (<3 months)	12.88	9,973	1,965	11,938	64	13	77
Total		263,049	51,820	314,868	1,694	334	2,028

Animal Type	Emission Factor (lb/head-yr)	New Dairies/Dairy Expansion[3]				
		2020 Total Head Capacity[4]	Uncontrolled Total Emission (lb/yr)	Uncontrolled Total Emission (ton/yr)	50% Emission Control (ton/yr)	Total Controlled Emissions (ton/yr)
Milk cows	12.88	198,094	2,551,462	1,276	638	638
Dry Cows & bred heifers	12.88	29,714	382,719	191	96	96
Heifers (1 yr to breeding)	12.88	95,085	1,224,699	612	306	306
Calves (3 mos. To 1 year)	12.88	79,237	1,020,585	510	255	255
Baby Calves (<3 months)	12.88	15,848	204,119	102	51	51
Total		417,978	5,383,585	2,692	1,346	1,346

	Future Conditions	
Animal Type	Total Emissions w/Implementation of Control Measure[5]	Total Net Increase in Emissions
Milk cows	**1,599**	**796**
Dry Cows & bred heifers	**240**	**119**
Heifers (1 yr to breeding)	**767**	**382**
Calves (3 mos. To 1 year)	**640**	**318**
Baby Calves (<3 months)	**128**	**64**
Total	**3,374**	**1,680**

Notes:

[1] Future expansion head limit reflects the cumulative maximum number of head that existing individual dairies can expand to, without exceeding the ROG threshold limit of 10 tons/year. Expansion of existing dairies which currently exceed the ROG threshold limit would be subject to the 50% ROG Reduction Control Measure.

[2] Existing dairies which currently exceed the ROG threshold limit would not be subject to the 50% ROG Reduction Control Measure.

[3] New dairies also include the expansion of existing dairies which currently exceed the ROG threshold limit.

[4] Total head reflects total 10% reduced future capacity minus head from existing dairies and head from expansion of existing dairies that are not required to implement the 50% ROG Control Measure.

[5] The 50% ROG Control Measure would be required for all new dairies and expansion of existing dairies which currently exceed the ROG threshold limit.

2010 Scenario Controlled Methane Emissions from Manure Decomposition

Assumes Only New Future Dairies Subject to Dairy Element 50% Methane Reduction Control Measure;
Existing Dairies and Expansion Limits are Exempt from Dairy Element Methane Control Measures

Animal Type	Future Total Head Capacity	2010 Herd Capacity
Milk cows	381,980	213,225
Dry Cows & bred heifers	57,297	31,984
Heifers (1 yr to breeding)	183,351	102,348
Calves (3 mos. To 1 year)	152,792	85,290
Baby Calves (<3 months)	30,558	17,058
Total	**805,978**	**449,904**

Animal Type	Emission Factor (lb/head-yr)	Existing Dairies					
		Existing Head	Future Expansion Head Limit[1]	Total Dairy Head (Expansion and Existing)	Emissons from Existing Head (tons/year)	Emissons from Expanded Head (tons/year)	Total Uncontrolled Emissions[2] (tons/yr)
Milk cows	112.56	124,668	24,559	149,227	7,016	1,382	8,398
Dry Cows & bred heifers	112.56	18,700	3,684	22,384	1,052	207	1,260
Heifers (1 yr to breeding)	112.56	59,841	11,788	71,629	3,368	663	4,031
Calves (3 mos. To 1 year)	112.56	49,867	9,824	59,691	2,807	553	3,359
Baby Calves (<3 months)	112.56	9,973	1,965	11,938	561	111	672
Total		263,049	51,820	314,868	14,804	2,916	17,721

