FINAL MITIGATED NEGATIVE DECLARATION AND INITIAL STUDY
BAR 20 DAIRY

April 2008

Lead Agency:	San Joaquin Valley Air Pollution Control District 1990 East Gettysburg Avenue Fresno, California 93726-0244
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SECTION ONE

MITIGATED NEGATIVE DECLARATION AND MITIGATION MONITORING PROGRAM

SECTION ONE – FINAL MITIGATED NEGATIVE DECLARATION

1.1 The Project

The project proponent has applied to the San Joaquin Valley Air Pollution Control District (The Air District) for a permit to increase the number of milking cows on an existing dairy facility from 2,904 (6,204 total head) to 9,400 (19,120 total head); and make concomitant changes in the dairy's support stock. In addition, Bar 20 Dairy has proposed to install an anaerobic digester as an integral part of the project. The anaerobic digester will collect and digest cow manure from the dairy expansion and from the existing dairy to produce biogas. The biogas will then be piped approximately 5.5 miles by a pipeline that will extend from the Bar 20 Dairy to an existing PG&E pipeline. The dairy facilities (corrals, dairy barn, feed storage, manure management area and process water storage area, etc.) are located at 24387 Whites Bridge Road (SR 180), approximately 6 miles west of Kerman, in Fresno County.

1.2 Purpose and Authority

The purpose (objective) of the project is to operate an economically viable and competitive dairy facility in compliance with applicable laws and regulations, optimally utilizing the available land resources and mitigating all potentially significant impacts to a less than significant level in accord with the California Environmentally Quality Act (CEQA).

The San Joaquin Valley Air Pollution Control District (Air District) is the lead agency pursuant to California CEQA Guidelines, Section 15050. Consistent with these guidelines this Mitigated Negative Declaration evaluates and discusses the project's potential environmental impacts together with feasible mitigation measures that adequately mitigate these impacts.

1.3 Decision to Prepare a Mitigated Negative Declaration

In August 2000 the Air District adopted *Environmental Review Guidelines Procedures for Implementing the California Environmental Quality Act.* Section 4.3.3 of these guidelines state:

> *"Following completion of the Initial Study, the SJVUAPCD will review the potential impacts along with the recommendations of the trustee agencies and responsible agencies to determine if substantial evidence exists that the project will have a significant effect on the environment. If there are no significant effects, the SJVUAPCD will prepare a Negative Declaration. If there are significant effects, but those effects can be mitigated to a level considered less than significant, the SJVUAPCD will prepare a Mitigated Negative Declaration and incorporate the mitigation measures into the project. When an individual or entity other than the SJVUAPCD is undertaking the project, the project applicant must agree to the incorporation of the measures into the project. If there are unavoidable significant effects, the SJVUAPCD will prepare an EIR. The Director of Planning or his designee shall make this determination."*

The CEQA Guidelines defines significant effect on the environment as *"a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic and aesthetic significance." When "substantial evidence exists, in the light of the whole record before the Lead Agency, that a project may have a significant effect on the environment"*, the agency must prepare a draft EIR [CCR §15064(a)(1)].

Based on the evidence and facts set forth in the Initial Study, the Air District finds that all potentially significant impacts will be mitigated to a less than significant level.

1.4 Final Mitigated Negative Declaration

Title: Bar 20 Dairy
Location: 24387 Whites Bridge Road
City: 6 miles west of Kerman **County:** Fresno
Section: 5 **Township:** 13S **Range:** 16E **Meridian:** Mount Diablo
Contact: Chris Kalashian

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1. This is to advise of the following determinations regarding this action:

    a. This Mitigated Negative Declaration together with an Initial Study was prepared and circulated pursuant to *Section 11105 of the CEQA Guidelines*.

    b. Copies of the Mitigated Negative Declaration and Initial Study were made available for public review at the San Joaquin Valley Air Pollution Control Office, 1990 East Gettysburg Ave. Fresno 93726.

    c. A public notice was placed in a newspaper of general circulation in the Fresno area. The public notice described the proposed project and the dates when the District would receive public comments.

    d. Responses to all comments on the Mitigated Negative Declaration and Initial Study were prepared, and copies furnished to commenting persons and/or agencies.

    e. The project has been found not to have a significant effect on the environment, with the mitigation measures incorporated in the project design and set forth in the Mitigation Monitoring Program.

2. Enclosed and incorporated as part of the Mitigated Negative Declaration is the Initial Study.

1.5 Mitigation Monitoring Program

State and local agencies are required by *Section 21081.6* of the *California Public Resources Code* to establish a monitoring program for all projects which are approved and which require CEQA processing.

Local agencies are given broad latitude in developing programs to meet the requirements of *Public Resources Code Section 21081.6*. The mitigation monitoring program outlined in this document is based upon guidance issued by the Governor's Office of Planning and Research.

The mitigation monitoring program for the proposed project corresponds to mitigation measures outlined in the Initial Study. The Program summarizes the environmental issues identified in the Initial Study, the mitigation measures required to reduce each potentially significant impact to less than significant, the person or agency responsible for implementing the measures, and the agency or agencies responsible for monitoring and reporting on the implementation of the mitigation measures.

1.6 The Program

Operation of the dairy will require a Permit to Operate from the SJVAPCD: and an acceptance by the California Regional Water Quality Control Board of a Report of Waste Discharge or other approval.

The mitigation measures contained herein shall be included as conditions of approval for each of these permits, to the extent permitted by law. The SJVAPCD shall ensure that all project operations conform to the conditions of the mitigated project. Table 1-1 shall be attached to all permits as a condition of approval.

Table 1-1
Mitigation Monitoring Program

Mitigation Measures	Implementation	Monitoring
Mitigation Measure 2.6.3.1-1 Reduction of Greenhouse Gas Emissions (quantifiable) 1. Feeding dietary oils (eg. Cottonseed) to animals. 2. Removal of manure from the concrete feed lanes at least once a day. NOTE: Bar 20 Dairy is required to remove manure at least four times a day for the mature cows and at least two times per day for all other support stock. 3. Solid manure applied to fields shall be incorporated into the soil immediately (within two hours) after application.	Mitigation measure shall be implemented by the owner/operator and shall be a condition of the Permit to Operate.	Monitoring shall be the responsibility of the SJVAPCD.
Mitigation Measure 2.6.3.1-2 Reduction of Greenhouse Gas Emissions (non-quantifiable) 1. Downwind windbreak designed in accordance to the NRCS	Mitigation measure shall be implemented by the owner/operator and shall be a condition	Monitoring shall be the responsibility of the SJVAPCD.

Mitigation Measures	Implementation	Monitoring
guideline #380. 2. All open corrals adequately sloped to promote drainage (minimum of 3% slope where the available space for each animal is 400 square feet or less and minimum of 1.5% where the available space for each animal is more than 400 square feet per animal). 3. Maintain corrals to ensure drainage and prevent water from standing more than 48 hours after a storm. 4. Knockdown fence line animal waste build-up prior to its exceeding a height of 12 inches at any time or point. 5. All animals fed in accordance with National Research Council (NRC) or other District approved guidelines utilizing routine nutritional analysis for rations	of the Permit to Operate.	
Mitigation Measure 2.6.3.2-2 PM_{10} Control Measures – Expanded Dairy Facility 1. Milk cows housed in freestalls shall not be allowed in exercise pens. Exercise pens shall be permanently blocked off and made inaccessible. 2. Shade structures shall be provided for the following cows: 950 heifers (15-24 months) and 950 heifers (7-14 months). Saudi-style barns shall be provided for the following: 200 milk cows, 1,000 dry cows, 300 heifers (15-24 months), 100 heifers (7-14 months) and 700 heifers (4-6 months). Calves shall be housed in individual above-ground calf hutches. 3. Sufficient sprinkling shall be undertaken in heifer corrals (heifers 7-14 months) to match daily evaporation. 4. At least one of the daily feedings of the heifers shall be near (within one hour of) dusk. 5. Weekly scraping of corrals using pull-type scraper in the morning hours except when prevented by wet conditions (this also applies to the existing dairy). 6. Dry manure (both facilities) shall not be applied to fields when wind speeds exceed 10 miles per hour. 7. Field perimeter roads and onsite facility roads shall be stabilized such that no visible dust clouds beyond the site boundary from manure spreading or agricultural service vehicles using these roads. All onsite dairy facility roads shall be surfaced with gravel, sand, or decomposed granite. 8. Mud or dirt on project-adjacent public roads which originates from project operations shall be removed within 24 hours of deposition.	Mitigation measure shall be implemented by the owner/operator and shall be a condition of the Permit to Operate.	Monitoring shall be the responsibility of the SJVAPCD.

Mitigation Measures	Implementation	Monitoring
9. Begin establishing windbreak(s) around the dairy in accordance with National Resource Conservation Practice Standard Code 380-Windbreak/Shelterbelt establishment or other District-approved guidelines for downwind windbreaks for all cows and upwind windbreaks for all cows except milk and dry cows.		
Mitigation Measure #2.6.3.2-3 PM_{10} Control Measures – Existing Dairy Facility: In addition to the control measures directed to the expanded milk cow herd, the owner/operator has agreed to implement the following measures at the existing permitted dairy facility site: 1. The cow herd at the existing dairy to be reduced from 6,204 to 5,610 cows; the herd composition to be: Type — Number Milking cows — 2,600 Dry cows — 500 Heifers (15-24 months) — 1,000 Heifers (7-14 months) — 800 Calves (4-6 months) — 400 Calves (under 3 months) — 300 Bulls — 10 **Total 5,610** 2. At least one of the daily feedings of the heifers shall be near (within one hour of) dusk. 3. Weekly scraping of corrals using pull-type scraper in the morning hours except when prevented by wet conditions. 4. In accordance with National Resource Conservation Service (NRCS) Conservation Practice Standard Code 380-Windbreak/Shelterbelt shall install upwind shelterbelts for heifers 7-14 months of age. 5. Sufficient sprinkling in heifer corrals (heifers ages between 7-24 months) to match daily evaporation (pan evaporation rate).	Mitigation measure shall be implemented by the owner/operator and shall be a condition of the Permit to Operate.	Monitoring shall be the responsibility of the SJVAPCD.
Mitigation Measure #2.6.3.2-4 PM_{10} Offset Purchase: 1. The owner/applicant has purchased 3.47 tons of PM_{10} (at the appropriate Distance Offset ratio).	Mitigation measure shall be implemented by the owner/operator and shall be a condition of the Permit to Operate.	Monitoring shall be the responsibility of the SJVAPCD.
Mitigation Measure #2.6.3.3-1 VOC Control Measure – Expanded Dairy Facility: 1. Flush/Spray down milking parlor(s) immediately prior to, immediately after, or during the milking of each group of cows. 2. Concrete feed lanes and walkways.	Mitigation measure shall be implemented by the owner/operator and shall be a condition of the Permit to Operate.	Monitoring shall be the responsibility of the SJVAPCD.

Mitigation Measures	Implementation	Monitoring
3. All but 200 milk cows housed in freestall barns with water drainage to separator facilities. 4. Feed lanes and walkways for all milk and dry cows flushed at least four times per day. 5. All corrals adequately sloped to promote and achieve full drainage. 6. Corrals shall be managed to ensure drainage and prevent water from standing more than forty-eight (48) hours after a storm. 7. Leachate from the silage piles shall be collected and sent to a waste treatment system such as a lagoon in a timely manner (minimum of once every twenty-four (24) hours). 8. All animals fed in accordance with National Research Council (NRC) or other District approved guidelines utilizing routine nutritional analysis for rations. 9. Silage shall be fully enclosed or covered with tarps, except for the area where feed is being removed from the pile. 10. Silage Face Management (only disturb the required area of face – leave remaining area undisturbed). 11. Refused feed shall be pushed up to be re-fed or removed from feed lanes on a daily basis to prevent decomposition. 12. Solid manure shall be harrowed in thin layers in corrals and drying areas to facilitate aerobic drying. This requirement shall not apply when wet weather conditions make this practice infeasible. 13. Solid manure shall be incorporated into fields immediately (within two hours) after application.		
Mitigation Measure #2.6.3.3-2 VOC Control Measures – Existing Dairy Facility: Control measures shall also be required for operation of the existing dairy. 1. Flush/Spray down milking parlor(s) immediately prior to, immediately after, or during the milking of each group of cows. 2. Feed lanes and walkways for all milk and dry cows flushed at least four times per day. 3. At least one of the daily feedings of the heifers shall be near (within one hour of) dusk. 4. All animals fed in accordance with National Research Council (NRC) or other District-approved guidelines utilizing routine nutritional analysis for rations.	Mitigation measure shall be implemented by the owner/operator and shall be a condition of the Permit to Operate.	Monitoring shall be the responsibility of the SJVAPCD.

Mitigation Measures	Implementation	Monitoring
5. Weekly scraping of corrals using pull-type scraper in the morning hours except when prevented by wet conditions. 6. Irrigation of crops using liquid and slurry manure from a holding/ storage pond(s). 7. Utilization of manure water and manure will be in thin layers, blending such manure water with irrigation water in compliance with the nutrient management plan.		
Mitigation Measure #2.6.3.3-3 Reduction in Milking Cows: In addition to the above VOC control measures, the owner applicant has agreed to reduce the number of milking cows in the San Joaquin Valley Air District. 1. The owner/applicant shall purchase and permanently close two dairies in the District. The 1,174 milking cows thereon shall be transferred to the Bar 20 Dairy. (The two dairies are the JMC Dairy located on 13th Street approximately ½ mile north of Grangeville Boulevard in Kings County, 504 milking cows, and the Joe Machado Dairy located on Henry Street approximately 1-1/2 miles west of State Route 99 in Merced County, 670 milking cows.) Total reduction in VOC emissions by 11.33 tons. 2. From a third dairy site in Fresno County, located at Madison Avenue and Brawley Avenue 17 miles east of the project site, the owner/applicant shall transfer 433 milking cows, 53 dry cows, and 11 heifers to the Bar 20 Dairy, and shall then convert this dairy into a heifer ranch. The heifer ranch shall be limited to 400 heifers (200 age 15-24 months and 200 under 15 months). Total reduction in VOC emissions by 2.88 tons. 3. In addition to the above shutdowns, Bar 20 has proposed to shutdown additional existing dairies in the San Joaquin Valley and transfer the cows from the shutdown dairies for use at their expansion project. The number and types of cows transferred to Bar 20 Dairy must create a reduction equal to or exceed 10,401.3 tons-CO2 emissions. Bar 20 Dairy will be required to submit to the District a list of the facilities shutdown, their location, and the number and type of cows being transferred with the calculation showing that the emissions of 10,401.3 tons-CO2 have been achieved. Historical records demonstrating herd capacity shall also be included. In addition, Bar 20 dairy will have to demonstrate to the District that the reductions are permanent. Total VOC emission reductions by 14.48 tons[1]	Mitigation measure shall be implemented by the owner/operator and shall be a condition of the Permit to Operate.	Monitoring shall be the responsibility of the SJVAPCD.

[1] The make-up of the cows (type of cows) that will be transferred over to Bar 20 Dairy may vary and may contain milk cows and/or a variety of heifers. The methane emission factor is more than 4 times lower for heifers than for milk cows, meaning that a significant number of heifers will need to be transferred compared to relocating only one milk cow in order to achieve the 10,401.3 tons-CO2/yr. However, the VOC emission factor for heifers is only 2-3 times lower than that of the milk cow VOC emission Factor. Therefore, it will be assumed that only milk cows will be relocated for calculation purposes in order to calculate conservative VOC reductions. Any heifer transfer would in fact result in more VOC reductions.

Mitigation Measures	Implementation	Monitoring
Mitigation Measure #2.6.3.3-4 Purchase of Emission Reduction Credits: 1. The owner/applicant has purchased 4.9 tons of VOC at the appropriate Distance Offset Ratio.	Mitigation measure shall be implemented by the owner/operator and shall be a condition of the Permit to Operate.	Monitoring shall be the responsibility of the SJVAPCD.
Mitigation Measure #2.6.3.3-5: Although project impacts are less than significant, the following mitigation measure is recommended to further reduce NOx emissions. 1. Employees will be encouraged to carpool-travel to and from the project site. 2. Idling time of on-site project farming and dairy operations equipment shall be minimized. 3. All on-site equipment shall be properly tuned and maintained in accord with manufacturer's specifications. 4. Whenever feasible, alternative fueled or electrical on-site equipment shall be utilized. 5. Minimum practicable on-site engine sizes shall be used. 6. On-site gasoline powered equipment shall be equipped with catalytic converters. 7. Employees will be encouraged to carpool to and from the project site.	Mitigation measure shall be implemented by the owner/operator and shall be a condition of the Permit to Operate.	Monitoring shall be the responsibility of the SJVAPCD.

SECTION TWO

INITIAL STUDY

SECTION TWO – INITIAL STUDY

2.1 Project Location

Bar 20 Dairy is located at 24387 West Whites Bridge Road, approximately 6 miles west of the City of Kerman (see Figure 2-1). The existing 3,902-acre project site includes 2 dairy facilities sites (corrals, dairy barn, feed storage area, process water lagoons, etc.) totaling 482 acres. The remaining 3,420 acres is devoted to field crops, farm roads, water well sites and irrigation canals.

2.2 Project Objective

It is the objective of the project to operate an economically viable and competitive dairy in compliance with applicable laws and regulations, optimally utilizing the available land resource, and mitigating environmental impacts to the extent feasible and as required by CEQA.

2.3 Project Background

The project is a component of Fresno County's and the San Joaquin Valley dairy industry. Statistics provided by the Fresno County Agricultural Commissioner in the 2005 Annual Crop Report detail the financial impact of the dairy industry on the local economy. Milk production values in Fresno County were $334,383,000 in 2005.

Construction of the Bar 20 Dairy project had begun before the applicant had submitted the required Authority to Construct (ATC) application. The District entered into a settlement agreement with Bar 20 Dairy, which included significant monetary penalty for having constructed the dairy in violation of District permitting Requirements. On March 14, 2006, the San Joaquin Valley Unified Air Pollution Control District (District) received an Authority to Construct (ATC) application from the applicant to expand the existing Bar 20 dairy. The project is located in Fresno County. The Fresno County Planning Department determined that the proposed project is a ministerial "by-right" approval. On November 26, 2007, the County of Fresno adopted a dairy ordinance making County approval of new dairy projects a discretionary act. The District contacted Fresno County to determine if the new dairy ordinance would result in the project being subject to County discretionary approval. The County determined that the project received County approval before adoption of the Dairy ordinance and as such, the County did not have discretionary approval authority over the project. The District has discretionary approval power over the Project via its Permits Rule (Rule 2010) and New Source Review Rule (Rule 2201). As such, the District is the public agency having principal responsibility for approving the Project and serves as Lead Agency (California Environmental Quality Act Guidelines 15367).

2.4 Description of the Project

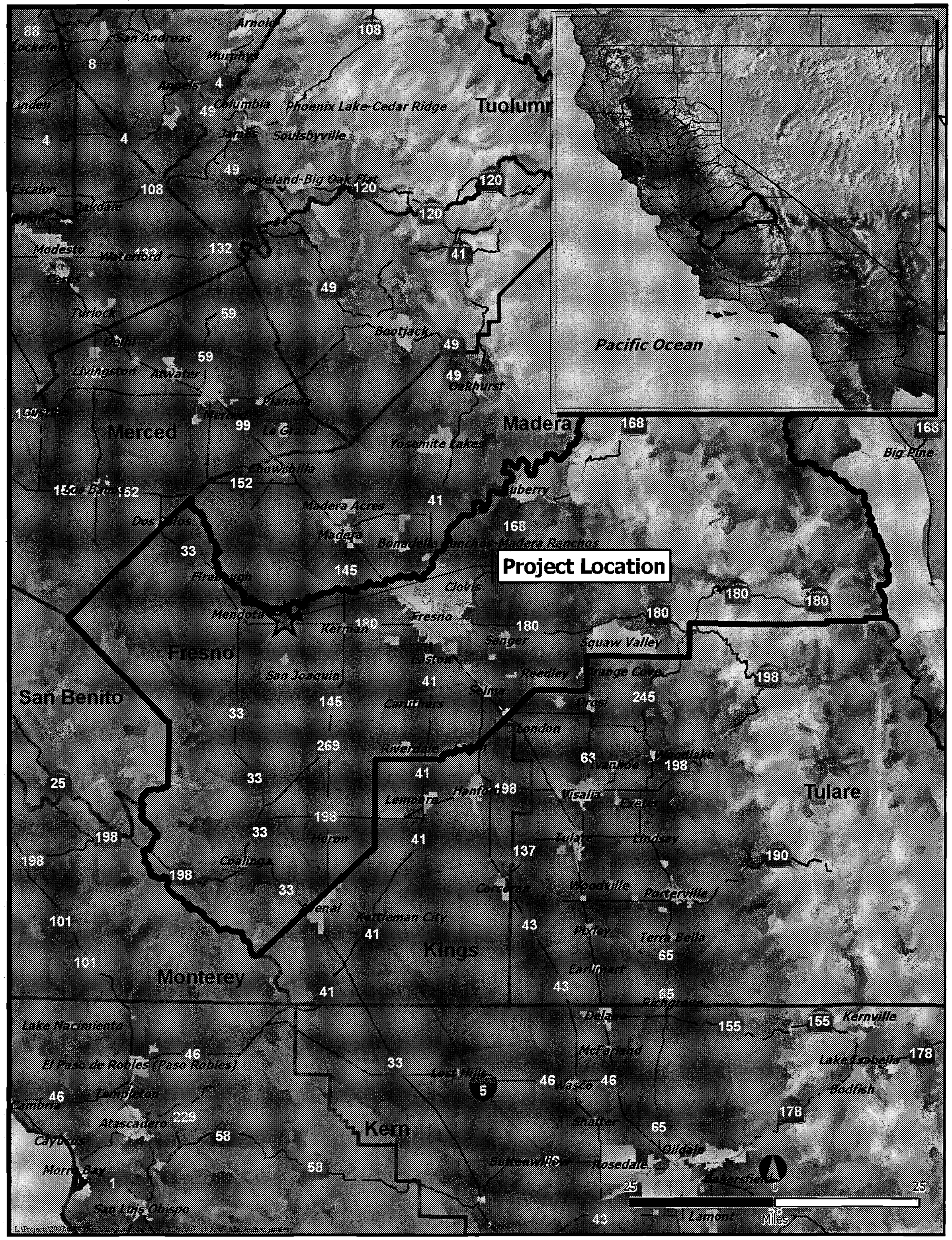
The project proponent has applied to the SJVAPCD for a permit to increase the number of milking cows on 2 adjacent dairy facilities by 6,496 from 2,904 to 9,400 milk cows. The additional 6,496 Holstein milk cows will be supported by 1,057 dry cows, 4,250 heifers and 700 calves. In addition, Bar 20 Dairy has proposed to install an anaerobic digester as an integral part of the project. The anaerobic digester will collect and digest cow manure from the dairy and import non-hazardous agricultural waste materials to produce biogas. The biogas will then be piped approximately 5.5 miles by a pipeline that will extend from the Bar 20 Dairy to an existing PG&E pipeline. For clarity in evaluation of air emissions impacts and mitigation measures the project is defined as including such increase on an "existing" dairy facility and an "expanded dairy facility" although both facilities currently exist.

The 3,902-acre project site is located in a Fresno County AE-20 (Exclusive Agriculture 20-Acre Minimum) zone. The dairy facilities occupy 482 acres on the north and south side of Whites Bridge Road. All of the dairy cropland is north of Whites Bridge Road in current agricultural production including alfalfa and corn silage/wheat (double cropped).

The location of the project site is shown on Figure 2-2. The dairy facilities sites are depicted on Figure 2-3.

The project is designed to maximize the available land for the production of feed to meet the dairies' forage needs, thereby minimizing the necessity for imported feed. Utilization of manure water provides necessary nutrients for on-site feed production, and reduces the need for groundwater usage for irrigation.

The dairy facility operation includes milking cows in freestall barns with flush systems and dry cows in corrals and Saudi style barns with flushed alleys. Liquid waste is processed through separator basins and "weeping walls", which remove solids from liquids; liquids then flow into wastewater lagoons.