Animal Type	Emission Factor (lb/head-yr)	New Dairies/Dairy Expansion[3]				
		2010 Reduced Total Head Capacity[4]	Uncontrolled Total Emission (lb/yr)	Uncontrolled Total Emission (ton/yr)	50% Emission Control (ton/yr)	Total Controlled Emissions (ton/yr)
Milk cows	112.56	63,998	7,203,602	3,602	1,801	1,801
Dry Cows & bred heifers	112.56	9,600	1,080,540	540	270	270
Heifers (1 yr to breeding)	112.56	30,719	3,457,702	1,729	864	864
Calves (3 mos. To 1 year)	112.56	25,599	2,881,441	1,441	720	720
Baby Calves (<3 months)	112.56	5,120	576,306	288	144	144
Total		135,035	15,199,590	7,600	3,800	3,800

	Future Conditions	
Animal Type	Total Emissions w/Implementation of Control Measure[5]	Total Net Increase in Emissions
Milk cows	**10,199**	**3,183**
Dry Cows & bred heifers	**1,530**	**477**
Heifers (1 yr to breeding)	**4,896**	**1,528**
Calves (3 mos. To 1 year)	**4,080**	**1,273**
Baby Calves (<3 months)	**816**	**255**
Total	**21,521**	**6,716**

Notes:

[1] Future expansion head limit reflects the cumulative maximum number of head that existing individual dairies can expand to, without exceeding the ROG threshold limit of 10 tons/year. Expansion of existing dairies which currently exceed the ROG threshold limit would be subject to the 50% Reduction Control Measure.

[2] Existing dairies which currently exceed the ROG threshold limit would not be subject to the 50% Reduction Control Measure.

[3] New dairies also include the expansion of existing dairies which currently exceed the ROG threshold limit.

[4] Total head reflects total 10% reduced future capacity minus head from existing dairies and head from expansion of existing dairies that are not required to implement the 50% Control Measure.

[5] The 50% Control Measure would be required for all new dairies and expansion of existing dairies which currently exceed the ROG threshold limit.

2020 Scenario Controlled Methane Emissions from Manure Decomposition

Assumes Only New Future Dairies Subject to Dairy Element 50% Methane Reduction Control Measure;
Existing Dairies and Expansion Limits are Exempt from Dairy Element Methane Control Measures

Animal Type	Future Total Head Capacity	2020 Herd Capacity
Milk cows	381,980	347,320
Dry Cows & bred heifers	57,297	52,098
Heifers (1 yr to breeding)	183,351	166,714
Calves (3 mos. To 1 year)	152,792	138,928
Baby Calves (<3 months)	30,558	27,786
Total	**805,978**	**732,846**

Animal Type	Emission Factor (lb/head-yr)	Existing Dairies					
		Existing Head	Future Expansion Head Limit[1]	Total Dairy Head (Expansion and Existing)	Emissons from Existing Head (tons/year)	Emissons from Expanded Head (tons/year)	Total Uncontrolled Emissions[2] (tons/yr)
Milk cows	112.56	124,668	24,559	149,227	7,016	1,382	8,398
Dry Cows & bred heifers	112.56	18,700	3,684	22,384	1,052	207	1,260
Heifers (1 yr to breeding)	112.56	59,841	11,788	71,629	3,368	663	4,031
Calves (3 mos. To 1 year)	112.56	49,867	9,824	59,691	2,807	553	3,359
Baby Calves (<3 months)	112.56	9,973	1,965	11,938	561	111	672
Total		263,049	51,820	314,868	14,804	2,916	17,721

Animal Type	Emission Factor (lb/head-yr)	New Dairies/Dairy Expansion[3]				
		2020 Reduced Total Head Capacity[4]	Uncontrolled Total Emission (lb/yr)	Uncontrolled Total Emission (ton/yr)	50% Emission Control (ton/yr)	Total Controlled Emissions (ton/yr)
Milk cows	112.56	198,094	22,297,424	11,149	5,574	5,574
Dry Cows & bred heifers	112.56	29,714	3,344,614	1,672	836	836
Heifers (1 yr to breeding)	112.56	95,085	10,702,737	5,351	2,676	2,676
Calves (3 mos. To 1 year)	112.56	79,237	8,918,970	4,459	2,230	2,230
Baby Calves (<3 months)	112.56	15,848	1,783,812	892	446	446
Total		417,978	47,047,557	23,524	11,762	11,762