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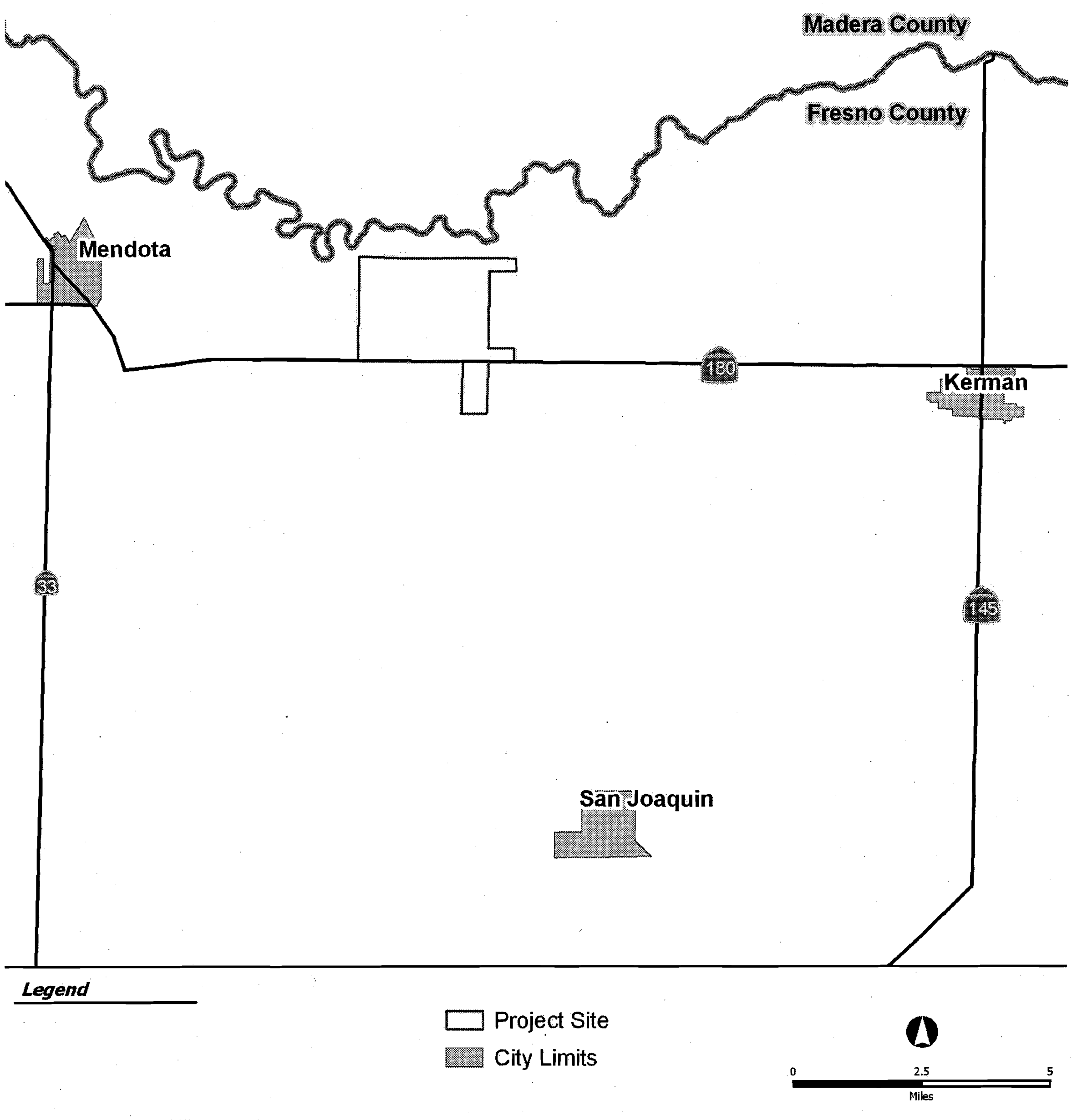
REGIONAL LOCATION

Figure 2 - 1



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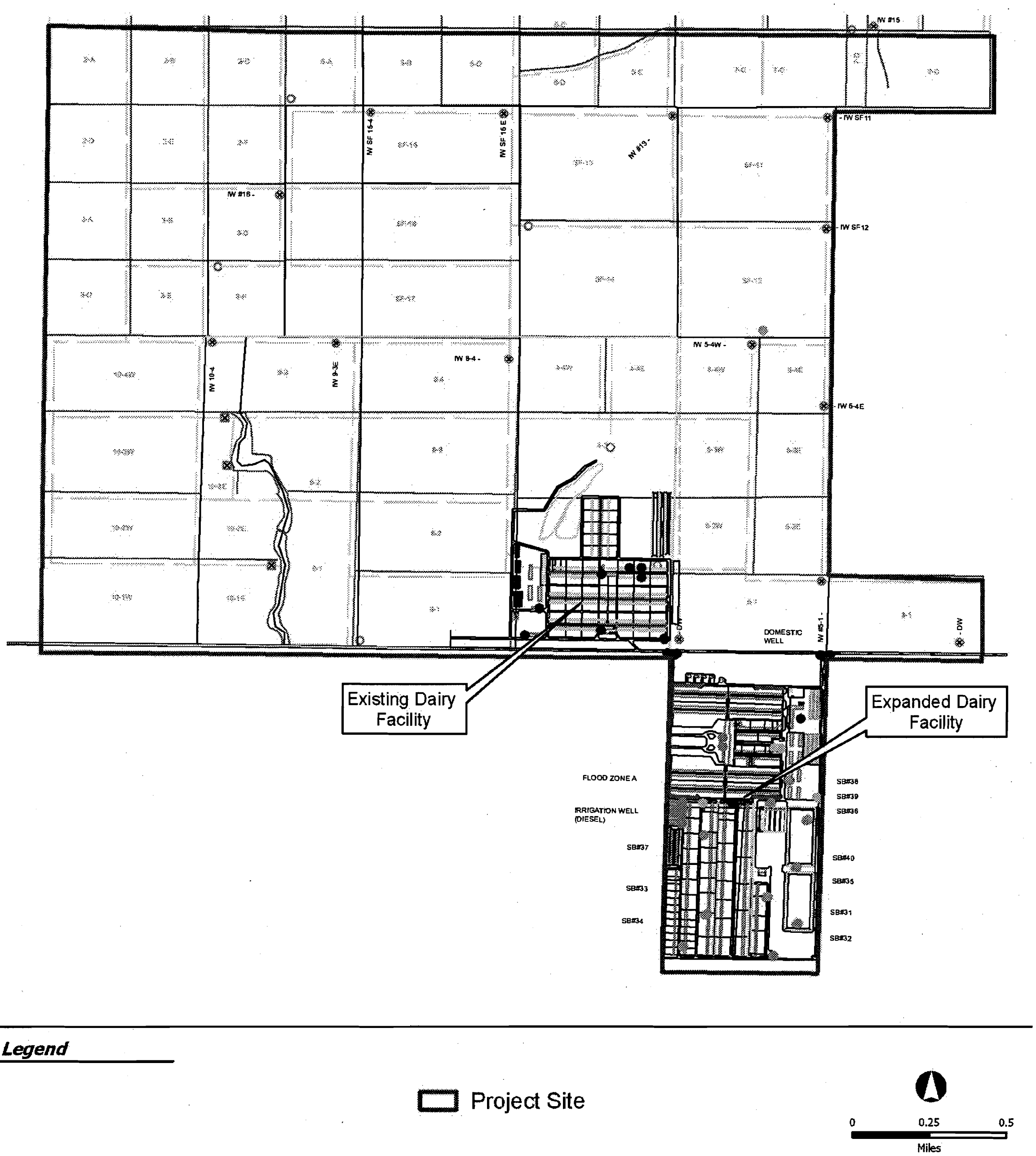
VICINITY MAP

Figure 2 - 2



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PROJECT SITE

Figure 2 - 3

The dairy structures – barns, freestalls, etc. – are metal frame. Each milking cow is provided an individual bedded-stall in the freestall structure. The milking cows are generally kept in the stalls except when they are walked to the milking barn on concrete walk lanes.

The floors of the freestalls are concrete. Curbs separate the feed lane from the freestalls in order to facilitate flushing and enclose feed. All dairy facilities areas are sloped to prevent ponding of water and to divert and convey rainfall runoff to the separated basins and wastewater lagoons.

A substantial percentage of the forage feed – corn and wheat – is produced on agricultural land at the project site. All fields have return water facilities. The remainder of the forage feed, and feed concentrate, is imported to the site from outside sources. The feed is stored in hay barns and on concrete pads.

Further descriptive project details relevant to the environmental analysis are provided in the appropriate topical areas of Section 2.6 of this Initial Study.

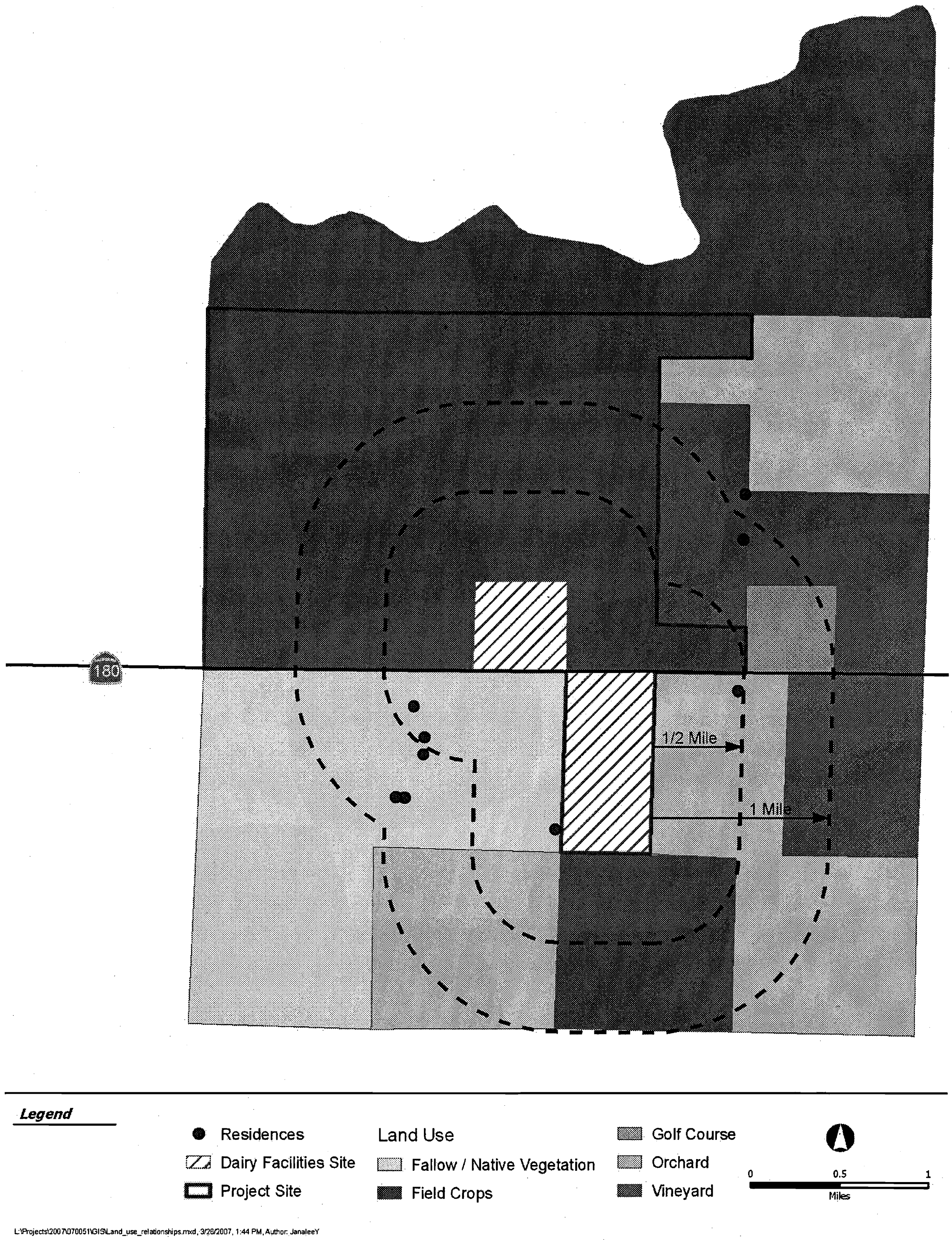
2.5 Environmental Setting

Located in a rural farm area in Fresno County, the project area is zoned AE-20 (Exclusive Agricultural District, 20-acre minimum lot size). The land surrounding the site is dedicated to field crops such as corn, wheat, and alfalfa which will in part be used as fodder for the herd (see Figure 2-4). The Fresno County General Plan Land Use Element shows this portion of the County as agricultural.

The climate of the project area is characteristic of that of the Central San Joaquin Valley. The summer climate is hot and dry, while the winters are cool and periodically humid. Mean daily maximum temperatures range from a low of approximately 57 degrees F in December and January to a high of about 99 degrees F in July.

Rainfall is concentrated during the six months from November to April. December and January typically experience heavy fog, mostly nocturnal, caused when moist cool air is trapped in the valley by high-pressure systems. In extreme cases, this fog may last continuously for two or three weeks. Its depth is usually less than 3,000 feet.

The project area is subject to characteristic seasonal airflows. During the summer, air currents from the Pacific Ocean enter the Valley through the San Francisco Bay and Delta region and are forced down the valley. These air movements are primarily to the southeast at velocities of six to ten miles per hour. During the winter, cold air flowing off the surrounding mountains results in currents toward the northwest and velocities ranging from zero to five miles per hour. These airflows result in extensive horizontal mixing of air masses in the Valley. However, vertical dispersion is constrained by temperature inversions, an increase in air temperature in a stable atmospheric layer, which may occur throughout the year.



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LAND USE RELATIONSHIPS

Figure 2 - 4

The project lies within the Fresno County portion of the San Joaquin Valley Air Basin (SJV Air Basin). The air quality of the Valley is directly related to the ability of the atmosphere to dilute and transport pollutants. The climate and meteorology within the Valley are conducive to the creation and entrapment of air pollution. Air pollution within the Valley is, in part, a result of the enclosed air basin, which experiences long periods of inversion, a relatively light wind flow, and a generous amount of sunlight. The SJV Air Basin is comprised of eight counties: San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare and central and western Kern. The Basin periodically exceeds State and/or federal standards for levels of ozone and fine particulate matter.

The natural vegetation communities of the southern San Joaquin Valley historically supported a diverse assemblage of plant and animal species. The conversion of native and naturalized plant communities by agricultural development, road construction, dam construction, and urbanization has significantly reduced available wildlife and plant habitat. As a result of this conversion, several species of both plants and animals have been extirpated from the southern San Joaquin Valley, and populations of other species have declined significantly. As a result, and as directed by State and federal legislation, the California Department of Fish and Game and the United States Fish and Wildlife Service have listed many southern San Joaquin Valley species as threatened, endangered, candidates for state or federal listing, "sensitive species", "special-status species", or "species of concern." The likelihood of their appearance at this site is reduced by the conversion of native vegetation in the project area to intensive agriculture.

The topography of the project area is essentially flat with slopes, prior to agricultural land leveling, averaging five feet to the mile toward the southwest. The Federal Emergency Management Flood Insurance Rate Maps show a small portion of the project area to be in a 100-year flood zone.

The southern San Joaquin Valley, approximately 10,000 square miles, is a broad structural trough bordered by the Sierra Nevadas on the east, the Coastal Ranges on the west and the Transverse Range on the south. The occurrence of groundwater is directly related to the geology and soils in the region. Fresh groundwater is principally contained in the unconsolidated continental deposits of the Pliocene to the Holocene age, which extend to depths ranging from less than 100 to more than 3,000 feet.

The ultimate source of groundwater in the San Joaquin Valley is precipitation on the valley and its tributary drainage basins. Replenishment of the unconfined and semi-confined groundwater bodies can be by seepage from streams and by underflow in permeable materials flooring the river and stream canyons that border the valley.

The groundwater basin in this portion of the San Joaquin Valley is the Tulare Lake Basin which covers the area south of the San Joaquin River and includes Kings County and the western (valley portions) of Fresno, Fresno and Kern Counties.

2.6 Environmental Evaluation

Issues:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
2.6.1 AESTHETICS Would the project:				
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☐	☒
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☒
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☐	☒
d) Create a new source of substantial light or glare which would adversely affect day or night time views in the area?	☐	☐	☒	☐

Response

Visual Compatibility
[Evaluation Criteria (a), (b), (c)]

The dairy structures, including the milking barn, freestall barns, and feed storage barns, are approximately 30 feet in height; the general design of the existing dairy is consistent with other dairies in the area, and compatible with adjacent farm operations.

Conclusion: The dairy facilities are located in an agricultural area characterized by other dairies, agricultural operations and similar structures and facilities. No identified scenic vistas have been blocked by the project facilities. The project does not have an adverse effect on a scenic vista or degrade the existing visual character of the project vicinity.

Mitigation Measures: None required.

Light and Glare
[Evaluation Criteria (d)]

The dairy facilities sites include lighting. The effects of this lighting are a loss of darkness in the night sky that may be noticeable to residents in the area.

Conclusion: All lighting is principally under roofs and directed downward and inward to illuminate specific areas. The impact is less than significant.

Mitigation Measures: None are required.

Issues:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
2.6.2 AGRICULTURE RESOURCES: - Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
c) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of farmland to non-agricultural use?	☐	☐	☐	☒

Response:

Loss of Farmland
[Evaluation Criteria (a)(c)]

The dairy is an agricultural use; no conversion has been created by the project.

Conclusion: The project does not have an adverse impact on farmland.

Mitigation Measures: None required.

Zoning Conflicts
[Evaluation Criteria (b)]

The site is zoned for agricultural use (AE-20). Dairies are permitted under the Fresno County Zoning Ordinance, in the AE-20. The project location complies with the provisions of the County's Land Use Element which considers a dairy to be an agricultural use consistent with the County's agricultural land use designation. The site is included in a Williamson Act Agricultural Preserve and the existing dairy usage is consonant with approved uses.

Conclusion: The dairy site is in compliance with Fresno County's land use plans and Zoning Ordinance. There are no environmental impacts involving land use or zoning.

Mitigation Measures: None required.

Issues:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
2.6.3 AIR QUALITY: Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☒	☐	☐
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☒	☐	☐
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☐	☒	☐	☐
d) Expose sensitive receptors to substantial pollutant concentrations?	☐	☒	☐	☐
e) Create objectionable odors affecting a substantial number of people?	☐	☐	☒	☐

Response:

Air quality is the principal area of environmental concern with respect to this project which involves no new physical facilities but increases the allowable dairy cow occupancy of existing facilities. Accordingly, the following additional physical and regulatory setting data and discussion are provided, together with a summary tabulation of project air emissions after incorporation in project operations of all the mitigation measures required to reduce impacts to less than significance.

Setting

The estimated population within the San Joaquin Valley Air Basin (Air Basin) is more than 3.6 million people, according to SJVAPCD's Planning Division. The Air Basin has one of the most severe air pollution problems in the State. The surrounding topographic features restrict air movement through and out of the basin and, as a result, impede the dispersion of pollutants from the basin. Inversion layers are formed in the Air Basin throughout the year. During the summer, the San Joaquin Valley experiences daytime temperature inversions at elevations from 2,000 to 2,500 feet above the valley floor. During the winter months, inversions occur from 500 to 1,000 feet above the valley floor (Cal. Air Resources Board, 2007).

Although the San Joaquin Valley Air Basin is often in violation of state and federal ozone ambient air quality standards and PM_{10} thresholds, data collected over the past ten years by the California Air Resources Board show that air quality in the Valley is, in general, improving. San Joaquin Valley Air Pollution Control (District) has requested and received approval of Federal standard reclassification to 'extreme' nonattainment, which will delay the attainment date to 2024, but results in extremely strict controls for stationary sources of pollutants. The focus of the current planning effort for the Air Basin is ozone, but it is important to remember that the Air Basin is also classified as nonattainment for the federal $PM_{2.5}$ standard. The Air Basin now has a nominal attainment date for the $PM_{2.5}$ standard of April 2010, with a maximum extension to 2015. The $PM_{2.5}$ attainment plan must be submitted to the EPA by April 2008. Many of the control strategies needed to bring the Air Basin into attainment of federal ozone standard will also provide progress toward attainment of the $PM_{2.5}$ standard.

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 strategies focus on reducing Criteria Pollutants to meet federal and state standards, and regulating stationary source emissions.

Ambient Air Quality Standards. Under the federal *Clean Air Act, 42 U.S.D. Section 7401 et. seq. (1970) (as amended 1990)*, the federal government originally established National Ambient Air Quality Standards ("NAAQS") for "criteria" pollutants. Both the U.S. Environmental Protection Agency and the California Air Resources Board have now established ambient air quality standards for such pollutants. These ambient air quality standards are maximum levels of contaminants, which are intended to represent safe levels that avoid specific adverse health effects associated with each pollutant. The ambient air quality standards cover what are called "criteria" pollutants because the health and other effects of each pollutant are described in criteria documents. The air quality criteria pollutants under state and federal law include ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, PM_{10}, $PM_{2.5}$, lead, and hydrogen sulfide.

The federal and California state ambient air quality standards are summarized in Table #2.6.3.1 The federal and state ambient standards were developed independently with differing purposes and methods, although both processes are intended to avoid health-related effects. As a result, the federal and state standards differ in some cases. In general, the California state standards are more stringent. This is particularly true for ozone and PM_{10}.

Table 2.6.3.1
Federal and State Ambient Air Quality Standards –2007

Pollutant	Averaging Time	California Standards [a] Concentration [c]	Federal Standards [b] Primary [c, d]
Ozone	1 Hour	0.09 ppm (180 μg/m^3)	--
	8 Hour	--	0.08 ppm (157 μg/m^3) [e]
Respirable Particulate Matter (PM_{10})	24 Hour	50 μg/m^3	150 μg/m^3
	Annual Arithmetic Mean	20 μg/m^3	50 μg/m^3
Fine Particulate Matter ($PM_{2.5}$)	24 Hour	65 μg/m^3	65 μg/m^3
	Annual Arithmetic Mean	12 μg/m^3	15 μg/m^3
Carbon Monoxide (CO)	8 Hour	9.0 ppm (10 μg/m^3)	9 ppm (10 mg/m^3)
	1 Hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)
	8 Hour (Lake Tahoe)	6 ppm (7 μg/m^3)	--
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	--	0.053 ppm (100 μg/m^3)
	1 Hour	0.25 ppm (470 μg/m^3)	--
Sulfur Dioxide ($S0_2$)	Annual Arithmetic Mean	--	0.030 ppm (80 μg/m^3)
	24 Hour	0.04 ppm (105 μg/m^3)	0.14 ppm (365 μg/m^3)
	1 Hour	0.25 ppm (655 μg/m^3)	--
Lead	30 Day Average	1.5 μg/m^3	--
	Calendar Quarter	--	1.5 μg/m^3
Visibility Reducing Particles	8 Hour	f	--
Sulfates	24 Hour	25 μg/m^3	--
Hydrogen Sulfide	1 Hour	0.03 ppm (42 μg/m^3)	--
Vinyl Chloride	24 Hour	0.010 ppm (26 μg/m^3)	--

[a] California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, suspended particulate matter – PM_{10}, $PM_{2.5}$, and visibility reducing particles, are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

[b] National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest eight hour concentration in a year, averaged over three years, is equal to or less than the standard. For PM_{10}, the 24 hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 μg/m^3 is equal to or less than one. For $PM_{2.5}$, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact U.S. EPA for further clarification and current federal policies.

[c] Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

[d] National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

[e] New federal 8-hour ozone and fine particulate matter standards were promulgated by U.S. EPA on July 18, 1997.

[f] Statewide VRP Standard (except Lake Tahoe Air Basin): Particles in sufficient amount to produce an extinction coefficient of 0.23 per kilometer when the relative humidity is less than 70 percent. This standard is intended to limit the frequency and severity of visibility impairment due to regional haze and is equivalent to a 10-mile nominal visual range.

The U.S. Environmental Protection Agency in 1997 adopted new national air quality standards for ground-level ozone and for fine Particulate Matter. The existing one-hour ozone standard of 0.12 PPM was phased out and replaced by an eight-hour standard of 0.08 PPM. New national standards for fine Particulate Matter (diameter 2.5 microns or less) have also been established for 24-hour and annual averaging periods. The current PM_{10} standards were retained, but the method and form for determining compliance with the standards were revised. Additionally, a $PM_{2.5}$ state standard was adopted effective July 5, 2003. The San Joaquin Valley is non-attainment for both the State and Federal $PM_{2.5}$ standards.

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, for CEQA purposes, without the normal degree of accepted guidance and case law.

Greenhouse Gases. Gases that trap heat in the atmosphere are called greenhouse gases; they act in the atmosphere in a manner analogous to the way a greenhouse retains heat. Common GHG include water vapor, carbon dioxide, methane, nitrous oxides, chlorofluorocarbons, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, ozone, and aerosols. Without the natural heat trapping effect of GHG, the earth's surface would be about 34 degrees Centigrade cooler (Climate Action Team, 2006). Natural processes and human activities are primarily responsible for the emission of GHG. Green house gases include:

Water Vapor: Although not considered a pollutant, water vapor is the most important, abundant, and variable GHG. In the atmosphere, it maintains a climate necessary for life. The main source of water vapor is evaporation from the ocean (approximately 85 percent). Other sources include sublimation (change from solid to gas) from ice and snow, evaporation from other water bodies, and transpiration from plant leaves.

Ozone: Unlike other GHG, ozone is relatively short- lived and, therefore, is not global in nature. It is difficult to make an accurate determination of the contribution of ozone precursors (nitrogen oxides and volatile organic compounds) to global climate change (California Air Resources Board (CARB) 2004b).

Aerosols: Aerosols are suspensions of particulate matter in a gas emitted into the air through burning biomass (plant material) and fossil fuels. Aerosols can warm the atmosphere by absorbing and emitting heat and can cool the atmosphere by reflecting light. Cloud formation can also be affected by aerosols. Sulfate aerosols are emitted when fuel-containing sulfur is burned. Black carbon (or soot) is emitted during bio mass burning or incomplete combustion of fossil fuels. Particulate matter regulation has been lowering aerosol concentrations in the United States; however, global concentrations are likely increasing.

Carbon dioxide: Carbon dioxide (CO_2) is an odorless, colorless gas, which has both natural and anthropogenic sources. Natural sources include the following: respiration of bacteria, plants, animals, and fungus, evaporation from oceans, volcanic outgassing, and decomposition of dead organic matter. Anthropogenic sources of carbon dioxide are from burning coal, oil, natural gas, and wood. Concentrations of CO_2 were 379 parts per million (ppm) in 2005, which is an increase of 1.4 ppm per year since 1960 (Intergovernmental Panel on Climate Change 2007).

Methane: Methane (CH_4) is a flammable gas and is the main component of natural gas. When one molecule of CH_4 is burned in the presence of oxygen, one molecule of carbon dioxide and two molecules of water are released. There are no ill health effects from CH_4. A natural source of CH_4 is from the anaerobic decay of organic matter. Geological deposits, known as natural gas fields, also contain CH_4, which is extracted for fuel. Other sources are from cattle, fermentation of manure, and landfills.

Nitrous oxide: Nitrous oxide (N_2O), also known as laughing gas, is a colorless greenhouse gas. Higher concentrations of N_2O can cause euphoria, dizziness, and slight hallucinations. N_2O is produced by microbial processes in soil and water, including those reactions that occur in fertilizer containing nitrogen. In addition to agricultural sources, some industrial processes (nitric acid production, nylon production, fossil fuel-fired power plants, and vehicle emissions) also contribute to its atmospheric load. It is used in racecars, rocket engines, and as an aerosol spray propellant.

Chlorofluorocarbons: Chlorofluorocarbons (CFCs) are gases formed synthetically by replacing all hydrogen atoms in CH_4 or ethane with chlorine and/or fluorine atoms. CFCs are nonflammable, nontoxic, insoluble, and chemically uncreative in the troposphere (the level of air at the earth's surface). CFCs were first synthesized in 1928 for use as cleaning solvents, refrigerants, and aerosol propellants. They destroy stratospheric ozone; therefore, their production was stopped as required by the Montreal Protocol in 1987.

Hydrofluorocarbons: Hydrofluorocarbons (HFCs) are synthetic man-made chemicals that are used as a substitute for CFCs for automobile air conditioners and refrigerants.

Perfluorocarbons: Perfluorocarbons (PFCs) have stable molecular structures and do not break down though the chemical processes in the lower atmosphere. High-energy ultraviolet rays, roughly 60 lulometers above the earth's surface are able to destroy the compounds. PFCs have long lifetimes, ranging between 10,000 and 50,000 years. Two common PFCs are tetrafluoromethane and hexafluoroethane. Concentrations of tetrafluoromethane in the atmosphere are over 70 parts per trillion (ppt) (Environmental Protection Agency (EPA) 2006d). The two main sources of PFCs are primary aluminum production and semiconductor manufacture.

Sulfur hexafluoride: Sulfur hexafluoride (SF_6) is an inorganic, colorless, odorless, nontoxic, nonflammable gas. Concentrations in the 1990s were roughly 4 ppt (EPA 2006d). SF_6 is used for insulation in electric power transmission and distribution equipment, in semiconductor manufacturing, the magnesium industry, and as a tracer gas for leak detection.

Worldwide Greenhouse Gas Inventory. In 2004, total worldwide GHG emissions were estimated to be 20,135 teragram CO_2 equivalents (Tg CO_2 Eq.) (22,194,810,000 tons), excluding emissions/removals from land use, land use change, and forestry (United Nations Framework Convention on Climate Change 2006). (Note that sinks, or GHG removal processes, play an important role in the GHG inventory as forest and other land uses absorb carbon.) In 2004, U.S. GHG emissions were 7,074.4 Tg CO_2 Eq. (7,798,111,120 tons) (EPA 2006a). In 2005, total U.S.

GHG emissions were 7,260.4 Tg CO_2 Eq. (8,003,138,920 tons), a 16.3 increase from 1990 emissions, while U.S. gross domestic product increased by 55 percent over the same period (EPA 2007a). Emissions rose from 2004 to 2005, an increase of 0.8 percent. Factors causing the increase are the following: (1) strong economic growth in 2005, leading to increased demand for electricity and (2) an increase in the demand for electricity due to warmer summer conditions (EPA 2007a). However, a decrease in demand for fuels due to warmer winter conditions and higher fuel prices moderated the increase in emissions (EPA 2007a). California is a substantial contributor of GHG as it is the second largest contributor in the U.S. and the sixteenth largest in the world (California Energy Commission (CEC) 2006). In 2004, California produced 492 Tg CO_2 Eq.. (542,331,600 tons) (CEC 2006), which is approximately seven percent of U.S. emissions. The major source of GHG in California is transportation, contributing 41 percent of the State's total GHG emissions (CEC 2006). Electricity generation is the second largest source, contributing 22 percent of the State's GHG emissions.

Global Climate Changes. Global climate change (GCC), which most scientists believe is caused by GHG emissions, is a widely discussed economic, political, and scientific issue in the United States. GCC is a change in the average weather of the earth that may be measured by changes in temperature, precipitation, storms, and wind. The baseline by which these changes are measured originates in historical records identifying temperature changes that have occurred in the past, such as during previous ice ages. Many recent concerns over GCC utilize this data to extrapolate a level of statistical significance specifically focusing on temperature records from the past 150 years (the Industrial Age) that differ from previous climate changes in rate and magnitude.

Key Legislation and Policies. The Global warming Solutions Act of 2006, also known as Assembly Bill 32 (AB 32), was signed into law on September 27, 2006. AB 32 requires the California Resources Board (CARB) to do the following:

- By July 1, 2007, adopt a list of early action measures that can be implemented by regulation before January 2010.
- By January 1, 2008, adopt mandatory reporting requirements for significant sources.
- By January 1, 2008, establish a statewide GHG emission cap for 2020 based upon 1990 emissions levels.
- By January 1, 2009, adopt a scooping plan indicating how emission reductions will be achieved for significant GHG sources via regulations, market mechanisms, or other measures.
- By January 1, 2011, adopt regulations to achieve the maximum technologically feasible and cost effective reductions in GHG.

Thresholds of Significance. There are no widely accepted published thresholds of significance for determining the impact of GHG emissions. However, for the purposes of analyzing the GHG impacts of discretionary projects, the District is proposing to develop a GHG significance threshold in terms of annual CO2e emissions. This proposed GHG threshold, although still draft, will be used to measure the significance of this project. See Appendix F for a discussion of the proposed threshold.

Regional Air Quality Plans. Federal and state air quality laws require identification of areas not meeting the ambient air quality standards for criteria pollutants. These areas must develop regional air quality plans to eventually attain the standards. Under both the federal and state Clean Air Acts the San Joaquin Valley Air Basin in a non-attainment area (standards have not been attained) for ozone, PM_{10} and $PM_{2.5}$. The air basin is either attainment or unclassified for other ambient standards.

The Basin is currently serious non-attainment for PM10 and for 8-hour ozone (the previous extreme non-attainment for 1-hour ozone has been revoked by the US EPA effective June 15, 2005 as specified in Federal Register VO. 69 No. 84 Friday April 30, 2004 Rules and Regulations). The District has prepared its *2007 Ozone Plan* which will be heard by the District Governing Board April 30, 2007. Once the plan is adopted the District will be reclassified to an 'extreme' attainment status for ozone. Under the *2007 Ozone Plan*, all proposed local measures will be adopted by the SJVAPCD before 2012. Additional measures requiring technology advancement or new incentive funding will also be adopted and implemented as expeditiously as they become available. By 2015 over 50% of the Valley's population will reside in areas meeting the federal ozone standard. By 2020, this percentage will increase to 90% with the area east of Arvin and in Northwest Fresno remaining. It is expected that further advancements in technology occurring after 2020 but no later than 2023 will bring these areas into compliance as well.

The attainment deadline for PM_{10} is 2010; however, the SJVAPCD recently submitted a request to the EPA to reclassify the area as in attainment for PM_{10}. In order to meet the standard, the District had to provide three years of data showing that PM_{10} concentrations did not exceed 24-hour and annual caps. The EPA's declaration of attainment for PM_{10} was the final step in reaching this milestone. Since 1990, emissions of PM_{10} and its precursors have dropped 36 percent as a result of the commitments undertaken by the Air District and the Valley's businesses, citizens and local governments. In October 2007, the EPA found that the SJVAB had shown continued attainment of the 24-hour and annual PM_{10} national ambient air quality standards (Federal Register Vol. 71, No. 209). The designation and classification status remains nonattainment for the SJVAB until such time as California has an approved maintenance plan as required under section 175(A) of the CAA. When such a plan is approved by the EPA, the SJVAB will be redesignated as in attainment for PM_{10}. Currently there is no established timeframe for this action.

The SJVAPCD is in the process of preparing a $PM_{2.5}$ SIP for submittal to the EPA by April 2008. The air quality science indicated that reductions of nitrogen oxides (NOx) are relatively more beneficial for both ozone and $PM_{2.5}$ attainment than other contributing pollutants. The SJVAB ozone SIP is designed with this in mind and when the $PM_{2.5}$ plan is complete, the District will review the ozone strategy to ensure this is the case.

Summary of SJVAPCD Rules and Processes Applicable to Project. The SJVAPCD has indicated that the following are among those applicable:

- Regulation VIII, Fugitive PM_{10} Prohibitions, has been adopted by the District to reduce the amount of particulate matter entrained into the ambient air from man-made sources (See Table #2.6.3.2).

- Rule 4550, Conservation Management Practices (CMP). This program reduces fugitive dust from agricultural operations. The rule requires the preparation of a CMP Plan that must be submitted to the District.

- Rule 4570, Confined Animal Facilities (CAF). The program limits emissions of volatile organic compounds (VOC) from Confined Animal Facilities.

- An operation of this size is subject, under Rule 2201, to the District's Permit to Operate requirements. This project is subject to Best Available Control Technology (BACT).

Table 2.6.3.2
Summary of Rules Comprising Regulation VIII of the San Joaquin Valley Air Pollution Control District

Rule Number	Title and Brief Summary
8010	**Fugitive Dust Administrative Requirements for Control of Fine Particulate Matter (PM_{10})** – The purpose of Regulation VIII is to reduce the amount of PM_{10} entrained in the ambient air as a result of emissions generated from man-made fugitive dust sources by requiring actions to prevent, reduce, or mitigate PM_{10} emissions. The Rules contained in this regulation are required to reduce PM_{10} emissions which violate the National Ambient Air Quality Standards for PM_{10} and implement control measures contained in the District PM_{10} Nonattainment Area State Implementation Plan.
8011	**General Requirements** – Sets forth the definitions, exemptions, requirements, administrative requirements, recordkeeping requirements, and test methods applicable to all Rules under Regulation VIII.
8020	**Fugitive Dust Requirements for Control of Fine Particulate Matter (PM_{10}) from Construction, Demolition, Excavation and Extraction Activities** – Purpose is to limit fugitive dust emissions from construction, demolition, excavation, and related activities. Rule shall remain in effect until April 2002 or until the effective date of Rule 8021 whichever occurs later.
8021	**Construction, Demolition, Excavation, Extraction, and other Earthmoving Activities** – Applies to any construction, demolition, excavation, extraction, and other earthmoving activities, including, but not limited to, land clearing, grubbing, scraping, travel on site, and travel on access roads to and from the site.
8030	**Fugitive Dust Requirements for Control of Fine Particulate Matter (PM_{10}) from Bulk Materials** – Purpose is to limit outdoor handling and storage of any bulk material which emits visible dust when stored or handled. Rule to remain in effect until April 2002 or until the effective date of Rule 8031.
8031	**Bulk Materials** – Applies to outdoor handling, storage and transport of any bulk material.

Table 2.6.3.2, Summary of Rules (continued)

Rule Number	Title and Brief Summary
8040	**Fugitive Dust Requirements for Control of Fin Particulate Matter (PM_{10}) from Landfill Disposal Sites** – Applies to all operational landfill disposal sites.
8041	**Carryout and Trackout** – Applies to all sites that are subject to any of the following rules where carryout or trackout has occurred or may occur on paved public roads of the paved shoulders of a paved public road: Rules 8021 ,8031, 8061, 8071.
8051	**Open Areas** – Applies to any open area having 0.5 acre or more within urban areas, or 3.0 acres or more within rural areas; and contains at least 1,000 square feet of disturbed surface area.
8060	**Fugitive Dust Requirements for Control of Fine Particulate Matter (PM10) from Paved and Unpaved Roads** – Purpose is to limit dust from any paved, or unpaved public or private road, street highway, freeway, alley, access drive, access easement, or driveway constructed or modified after December 1993. Rule shall remain in effect until April 2002 or until the effective date of Rule 8061.
8061	**Paved and Unpaved Roads** – Applies to any new or existing public or private pave or unpaved road, road construction project, or road modification project.
8070	**Fugitive Dust Requirements for Control of Fine Particulate Matter (PM10) from Vehicle and/or Equipment Parking, Shipping, Receiving, Transfer, Fueling and Service Areas** – Purpose is to limit dust from all unpaved areas of one acre or larger. Rule effective until effective date of Rule 8071.
8071	**Unpaved Vehicle/Equipment Traffic Areas** – Applies to any unpaved vehicle/equipment traffic area.
8081	**Agricultural Sources** – Applies to off-field agricultural sources.

Currently, there is no final BACT guideline for dairy operations. The SJVAPCD must perform a detailed "Top-Down" BACT analysis for VOC, PM_{10}, H_2s and NH_3 as part of its evaluation of the dairy's Authority to Construct (ATC) application. This analysis entails a listing of all available control technologies, in order of lowest emissions. Each control technology is evaluated, starting with the cleanest (lowest emission), to see if it is cost effective to install on a given dairy. In other words, the District will first review the lowest VOC, PM_{10}, H_2s and NH_3 technologies available in today's market and, if not cost effective, then looks at the next cleanest technologies. This continues until the District finds a technology that is cost effective or until the project reaches an emissions level that the District considers "achieved-in-practice."

The 1990 Federal Clean Air Act Amendment (CAAA) included a Federal permitting program for "major" sources of emissions. In the San Joaquin Valley, this now includes any facility with more than 10 tons per year of ozone precursors (NOx and VOC). This was presented in Title V of the CAAA and was thus called "Title V Permitting". CARB and EPA have reached an agreement regarding removal of Title V Agricultural exemptions. One of EPA's conditions was the California Legislature's revision of the Health and Safety Code to eliminate the provision that exempts "any animals" from the requirement to obtain a permit. All local Districts modified their permitting system appropriately. Sources that may require permits include facilities with stationary diesel engines and concentrated animal feeding operations. Applicability of the Title V permit program depends on where sources are located, and the air quality rating of that area. EPA has not as yet established, other than Title V regulations, air quality requirements for dairies, thus further emphasizing the current difficulty in scientifically determining appropriate limits on dairy emissions.

The agricultural exemption is now repealed pursuant to SB 700 (Florez), and the applicant must comply with the adopted regulations by the SJVAPCD and obtain necessary air quality permits from the APCD, or any other area-responsible air quality regulatory authority. The SJVAPCD adopted Rules 3190 and 4550 in 2004 for PM_{10} conservation management fees and for implementation of selected PM_{10} reduction programs for agricultural operations. The project applicant must comply with these rules.

Regulatory Framework. The California Air Resources Board (CARB) is responsible for enforcing the federally required State Implementation Plan (SIP) in an effort to achieve and maintain the national ambient air quality standards. SIP is the plan prepared by states and submitted to U.S. EPA describing how each federal nonattainment area will attain and maintain national ambient standards. SIPs include the technical foundation for understanding the air quality (e.g. emission inventories and air quality monitoring), control measures and strategies, and enforcement mechanisms. The SIP incorporates the individual nonattainment plans for air quality districts. In addition, CARB has established State Ambient Air Quality Standards for the Federal "criteria" pollutants as well as for other pollutants for which there are no corresponding Federal standards. CARB is responsible for determining air basin attainment designations in California, and has the authority over mobile sources of pollutants.

The SJVAPCD, as the local air quality agency, is responsible for preparing regional air quality plans under the state and federal Clean Air Acts. The District's boundaries are contiguous with the San Joaquin Valley Air Basin. In addition to planning responsibilities, SJVAPCD has permitting authority over stationary sources of pollutants such as power plants and manufacturing facilities as well as some area sources such as agricultural operations. The State Health and Safety Code exempted agricultural and livestock operations from local air districts' permitting regulations (Section 42310), opacity limits from plumes (Section 41704), and odor nuisance (Section 41705). Thus, the District's authority with respect to such operations was limited to review of CEQA documents, enforcement in nuisance situations, and identification of significant thresholds.

The San Joaquin Valley *PM_{10} Attainment Demonstration Plan* (PM_{10} ADP) acknowledges that agricultural activities may represent a significant source of fugitive dust and supports continued research to characterize emissions from these activities. The PM_{10} ADP addressed control of particulate emissions from agricultural operations by implementation of voluntary "agricultural conservation practices". Certain aspects of the operation of dairies are covered by revised Regulation VIII PM_{10} requirements.

The SJVAPCD's 2004 Extreme Ozone Attainment Demonstration Plan (EOADP), included control measure Rule 4570. Concentrated Animal Feeding Operations. This rule is intended to control volatile organic compounds (VOC's), which are precursors to ozone from confined animal facility operations (CAFO). This plan was submitted by ARB as part of the State Implementation Plan. This control measure was effective July 1, 2006. Rule 4570 is also intended to meet the requirements of SB 700, which amended sections of the California Health and Safety Code, specifically CH&SC Section 40724.6 (b), to require air districts which are designated as federal nonattainment areas for ozone to adopt, implement, and submit for inclusion in the State Implementation Plan a rule or regulation requiring CAFO's to obtain a permit from the District and to reduce, to the extent feasible, emissions of air contaminants form the facilities. This control measure applies to all new and existing dairies which have or will have VOC emissions greater than 1,000 milk cows and will require Best Available Retrofit Control Technologies, outlined in the rule.

Impact #2.6.3.1 Operational Emissions of Greenhouse Gases
[Evaluation Criteria (a), (b), (c), (d)]

The lack of validated scientific information on dairy emissions results in uncertainty in characterizing the project's GHG emissions and their impact on GCC. However, the District has quantified the operational GHG emissions from the Bar 20 project using the available scientific methodology and information. Using CARB's emissions factors, the operational emissions of CH_4 and N_2O from the project are presented in the table below:

Table 2.6.3.3
Operational Greenhouse Gas Emissions from Bar 20 Dairy

Pollutant	Pre-Project emissions tons/year[a]	Post-Project emissions tons/year[b]	Reductions from shutting down existing dairies tons/year	Increase in GHG emissions tons/year[c]
Methane (CH_4)	1,912.71	2,267.6	777.27	(422.38)
CO_2 Equivalents	40,166.94	47,619.57	16,322.76	(8,870.13)
Nitrous Oxide (N_2O)	12.84	16.03	0.22	2.97
CO_2 Equivalents	3,979.93	4,969.39	68.61	920.85
CO_2 Equivalents (Total)	44,146.87	52,588.89	(16,391.37)	(7,949.28)

[a] As described in the original engineering evaluation, this facility was partially constructed on the date that the District began requiring permits of dairies. Generally, such facilities can be argued to have a vested right to complete construction, and are "grandfathered" into the permitting system. Had the District accepted this argument, the dairy would have been able to construct without being subjected to our Rule 2201, "New and Modified Stationary Sources", and would have therefore escaped not only the controls of our BACT determination, but also would not have been subject to a CEQA review, at all, because no discretionary permit would have been required. However, the District took what we believed to be a defensible position that was more protective of air quality – we "grandfathered" only the portions of the dairy for which construction had demonstrably commenced, and required all other parts of the dairy to go through the full new-source permitting process. We continue to believe that a determination that none of the dairy was grandfathered (constructed prior to permitting requirements) is indefensible, and we continue to believe that the approach taken was the alternative that is most beneficial to the protection of air quality, as the other alternative was to consider the commencement of construction to be applicable to the entire dairy, thus grandfathering in the entire dairy. Totals in this column therefore include the emissions contribution from the lagoon of the dairy expansion. However, even if this lagoon emissions contribution is not counted, the increase from the project remains below the District's draft proposed GHG significance threshold.

[b] Includes reductions mentioned below: feeding cottonseed, weekly scraping, land incorporation of solid manure, and the proposed design element, the anaerobic digester.

[c] CH_4 Increase is calculated: 2,267.6 - 1,912.71 – 777.27 = - 422.38.

The calculations for this table are found in Appendix "A" of this document.

The District has statutory authority over the project via its Permits Required Rule (Rule 2010) and New Source Review Rule (Rule 2201). Pursuant to these rules, the District can impose mitigation measures limiting the project's emissions of criteria pollutants. The District has imposed mitigation measures on the Bar 20 Dairy project to reduce Volatile Organic Compounds (VOC) emissions. Certain mitigation measures imposed on the Bar 20 Dairy project will also contribute to the reduction of GHG emissions. These measures are the following:

Mitigation Measure #2.6.3.1-1 Reduction of Greenhouse Gas Emissions (quantifiable):

1. Feeding dietary oils (eg. Cottonseed) to animals.

   Explanation: Nutritional and dietary management is routinely practiced to improve milk production and heard health. Many of these practices have the potential to reduce air emissions. A literature review showed that there are quite a few number of dietary products and techniques which have the potential to reduce GHG emissions. However, further research is needed to better quantify these reductions from many of the feed strategies.

   The District was able to find studies[2] that demonstrated that a significant amount of methane reductions can be achieved by feeding dietary oils (eg. Cottonseed), ranging from 12% to 36%. Bar 20 Dairy has proposed to feed their dairy cows cottonseed (6% of the dry matter), which will result in a significant reduction in GHG emissions from their facility. Although, a reduction of up to 36% can be achieved by feeding 6% cottonseed based on Beauchmin et al. 2007, the District will only apply a 12% reduction from the Grainger et al. 2007 study, in order to be conservative.

2. Removal of manure from the concrete feed lanes at least once a day.

   Explanation: Bar 20 Dairy is required to remove the manure from the concrete feedlanes at least 4 times a day for the mature cows and two times a day for the remaining support stock. The primary purpose of frequent removal of manure from the concrete feedlanes was to reduce VOC emissions from the decomposition of fresh manure on those lanes. However, based on a news alert issued by *Science for Environment Policy*, frequent removal of manure from the concrete feedlanes was also found to reduce GHG emissions by up to 7.1%. Since Bar 20 Dairy is flushing at a frequency twice that for the support stock and four times that for the mature cows, GHG emission reductions would be expected to be much greater than the 7.1%. However, in order to be conservative, a control efficiency of 7.1% will be applied at this time.