	Future Conditions	
Animal Type	Total Emissions w/Implementation of Control Measure[5]	Total Net Increase in Emissions
Milk cows	**13,973**	**6,957**
Dry Cows & bred heifers	**2,096**	**1,043**
Heifers (1 yr to breeding)	**6,707**	**3,339**
Calves (3 mos. To 1 year)	**5,589**	**2,783**
Baby Calves (<3 months)	**1,118**	**557**
Total	**29,483**	**14,678**

Notes:

[1] Future expansion head limit reflects the cumulative maximum number of head that existing individual dairies can expand to, without exceeding the ROG threshold limit of 10 tons/year. Expansion of existing dairies which currently exceed the ROG threshold limit would be subject to the 50% Reduction Control Measure.

[2] Existing dairies which currently exceed the ROG threshold limit would not be subject to the 50% Reduction Control Measure.

[3] New dairies also include the expansion of existing dairies which currently exceed the ROG threshold limit.

[4] Total head reflects total 10% reduced future capacity minus head from existing dairies and head from expansion of existing dairies that are not required to implement the 50% Control Measure.

[5] The 50% Control Measure would be required for all new dairies and expansion of existing dairies which currently exceed the ROG threshold limit.

ROG & Methane Emissions from Manure Decomposition

1999 Scenario

Source	Head		emission factors (lb/head-year)			emission (lb/year)			emission (ton/year)		
			TOG	Methane	ROG	TOG	Methane	ROG	TOG	Methane	ROG
	c=axb	c	g	h	I	j=gxf	k=hxf	l=lxf	m=j/2000	n=k/2000	0=l/2000
Milk cows	124,668	124,668	160.8	112.56	12.88	20,046,614	14,032,630	1,605,734	10,023	7,016	803
Dry Cows & bred heifers	18,700	18,700	160.8	112.56	12.88	3,006,992	2,104,895	240,860	1,503	1,052	120
Heifers (1 yr to breeding)	59,841	59,841	160.8	112.56	12.88	9,622,375	6,735,662	770,752	4,811	3,368	385
Calves (3 mos. To 1 year)	49,867	49,867	160.8	112.56	12.88	8,018,646	5,613,052	642,294	4,009	2,807	321
Baby Calves (<3 months)	9,973	9,973	160.8	112.56	12.88	1,603,729	1,122,610	128,459	802	561	64
Total	**263,049**	**263,049**				42,298,356	29,608,849	3,388,098	**21,149**	**14,804**	**1,694**

2010 Scenario

Source	Projected Head		emission factors (lb/head-year)			emission (lb/year)			emission (ton/year)		
			TOG	Methane	ROG	TOG	Methane	ROG	TOG	Methane	ROG
	c	c	g	h	I	j=gxf	k=hxf	l=lxf	m=j/2000	n=k/2000	0=l/2000
Milk cows	213,225	213,225	160.8	112.56	12.88	34,286,514	24,000,560	2,746,350	17,143	12,000	1,373
Dry Cows & bred heifers	31,984	31,984	160.8	112.56	12.88	5,142,977	3,600,084	411,952	2,571	1,800	206
Heifers (1 yr to breeding)	102,348	102,348	160.8	112.56	12.88	16,457,527	11,520,269	1,318,248	8,229	5,760	659
Calves (3 mos. To 1 year)	85,290	85,290	160.8	112.56	12.88	13,714,605	9,600,224	1,098,540	6,857	4,800	549
Baby Calves (<3 months)	17,058	17,058	160.8	112.56	12.88	2,742,921	1,920,045	219,708	1,371	960	110
Total	**449,904**	**449,904**				72,344,544	50,641,181	5,794,798	**36,172**	**25,321**	**2,897**