3. Solid manure applied to fields shall be incorporated into the soil immediately (within two hours) after application.

   Explanation: A report entitled *"Recommendations to the San Joaquin valley Air Pollution Control Officer Regarding Best Available Control Technology for Dairies in the San Joaquin Valley"* by the Dairy Permitting Advisory Group (DPAG) provided a VOC control efficiency of incorporating manure into the soil in the range of 29-58%. CH_4 emissions will also be

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[2] Beauchemin KA, Kreuzer M, O'Mara FO, McAllister TA (2007) Nutritional management for enteric methane abatement: a review. Special Edition: Proceedings of the 3rd Greenhouse Gases and Animal Agriculture Conference. *Australian Journal of Experimental Agriculture* (in press).

Grainger C, Clarke T, Beauchemin KA, McGinn SM, Eckard RJ (2007a) Supplementation with whole cottonseed reduces methane emissions and increases milk production of dairy cows offered a forage diet supplemented with grain. Special Edition: Proceedings of the 3rd Greenhouse Gases and Animal Agriculture Conference. *Australian Journal of Experimental Agriculture* (in press).

assumed to be reduced similarly to VOC due to the organic content of both pollutants, however due to the lack of data, the lower control efficiency of 29% will be used.

Effectiveness of Measures: 1. Feeding animals dietary oils (eg. Cottonseed) will result in a reduction of approximately 238.73 tons of CH_4/year (5,013.28 tons of CO_2 equivalent) from the project. 2. Removal of manure from the concrete feed lanes at least once a day will result in a reduction in emissions of approximately 5.69 tons of CH_4/year (119.49 tons of CO_2 equivalent) from the project. 3. Incorporating solid manure into the soil immediately after land application will result in a potential reduction in emissions of approximately 28.07 tons of CH_4/year (589.43 tons of CO_2 equivalent) from the project.

Design Elements #2.6.3.1-2 Reduction of Greenhouse Gas Emissions:

- Measure: Anaerobic Digester

  Explanation: An anaerobic digester is an enclosed basin or tank that is designed to facilitate the decomposition of wastewater by microbes in the absence of oxygen. The process of anaerobic decomposition results in the preferential conversion of organic compounds in the wastewater into methane (CH_4), carbon dioxide (CO_2), and water rather than intermediate metabolites (VOCs). The gas generated by this process is known as biogas, waste gas or digester gas. In addition to CH_4 and CO_2, biogas also contains small amounts of Nitrogen (N_2), Oxygen (O_2), Hydrogen Sulfide (H_2S), and Ammonia (NH_3). Biogas will also include trace amounts of various Volatile Organic Compounds (VOCs) that remain from incomplete digestion of the volatile solids in the incoming wastewater. Because biogas is mostly composed of methane, the main component of natural gas, the gas produced in the digester can be cleaned to remove H_2S and other impurities and used as a fuel. The captured biogas can be sent to a natural gas pipeline, used by fuel cells, or combusted in a IC engine, microturbine, flare, or a boiler, where the gas can be used to generate useful heat or electrical energy.

  As stated above, the gas generated in the covered lagoon can be captured and then sent to a suitable combustion device. Combustion (thermal incineration) is a generally accepted, well-established VOC control technique. During combustion, gaseous hydrocarbons are oxidized to form CO_2 and water. The VOCs emitted from the liquid manure in the covered lagoon can be reduced by 95% or more with the use of an appropriate combustion device. Therefore, installation of the digester will lower the total VOCs and methane emitted from the liquid manure from the liquid manure handling system. Since the biogas is being injected into the natural gas pipeline, the control efficiency for CH_4 captured is expected to be 100%, however a conservative 95% control will be applied.

  There are drawbacks to anaerobic digesters related to air quality. One of the main drawbacks that can result from anaerobic digestion is the emission of other pollutants resulting from the combustion of biogas. These pollutants include oxides of nitrogen (NO_X), sulfur oxides (SO_X), particulate matter (PM_{10} and $PM_{2.5}$) and carbon monoxide (CO). Oxides of nitrogen react with VOCs to produce ground-level ozone. Current air quality modeling has demonstrated that the high levels of biogenic and anthropogenic VOC emissions in the San Joaquin Valley Air Basin cause NO_X to be the limiting reactant for ozone production.

Therefore, in terms of ozone production, large reductions in VOC and CH_4 emissions can be offset by relatively smaller increases in NO_X emissions. The District will consider this factor when determining if anaerobic digesters will reduce ozone formation in the San Joaquin Valley Air Basin. Therefore, the District will err on the side of public health in making this determination, and will not require a combustion technology that reduces GHG, but increases ozone concentrations in the Valley.

However, Bar 20 has proposed to install an anaerobic digester system with the biogas injected to a natural gas pipeline. Because the majority of the biogas, which consists of CH_4, will go directly into a natural gas pipeline, rather than into the atmosphere, a significant amount of methane reductions are expected from this project. In addition, since little or no combustion is expected from such processes, no collateral increase in NOx is expected.

Effectiveness of Design Element(s): The estimated methane reduction from this design element is approximately 1,522.22 tons of CH_4 per year (31,966.62 tons-CO_2/yr equivalents).

Mitigation Measure #2.6.3.1-3 Reduction of Greenhouse Gas Emissions (non-quantifiable):

1. Downwind windbreak designed in accordance to the NRCS guideline #380

   Explanation: Plants are nature's CO_2 sinks, meaning, through photosynthesis, plants remove or sequester carbon from the atmosphere. Bar 20 dairy has proposed to install windbreaks at their facility (a 3-row windbreak, consisting of hundreds of trees and shrubs). Although the primary purpose of the windbreaks is to reduce the PM_{10} from the facility, it will also serve as a medium for removal of CO_2 from the facility or the surrounding environment. Generally a large number of trees are required in order to be considered effective in reducing CO_2 emissions. Although this windbreak is expected to result in some GHG reduction, the extent of the reductions cannot be quantified at this time.

2. All open corrals adequately sloped to promote drainage (minimum of 3% slope where the available space for each animal is 400 square feet or less and minimum of 1.5% where the available space for each animal is more than 400 square feet per animal.)

3. Maintain corrals to ensure drainage and prevent water from standing more than 48 hours after a storm.

4. Knockdown fence line animal waste build-up prior to it exceeding a height of 12 inches at any time or point.

Effectiveness of Measures: The purpose of the above mitigation measures is to reduce anaerobic decomposition, which takes place inside of the corrals. The byproducts of anaerobic decomposition are primarily CH_4 and CO_2 emissions with secondary pollutants consisting of VOC, NH_3, and sulfur compounds. Although a significant amount of GHG emissions can potentially be reduced through these measures, the amount cannot be quantified at this time due to lack of data.

5. All animals fed in accordance with National Research Council (NRC) or other District-approved guidelines utilizing routine nutritional analysis for rations.

   Explanation: Nutritional management of dairy feed is routinely practiced to improve milk production and herd health. The requirement to feed in accordance with The NRC guidelines has the potential for reducing VOC and NH_3 emissions by reducing the quantity of undigested nutrients in the manure. Many of these emissions originate from the decomposition of undigested protein in animal waste.[3] The level of microbial action in the manure corresponds to the level of organic nitrogen content in the manure; the lower the level of nitrogen, the lower the level of microbial action and the lower the production of NH_3 and VOCs. Nutritional management has also been shown to impact CH_4 production. Data is available demonstrating that a change in diet by feeding various types of feed can in fact reduce CH_4 emissions. However, the effects these feeds have on VOC and NH_3 emissions is not available. Since these impacts are not known, these various feedstuffs will not be required as part of this evaluation. Although feeding to the NRC guidelines has the potential to result in significant GHG emission reductions, these reductions will not be quantified at this time.

VOC Mitigation Measures that were evaluated but are not feasible for the project:

- Measure: Freestall Enclosure and vent biogas to a control device such as an incinerator or a biofilter.

  Explanation: Freestall enclosures with the biogas vented to a control device such as an incinerator or a biofilter has the potential of reducing a significant amount of CH_4 emissions.

  District staff has researched the use of biofilters for inclusion in the Dairy BACT Guideline. The District has been able to verify that biofilters have been used to control odors and/or emissions from wastewater treatment plants, composting operations, and enclosed barns at some poultry and swine confined animal facilities. However, to date, the District has not been able to confirm a single case of an enclosed dairy barn vented to a biofilter. As stated in the Final DPAG BACT Report, the reports of dairy barns vented to biofilters remain unverified and therefore cannot be deemed Achieved-in-Practice BACT.

  The fact that biofilters have been used at poultry and swine facilities also does not render this option Achieved in Practice for dairy facilities. Dairy and swine facilities are not the same source category because the design and operation of these facilities differ significantly from that at dairies. Additionally, the airflow rate required to dissipate heat from the larger dairy animals is much higher. The higher airflow rate would necessitate a substantially larger biofilter than that employed at poultry or swine facilities in order to provide the minimum residence time needed to control emissions. Due to these reasons, the technological feasibility of capturing and controlling the air exhaust from dairy barns remains in question. However, the District has considered this technology as a

[3] "Emissions of Volatile Organic Compounds Originating from UK Livestock Agriculture", Hobbs, P.J. 2004 – Journal of the Science of Food and Agriculture

technologically feasible BACT option, and has performed a cost-effectiveness analysis, which concluded that this option is not cost-effective at this time.

- Measure: Aerobic Treatment Lagoon – mechanical aeration to achieve a dissolved oxygen concentration of 2.0 mg/L.

  Explanation: An aerobic treatment lagoon is a waste treatment lagoon that is designed to facilitate the decomposition of wastewater by microbes in the presence of oxygen (O_2). The process of aerobic decomposition results in the conversion of organic compounds in the wastewater into carbon dioxide (CO_2), and (H_2O), nitrates, sulphates, and inert biomass (sludge). The process of aerobic digestion is sometimes referred to as nitrification (especially when discussing NH_3 transformation). Complete aerobic digestion (100% aeration) removes nearly all malodors and also virtually eliminates VOCs, H_2S, CH_4, and NH_3 emissions from liquid waste.

  Sufficient oxygen must be provided to sustain the aerobic microorganisms in completely aerated lagoons. Lagoons can be considered completely aerobic if sufficient oxygen is provided to achieve a dissolved oxygen (DO) content of 2.0 mg/L or more. Oxygen is typically provided by mechanical aerators. A major disadvantage of completely aerated lagoons is the enormous cost of the energy required to run the aerators continuously. The District performed a cost effective analysis for the purposes of reducing VOC emissions. Because of the large costs, it was determined that completely aerated lagoons are not cost effective options for dairy facilities at the present time.

Conclusion: The Bar 20 project will result in GHG emissions. However, design features and mitigation measures have been incorporated into the project that will reduce GHG emissions. As discussed above, the reduction in GHG emissions from several measures is quantifiable, while additional reductions may result from other measures whose reductions are not quantifiable with the available science. In addition to several design elements, the proposed measures that will result in quantifiable GHG emission reductions are identified below:

- Feeding animals dietary oils (eg. Cottonseed),
- Removal of manure from the concrete feed lanes at least once a day, and
- Solid manure applied to fields incorporated within two hours into the soil.

The reductions achieved through these measures will reduce CH_4 emissions by 272.42 tons/year (5,722.17 tons of CO_2 equivalents).
As you can see from Table 2.6.3.3, there is a net decrease in GHG emissions of 12,947 tons per year of CO2 equivalents, clearly below the proposed significance threshold of 42,000 tons per year.

Impact #2.6.3.2 Particulate Matter (PM10) and Fine Particulate Matter (PM2.5) Construction Impacts

As previously discussed, construction for a portion of the project, and associated impacts have already occurred, however, for the purposes of disclosing the project's impact, this analysis has been prepared as if construction has not occurred. Project construction will result in numerous activities that generate dust. Grading, earthmoving and excavation are the activities that generate the most PM10 and PM2.5 emissions.

Construction activities associated with project development include site preparation, soil excavation, grading, equipment traffic on paved and unpaved surfaces, and the construction of dairy structures. The duration of construction for this project is occurred for a total period of (Try to be more specific, since construction has already occurred.).

The District has developed a menu of PM10/PM2.5 control options that define the minimum content of a construction dust control program. Regulation VIII control measures are required for all construction projects to reduce the amount of PM10/PM2.5 emissions generated from fugitive dust sources. According to District guidance, control measures are applicable to construction projects that would be expected to generate large amounts of PM10/PM2.5 emissions, and additional control measures are applicable to projects with large construction sites, located near sensitive receptors, or that for other reasons warrant additional emissions reductions.

The District's Guide for Assessing and Mitigating Air Quality Impacts recommends that the size of the construction area and nature of the activities that will occur be considered in evaluating PM10/PM2.5 emission impacts from construction. Due to the relatively large project area and projected intensity of dust-producing activities during construction, PM10/PM2.5 emissions generated during construction will constitute a temporary potentially significant impact, possibly exposing residents downwind to elevated PM10 concentrations and contributing to the regional PM10/PM2.5 emission burden.

Conclusion: Compliance with Regulation VIII and implementation of the project-pertinent District control measures will constitute sufficient mitigation to reduce PM10 impacts below significance for this project.

Mitigation Measure: None are required; feasible mitigation measures have been incorporated in the District's Regulation VIII.

Impact #2.6.3.3 Construction Emissions – Volatile Organic Compounds (VOC), Nitrogen Oxide (NOx), Particulate Matter (PM10), Fine Particulate Matter (PM2.5), Carbon Dioxide (CO2)

Site preparation and facilities construction activity emissions have been estimated based on construction equipment, construction employment, and construction duration. The results of this calculation are shown in the table below, expressing tons per year (see Appendix A for calculation basis).

Conclusion: As presented in the table below, project construction-related emissions are less than significant.

Mitigation Measure: None are required.

Construction Exhaust Emissions for Bar 20 (tons/year)

Source	VOC	NOx	PM10	PM2.5	SOx	CO	CO2
Backhoes (2) for Dairy Expansion	0.11	0.61	0.06	0.06	0.0	0.4	49.42
Water Trucks (2) for Dairy Expansion	0.27	2.74	0.09	0.03	0.0	0.28	222.24
Forklifts (3) for Dairy Expansion	0.04	0.34	0.02	0.02	0.0	0.15	25.61
Concrete Trucks (3) for Dairy Expansion	0.32	3.25	0.12	0.11	0.0	1.09	289.54
Construction Vehicles for Anaerobic Digester	0.17	1.22	0.07	0.07	0.0	0.69	109.59
Total Project Emissions	0.91	8.16	0.36	0.29	0.0	2.61	696.4
SJVUAPCD Threshold	10	10	15	--	27.4	100	--

Impact #2.6.3.4 Operational Emission of Criteria Pollutants, Particulate Matter (PM_{10}) [Evaluation Criteria (a), (b), (c), (d)]

The Bar 20 dairy is currently permitted for an existing dairy facility with the following herd breakdown:

Existing Bar 20 Dairy Herd

Type	Number
Milking Cows	2,904
Dry Cows	443
Heifers (15-24 months)	276
Heifers (7-14 months)	1,553
Heifers (4-6 months)	421
Calves (under 3 months)	606
Bull	1
Total dairy herd	**6,204**

The project is the expansion of dairy operations by housing the following number of cows in a recently constructed dairy facility located to the south across Whites Bridge Road (see Figure 2-3 for location).

Expanded Dairy Facility Herd Size

Type	Number
Milking cows – freestalls	6,600
Milk cows – Saudi style barns	200
Dry cows – Saudi style barn	1,000
Heifers (15-24 months) open corrals	950
Heifers (15-24 months) open corrals w/shades	950
Heifers (15-24 months) Saudi style barns	300
Heifers (7-14 months) open corrals	750
Heifers (7-14 months) shades	950
Heifers (7-14 months) Saudi style barns	100
Heifers (4-6 months) Saudi style barns	700
Calves (under 3 months) individual hutches	1,000
Bulls	10
Total dairy herd size	**13,510**

Conclusion: The proposed addition of the 13,510 dairy cow herd at the expanded dairy facility site will generate new PM_{10} emissions. However, with implementation of the required mitigation measures the impact will be less than significant.

Mitigation Measure #2.6.3.4-1 PM_{10} Control Measures – Expanded Dairy Facility:

1. Milk cows housed in freestalls shall not be allowed in exercise pens. Exercise pens shall be permanently blocked off and made inaccessible.

2. Shade structures shall be provided for the following cows: 950 heifers (15-24 months) and 950 heifers (7-14 months). Saudi-style barns shall be provided for the following: 200 milk cows, 1,000 dry cows, 300 heifers (15-24 months), 100 heifers (7-14 months) and 700 heifers (4-6 months). Calves shall be housed in individual above-ground calf hutches.

3. Sufficient sprinkling shall be undertaken in heifer corrals (heifers 7-14 months) to match daily evaporation.

4. At least one of the daily feedings of the heifers shall be near (within one hour of) dusk.

5. Weekly scraping of corrals using pull-type scraper in the morning hours except when prevented by wet conditions (this also applies to the existing dairy).

6. Dry manure (both facilities) shall not be applied to fields when wind speeds exceed 10 miles per hour.

7. Field perimeter roads and onsite facility roads shall be stabilized such that no visible dust clouds beyond the site boundary from manure spreading or agricultural service vehicles using these roads. All onsite dairy facility roads shall be surfaced with gravel, sand, or decomposed granite.

8. Mud or dirt on project-adjacent public roads which originates from project operations shall be removed within 24 hours of deposition.

9. Begin establishing windbreak(s) around the dairy in accordance with National Resource Conservation Practice Standard Code 380-Windbreak/Shelterbelt establishment or other District-approved guidelines for downwind windbreaks for all cows and upwind windbreaks for all cows except milk and dry cows.

Effectiveness of Measure: Implementation of the described control measures will reduce the project-related PM_{10} emissions from the expansion to 11.924 tons per year which is below the District's PM_{10} emission threshold of 15 tons per year.

Mitigation Measure #2.6.3.4-2 PM_{10} Control Measures – Existing Dairy Facility: In addition to the control measures directed to the expanded milk cow herd, the owner/operator has agreed to implement the following measures at the existing permitted dairy facility site:

1. The cow herd at the existing dairy to be reduced from 6,204 to 5,610 cows; the herd composition to be:

Type	Number
Milking cows	2,600
Dry cows	500
Heifers (15-24 months)	1,000
Heifers (7-14 months)	800
Calves (4-6 months)	400
Calves (under 3 months)	300
Bulls	10
Total	**5,610**

2. At least one of the daily feedings of the heifers shall be near (within one hour of) dusk.

3. Weekly scraping of corrals using pull-type scraper in the morning hours except when prevented by wet conditions.

4. In accordance with National Resource Conservation Service (NRCS) Conservation Practice Standard Code 380-Windbreak/Shelterbelt shall install upwind shelterbelts for heifers (7-14 months of age).

5. Sufficient sprinkling in heifer corrals (heifers ages between 7-24 months) to match daily evaporation.

Effectiveness of Measure: These measures will reduce the PM_{10} emissions at the existing dairy facility by 6.776 tons, from 18.803 to 12.027 tons per year. The overall increase in PM_{10} emissions from this project will be 5.148 tons per year (11.924 tons increase from expansion – 6.776 tons decrease from existing operation = 5.148).

Mitigation Measure #2.6.3.4-3 PM_{10} Offset Purchase:

1. The owner/applicant has purchased 3.47 tons of PM_{10} (at the appropriate Distance Offset ratio).

   The requirement to purchase PM10 emission reduction credits was outlined in a settlement agreement between the District and Bar 20 Dairy. The basis for this requirement was the assumption that Bar 20 dairy would fail the Ambient Air Quality Analysis (AAQA). However, upon further review of the project and the proposal of additional mitigation measures by Bar 20, the project passed the AAQA, and was judged, based on our conservative computer modeling, to be no threat to cause local exceedances of the state or federal PM10 ambient air quality standards. Therefore, the District's regulations no longer required PM10 ERCs to be surrendered. Despite that fact, Bar 20 Dairy was nonetheless required by the District to surrender those credits as a part of the monetary penalty associated with the settlement agreement.

Effectiveness of Measure: Purchase of the remaining 3.47 tons of PM_{10} will eliminate all project-related PM_{10} emissions.

Implementation/Monitoring: The implementation by the owner/applicant of the PM_{10} mitigation measures is required as a condition of the Permit to Operate by the SJVAPCD. Monitoring shall be by the SJVAPCD.

Impact #2.6.3.5 Operational Emission of Criteria Pollutant, Volatile Organic Compounds (VOC)
[Evaluation Criteria (a), (b), (c), (d)]

The proposed addition of a 13,510 dairy cow herd will generate new VOC emissions. Mobile source emissions will increase by 0.33 tons/year.

Conclusion: With implementation of the required mitigation measures this air quality impact will be less than significant.

Mitigation Measure #2.6.3.5-1 VOC Control Measure – Expanded Dairy Facility:

1. Flush/Spray down milking parlor(s) immediately prior to, immediately after, or during the milking of each group of cows.

2. Concrete feed lanes and walkways.

3. All but 200 milk cows housed in freestall barns with water drainage to separator facilities.

4. Feed lanes and walkways for all milk and dry cows flushed at least four times per day.

5. All corrals adequately sloped to promote and achieve full drainage.

6. Corrals shall be managed to ensure drainage and prevent water from standing more than forty-eight (48) hours after a storm.

7. Leachate from the silage piles shall be collected and sent to a waste treatment system such as a lagoon in a timely manner (minimum of once every twenty-four (24) hours).

8. All animals fed in accordance with National Research Council (NRC) or other District approved guidelines utilizing routine nutritional analysis for rations.

9. Silage shall be fully enclosed or covered with tarps, except for the area where feed is being removed from the pile.

10. Silage Face Management (only disturb the required area of face – leave remaining area undisturbed).

11. Refused feed shall be pushed up to be re-fed or removed from feed lanes on a daily basis to prevent decomposition.

12. Solid manure shall be harrowed in thin layers in corrals and drying areas to facilitate aerobic drying. This requirement shall not apply when wet weather conditions make this practice infeasible.

13. Solid manure shall be incorporated into fields immediately (within two hours) after application.

Mitigation Measure #2.6.3.5-2 VOC Control Measures – Existing Dairy Facility: Control measures shall also be required for operation of the existing dairy.

1. Flush/Spray down milking parlor(s) immediately prior to, immediately after, or during the milking of each group of cows.

2. Feed lanes and walkways for all milk and dry cows flushed at least four times per day.

3. At least one of the daily feedings of the heifers shall be near (within one hour of) dusk.

4. All animals fed in accordance with National Research Council (NRC) or other District-approved guidelines utilizing routine nutritional analysis for rations.

5. Weekly scraping of corrals using pull-type scraper in the morning hours except when prevented by wet conditions.

6. Irrigation of crops using liquid and slurry manure from a holding/storage ponds.

7. Utilization of manure water and manure will be in thin layers, blending such manure water with irrigation water in compliance with the nutrient management plan.

Effectiveness of Measures #2.6.3.5-1 and #2.6.3.5-2: Implementation of the described control measures, including the reduction in herd size, will reduce the dairy facility VOC emissions to 17.19 tons/yr

Mitigation Measure #2.6.3.5-3 Shutdown and modification of existing dairy facilities located in the San Joaquin Valley: In addition to the above VOC control measures the owner applicant has agreed to offset the increase in emissions by the following measures:

1. The owner/applicant shall purchase and permanently close two dairies in the District. The 1,174 milking cows thereon shall be transferred to the Bar 20 Dairy. (The two dairies are the JMC Dairy located on 13th Street approximately ½ mile north of Grangeville Boulevard in Kings County, 504 milking cows, and the Joe Machado Dairy located on Henry Street approximately 1-1/2 miles west of State Route 99 in Merced County, 670 milking cows.)

2. From a third dairy site in Fresno County, located at Madison Avenue and Brawley Avenue 17 miles east of the project site, the owner/applicant shall transfer 433 milking cows, 53 dry cows, and 11 heifers to this project, and shall then convert the dairy into a heifer ranch. The heifer ranch shall be limited to 400 heifers (200 age 15-24 months and 200 under 15 months).