2020 Scenario

Source	Projected Head		emission factors (lb/head-year)			emission (lb/year)			emission (ton/year)		
			TOG	Methane	ROG	TOG	Methane	ROG	TOG	Methane	ROG
	c	c	g	h	I	j=gxf	k=hxf	l=lxf	m=j/2000	n=k/2000	0=l/2000
Milk cows	347,320	347,320	160.8	112.56	12.88	55,849,118	39,094,382	4,473,514	27,925	19,547	2,237
Dry Cows & bred heifers	52,098	52,098	160.8	112.56	12.88	8,377,368	5,864,157	671,027	4,189	2,932	336
Heifers (1 yr to breeding)	166,714	166,714	160.8	112.56	12.88	26,807,577	18,765,304	2,147,287	13,404	9,383	1,074
Calves (3 mos. To 1 year)	138,928	138,928	160.8	112.56	12.88	22,339,647	15,637,753	1,789,406	11,170	7,819	895
Baby Calves (<3 months)	27,786	27,786	160.8	112.56	12.88	4,467,929	3,127,551	357,881	2,234	1,564	179
Total	**732,846**	**732,846**				117,841,639	82,489,147	9,439,115	**58,921**	**41,245**	**4,720**

Summary

	emission (lb/year)			**emission (ton/year)**		
Scenario	**TOG**	**Methane**	**ROG**	**TOG**	**Methane**	**ROG**
1999	42,298,356	29,608,849	3,388,098	21,149	14,804	1,694
2010	72,344,544	50,641,181	5,794,798	36,172	25,321	2,897
2,020	117,841,639	82,489,147	9,439,115	58,921	41,245	4,720

Notes:

d From Table No. 5 (Theoretical Dairy Herd Capacity in Kings County)

e From Table No. 5 (Theoretical Dairy Herd Capacity in Kings County)

g, h, I From CARB Livestock Waste Methodology and 1988, Radian.

Ammonia Emissions Generated from Manure Decomposition

Cattle	head	emission factor (lb/animal/yr) NH3	emission (lb/year) NH3	emissions (tons/year) NH3
1999 Scenario				
milk cows	124,668	28.37	3,537,230	1,769
dry cows&bred	18,700	28.37	530,585	265
heifers (1yr-bred)	59,841	8.54	510,873	255
3mo-1yr calves	49,867	3.53	176,011	88
baby calves	9,973	3.53	35,202	18
Total	263,049		4,789,901	2,395
2010 Scenario				
milk cows	213,225	28.37	6,049,864	3,025
dry cows&bred	31,984	28.37	907,480	454
heifers (1yr-bred)	102,348	8.54	873,766	437
3mo-1yr calves	85,290	3.53	301,039	151
baby calves	17,058	3.53	60,208	30
Total	449,904		8,192,356	4,096
2020 Scenario				
milk cows	347,320	28.37	9,854,591	4,927
dry cows&bred	52,098	28.37	1,478,189	739
heifers (1yr-bred)	166,714	8.54	1,423,272	712
3mo-1yr calves	138,928	3.53	490,361	245
baby calves	27,786	3.53	98,072	49
Total	732,846		13,344,485	6,672

Notes:
Emission factors obtained from 1994 Battye Report; emission factors reflect stable & storage emission factor components only.
Table No. 5 (Theoretical Dairy Capacity of Kings County).

Ammonia Emissions Generated from Manure Decomposition

Cattle	head	emission factor (lb/animal/yr) NH3	emission (lb/year) NH3	emissions (tons/year) NH3
1999 Scenario				
milk cows	124,668	74.00	9,225,432	4,613
dry cows&bred	18,700	74.00	1,383,815	692
heifers (1yr-bred)	59,841	74.00	4,428,207	2,214
3mo-1yr calves	49,867	74.00	3,690,173	1,845
baby calves	9,973	74.00	738,035	369
Total	263,049		19,465,662	**9,733**
2010 Scenario				
milk cows	213,225	74.00	15,778,619	7,889
dry cows&bred	31,984	74.00	2,366,793	1,183
heifers (1yr-bred)	102,348	74.00	7,573,737	3,787
3mo-1yr calves	85,290	74.00	6,311,448	3,156
baby calves	17,058	74.00	1,262,290	631
Total	449,904		33,292,887	16,646
2020 Scenario				
milk cows	347,320	74.00	25,701,708	12,851
dry cows&bred	52,098	74.00	3,855,256	1,928
heifers (1yr-bred)	166,714	74.00	12,336,820	6,168
3mo-1yr calves	138,928	74.00	10,280,683	5,140
baby calves	27,786	74.00	2,056,137	1,028
Total	732,846		54,230,605	27,115

Notes:
Emission factors obtained from James, et al.; emission factor does not speciate between the different cattle types (e.g., heifers, calves, cows) as it reflects the average emission factor for all cattle types; estimate assumes that ratios of cattle types are similar to the dairy studied by UC Davis in developing the emission factor.

Methane Generation from Dairy Cattle

Animal type	#cows	Emission Factor (lb CH4/head/year)	Emissions (tons CH4/year)	Notes
1999 Scenario				
milk cows	124,668	262.5	16,363	considered mature cows
dry cows&bred	18,700	152	1,421	used beef cattle mature cows since these cows are not milk cows
heifers (1yr-bred)	59,841	134.6	4,027	considered replacement cows from 12 -24 months
3mo-1yr calves	49,867	45.5	1,134	considered replacement cows from 0-12 months
baby calves	9,973	45.5	227	considered replacement cows from 0-12 months
Total	263,049		**23,173**	
2010 Scenario				
milk cows	213,225	262.5	27,986	considered mature cows
dry cows&bred	31,984	152	2,431	used beef cattle mature cows since these cows are not milk cows
heifers (1yr-bred)	102,348	134.6	6,888	considered replacement cows from 12 -24 months
3mo-1yr calves	85,290	45.5	1,940	considered replacement cows from 0-12 months
baby calves	17,058	45.5	388	considered replacement cows from 0-12 months
Total	449,904		**39,633**	
2020 Scenario				
milk cows	347,320	262.5	45,586	considered mature cows
dry cows&bred	52,098	152	3,959	used beef cattle mature cows since these cows are not milk cows
heifers (1yr-bred)	166,714	134.6	11,220	considered replacement cows from 12 -24 months
3mo-1yr calves	138,928	45.5	3,161	considered replacement cows from 0-12 months
baby calves	27,786	45.5	632	considered replacement cows from 0-12 months
Total	732,846		**64,558**	

Notes:
Emission factors obtained from CARB and Radian Report

URBEMIS 7G: Version 3.1

File Name: 99233c10.URB
Project Name: 2010 Cumulative Cow Dairy, Dairy Element
Project Location: San Joaquin Valley

DETAILED REPORT
(Tons/Year)

OPERATIONAL (Vehicle) EMISSION ESTIMATES

Analysis Year: 2010 Temperature (F): 100 Season: Annual

EMFAC Version: EMFAC7G (10/96)

Summary of Land Uses:

Unit Type	Trip Rate	Size	Total Trips
5000-cow dairy	84.00 trips / trips/dairy	363.00	30,492.00

Vehicle Assumptions:

Fleet Mix:

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Duty Autos	30.00	1.16	98.58	0.26
Light Duty Trucks	30.00	0.13	99.54	0.33
Medium Duty Trucks	0.00	1.44	98.56	
Lite-Heavy Duty Trucks	0.00	19.56	40.00	40.44
Med.-Heavy Duty Trucks	33.00	19.56	40.00	40.44
Heavy-Heavy Trucks	7.00			100.00
Urban Buses	0.00			100.00
Motorcycles	0.00			

100.00 % all fuels