3. In addition to the above shutdowns, Bar 20 has proposed to shutdown additional existing dairies in the San Joaquin Valley and transfer the cows from the shutdown dairies for use at their expansion project. The number and types of cows transferred to Bar 20 dairy must create a reduction equal to or exceed 10,401.3 tons-CO2 emissions. Bar 20 Dairy will be required to submit to the District a list of the facilities shutdown, their location, and the number and type of cows being transferred with the calculation showing that the emissions of 10,401.3 tons-CO2 have been achieved. Historical records demonstrating herd capacity shall also be included. In addition, Bar 20 dairy will have to demonstrate to the District that the reductions are permanent.

   Since there are no rules or regulations in place that would have made it compulsory for the dairies to shut down, the reductions are therefore surplus of any requirement, for the purposes of permitting requirements. In addition, any other new or expanding dairy that may serve as a replacement dairy must also undergo a determination of whether permits are required, thus assuring that the reductions are permanent. The District, while allowing the reductions, also made the shutdowns and modifications to the existing facilities enforceable and permanent by placing the following conditions on Bar 20 Dairy's permit.

   Bar 20 Dairy shall permanently shutdown JMC Dairy located on 13th Street approximately ½ mile north of Grangeville Boulevard in Kings County and Joe Machado Dairy located on Henry Street approximately 1-1/2 miles west of State Route 99 in Merced County and transfer the 1,174 milking cows to Bar 20 Dairy. The shutdown dairies shall be rendered inoperable.

   Bar 20 Dairy shall transfer 433 milking cows, 53 dry cows, and 11 heifers from their dairy located at Madison Avenue and Brawley Avenue 17 miles east of the project site. This dairy should then be converted into a heifer ranch. The heifer ranch shall be limited to 400 heifers (200 age 15-24 months and 200 under 15 months).

Bar 20 Dairy shall permanently shutdown existing dairies in the San Joaquin Valley and relocate a sufficient number and types of cows which equal or exceeds 10,401.3 tons-CO2/yr. The following emission factors should be used in calculating the emissions from the cows: 6.9432 tons-CO2/yr for milk and dry cows; 1.5204 tons-CO2/yr for heifers (15-24 months); 0.99 tons-CO2/yr for calves/heifers (1-14 months).

Bar 20 Dairy shall submit to the District a list of the facilities shutdown, their location, and the number and type of cows being transferred with the calculation showing that the emissions of 10,401.3 tons-CO2 have been achieved. Historical records demonstrating herd capacity shall also be included. In addition, Bar 20 dairy shall also demonstrate to the District that the reductions are permanent.

Effectiveness of Measure: This measure will reduce VOC emissions by 28.69 tons per year. These measures, together with the implementation of Mitigation Measures #2.6.3.5-1 and 2, will further reduce the VOC emissions to -11.5 tons per year (28.69 – 17.19 tons = -11.5 tons/yr.).

Mitigation Measure #2.6.3.5-4 Purchase of Emission Reduction Credits:

1. The owner/applicant has purchased 4.9 tons of VOC at the appropriate Distance Offset Ratio.

Effectiveness of Measure: This will reduce the overall project emissions to -16.4[4] tons of VOC per year, resulting in an overall decrease in VOC emissions from the project, which is less than the District's significance threshold of 10 tons/year.

Implementation/Monitoring: The implementation by the owner/applicant of the VOC mitigation measures is required as a condition of the Permit to Operate by the SJVAPCD. Monitoring shall be by the SJVAPCD.

Impact #2.6.3.6 Operational Emission of Criteria Pollutants, Nitrogen Oxide (NOx): [Evaluation Criteria (a), (b), (c), (d)]

The Bar 20 Dairy expansion project will increase nitrogen oxide (NOx) emissions resulting from additional on-road vehicle and truck traffic and mobile dairy equipment.

Conclusion: On-road vehicle trips include feed trucks, milk trucks, anaerobic digester trucks, and employee vehicles. Mobile dairy equipment would include a diesel tractor used for manure scraping. The combined NOx emissions from these sources is 6.83 tons per year (see Appendix A for calculations). As the NOx emissions for the project are less than the SJVAPCD significance threshold level of 10 tons per year the impact is less than significant.

[4] The addition of the flare and boiler emissions will result in an overall decrease in emissions of 15.74 tons-VOCs/yr

Mitigation Measure #2.6.3.6-1: Although project impacts are less than significant the following mitigation measure is recommended to further reduce NOx emissions.

1. Employees will be encouraged to carpool travel to and from the project site.
2. Idling time of on-site project farming and dairy operations equipment shall be minimized.
3. All on-site equipment shall be properly tuned and maintained in accord with manufacturer's specifications.
4. Whenever feasible, alternative fueled or electrical on-site equipment shall be utilized.
5. Minimum practicable on-site engine sizes shall be used.
6. On-site gasoline powered equipment shall be equipped with catalytic converters.
7. Employees will be encouraged to carpool to and from the project site.

Effectiveness of Measures: The implementation of these measures will further reduce NOx emissions.

Implementation/Monitoring: The listed implementation measures will be a condition of the Permit to Operate for the project. The owner/operator of the project will be responsible for implementation. Monitoring thereof will be the continuing responsibility of the SJVAPCD.

Impact #2.6.3.7 Health Risks
[Evaluation Criteria (d)]

The SJVAPCD staff has modeled the proposed project to determine if there is a health risk from project-derived pollutants (see Appendix B) and has determined that in accord with the criteria incorporated in the District's "Guide for Assessing and Mitigating Air Quality Impacts" (GAMAQI) no such risk exist for any offsite sensitive receptor.

Conclusion: The project does not expose sensitive receptors to substantial pollutant concentrations; there is no significant health risk impact.

Mitigation Measure: None required.

Impact #2.6.3.8 Odor Emissions:
[Evaluation Criteria (e)]

Although odors from raising livestock are exempt from direct regulation by the local air quality jurisdiction under California state law [California Health and Safety Code, Section 41705 (a)], odor can still be considered a perceived nuisance and an environmental impact.

Odor formation and transport from dairy operations – corrals, lagoons, freestalls – is a complex process. Odor formation is most rapid during hot weather when anaerobic conditions set in the fastest. Conversely, atmospheric dispersion is best when heated surfaces induce gusty winds and convective turbulence. There is therefore no time of day when odor potential is minimized. Odors "generate" faster in the day, but disperse faster. Slower nocturnal chemistry is offset by more stagnant meteorology.

The prevailing wind direction in Fresno County is toward the southeast based upon Fresno-Yosemite Airport wind rose records.

Factors which impact the analysis of the significance of odor impacts include the influence of the proposed dairy's modern design incorporating concrete-base, flushed, freestalls and walk lanes and water drainage to separator facilities, together with SJVAPCD–required operational mitigation measures for other impacts resulting in odor reduction as a supplemental benefit.

The nearest off-site residential dwelling is approximately 500 feet west of the expanded dairy facilities site. There are 9 offsite residential units within 1 mile of the dairy facility site (see Figure 2-4 on page 2-6).

The procedure outlined for odor analysis in the SJVAPCD's "Guide for Assessing and Mitigating Air Quality Impacts" (GAMAQI) includes the following:

- *Identify the location of sensitive receptors (including residences).*
- *Compare the distance to the nearest sensitive receptor to the distances in Table 4-2 of the GAMAQI. If the sensitive receptors are further away than the distances given in Table 4-2, no further analysis is required.*
- *Obtain any odor complaints against the facility or similar facilities from the local District office and the County's environmental health department.*
- *Review the complaints to determine the location of complainants relative to the facility.*
- *Identify any sensitive receptors at similar distances.*
- *Determine if emissions of odiferous compounds will increase or decrease with implementation of the project.*
- *Draw any reasonable conclusions as to the probability that the project will generate odor complaints based on this analysis of complaint history.*

In reiteration of the standard analysis contained in the preceding discussion, and in compliance with the GAMAQI process:

- *Identify the location of sensitive receptors (including residences).*

See Figure 2-4 on page 2-6.

- *Compare the distance to the nearest sensitive receptor to the distances in Table 4.2 of the GAMAQI. If the sensitive receptors are further away than the distances given in Table 4-2, no further analysis is required.*

GAMAQI Table 4-2 and its pertinent accompanying text are:

Table 4-2 (GAMAQI)
Project Screening Trigger Levels
For Potential Odor Sources

Type of Facility	***Distance***
Wastewater Treatment Facilities	*2 miles*
Sanitary Landfill	*1 mile*
Transfer Station	*1 mile*
Composting Facility	*1 mile*
Petroleum Refinery	*2 miles*
Asphalt Batch Plant	*1 mile*
Chemical Manufacturing	*1 mile*
Fiberglass Manufacturing	*1 mile*
Painting/Coating Operations (e.g. auto body shops)	*1 mile*
Food Processing Facility	*1 mile*
Feed Lot/Dairy	*1 mile*
Rendering Plant	*1 mile*

Because offensive odors rarely cause any physical harm and no requirements for their control are included in state or federal air quality regulations, the SJVAPCD has no rules or standards related to odor emissions, other than its nuisance rule[35]*. Any actions related to odors are based on citizen complaints to local governments and the SJVAPCD. Lead Agencies can make a determination of significance based on a review of District complaint records as described in Section 5. For a project locating near an existing source of odors, the impact is potentially significant when the project site is at least as close as any other site that has already experienced significant odor problems related to the odor source. Significant odor problems are defined as:*

- *More than one confirmed complaint per year averaged over a three year period, or*
- *Three unconfirmed complaints per year averaged over a three-year period.*

For projects locating near a source of odors where there is currently no nearby development and for odor sources locating near existing receptors, the determination of significance should be based on the distance and frequency at which odor complaints from the public have occurred in the vicinity of a similar facility.

There are 9 offsite dwelling units within one mile of the existing dairy facilities site.

- *Obtain any odor complaints against the facility or similar facilities from the local District office and the county's environmental health department.*

No such odor complaints have been filed with the Fresno County Environmental Health Department, or the SJVAPCD.

- *Review the complaints to determine the location of complainants relative to the facility.*

Not applicable.

- *Identify any sensitive receptors at similar distances.*

Not applicable.

- *Determine if emissions of odiferous compounds will increase or decrease with implementation of the project.*

There will be an animal unit-proportional potential for emissions of odiferous compounds.

- *Draw any reasonable conclusions as to the probability that the project will generate odor complaints based on this analysis of complaint history.*

There are 9 dwelling units within 1 mile of the proposed dairy. The operation of the dairy facility is not expected to generate odor complaints.

Mitigation Measures: Although the exact correlation of VOC reduction to odor reduction is not known, a significant amount of odor reductions are actually achieved through VOC reduction strategies. Bar 20 Dairy has proposed to comply with the District's Best Available Control Technology requirements and has proposed the required VOC mitigation measures under District Rule 4570 (Confined Animal Facility) (section 2.6.3.5). These control technologies/mitigation measures will therefore result in odor reductions.

Conclusion: It is concluded, based upon the above data and analysis that the project will not create objectionable odors affecting a substantial number of people, and that the impact of project-generated odors is therefore less than significant.

Impact #2.6.3.9 Local Carbon Monoxide (CO) Concentrations:
[Evaluation Criteria (b)]

Concentrations of this pollutant are related to the levels of traffic and congestion along streets and at intersections.

The SJVAPCD'S *Guide for Assessing and Mitigation Air Quality Impacts* provides screening criteria to identify situations where modeling is warranted. If neither of the following criteria is met at intersections affected by the project, the project is concluded to have no potential to create a violation of the carbon monoxide standards:

- The Level of Service (LOS) on one or more streets or at one or more intersections in the project vicinity will be reduced to LOS E or F.

- The project will substantially worsen an already existing LOS F on one or more streets or at one or more intersections in the project vicinity.

Although not stated expressly, the above criteria are to be applied to signal controlled intersections rather than stop sign controlled intersections. The project is served by rural streets and highways with stop sign controlled intersections with good levels of service, indicating little potential for exceedance of the carbon monoxide standards.

Conclusion: Based on the SJVAPCD criteria and the limited amount of project-related traffic on Whites Bridge Road, the project would have no potential to create a violation of the carbon monoxide standards. Any carbon monoxide concentration increases resulting from the proposed project would be less than significant.

Mitigation Measures: None required.

Table #2.6.3.5 summarizes the mitigated project emissions.

The mitigated impacts have been evaluated by the District and it has determined that none of such impacts are sufficient to warrant a conclusion that they are cumulatively significant. This analysis includes any impacts on global warming which will be effected by project-related emissions of methane, carbon dioxide, or NOx compounds. Such analysis is not predicated on a 'ratio' comparison of project impacts to total worldwide emissions but upon rational consideration of the de minimus project effects with relationship to the magnitude of the global warming phenomena and its apparent causes and of the economic infeasibility of any further mitigation measures.

Table 2.6.3.4
Mobile Source Operational Emissions of Pollutants (tons/year) from Proposed Dairy Expansion

Source	VOC	NOx	PM10	PM2.5	SOx[a]	CO	CO2
Truck Trips (Feed Trucks)	0.06	1.03	0.09	.04	0.0	0.32	117.56
Truck Trips (Milk Trucks)	0.04	0.68	0.06	0.03	0.0	0.21	77.15
Employee and Visitor Travel	0.16	0.17	0.24	0.05	0.0	2.1	123.36
Mobile Dairy Equipment	0.03	0.4	0.02	0.02	0.0	0.143	25.9
Truck Trips (Anaerobic Digester Trucks)	0.27	4.55	0.28	0.18	0.0	1.57	529.02
Total Project Emissions	0.56	6.83	0.69	0.32	0.00	4.34	872.99
SJVUAPCD Threshold	10	10	15	--	24.7	100	42,000

[a] SOx emissions are insignificant because the equipment operate on ultra low sulfur diesel fuel.

Table 2.6.3.5
Operational Emissions of Pollutants (tons/year) from Proposed Dairy Expansion

Source	VOC	NOx	PM10	PM2.5	SOx	CO	NH3	CH4	N2O	CO2e
Pre-Project Operational Emissions										
Bar 20 Dairy 1	40.75	--	18.8	--	--	--	155.85	1,138.1	5.46	25,592.7[a]
Existing Liquid Manure Management System	34.79	--	--	--	--	--	209.11	774.61	7.38	18,554.61
Post-Project Operational Emissions Prior to Mitigation[b]										
Bar 20 Dairy 1	28.67	--	18.8	--	--	--	155.85	949.55	4.83	21,437.85
Bar 20 Dairy 2 (expansion) including Liquid Manure Management System	81.34	--	33.33	--	--	--	355.04	1,590.53	11.21	36,876.23
Post-Project Operational Emissions Post Mitigation										
Bar 20 Dairy 1[c]	24.13	--	12.03	--	--	--	86.06	880.46	4.83	19,986.96
Bar 20 Dairy 2 (expansion)	68.6	--	11.92	1.4	--	--	412.3	1,387.14	11.21	32,605.04
Emissions After Mitigation [d]	**17.19**	**-**	**5.15**	**1.4**	**--**	**--**	**133.41**	**354.85**	**3.2**	**8,443.85**
Other Post-Project Operational Emissions										
Digester Flare	0.41	9.0	1.2	--	5.71	16.52	--	--	--	--[e]
Digester Boiler	0.25	0.8	0.34	--	0.13	3.76	--	--	--	5,366.38
Less Closed or Converted Dairies (Dairy Operational Emissions including Cattle in Corrals) [fg]										
JMC Dairy	-6.47	--	-1.4	-0.2	--	--	-18.6	-170.68	-0.18	-3,640.08
Joe Machado Dairy	-4.86	--	-1.8	-0.2	--	--	-24.8	-128.39	-0.13	-2,736.49
Heifer Ranch Conversion	-2.88	--	0.7	0.1	--	--	-11.5	-96.07	0.49	-1,865.57
Future Dairy Shutdowns	-14.48	--	-1.03[h]	--	--	--	-23.85[i]	-382.13	-0.4	-8,148.73
Less Emission Offsets	-4.9	--	-3.5	--	--	--	--	--	--	--
Total Project Emissions	-15.74	9.8	-0.34	1.1	5.84	20.28	54.65	-422.42	2.98	-2,580.64
SJVUAPCD Threshold	10	10	15	--	27.4	100	--	--	--	42,000

[a] CO2e is calculated as follows: (1,138.1 x 21) + (5.46 x 310) = 25,592.7
[b] The emissions include existing control measures already implemented at the existing dairy and any design elements proposed for the project expansion (eg, anaerobic digester).
[c] 75% of the flushed manure from Dairy 1 (existing) is sent to the to the expansion dairy into the digester system. The emissions from this manure will be calculated from the expansion dairy.
[d] Emissions after Mitigation are calculated as follows: Post-Project Operational Emissions Post Mitigation – Pre-Project Operational Emissions. (eg. VOC: (24.13+68.6) – (40.75+34.79) = 17.19
[e] Pursuant to the *California Climate Action Registry, Livestock Reporting Protocol, Capturing and Combusting Methane from Manure Management Systems,*

(http://www.climateregistry.org/resources/docs/protocols/project/livestock/CCAR_Livestock_Project_Reporting_Protocol_June_2007.pdf) carbon dioxide emissions from biogas control systems are considered biogenic emissions (as opposed to anthropogenic). "The rationale is that carbon dioxide emitted during combustion represents the carbon dioxide that would have been emitted during natural decomposition of the manure. Emissions from the biogas control system do not yield a net increase in atmospheric carbon dioxide because they are theoretically equivalent to the carbon dioxide absorbed during plant/feed growth.".

[f] Although not calculated, additional emission reductions would occur from the elimination of mobile dairy equipment and truck, employee, and visitor trips.

[g] Bar 20 has proposed to shutdown existing dairies in the San Joaquin Valley and transfer the cows from the shutdown dairies for use at their expansion project. The number and types of cows transferred to Bar 20 dairy must create a reduction equal or exceed 10,401.3 tons-CO2 emissions. Bar 20 Dairy will be required to submit to the District a list of the facilities shutdown, their location, and the number and type of cows being transferred with the calculation showing that the emissions of 10,401.3 tons-CO2 have been achieved. Historical records demonstrating herd capacity shall also be included. In addition, Bar 20 dairy will have to demonstrate to the District that the reductions are permanent.

[h] The PM10 emissions are based on a very conservative calculation assuming that only cows housed in freestalls, with the lower emission factor of 1.37 lbs-hd-yr will be relocated, even though the majority of smaller existing dairies are open corral dairies.

[I] The ammonia emissions are also based on a very conservative calculation assuming that only heifers will be relocated, even though a large portion of the relocation will consist of milk cows. The emission factor of 31.8 lbs-hd-yr will be used rather than the 74 lbs-milk/yr.

Note: The proposed dairy expansion would not change the support crop acreage or crop types; therefore, the emissions change associated with agricultural activities would be zero.

Table 2.6.3.6

Total Project CO_2 Emissions from Proposed Dairy Expansion

Source	CO2e
Dairy Operational Emissions	-7,330.43
Mobile Source Emissions	872.99
Total Project Emissions	-6,457.44
SJVUAPCD Proposed Threshold	42,000

Issues:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
2.6.4 BIOLOGICAL RESOURCES – Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☐	☒
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☐	☒
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☐	☒
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☐	☒
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☒
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

Substantial Adverse Effect on Candidate, Special-Status or Sensitive Species [Evaluation Criteria (a)]

The burrowing owl and tricolor blackbird are the only special-status animal species that may potentially breed in the existing 3,420 acres of irrigated cropland. San Joaquin kit fox may occasionally forage or pass through. Swainson's hawk may seasonally forage on the site.

Conclusion: The project is increasing the dairy herd within the existing dairy facilities sites. As there will be no alterations of the existing land uses, there will be no adverse impacts on candidate, special-status or sensitive species.

Mitigation Measures: None required.

Substantial Adverse Effect on Riparian Habitat [Evaluation Criteria (b)]

Projects that result in removal of or disturbance to riparian habitat can have substantial impact on flora and fauna.

Conclusion: The project site includes the dairy facilities sites and 3,420 acres of intensively developed agricultural use. As no riparian habitat exists, no adverse impacts will occur.

Mitigation Measures: None required.

Substantial Adverse Effect on Federally Protected Wetlands [Evaluation Criteria (c)]

Vernal pools and other wetlands are becoming increasingly rare in California. Projects that go forward on sites where wetlands occur must have appropriate authorization from the U.S. Army Corps of Engineers.

Conclusion: There are no vernal pools wetlands on the existing project site. There is no adverse impact.

Mitigation Measures: None required.

Interference with Movement of Native Wildlife [Evaluation Criteria (d)]

The proposed increase in dairy herd size will be confined to the existing dairy facilities sites.

Conclusion: The proposed project will have no effect on the regional movements of terrestrial wildlife.

Mitigation Measures: None required.

Local Policy/Ordinances Conflict [Evaluation Criteria (e)]

There are no applicable or pertinent tree preservation policies or ordinances affecting the project area.

Conclusion: There is no impact.

Mitigation Measures: None required.

Habitat Conservation Plan or Other Plan Conflict

[Evaluation Criteria (f)]

There are no applicable or pertinent habitat conservation plans or natural community preservation plans affecting the project area.

Conclusion: There is no impact.

Mitigation Measures: None required.

Issues:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
2.6.5 CULTURAL RESOURCES – Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	☐	☐	☐	☒
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☐	☐	☐	☒
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☐	☒
d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☐	☐	☒

Response:

Cultural Resources
[Evaluation Criteria (a), (b), (c), (d)]

There are no historic buildings or other potential historic resources on the project site. The project site has been farmed for many years, and the dairy facilities have been constructed without evidence of archaeological, paleontological, or human remains.

Conclusion: The project, an increase in dairy herd size, will have no environmental impact.

Mitigation Measures: None required.

Issues:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
2.6.6 GEOLOGY/SOILS -- Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving?				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☐	☒
ii) Strong seismic ground shaking?	☐	☐	☐	☒
iii) Seismic-related ground failure, including liquefaction.	☐	☐	☐	☒
iv) Landslides	☐	☐	☐	☒
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☐	☒
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction of collapse?	☐	☐	☐	☒
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building code (1994), creating substantial risks to life or property?	☐	☐	☐	☒

Response:

Seismic Effects
[Evaluation Criteria (a) i), ii), iii)]

There are no known earthquake faults, active or inactive, at or near the project site, although several faults are within a 60 to 70-mile radius of the project site.

The Five-County Seismic Safety Element places the project site in an area of minimal ground shaking, with no likelihood of ground failure or liquefaction. Project structures have been required by Fresno County to comply with building code requirements.

Conclusion: There are no significant seismic-related project impacts.

Mitigation Measures: None required.

Landslides
[Evaluation Criteria (a) iv)]

Site topography is essentially level, less than one percent slope prior to land leveling for agricultural production.

Conclusion: There is no potential landslide impact.

Mitigation Measures: None required.

Soil Erosion, Topsoil Loss
[Evaluation Criteria (b)]

Dairy facility site slopes are minimal (0.33% to 4%); and the balance of the project site, with slopes generally not exceeding two percent, will be double-cropped or maintained in alfalfa.

Conclusion: The dairy operation will not create soil erosion or occasion loss of topsoil; there will not be an impact.

Mitigation Measures: None required.

Soil Instability
[Evaluation Criteria (c)]

Landslide potential and liquefaction potential have been discussed, and found to be les than significant. There is no evidence in the geologic record that "Old Alluvium" or its derivative soils are subject to lateral spreading. Subsidence is due to non-compacted, wind-deposited, soils consolidation under load, or to severe ground water overdraft; no such soils or severe overdraft exists at the project site.

Conclusion: There will be no soil instability impact.

Mitigation Measures: None required.

Expansive Soils Hazards
[Evaluation Criteria (d)]

The existing dairy facility sites have been constructed on Chino series Traver soils which are classified as medium or high with respect to expansion attributes, as defined in Table 18-1-B of the 1994 Uniform Building Code. No multi-story or pile-supported structures have been constructed as a part of the project. Design modification of footings or slabs were therefore not required, but only normal compliance with Uniform Building Code requirements.

Conclusion: There are no expansive soil hazard-related significant impacts.

Mitigation Measures: None required.

Issues:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
2.6.7 HAZARDS/HAZARDOUS MATERIALS – Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☒	☐	☐
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☒	☐	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safely hazard for people residing or working in the project area?	☐	☐	☐	☒
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☐	☒
i) Will the project result in significant Vectors generation and Fly generation in the surrounding areas?	☐	☒	☐	☐

Response:

Operational Hazards
[Evaluation Criteria (a), (b), (c)]

Hazardous materials are used for the operation of the dairies and continued agricultural production at the project site, but are applied by contract and not stored on the project site. Fuel stored in aboveground tanks, lubricants, and cleaning solutions are required for the operation and maintenance of equipment during and after construction. Pesticides (for control of vectors) and medicines for dairy cattle are used at the dairies. Agricultural chemicals, including insecticides, herbicides, and fertilizer, are used for continued farming at the site. As a requirement of the Fresno County Department of Community Health, the applicant has submitted a Hazardous Materials Business Plan to the County.

The RWQCB requires that a Storm Water Pollution Prevention Plan (SWPPP) be prepared for the dairy in compliance with the provisions of the General Waste Discharge Requirements for Milk Cow Dairies. The SWPPP is required to include provisions for the safe storage, use, and disposal of hazardous materials. In addition, all use of restricted agricultural chemicals is controlled by Federal and State laws and regulations enforced by the California Department of Pesticide Regulation (DPR).

Conclusion: Due to the hazardous nature of some materials that are utilized by the dairy, operational hazards are potentially significant.

Mitigation Measure #2.6.7.1: The owner/operator shall submit documentation to the SJVAPCD that appropriate permits and notifications regarding the storage, transport, use and disposal of hazardous materials have been completed and acquired. The documentation shall include, at minimum, evidence of compliance with:

1. An employee safety program in accord with California Labor Code Section 6401.7.

2. The RWQCB requirements, including a Storm Water Pollution Prevention Plan incorporating provisions for the safe storage, use, and disposal of hazardous wastes.

3. The permitting requirements of the California Department of Pesticide Regulation.

Effectiveness of Measure: Compliance with the measure will reduce the potential impact to less than significant.

Implementation/Monitoring: This requirement shall be a condition of the SJVAPCD's Authority to Construct (ATC) and Permit to Operate (PTO) approvals; monitoring thereof shall be the responsibility of the SJVAPCD, and the Regional Water Quality Control Board.

Site Hazards
[Evaluation Criteria (d)]

The site is not on or near a hazardous waste site, as verified by review of the State of California Hazardous Waste and Substances Sites List (1998).

Conclusion: No evidence exists that the site is a designated hazardous waste site; there is no impact.

Mitigation Measures: None required.

Airport Hazards
[Evaluation Criteria (e), (f)]

The dairy facilities are located outside of any airport restricted zones established in the Fresno County Health and Safety Element.

Conclusion: The impact is less than significant.

Mitigation Measures: None required.

Emergency Evacuation and Wildland Fires
[Evaluation Criteria (g), (h)]

The dairy has been developed on private farmland and does not interfere with the County's public emergency evacuation plan. Surrounded by irrigated farmland, the project site is not within a recognized wildland fire hazard area.

Conclusion: No environmental impacts will occur.

Mitigation Measures: None required.

Vector and Fly Generation Hazards
[Evaluation Criteria (i)]

Implementation of the proposed expansion could provide additional mosquito-breeding habitat and could produce an additional source of flies that can adversely affect animal and human health, and become a nuisance for other adjacent land uses. To minimize potential adverse effects from mosquitoes, the following measures have been required.

1. All holding ponds shall be surrounded by lanes at least twelve feet in width and nothing (i.e., trees, calf pens, hay stacks, silage, tires, equipment, etc.) shall be placed in the area of the holding ponds that would prevent passage or use of vector control equipment.

2. Should fencing be placed around the holding ponds, it shall be placed on the outside of the twelve-foot lane and gates shall be provided for vehicle access.

3. All wastewater designs shall include a solids separation system. If separator ponds are the exclusive means of solids removal, then two or more solids separator ponds are required. These ponds shall not be greater than sixty feet in surface width.

4. No drainage lines shall by-pass the separator ponds, except those that provide for normal corral run-off. All such drain inlets must be sufficiently graded to prevent solids accumulation in the holding ponds.

5. Floatage of any solid substance that could provide harborage for immature mosquito species shall be kept out of all wastewater holding ponds. Mechanical agitators may be helpful in this regard.

6. The owner shall be responsible for keeping vegetative growth from all areas of the wastewater and solids separation ponds. This includes access lanes, interior pond embankments and any weed growth that might become established as floating mats on the pond surface.

7. All wastewater holding ponds shall be kept filled to within two (2) feet of their maximum levels, allowing for two (2) feet of freeboard, at all times during the summer. If the pond level drops during the growing season, more irrigation water shall be added. The water level shall not be dropped and kept low until the onset of the rainy season.

8. Dairy wastewater discharged for irrigation purposes shall be managed so that it does not stand for more than 24 hours. Discharges that do stand for more than three days could cause severe mosquito emergence.

9. Any deviations desired from the above requirements must be submitted to the Fresno Westside Mosquito Abatement District for its prior review and approval.

10. Project dairy facilities design and construction shall include concrete-base feed lanes.

11. Utilization of manure and manure water shall be in thin layers, blending such manure with irrigation water in compliance with the nutrient management plan.

12. Manure in corrals shall be scraped weekly to ensure effective fly control.

13. Uneaten feed shall be re-fed or removed from the area where animals stand to eat feed on a daily basis to prevent decomposition. Uneaten feed shall be properly disposed after removal.

14. All manured areas shall be sloped to prevent ponding and to convey all precipitation and moisture drainage systems, including the lagoons. The applicant shall, at a minimum of once per year, backfill any slope loss with compacted, non-manured material, to maintain pre-existing slopes.

15. All water systems shall be checked every two weeks to look for breaks, leaks, and overflows, including the water pressure systems, water troughs, and mister lines.

16. The owner applicant shall continuously and fully implement during dairy operation, an Integrated Pest Management Plan for fly control which contains the following specific requirements:
    a. Manure and feed storage maintenance, and prompt dead animal disposal, to minimize fly breeding.
    b. Utilization of fly bait or any other technique for effective fly suppression

17. In the event mosquito production occurs on the property (with or without an approved variance), the property owner shall be responsible for abating the nuisance. If the property owner fails to abate the nuisance, the Fresno Westside Mosquito Abatement District will complete the needed mosquito abatement measures at the owner's expense.

Conclusion: With the implementation of the control measures listed above, the projects impact will be less than significant.

Issues:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
2.6.8 HYDROLOGY/WATER QUALITY – Would the project:				
a) Violate any water quality standards or waste discharge requirements?	☐	☐	☒	☐
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☐	☒
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	☐	☐	☐	☒
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	☐	☐	☐	☒
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☐	☒
f) Otherwise substantially degrade water quality?	☐	☐	☒	☐
g) Place housing within a 100-year flood hazard area as mapped on a federal flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☒
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☐	☐	☒
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☒	☐
j) Inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☒

Response:

Violation of Water Quality Standards or Waste Discharge Requirements [Evaluation Criteria (a)(f)]

The Basin Plan establishes Water Quality Objectives for Ground Waters (Pages III-7 and III-8). These objectives are further defined in and supplemented by State Water Board water quality control policies and State Water Quality Control Board water quality control plans, as applicable to the Tulare Lake Basin and outlined in Section V of the Basin Plan. It is against this background that possible violation of water quality standards is evaluated. The Regional Water Quality Control Board (RWQCB)conducts further evaluation, and establishes project-specific requirements in permitting dairy operation.

The Central Valley Water Board has authority to regulate waste discharges that could affect the quality of the waters of the state, which includes both surface water and groundwater and the prevention of nuisances. California Water Code Section 13260 requires any person discharging waste, or proposing to discharge wastes, within the Central Valley Region, that could affect the quality the wastes of the state (which includes both surface wastes and groundwaters) to file a report of waste discharge with the Central Valley Water Board. In regulating discharges of waste, the Central Valley Water Board implements State laws and regulations. California regulations governing discharges from confined animal facilities are contained in Title 27 of the California Code of Regulations, Division 2, Subdivision 1, Chapter 7, Subchapter 2, Article 1 (Title 27). This project is an expansion of the existing Bar 20 dairy. Waste discharges of the Bar 20 Dairy are regulated under RWQCB Order NO. R5-2007-0035 (See Appendix D). Pursuant to Order NO. R5-2007-0035, Prohibition A(2): Except when authorized by a National Pollutant Discharge Elimination permit, the direct or indirect discharge of waste and/or storm water from the production areas to surface waters is prohibited. Additionally, the discharge of waste from existing milk cow dairies to surface waters which causes or contributes to an exceedance of any applicable water quality objective in the Basin Plans or any applicable state or federal water quality criteria, or a violation of any applicable state or federal policies or regulations is prohibited pursuant to Order NO. R5-2007-0035, Prohibition A(3).

The expansion is subject to RWQCB permitting authority and as such, RWQCB would issue new Waste Discharge Requirements (WDR) for the expanded dairy. The tentative order (See Appendix E) to be adopted by RWQCB contains several requirements that will insure the project's impact on water quality will be mitigated to less than significant. Specific requirements include:

- An anti-degradation evaluation is required, which includes ongoing monitoring of three monitoring wells, which have been installed. If monitoring detects degradation to ground water, the tentative Order will require the dairy to propose modifications to the facility to correct the problem.
- Implementation of Best Practicable Treatment or Control (BPTC) is required. Operators of Bar 20 will be required to submit a written workplan for a BPTC technical evaluation that sets for a schedule for a systematic and comprehensive technical evaluation for each component of the on site waste treatment and control to determine for each waste

constituent BPTC. The workplan shall contain a time schedule for completing the comprehensive technical evaluation. The schedule to complete the BTPC technical evaluation shall be as short as practicable and shall not exceed two years.

- Operators of Bar 20 will be required to develop and implement a Nutrient Management Plan (NMP), which must ultimately provide for protection of both surface water and ground water. The purpose of the NMP is to control recycling of waste generated on the facility to minimize their potential to degrade groundwater quality. The objective of the NMP is to manage the application of the waste to the cropland and disposal off-site to achieve a balance between nutrients and salts generated, crop requirements, and leaching to underlying groundwater.
- Groundwater monitoring will be used to determine if implementation of the NMP is protective of groundwater quality.
- Operators of Bar 20 shall submit a hydrogeologic report for the area affected or potentially affected by the facility. The report shall include a Monitoring Well Installation Work Plan recommending installation of additional groundwater monitoring wells appropriately located to provide data regarding first encountered groundwater up gradient and down gradient of the original portion of the facility. The new monitoring wells with the existing three monitoring wells shall be sufficient to evaluate performance of BPTC measures at the facility, and shall provide sufficient data to determine compliance with the Order's Groundwater Limitations.

The project applicant has submitted a Report of Waste Discharge (see Appendix C) which demonstrates that the expanded dairy facility site located south located south of Whites Bridge Road will, after offsite disposal of the corral-scraped and separator basin-settled solid wastes, comply with the nitrogen loading and salt loading groundwater protection requirements of the Regional Water Quality Control Board.

The Regional Water Quality Control Board, in its comments on a, recent, EIR in Tulare County has commented as follows: *...Water supply wells in proximity to sources of pollution have the potential to act as conduits for the migration of pollutants to groundwater. California Well Standards (Department of Water Resources Bulletin 74-90) state: "When, at the approval of the enforcing agency, a water well is located closer to a source of pollution or contamination than allowed by Section 8, page 12, above (less than 100 feet form an animal enclosure, etc), the annular space shall be sealed form ground surface to the first impervious stratum if possible. The annular seal for all such wells shall extend to a minimum depth of 50 feet." It should be demonstrated that existing or planned water supply wells located within 100 feet of corrals, wastewater retention components, and/or cropland where dairy wastewater will be applied have been constructed to the standard specified in the California Well Standards.*

The dairy facilities site north of Whitesbridge Road has been previously permitted by the Regional Water Quality Control Board. The dairy facilities site south of Whitesbridge Road is the subject of a Report of Waste Discharge (February, 2004) a copy of which is appended to this document.

The project applicant has, or will, in accordance with the RWQCB's direction, and as a condition of obtaining Report of Waste Discharge acceptance or project approval under Order No. 96-270, undertaken the following steps:

1. Obtained available subsurface geologic and well construction data for all wells "within 100-feet of proposed wastewater retention ponds, corrals or cropland where wastewater will be applied" to determine whether casing seals or other construction details will prevent vertical migration of dairy wastewater.

2. When such positive determination cannot be made from well records, the applicant will:

   a. Periodically, upon a schedule and with procedures approved by the RWQCB, test wells to assure that vertical migration of dairy wastewater is not taking place, and, when indicated by test results,
   b. Construct casing seals, as approved by the RWQCB to prevent migration.

Since the wells are not associated with an identified or identifiable environmental impact, these procedures are not specified as mitigation measures. However, the applicant has agreed to take these voluntary steps as part of compliance with the RWQCB's requirements.

Additional protections for surface and groundwater quality necessary to mitigate impacts to water quality, include the following:

- Prohibitions A.4., and A.9. prohibit discharge of wastewater to surface waters from cropland without an NPDES permit, and the direct discharge of wastewater into groundwater via backflow through water supply or irrigation supply wells.

- Specifications 1.a., 1.b., 1.c., and 1.d., require the collection, treatment, storage, or disposal of wastes at the facility not result in discharge of waste constituents in a manner or place or at concentrations or in a mass, which could cause and exceedance of water quality objectives in surface water or groundwater, or create a condition of contamination or pollution of surface water or groundwater, or create a condition of nuisance, or unreasonably affect beneficial uses.

- Interim Groundwater Limitations 0 .I., and 0.2., require waste constituents from any treatment, storage, or disposal component associated with the facility not cause or contribute to groundwater containing constituents in excess of applicable water quality objectives or natural background, whichever is greater, and final groundwater limitations once required evaluations and monitoring are conducted as directed by the Order.

- Specification C.I., requires the application of manure and wastewater to cropland at rates reasonable for the crop, soil, climate, special local situations, management system, and type of manure.

Conclusion: The dairy operation is not in violation of water quality standards or waste discharge requirements as impoundments have been designed to preclude significant leakage to groundwater. Dairy lagoons and separator ponds have been lined to minimize leakage to groundwater.

Mitigation Measures: None required.

Depletion of Groundwater Supplies
[Evaluation Criteria (b)]

Water for continued farming and dairy operations on the project site is provided by onsite wells.

The groundwater in the project area (see Appendix C) is of adequate quality for irrigation and, dependent upon regional rainfall/drought cycles, generally ranges in depth below ground surface from 40 to 74 feet.

The project is to increase the number of milk cows from 2,904 to 9,400. The increase in water usage will be from 260 acre-feet per year to 842 acre-feet per pear. Current and projected water usage is based on the dairy operational design of 80 gallons of water per day per milk cow. The 482 acres currently occupied by the dairy facilities sites was previously farmed and using an estimated 1,446 acre-feet of irrigation water per year. This estimated water usage is based on an annual field crop utilization rate of 3 acre-feet per acre.

Conclusion: The project will result in no significant depletion of groundwater supplies.

Mitigation Measures: None required.

Drainage Pattern Alteration
[Evaluation Criteria (c), (d)]

The increased number of milk cows and support stock will be housed within the existing dairy facility sites.

Conclusion: The project will result in no runoff which would exceed onsite storage capacity or provide a source of polluted runoff, nor would it result in siltation or erosion.

Mitigation Measures: None required.

Surface Runoff and Flood Hazard
[Evaluation Criteria (d), (e), (g), (h)]

The project lagoons have been constructed to retain all storm runoff on-site during a 25-year storm, plus the runoff from 120 days of December through March average rainfall plus all dairy wastewater, discharging such runoff to the wastewater lagoon.

A technical report was submitted to RWQCB that shows that the majority of the cropland associated with the project is not within 1000 feet of the 100 year flood zone. The expansion is even further away. The distance between the flood zone and dairy operations, and prohibitions established by the RWQCB are considered adequately protective to prevent significant adverse impact associated with wastewater and runoff pollution.

Conclusion: To the extent that runoff could occur from project fields fertilized with manure, such runoff is, and will be, contained on site with irrigation return systems and bermed fields which are currently appropriately designed to prevent offsite discharge of irrigation or rainfall runoff. Although small portions of the project site are within a mapped 100-year flood plane (see Figure 2-5), the dairy facilities expansion has been constructed in compliance with the Basin Plan, and is not expected to result in any significant impact to surface water. Project operation will result in no runoff which would exceed onsite storage capacity or provide a source of polluted runoff. The likelihood of offsite pollution from irrigation usage of lagoon liquid is thus less than significant.

Mitigation Measures: None required.

Dam Failure
[Evaluation Criteria (i)]

The project site is located within the plotted dam failure inundation zone of Little Panoche Dam.

Conclusion: The low probability of the occurrence of dam failure, the large volume of flood water available for dilution of pollutants, and the relatively long warning period to ready the site for flooding indicate that inundation related to dam failure is not a significant risk to the project. The potential impact is less than significant.

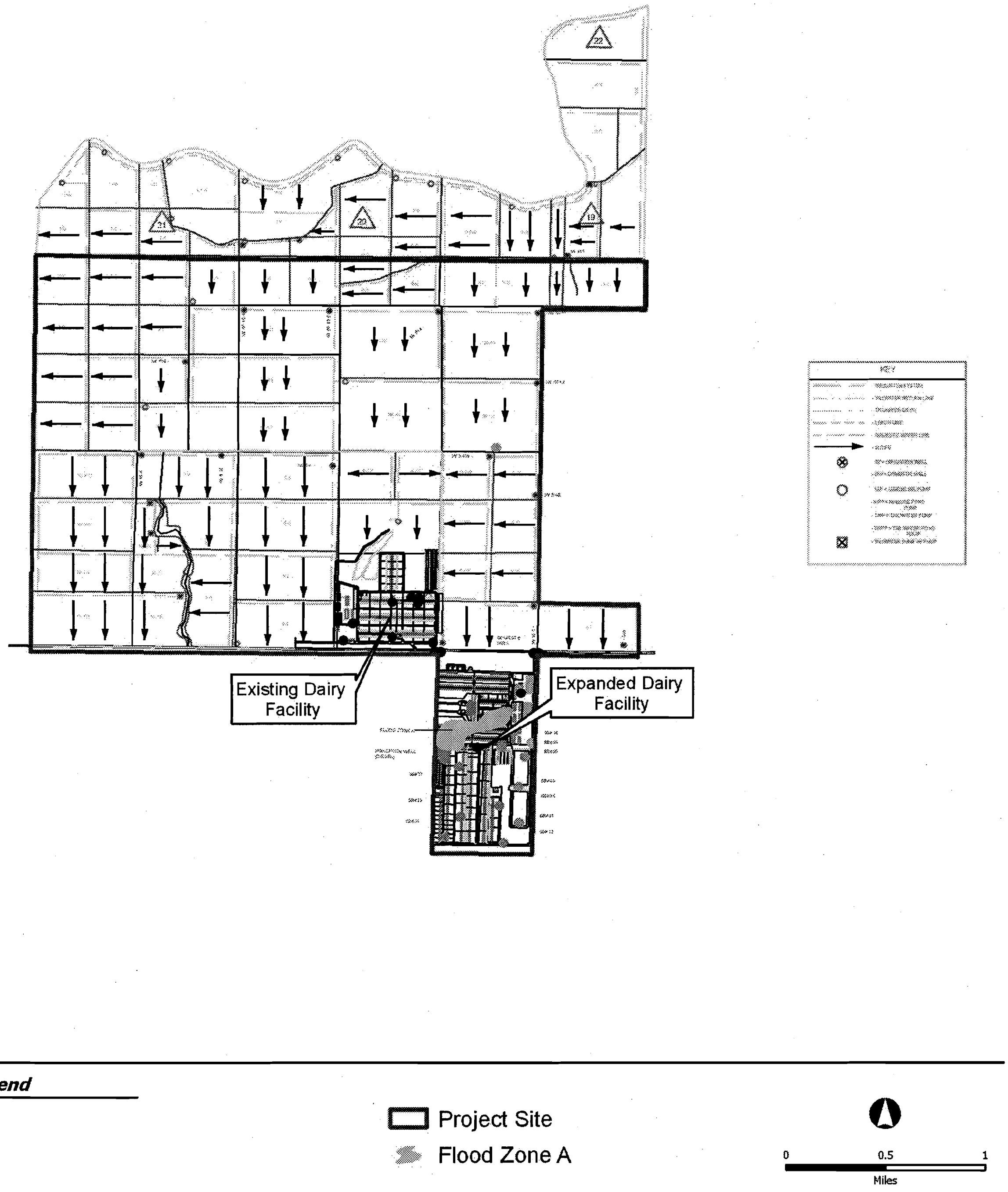
Mitigation Measures: None required.

Seiche, Tsunami or Mudflow
[Evaluation Criteria (j)]

The project is not located near a body of water which could generate seiche or tsunami effects; site topography, as described in the setting portion of this topical analysis, does not support mudflow events.

Conclusion: There are no possible seiche, tsunami, or mudflow impacts.

Mitigation Measures: None required.



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Quad Knopf	DRAINAGE AND FLOOD HAZARDS	Figure 2 - 5

Issues:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
2.6.9 LAND USE/PLANNING – Would the project:				
a) Physically divide an established community?	☐	☐	☐	☒
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☒
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☒

Response:

Land Use/Planning
[Evaluation Criteria (a), (b), (c)]

The dairy is not near any established community and was constructed in compliance with applicable County of Fresno land use regulations.

Conclusion: There are no land use or planning impacts.

Mitigation Measures: None required.

Issues:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
2.6.10 MINERAL RESOURCES – Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☒

Response:

Mineral Resources
[Evaluation Criteria (a), (b)]

There are no known mineral resources located within the dairy project area.

Conclusion: The project will have no impact on mineral resources.

Mitigation Measures: None required.

Issues:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
2.6.11 NOISE – Would the project result in:				
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☐	☒
b) Exposure of persons to or generation of excessive ground borne vibration or ground borne noise levels?	☐	☐	☐	☒
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☒	☐
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☐	☒
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☒	☐

Response:

Construction Noise
[Evaluation Criteria (a), (b), (d)]

The dairy facilities have been constructed and will accommodate the proposed increase in milk cows and support stock. No construction noise will occur.

Conclusion: There will be no impact.

Mitigation Measures: None required.

Traffic Noise
[Evaluation Criteria (c)]

The project will generate an increase of 130 trips per day of vehicular traffic.

Conclusion: With an annual average traffic volume of 4,900 vehicles per day on Whites Bridge Road (Caltrans 2005), the project's 130 trips represent a 3% increase in vehicular traffic along this route. This level of traffic will result in an increased noise level of less than 2 decibels along the roadway. This minimal increase in traffic noise levels is not generally detectable, and is therefore not a potentially significant impact.

Mitigation Measures: None required.

Operational Noise
[Evaluation Criteria (c)]

Current operational activities include milking 2,904 cows and feeding a total herd size of 6,204 animals. The proposed increase in milk cows to 9,400, and a herd size of 19,120 will increase noise levels at the dairy facilities site.

Conclusion: The only noise receptor that may notice an increase in dairy activities is a residential unit located approximately 500 feet west of the expanded dairy facilities site. The increase in operational noise levels associated with the project will be less than significant.

Mitigation Measures: None required.

Public and Private Airports

The project site is not within an adopted airport land use plan or within 2 miles of a public airport or public use airport. There is, however, a small dirt airstrip located approximately 1,000 feet west of the expanded dairy facility site, south of Whites Bridge Road. Its usage is limited to crop-dusting, planting or agricultural support activities directly related to immediate area farming.

Conclusion: This small agricultural air strip will have no significant noise impacts on expanded dairy operations.

Mitigation Measures: None required.

Issues:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
2.6.12 POPULATION AND HOUSING – Would the project:				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☒
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

Response:

Population and Housing
[Evaluation Criteria (a), (b), (c)]

The increased number of milk cows and support stock will result in an additional 45 employees that will be recruited from the existing local workforce; thus there will be no direct population growth inducement.

The project will not displace any existing housing or persons.

Conclusion: The project will have no impact on population and housing.

Mitigation Measures: None required.

Issues:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
2.6.13 PUBLIC SERVICES – Would the project:				
a) Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impact, in order to maintain acceptable service ratios for any of the public services:				
Fire protection?	☐	☐	☐	☒
Police protection?	☐	☐	☐	☒
Schools?	☐	☐	☐	☒
Parks?	☐	☐	☐	☒
Other public facilities?	☐	☐	☐	☒

Response:

Public Services
[Evaluation Criteria (a)]

The project, an increase in dairy herd size, will not have an impact on fire, police or other public facilities. Employment of additional personnel will be from the existing workforce and will, therefore, have no impact on schools, parks or other population-growth related public facilities and services.

Conclusion: The project will not have any impact on public services.

Mitigation Measures: None required.

Issues:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
2.6.14 RECREATION – Would the project:				
a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☐	☒

Response:

Recreation
[Evaluation Criteria (a), (b)]

The project workforce will be recruited from the existing local population; there will be no increased demand on parks or recreational facilities.

The project does not include recreational facilities and will not require expansion of existing recreational facilities.

Conclusion: No recreation-related impacts will occur.

Mitigation Measures: None required.

Issues:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
2.6.15 TRANSPORTATION/TRAFFIC – Would the project:				
a) Cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections?	☐	☐	☒	☐
b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?	☐	☐	☐	☒
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that result in substantial safety risks?	☐	☐	☐	☒
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒
e) Result in inadequate emergency access?	☐	☐	☐	☒
f) Result in inadequate parking capacity?	☐	☐	☐	☒

Increased Traffic
[Evaluation Criteria (a)]

The project's increase in automobile/pickup traffic will be 90 trips per day, and the increase in truck traffic is 20 trips per day.

Conclusion: Traffic volumes on Whites Bridge Road in 2005 were 4,900 vehicles per day. Caltrans conducted an investigation of this situation and concluded that the sight distance was satisfactory and that the low traffic volumes on SR 180 did not satisfy criteria for the placement of left-turn lanes, flashing beacons, or special warning signs. The investigation concluded that there was no factual justification for the State to take action at this location. The project-induced increase in traffic is not substantial with respect to increase in vehicle trips, volume-to-capacity ratio, or congestion at intersections, and thus is less than significant.

Mitigation Measures: None required.

Level of Service
[Evaluation Criteria (b)]

The County of Fresno has not established level of service (LOS) standards for rural roads.

Conclusion: The project will not have any adverse impacts.

Mitigation Measures: None required.

Air Traffic Patterns
[Evaluation Criteria (a)]

The project has no conceivable impact on air traffic patterns; it is not located near, or served by, a public airport.

Conclusion: There will be no air traffic impacts.

Mitigation Measures: None required.

Traffic Hazards and Emergency Access
[Evaluation Criteria (d), (e)]

The existing dairy facility sites are located on Whites Bridge Road.

Conclusion: Current access to Whites Bridge Road is 3 miles west of the nearest intersection, James Road. There are no sight distance impediments for traffic using the dairy access roadways to enter or leave the dairy facilities sites. The dairies require no "emergency access". The location of these dairy facility sites do no affect any existing emergency access. The project will not alter the existing site access.

Parking Conditions
[Evaluation Criteria (f)]

The dairy facility sites contain adequate onsite parking for workers, salesmen, service vehicles and milk trucks.

Conclusion: There will be no adverse impacts.

Mitigation Measures: None required.

Issues:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
2.6.16 UTILITIES/SERVICE SYSTEMS – Would the project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☒
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☐	☒
e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☒	☐
g) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☐	☒

Response:

Wastewater
[Evaluation Criteria (a), (b), (e)]

The project facilities design complies with applicable water quality regulations enforced by the California Regional Water Quality Control Board, Central Valley Region.

The domestic water well is in compliance with Fresno County Environmental Health Department's regulation as is the onsite septic tank and leach line system. The dairies do not use a wastewater treatment provider's facilities.

Conclusion: There are no adverse environmental impacts.

Mitigation Measures: None required.

Storm Water
[Evaluation Criteria (c)]

All storm drainage runoff is contained onsite. The existing dairy facilities have been designed for such containment in accord with Regional Water Quality Control Board requirements.

Conclusion: The project will not have any adverse impacts.

Mitigation Measures: None required.

Water Supply
[Evaluation Criteria (d)]

Existing onsite water wells were developed to serve the proposed project.

Conclusion: No new water wells will be constructed.

Mitigation Measures: None required.

Solid Waste
[Evaluation Criteria (f), (g)]

The project will generate approximately 1 cubic yard per week of refuse that will be transported to the American Avenue Disposal Site which is expected to reach capacity in 2029.

Domestic refuse disposal from the project site complies with the County's landfill regulations.

Conclusion: The project will have a less than significant impact on solid waste disposal operations.

Mitigation Measures: None required.

Issues:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
2.6.17 MANDATORY FINDINGS OF SIGNIFICANCE				
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☒	☐	☐
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☐	☒	☐	☐
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☒	☐	☐

Response:

(a), (c): Expansion of the dairy herd will have a potential adverse impact on air quality. However, the implementation of the mitigation measures outlined in Section 2.6.3 will reduce these impacts to a less than significant level.

(b): The SJVAPCD will require effective air quality mitigation measures for not only all new and/or expanding dairies, but also for existing dairies.

2.7 *Environment Determination*

This Initial Study has identified environmental factors that may be significant after mitigation. The various environmental issue areas are discussed in detail in the Checklist.

Determination

On the basis of this initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION was prepared.

☒ The District finds that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION was prepared.

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT was required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT was required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, but because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Seyed Sadredin
Executive Director/APCO

April 18, 2008

APPENDICES

Appendix A

Air Quality Calculations

Emission Calculations for Bar 20 Dairy Project

Emission Factors

Dairy Permits (C-5203-1, -2, -3, -4, -7, -8, -9, -10, -11, and –12)

The emission factors for PM_{10}, VOC, and NH_3 given in the following tables will be used to calculate the combined emissions from the dairy and the pre/post-project emissions from the following permit units: the cow housing permits (permits C-5203-2 and C-5203-8) and the liquid manure handling systems (permits C-5203-3 and C-5203-9).

PM_{10} Emission Factors for the Dairies

The following tables list the PM_{10} emission factors for the animals at the dairy. The control efficiencies for the different management practices proposed for this dairy will be applied to the uncontrolled emission factors to arrive at the controlled emission factors that will be used to calculate post-project PM_{10} emissions from the dairy.

Uncontrolled PM_{10} Emission Factors (EF) for Cattle at the Dairies		
Type of Cow	Uncontrolled Emission Factor ($lb\text{-}PM_{10}$/head-yr)	Source
Milk & Dry Cows in Freestalls	**1.37**	Based on a Summer 2003 study by Texas A&M ASAE at a West Texas Dairy
Milk & Dry Cows Open Corrals	**5.46**	Based on a Summer 2003 study by Texas A&M ASAE at a West Texas Dairy
Heifers Open Corrals	**10.55**	Based on a USDA/UC Davis report quantifying dairy and feedlot emissions in Tulare & Kern Counties (April 2001)
Calves	**1.37**	SJVAPCD

Controlled PM_{10} Emission Factors (EF) for Animals at Barn 20 #2 (Dairy 1) (C-5203-2-3)				
Type of Cow	Uncontrolled EF ($lb\text{-}PM_{10}$/hd-yr)	Control(s)	Controlled EF Calculation	Controlled EF ($lb\text{-}PM_{10}$/hd-yr)
Milk Cows in Corrals	5.46	Weekly Scraping using Pull-Type Equipment in morning (15%) Shade Structures (16.7%)	5.46 x (1-0.15)(1-0.167) =	**3.87**
Dry Cows in Open Corrals	5.46	Weekly Scraping using Pull-Type Equipment in morning (15%)	5.46 x (1-0.15) =	**4.64**
Heifers in Open Corrals (15-24 months)	10.55	Shade Structures (8.3%) Weekly Scraping using Pull-Type Equipment in morning (15%) Feeding Heifers Near Dusk (10%) Sprinkling of Heifer Corrals (33%)[1]	10.55 x (1-0.083)(1-0.15)(1-0.10)(1-0.33) =	**4.96**

[1] 66% coverage area x 50% control = 33% overall control

Controlled PM_{10} Emission Factors (EF) for Animals at Barn 20 #2 (Dairy 1) (C-5203-2-3)				
Heifers in Open Corrals (7-14 months)	10.55	Shade Structures (8.3%) Weekly Scraping using Pull-Type Equipment in morning (15%) Feeding Heifers Near Dusk (10%) Sprinkling of Heifer Corrals (33%)[1] Upwind Shelterbelt (10%)	10.55 x (1-0.083)(1-0.15)(1-0.10)(1-0.33)(1-0.10) =	**4.46**
Heifers in Open Corrals (4-6 months)	10.55	Shade Structures (8.3%) Weekly Scraping using Pull-Type Equipment in morning (15%) Feeding Heifers Near Dusk (10%)	10.55 x (1-0.083)(1-0.15)(1-0.10) =	**7.40**
Calves	1.37	On-Ground calf Hutches (75%)	1.37 x (1-0.75) =	**0.34**
Bulls	10.55	Shades (8.3%) Weekly Scraping (15%)	10.55 x (1-0.083)(1-0.15) =	**8.22**

Controlled PM_{10} Emission Factors (EF) for Animals at Barn 20 #3 (Dairy 2) (C-5203-8-1)				
Type of Cow	Uncontrolled EF (lb-PM_{10}/hd-yr)	Control(s)	Controlled EF Calculation	Controlled EF (lb-PM_{10}/hd-yr)
Milk Cows in Freestalls	1.37	Downwind Shelterbelts (12.5%) No exercise Pens (80%)	1.37 x (1-0.125)(1-0.80) =	**0.24**
Milk and Dry Cows in Loafing Barns	5.46	Weekly Scraping using Pull-Type Equipment in morning (15%) Downwind Shelterbelts (12.5%) Saudi Style Barns (25%)	5.46 x (1-0.15)(1-0.125)(1-0.25)	**3.05**
Heifers in Open Corrals (7-24 months)	10.55	Shade Structures (8.3%) Feeding Heifers Near Dusk (10%) Weekly Scraping using Pull-Type Equipment in morning (15%) Upwind and downwind Windbreaks (22.5%) Sprinkling of Heifer Corrals (35.5%)[2]	10.55 x (1-0.083)(1-0.10)(1-0.15)(1-0.225)(1-0.355) =	**3.70**
Heifers in loafing barns (4-24 months)	10.55	Feeding Heifers Near Dusk (10%) Weekly Scraping using Pull-Type Equipment in morning (15%) Upwind and downwind Windbreaks (22.5%) Saudi Style Barns (25%)	10.55 x (1-0.10)(1-0.15)(1-0.225)(1-0.25) =	**4.69**
Calves	1.37	Upwind and Downwind Windbreaks (22.5%) Above-Ground Calf Hutches (95%)	1.37 x (1-0.225)(1-0.95) =	**0.05**
Bulls	10.55	Shade Structures (8.3%) Upwind and Downwind Windbreaks (22.5%)	10.55 x (1-0.083)(1-0.225) =	**7.50**

VOC and NH_3 Emission Factors for the Dairies

The following tables list the VOC and NH_3 emission factors for the animals at the dairies. These emission factors and the control efficiencies given in the

[2] 71% coverage area x 50% control = 35.5%

assumptions above will be used to calculate the pre-project and post-project VOC and NH_3 emissions from the dairies.

Emission Factors for Dairy Cows				
Type of Cow	Open Corral/Loafing Barn		Freestall Housing	
	(lb-VOC/cow-yr)	(lb-NH_3/cow-yr)	(lb-VOC/cow-yr)	(lb-NH_3/cow-yr)
Milk Cow	19.3[3]	74.0	21.0[4]	74.0
Dry Cow	11.9	45.4	12.9	45.4
Heifer (15 to 24 months)	8.3	31.8	9.0	31.8
Heifer (7 to 14 months)	7.2	27.8	7.9	27.8
Heifer (3 to 6 months)	6.6	25.1	7.1	25.1
Calf (under 3 months)	6.2	23.6	6.7	23.6
Mature Bull[5]	11.1	42.6	12.1	42.6

Breakdown of Emissions Factor for Milk Cows in Corrals[4]		
Permit Units	VOC Emissions (lb/cow-yr)	NH_3 Emissions (lb/cow-yr)
Milking Center	0.9	1.3
Cow Housing & Feed	12.4	32.3
Lagoons/Storage Ponds	2.3	15.5
Land Application	3.7	24.9
Total	**19.3**	**74**

Breakdown of Emissions Factor for Milk Cows in Freestalls[4]		
Permit Units	VOC Emissions (lb/cow-yr)	NH_3 Emissions (lb/cow-yr)
Milking Center	0.9	1.2
Cow Housing & Feed	12.4	28
Lagoons/Storage Ponds	2.7	15.7
Land Application	5.0	29.1
Total	**21.0**	**74**

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[3] This emission factor is from "APCO's Determination of VOC Emission Factors for Dairies" report.
[4] This emission factor was developed in an internal District document entitled "*Breakdown of Dairy VOC Emission Factor into Permit Units*", however, the basis of the emission factor was taken from the "APCO's Determination of VOC Emission Factors for Dairies" report.
[5] The emission factor for mature bulls is assumed to be similar to the feedlot cattle emission factor.

Cow Housing Emission Factors for Dairy Cows[6]					
Type of Cow	Open Corral Housing		Freestall Housing		Source
	(lb-VOC/cow-yr)	(lb-NH_3/cow-yr)	(lb-VOC/cow-yr)	(lb-NH_3/cow-yr)	
Milk Cow	12.4	32.3	12.4	28.0	SJVAPCD
Dry Cow	8.2	20.6	8.2	17.9	SJVAPCD
Heifer (15 to 24 months)	5.7	14.4	5.7	12.6	SJVAPCD
Heifer (7 to 14 months)	5.0	12.6	5.0	11.0	SJVAPCD
Heifer (3 to 6 months)	4.5	11.4	4.5	9.9	SJVAPCD
Calf (under 3 months)	4.3	10.7	4.3	9.3	SJVAPCD
Mature Bull	7.7	19.3	7.7	16.8	SJVAPCD

The emissions from the lagoons & storage ponds, the IC engines, the digester flare, and the natural gas-fired boiler are the only non-fugitive emissions at the dairies; therefore, the following emission factors are needed to determine if the emissions from this facility exceed the VOC major source threshold.

Lagoon/Storage Pond Emission Factors for Dairy Cows[6]					
Type of Cow	Open Corral/Loafing Barn		Freestall Housing		Source
	(lb-VOC/cow-yr)	(lb-NH_3/cow-yr)	(lb-VOC/cow-yr)	(lb-NH_3/cow-yr)	
Milk Cow	2.3	15.5	2.7	15.7	SJVAPCD
Dry Cow	1.4	9.5	1.7	9.6	SJVAPCD
Heifer (15 to 24 months)	1.0	6.7	1.2	6.7	SJVAPCD
Heifer (7 to 14 months)	0.9	5.8	1.0	5.9	SJVAPCD
Heifer (3 to 6 months)	0.8	5.3	0.9	5.3	SJVAPCD
Calf (under 3 months)	0.7	4.9	0.9	5.0	SJVAPCD
Mature Bull	1.3	8.9	1.6	9.0	SJVAPCD

Liquid Manure Land Application Emission Factors for Dairy Cows[6]					
Type of Cow	Open Corral/Loafing Barn		Freestall Housing		Source
	(lb-VOC/cow-yr)	(lb-NH_3/cow-yr)	(lb-VOC/cow-yr)	(lb-NH_3/cow-yr)	
Milk Cow	3.7	24.9	5.0	29.1	SJVAPCD
Dry Cow	2.3	15.3	3.1	17.9	SJVAPCD
Heifer (15 to 24 months)	1.6	10.7	2.1	12.5	SJVAPCD
Heifer (7 to 14 months)	1.4	9.3	1.9	10.9	SJVAPCD
Heifer (3 to 6 months)	1.3	8.5	1.7	9.9	SJVAPCD
Calf (under 3 months)	1.2	7.9	1.6	9.3	SJVAPCD
Mature Bull	2.1	14.3	2.9	16.8	SJVAPCD

[6] The emission factor for the milk cow is based on an internal document entitled "*Breakdown of Dairy VOC Emission Factor into Permit Units*". The emission factor for the other cows were developed by taking the ratio of manure generated by the different types of cows to the milk cow and multiplying it by the milk cow VOC emission factor.

Solid Manure Handling
An emissions factor for solid manure has not yet been fully established. Results of emissions studies by Dr. C.E. Schmidt at a Merced dairy indicate that VOC and NH_3 emissions from solid manure at a dairy are minimal.[7] Therefore, emissions from solid manure handling any emission reductions from installation of the digester system will not be quantified at this time.

Feed Handling and Storage
The feed handling and storage permit will not be modified under this project. Although there are potentially significant emissions from the feed handling and storage operation, an emission factor for feed has not been established. Therefore, emissions from feed will not be calculated in this evaluation.

Hydrogen Sulfide (H_2S) from Dairy Permits
Currently, there is no approved emission factor or data for Hydrogen Sulfide (H_2S) emissions from dairy operations. Therefore, H_2S emissions will not be calculated for the dairy permit units in this project. The District expects that research will be completed in the near future, which may be used to establish an emission factor for Hydrogen Sulfide from the dairy permit units.

FLARE FOR ANAEROBIC DIGESTER (C-5203-13-0)

The emission factors for NO_X, and CO are based on the manufacturer's guaranteed emission levels for the Flare Industries, Inc Model FEF fully enclosed flare. The SO_X emissions are based on the sulfur content of the biogas after the H_2S scrubber (worst-case day: 25.1 gr H_2S per 100 scf; annual average 9.4 gr H_2S per 100 scf). The emission factor for PM_{10} is taken from District FYI 83 – Use of AP-42 Section 13.5 Emission Factors for Industrial Flares. The VOC emission factor is taken from Section 5.7 of District Rule 4311. The emissions factors for the biogas-fired flare are given in the following table:

Emission Factors for Digester Flare			
Pollutant	lb/MMBtu	lb/scf*	Source
NO_x	0.06	3.98×10^{-5}	Manufacturer's Info
SO_X (worst-case day)	0.1017	6.740×10^{-5}	Equations Below
SO_X (average annual)	0.0381	2.524×10^{-5}	
PM_{10}	0.008	5.30×10^{-6}	District FYI 83
CO	0.11	7.29×10^{-5}	Manufacturer's Info
VOC	0.0027	1.79×10^{-6}	District Rule 4311

*lb/scf equivalent equals lb/MMBtu x 0.000663 MMBtu/scf

SO_X EF (worst-case day) = 25.1 gr-H_2S/100 scf x 1 lb/7,000 gr x 64.06 lb-SO_2/34.08 lb-H_2S = **6.740×10^{-5} lb/scf** x (1 scf/663 Btu) x (10^6 btu/MMBtu) = **0.1017 lb-SO_X/MMBtu**

SO_X EF(average annual) = 9.4 gr-H_2S/100 scf x 1 lb/7,000 gr x 64.06 lb-SO_2/34.08 lb-H_2S = **2.524×10^{-5} lb/scf** x (1 scf/663 Btu) x (10^6 btu/MMBtu) = **0.0381 lb-SO_X/MMBtu**

[7] "Assessment of Reactive Organic Gases and Amines from a Northern California Dairy Using the USEPA Surface Emission Isolation Flux Chamber", CE Schmidt, Tom Card, EMC, & Patrick Gaffney, CARB (http://www.valleyair.org/Workshops/postings/03-23-05/LivestockSymposiumCES.pdf)

NATURAL GAS-FIRED BOILER (C-5203-14-0)

Emission Factors for Natural Gas-Fired Boiler				
Pollutant	lb/MMBtu	lb/MMscf	ppmvd (@ 3%O_2)	Source
NO_x	0.018	18	15	Manufacturer's data
SO_x	0.00285	2.85	--	District Policy APR 1720
PM_{10}	0.0076	7.6	--	AP-42 (07/98) Table 1.4-2
CO	0.084	84	115	AP-42 (07/98) Table 1.4-1
VOC	0.0055	5.5	13	AP-42 (07/98) Table 1.4-2

According to boiler manufacturers, low NO_X burners will achieve their rated emissions within one to two minutes of initial startup and do not require a special shutdown procedure. Because of the short duration before achieving the rated emission factor following startup, the emissions factors for this unit during startup and shutdown will be assumed to be the same as the steady state emission factors shown in the table above.

GAS PROCESSING PLANT (C-5203-15-0)

As stated above, the main pollutant of interest that will be emitted by the gas processing plant will be H_2S. The amount of H_2S emitted per amount of gas processed is based on the amount of H_2S contained in the biogas (worst-case day: 125.6 gr-H_2S/100 scf; annual average: 47.1 gr-H_2S/100 scf) and the control efficiency of the exhaust treatment system (99%).

H_2S Emission Factor for the Gas Processing Plant (C-5203-15)		
Pollutant	lb/scf*	Source
H_2S (worst case)	1.794×10^{-6}	Equation Below
H_2S (annual average)	6.729×10^{-7}	Equation Below

H_2S EF (Gas Plant - worst case day) = 125.6 gr-H_2S/100 scf x 1 lb/7,000 gr = 1.794×10^{-5} lb/scf x (1-0.99) = **1.794×10^{-6} lb/scf**

H_2S EF (Gas Plant - worst case day) = 47.1 gr-H_2S/100 scf x 1 lb/7,000 gr = 6.729×10^{-5} lb/scf x (1-0.99) = **6.729×10^{-7} lb/scf**

Calculations

1. Pre-Project Potential to Emit (PE1)

PE1 for Emission Units at Bar 20 #2 (Dairy 1)

Milking Parlor (C-5203-1-0 – Bar 20 #2 (Dairy 1))

The pre-project emissions from the milking parlor are calculated as follows:

VOC

PE1 for VOC from the Milking Parlor at Bar 20 #2 (Dairy 1) (Permit C-5203-1-0)				
Type of Cow	**# of Cows**	**Uncontrolled EF (lb-VOC/hd-yr)**	**Control(s)**	**Emissions (lb-VOC/yr)**
Milk Cows	2,904	x 0.9		**2,614**
PE1 for VOC from the Milking Parlor				**lb/day** = lb/yr÷ (365 day/yr)
				7.2

NH_3

$PE1_{NH3}$ = (2,904 milk cows) x (1.3 lb-NH_3/cow-year)
= **3,775 lb-NH_3/year**

$PE1_{NH3}$ = (3,775 lb-NH_3/year) ÷ (365 day/year)
= **10.3 lb-NH_3/day**

Pre-Project Potential to Emit (PE1) C-5203-1-0		
	Daily Emissions (lb/day)	Annual Emissions (lb/year)
NO_X	0	0
SO_X	0	0
PM_{10}	0	0
CO	0	0
VOC	7.2	2,614
NH_3	10.3	3,775

Cow Housing (C-5203-2-0– Bar 20 #2 (Dairy 1))

Pre-project emissions from the cow-housing permit will be based on the uncontrolled emission factors given in Section VII.B of the evaluation.

Pre-Project Potential to Emit (PE1) for the cow housing permit unit is calculated in the table below.

PE1 for from the Cow Housing Permit at Bar 20 #2 (Dairy 1) (C-5203-3-0)									
Type of Cow	# of Cows		EF_{PM10} (lb/cow)	EF_{VOC} (lb/cow)	EF_{NH3} (lb/cow)		lb-PM_{10}/yr	lb-VOC/yr	lb-NH_3/yr
Milk Cow (Open Corral)	2,904	x	4.55			=	13,213		
				12.4				36,010	
					32.3				93,799
Dry Cow (Open Corral)	443	x	5.46			=	2,419		
				8.2				3,633	
					20.6				9,126
Heifer (15-24 month) (Open Corral)	276	x	9.67			=	2,669		
				5.7				1,573	
					14.4				3,974
Heifer (7-14 month) (Open Corral)	1,553	x	9.67			=	15,018		
				5.0				7,765	
					12.6				19,568
Heifer (4-6 month) (Open Corral)	421	x	9.67			=	4,071		
				4.5				1,895	
					11.4				4,799
Calf (under 3 month) (Calf Hutches)	606	x	0.34			=	206		
				4.3				2,606	
					10.7				6,484
Bull (Open Corral)	1	x	9.67			=	10		
				7.7				8	
					19.3				19
PE1 from the Cow Housing					**lb/yr**		**37,606**	**53,490**	**137,769**
					lb/day = lb/yr÷ (365 day/yr)		**103.0**	**146.5**	**377.4**

Liquid Manure Handling System (C-5203-3-0: Lagoon, Storage Pond, and Liquid Manure Land Application – Bar 20 #2 (Dairy 1))

Lagoons/Storage Ponds:

Pre-Project Potential to Emit (PE1) for the lagoons/storage ponds is calculated in the table below.

PE1 from Lagoons/Storage Ponds at Bar 20 #2 (Dairy 1) (Permit C-5203-3-0)							
Type of Cow	**# of Cows**		**EF_{VOC} (lb/cow)**	**EF_{NH3} (lb/cow)**		**lb-VOC/yr**	**lb-NH_3/yr**
Milk Cow (Open Corral)	2,904	x	2.3		=	6,679	
				15.5			45,012
Dry Cow (Open Corral)	443	x	1.4		=	620	
				9.5			4,209
Heifer (15-24 mo.) (Open Corral)	276	x	1.0		=	276	
				6.7			1,849
Heifer (7-14 mo.) (Open Corral)	1,553	x	0.9		=	1,398	
				5.8			9,007
Heifer (4-6 mo.) (Open Corral)	421	x	0.8		=	337	
				5.3			2,231
Calf (under 3 mo.) (Hutches)	606	x	0.7		=	424	
				4.9			2,969
Mature Bulls (Open Corrals)	1	x	1.3		=	1	
				8.9			9
PE1 from Lagoons/Storage Ponds					**lb/yr**	**9,735**	**65,286**
					lb/day = lb/yr÷ (365 day/yr)	**26.7**	**178.9**

Liquid Manure Land Application:

Pre-Project Potential to Emit (PE1) for liquid manure land application will be calculated in the table below.

PE1 from Liquid Manure Land Application at Bar 20 #2 (Dairy 1) (Permit C-5203-3-0)							
Type of Cow	**# of Cows**		**EF_{VOC} (lb/cow)**	**EF_{NH3} (lb/cow)**		**lb-VOC/yr**	**lb-NH_3/yr**
Milk Cow (Open Corral)	2,904	x	3.7	24.9	=	10,745	72,310
Dry Cow (Open Corral)	443	x	2.3	15.3	=	1,019	6,778
Heifer (15-24 mo.) (Open Corral)	276	x	1.6	10.7	=	442	2,953
Heifer (7-14 mo.) (Open Corral)	1,553	x	1.4	9.3	=	2,174	14,443
Heifer (4-6 mo.) (Open Corral)	421	x	1.3	8.5	=	547	3,579
Calf (under 3 mo.) (Hutches)	606	x	1.2	7.9	=	727	4,787
Mature Bulls (Open Corrals)	1	x	2.1	14.3	=	2	14
PE1 from Liquid Manure Land Application				**lb/yr**		**15,656**	**104,864**
				lb/day = lb/yr÷ (365 day/yr)		**42.9**	**287.3**

Total Pre-Project Emissions from Liquid Manure Handling System at Bar 20 #2 (Dairy 1) (Permit C-5203-3-0):

Pre-Project Potential to Emit (PE1) (Permit C-5203-3-0)						
Pollutant	Lagoon Emissions (lb/year)	+	Land Application (lb/year)	=	**Total from Liquid Manure Handling** Annual Emissions (lb/year)	Daily Emissions (lb/day)
NO_X	0	+	0	=	0	0.0
SO_X	0	+	0	=	0	0.0
PM_{10}	0	+	0	=	0	0.0
CO	0	+	0	=	0	0.0
VOC	9,735	+	15,656	=	25,391	69.6
NH_3	65,286	+	104,864	=	170,150	466.2

<u>Solid Manure Handling System (C-5203-4-0 – Bar 20 #2 (Dairy 1))</u>

An emissions factor for solid manure has not yet been fully established. Based on the currently available information, the pre-project emissions from the solid manure are considered negligible and are set to 0.0 lb/day for all affected pollutants.

<u>PE1 for Emission Units at Bar 20 #3 (Dairy 2)</u>

<u>Liquid Manure Handling System (C-5203-9-0: Lagoon, Storage Pond, and Liquid Manure Land Application – Bar 20 #3 (Dairy 2))</u>

<u>Lagoons/Storage Ponds:</u>

Pre-Project Potential to Emit (PE1) for the lagoons/storage ponds will be calculated in the table below.

PE1 from Lagoons/Storage Ponds at Bar 20 #3 (Dairy 2) (Permit C-5203-9-0)							
Type of Cow	**# of Cows**		**EF_{VOC} (lb/cow)**	**EF_{NH3} (lb/cow)**		**lb-VOC/yr**	**lb-NH_3/yr**
Milk Cow (Freestall)	6,600	x	2.7	15.7	=	17,820	103,620
Milk Cow (Loafing Barn)	200	x	2.3	15.5	=	460	3,100
Dry Cow (Loafing Barn)	1,000	x	1.4	9.5	=	1,400	9,500
Heifer (15-24 mo.) (Corral/Loafing)	2,200	x	1.0	6.7	=	2,200	14,740
Heifer (7-14 mo.) (Corral/Loafing)	1,800	x	0.9	5.8	=	1,620	10,440
Heifer (4-6 mo.) (Loafing Barn)	700	x	0.8	5.3	=	560	3,710
Calf (< 3 mo.) (Above-ground Hutches)	1,000	x	0.9	5.0	=	900	5,000
Mature Bulls (Open Corrals)	10	x	1.3	8.9	=	13	89
PE1 from Lagoons/Storage Ponds				**lb/yr**		**24,973**	**150,199**
				lb/day = lb/yr÷ (365 day/yr)		**68.4**	**411.5**

Liquid Manure Land Application:

Pre-Project Potential to Emit (PE1) for liquid manure land application will be calculated in the table below.

PE1 from Liquid Manure Land Application Ponds at Bar 20 #3 (Dairy 2) (Permit C-5203-9-0)							
Type of Cow	**# of Cows**		**EF_{VOC} (lb/cow)**	**EF_{NH3} (lb/cow)**		**lb-VOC/yr**	**lb-NH_3/yr**
Milk Cow (Freestall)	6,600	x	5.0	29.1	=	33,000	192,060
Milk Cow (Loafing Barn)	200	x	3.7	24.9	=	740	4,980
Dry Cow (Loafing Barn)	1,000	x	2.3	15.3	=	2,300	15,300
Heifer (15-24 mo.) (Corral/Loafing)	2,200	x	1.6	10.7	=	3,520	23,540
Heifer (7-14 mo.) (Corral/Loafing)	1,800	x	1.4	9.3	=	2,520	16,740
Heifer (4-6 mo.) (Loafing Barn)	700	x	1.3	8.5	=	910	5,950
Calf (< 3 mo.) (Above-ground Hutches)	1,000	x	1.6	9.3	=	1,600	9,300
Mature Bulls (Open Corrals)	10	x	2.1	14.3	=	21	143
PE1 from Liquid Manure Land Application				**lb/yr**		**44,611**	**268,013**
				lb/day = lb/yr÷ (365 day/yr)		**122.2**	**734.3**

Total Pre-Project Emissions from Liquid Manure Handling System at Bar 20 #3 (Dairy 2) (Permit C-5203-9-0):

Pre-Project Potential to Emit (PE1) (Permit C-5203-9-0)						
Pollutant	Lagoon Emissions (lb/year)	+	Land Application (lb/year)	=	Total from Liquid Manure Handling	
					Annual Emissions (lb/year)	Daily Emissions (lb/day)
NO_x	0	+	0	=	0	0.0
SO_x	0	+	0	=	0	0.0
PM_{10}	0	+	0	=	0	0.0
CO	0	+	0	=	0	0.0
VOC	24,973	+	44,611	=	69,584	190.6
NH_3	150,199	+	268,013	=	418,212	1,145.8

Feed Storage and Handling Permit Unit (C-5203-11-0)

An emissions factor for feed has not yet been developed. Therefore, emissions from feed will not be quantified in this evaluation.

2. Post-Project Potential to Emit (PE2)

Post-Project Potential to Emit (PE2) for the dairy will be calculated below based on the maximum design capacity for each type of cow at the dairy and the controls required and proposed by the dairy.

PE2 for Emission Units at Bar 20 #2 (Dairy 1)

Milking Parlor (C-5203-1-2 – Bar 20 #2 (Dairy 1))

As a condition of approval, this dairy will be required to feed all animals at the dairy in accordance with NRC guidelines. This dairy will also be required to flush the milking parlor after each milking. Therefore, the control efficiency for these practices will be used to calculate post-project VOC emissions from the milking parlor. The post-project emissions from the milking parlor are calculated as follows:

VOC

PE2 for VOC from the Milking Parlor (Permit C-5203-1-2)					
Type of Cow	# of Cows	Uncontrolled EF (lb-VOC/hd-yr)	Control(s)		Emissions (lb-VOC/yr)
			Feeding to NRC guidelines (5%)	Flushing/Spraying down milk parlor after each milking (16.7%)	
Milk Cows	2,600	x 0.9	x (1 - 0.05)	x (1 - 0.167) =	**1,852**
PE2 for VOC from the Milking Parlor					**lb/day** = lb/yr÷ (365 day/yr)
					5.1

NH_3

$PE2_{NH3}$ = (2,600 milk cows) x (1.3 lb-NH_3/cow-year)
= **3,380 lb-NH_3/year**

$PE2_{NH3}$ = (3,380 lb-NH_3/year) ÷ (365 day/year)
= **9.3 lb-NH_3/day**

Post-Project Potential to Emit (PE1) C-5203-1-2		
	Daily Emissions (lb/day)	Annual Emissions (lb/year)
VOC	5.1	1,852
NH_3	9.3	3,380

PE2 for Cow Housing Permit at Bar 20 #2 (Dairy 1) (C-5203-2-3)

VOC

As a condition of approval, this dairy will be required to feed all animals in accordance with NRC guidelines. This dairy will also be required to flush the freestalls for milk cows and dry cows at least four times per day. Therefore, the control efficiencies for these practices will be used to calculate post-project VOC emissions from the cow housing permit unit.

The pre-project VOC emissions from the cow housing permit unit are calculated in the table below:

PE2 for VOC from the Cow Housing Permit at Bar 20 #2 (Dairy 1) (ATC C-5203-2-3)					
Type of Cow	# of Cows	Uncontrolled EF (lb-VOC/hd-yr)	Control(s)		Emissions (lb-VOC/yr)
Milk Cow (Open Corral)	2,600	12.4	Feeding to NRC guidelines (5%) x (1 - 0.05	Flushing freestall lanes four times per day (18.2%) x (1 - 0.182) =	25,054
Dry Cow (Open Corral)	500	8.2	Feeding to NRC guidelines (5%) x (1 - 0.05	Flushing corral lanes four times per day (18.2%) x (1 - 0.182) =	3,186
Heifer (15-24 mo.) (Open Corral)	1,000	5.7	Feeding to NRC guidelines (5%) x (1 - 0.05	Flushing corral lanes two times per day (0%) x (1 - 0) =	5,415
Heifer (7 - 14 mo.) (Open Corral)	800	5.0	Feeding to NRC guidelines (5%) x (1 - 0.05	Flushing corral lanes two times per day (0%) x (1 - 0) =	3,800
Heifer (4 - 6 mo.) (Open Corral)	400	4.5	Feeding to NRC guidelines (5%) x (1 - 0.05	Flushing corral lanes two times per day (0%) x (1 - 0) =	1,710
Calves (<3 mo.) (on-ground Hutch)	300	4.3	Feeding to NRC guidelines (5%) x (1 - 0.05	Flushing corral lanes two times per day (0%) x (1 - 0) =	1,226
Mature Bulls (Open Corral)	10	7.7	Feeding to NRC guidelines (5%) x (1 - 0.05)	Flushing corral lanes two times per day (0%) x (1 - 0) =	73
PE2 for VOC from Cow Housing Permit at Bar 20 #2 (Dairy 1)				**lb/yr**	**40,464**
				lb/day = lb/yr÷ (365 day/yr)	**110.9**

PM_{10} and NH_3

As a condition of approval, this dairy will be required to plant trees upwind of the dairy for the heifers (7-14 months) in accordance with the NRCS specifications and standards. In addition, the applicant will feed cattle near dusk, scrape the open corrals weekly in the morning hours, and sprinkle water over 66% of the heifer corrals (7-24 months) area to match the evaporation rate to keep constant moisture content in the soil. Therefore, the post-project PM_{10} emissions from the cow-housing permit will be based on the controlled PM_{10} emission factors given in Section VII.B of the evaluation.

The post-project PM_{10} and NH_3 emissions from the cow housing permit unit are calculated in the table below:

PE2 for PM_{10} and NH_3 from the Cow Housing Permit at Bar 20 #2 (Dairy 1) (ATC C-5203-2-3)							
Type of Cow	**# of Cows**		**EF_{PM10} (lb/cow)**	**EF_{NH3} (lb/cow)**		**lb-PM_{10}/yr**	**lb-NH_3/yr**
Milk Cow (Open Corral)	2,600	x	3.87	32.3	=	10,062	83,980
Dry Cow (Open Corral)	500	x	4.64	20.6	=	2,320	10,300
Heifer (15-24 mo.) (Open Corral)	1,000	x	4.96	14.4	=	4,960	14,400
Heifer (7-14 mo.) (Open Corral)	800	x	4.46	12.6	=	3,568	10,080
Heifer (4-6 mo.) (Open Corral)	400	x	7.4	11.4	=	2,960	4,560
Calf (under 3 mo.) (Hutches)	300	x	0.34	10.7	=	102	3,210
Mature Bulls (Open Corrals)	10	x	8.22	19.3	=	82	193
PE1 for PM_{10} and NH_3 from the Cow Housing Permit at Bar 20 #2 (Dairy 1) (ATC C-5203-2-3)				**lb/yr**		**24,054**	**126,723**
				lb/day = lb/yr÷ (365 day/yr)		**65.9**	**347.2**

<u>Total Post-Project Emissions from the Cow Housing Permit at Bar 20 #2 (Dairy 1) (C-5203-2-3):</u>

Post-Project Potential to Emit (PE2) C-5203-2-3		
	Daily Emissions (lb/day)	Annual Emissions (lb/year)
NO_X	0	0
SO_X	0	0
PM_{10}	65.9	24,054
CO	0	0
VOC	110.9	40,464
NH_3	347.2	126,723

PE2 for Liquid Manure Handling System at Bar 20 #2 (Dairy 1) (Lagoon, Storage Pond, & Liquid Manure Land Application) (C-5203-3-3)

It is conservatively assumed that 75% of the manure that would enter the lagoon system at Bar 20 #2 will be vacuumed and sent to the digester at Bar 20 #3; therefore, these emissions will be deducted from the post-project emissions from the liquid manure handling system at Bar 20 #2. It will be assumed that the manure from the calves is not sent to the digester. Additionally, this dairy will be required continue feeding all animals at the dairy in accordance to NRC guidelines. Therefore, the control efficiency for feeding all animals in accordance with NRC guidelines will also be used to calculate post-project VOC emissions from the lagoons/storage ponds and liquid manure land application.

PE2 for Lagoon & Storage Pond at Bar 20 #2 (Dairy 1):

The post-project emissions for VOC and NH_3 from the lagoons/storage ponds are calculated in the tables below.

VOC

PE2 for VOC from Lagoon/Storage Pond at Bar 20 #2 (Dairy 1) (ATC C-5203-3-3)					
Type of Cow	**# of Cows**	**Uncontrolled EF (lb-VOC/hd-yr)**	**Control(s)**		**Emissions (lb-VOC/yr)**
Milk Cow (Open Corral)	2,600	2.3	Feeding to NRC guidelines (5%)	Manure Taken to Bar 20 #3 (75%)	**1,420**
			x (1 - 0.05)	x (1 - 0.75) =	
Dry Cow (Open Corral)	500	1.4	Feeding to NRC guidelines (5%)	Manure Taken to Bar 20 #3 (75%)	**166**
			x (1 - 0.05)	x (1 - 0.75) =	
Large Heifer (15-24 mo.)	1,000	1.0	Feeding to NRC guidelines (5%)	Manure Taken to Bar 20 #3 (75%)	**238**

			x (1 - 0.05)	x (1 - 0.75) =	
Medium Heifer (7 - 14 mo.)	800	0.9	Feeding to NRC guidelines (5%) x (1 - 0.05)	Manure Taken to Bar 20 #3 (75%) x (1 - 0.75) =	**171**
Small Heifer (3 - 6 mo.)	400	0.8	Feeding to NRC guidelines (5%) x (1 - 0.05)	Manure Taken to Bar 20 #3 (75%) x (1 - 0.75) =	**76**
Calves (<3 mo.) (On-ground Hutch)	300	0.7	Feeding to NRC guidelines (5%) x (1 - 0.05)	-- x (1 - 0) =	**200**
Mature Bulls (Open Corral)	10	1.3	Feeding to NRC guidelines (5%) x (1 - 0.05)	Manure Taken to Bar 20 #3 (75%) x (1 - 0.75) =	**3**
PE1 for VOC from Lagoon/Storage Pond at Bar 20 #2 (Dairy 1) (ATC C-5203-3-3)				**lb/yr**	**2,274**
				lb/day = lb/yr÷ (365 day/yr)	**6.2**

NH_3

PE2 for NH_3 from Lagoon/Storage Pond at Bar 20 #2 (Dairy 1) (ATC C-5203-3-3)						
Type of Cow	**# of Cows**	**x**	**EF_{NH3} (lb/cow)**	**Manure Taken to Bar 20 #3 (75%)**		**lb-NH_3/yr**
Milk Cow (Open Corral)	2,600	x	15.5	x (1- 0.75)	=	10,075
Dry Cow (Open Corral)	500	x	9.5	x (1- 0.75)	=	1,188
Heifer (15-24 mo.) (Open Corral)	1,000	x	6.7	x (1- 0.75)	=	1,675
Heifer (7-14 mo.) (Open Corral)	800	x	5.8	x (1- 0.75)	=	1,160
Heifer (3-6 mo.) (Open Corral)	400	x	5.3	x (1- 0.75)	=	530
Calves (<3 mo.) (On-ground Hutch)	300	x	4.9	x (1- 0)	=	1,470
Mature Bulls (Open Corral)	10	x	8.9	x (1- 0.75)	=	22
PE2 for NH_3 from Lagoon/Storage Pond at Bar 20 #2 (ATC C-5203-3-3)				**lb/yr**		**16,120**
				lb/day = lb/yr÷ (365 day/yr)		**44.2**

PE2 for Liquid Manure Land Application at Bar 20 #2 (Dairy 1):

The post-project emissions for VOC and NH_3 from the liquid manure land application are calculated in the tables below.

VOC

PE2 for VOC from Liquid Manure Land Application at Bar 20 #2 (Dairy 1) (ATC C-5203-3-3)					
Type of Cow	**# of Cows**	**Uncontrolled EF (lb-VOC/hd-yr)**	**Control(s)**		**Emissions (lb-VOC/yr)**
			Feeding to NRC guidelines (5%)	Manure Taken to Bar 20 #3 (75%)	
Milk Cow (Open Corral)	2,600	3.7	x (1 - 0.05)	x (1 - 0.75) =	**2,285**
			Feeding to NRC guidelines (5%)	Manure Taken to Bar 20 #3 (75%)	
Dry Cow (Open Corral)	500	2.3	x (1 - 0.05)	x (1 - 0.75) =	**273**
			Feeding to NRC guidelines (5%)	Manure Taken to Bar 20 #3 (75%)	
Large Heifer (15-24 mo.)	1,000	1.6	x (1 - 0.05)	x (1 - 0.75) =	**380**
			Feeding to NRC guidelines (5%)	Manure Taken to Bar 20 #3 (75%)	
Medium Heifer (7 - 14 mo.)	800	1.4	x (1 - 0.05)	x (1 - 0.75) =	**266**
			Feeding to NRC guidelines (5%)	Manure Taken to Bar 20 #3 (75%)	
Small Heifer (3 - 6 mo.)	400	1.3	x (1 - 0.05)	x (1 - 0.75) =	**124**
			Feeding to NRC guidelines (5%)	--	
Calves (<3 mo.) (On-ground Hutch)	300	1.2	x (1 - 0.05)	x (1 - 0) =	**342**
			Feeding to NRC guidelines (5%)	Manure Taken to Bar 20 #3 (75%)	
Mature Bulls (Open Corral)	10	2.1	x (1 - 0.05)	x (1 - 0.75) =	**5**
PE2 for VOC from Liquid Manure Land Application at Bar 20 #2 (Dairy 1) (ATC C-5203-3-3)				**lb/yr**	**3,675**
				lb/day = lb/yr÷ (365 day/yr)	**10.1**

NH_3

PE2 for NH_3 from Liquid Manure Land Application at Bar 20 #2 (Dairy 1) (ATC C-5203-3-3)						
Type of Cow	**# of Cows**	**x**	**EF_{NH3} (lb/cow)**	**Manure Taken to Bar 20 #3 (75%)**		**lb-NH_3/yr**
Milk Cow (Open Corral)	2,600	x	24.9	x (1- 0.75)	=	16,185
Dry Cow (Open Corral)	500	x	15.3	x (1- 0.75)	=	1,913
Heifer (15-24 mo.) (Open Corral)	1,000	x	10.7	x (1- 0.75)	=	2,675
Heifer (7-14 mo.) (Open Corral)	800	x	9.3	x (1- 0.75)	=	1,860
Heifer (3-6 mo.) (Open Corral)	400	x	8.5	x (1- 0.75)	=	850
Calves (<3 mo.) (On-ground Hutch)	300	x	7.9	x (1- 0)	=	2,370
Mature Bulls (Open Corral)	10	x	14.3	x (1- 0.75)	=	36
PE2 for NH_3 from Liquid Manure Land App. at Bar 20 #2 (ATC C-5203-3-3)				**lb/yr**		**25,889**
				lb/day = lb/yr÷ (365 day/yr)		**70.9**

Total Post-Project Emissions from Liquid Manure Handling System at Bar 20 #2 (Dairy 1) (ATC C-5203-3-3):

Post-Project Potential to Emit (PE2) (ATC C-5203-3-3)						
Pollutant	Lagoon Emissions (lb/year)	+	Land Application (lb/year)	=	**Total from Liquid Manure Handling** Annual Emissions (lb/year)	Daily Emissions (lb/day)
NO_x	0	+	0	=	0	0.0
SO_x	0	+	0	=	0	0.0
PM_{10}	0	+	0	=	0	0.0
CO	0	+	0	=	0	0.0
VOC	2,274	+	3,675	=	5,949	16.3
NH_3	16,120	+	25,889	=	42,009	115.1

Solid Manure Handling System (C-5203-4-2)

An emissions factor for solid manure has not yet been fully established. Based on the currently available information, the post-project emissions from the solid manure are considered negligible and are set to 0.0 lb/day for all affected pollutants.

PE2 for Emission Units at Bar 20 #3 (Dairy 2)

Milking Parlor (C-5203-7-0 – Bar 20 #3 (Dairy 2))

As a condition of approval, this dairy will be required to feed all animals at the dairy in accordance with NRC guidelines. This dairy will also be required to flush the milking parlor after each milking. Therefore, the control efficiency for these practices will be used to calculate post-project VOC emissions from the milking parlor.

The post-project emissions from the milking parlor are calculated as follows:

VOC

PE2 for VOC from the Milking Parlor (Permit C-5203-7-0)					
Type of Cow	**# of Cows**	**Uncontrolled EF (lb-VOC/hd-yr)**	**Control(s)**		**Emissions (lb-VOC/yr)**
			Feeding to NRC guidelines (5%)	Flushing/Spraying down milk parlor after each milking (16.7%)	
Milk Cows	6,800	x 0.9	x (1 - 0.05)	x (1 - 0.167) =	**4,843**
PE2 for VOC from the Milking Parlor					**lb/day** = lb/yr÷ (365 day/yr)
					13.3

NH_3

$PE2_{NH3}$ = (6,600 milk cows) x (1.2 lb-NH_3/cow-year) + (200 milk cows) x (1.3 lb-NH_3/cow-year)
= **8,180 lb-NH_3/year**

$PE2_{NH3}$ = (8,180 lb-NH_3/year) ÷ (365 day/year)
= **22.4 lb-NH_3/day**

PE2 for Cow Housing Permit at Bar 20 #3 (Dairy 2) (ATC C-5203-8-1)

VOC

As a condition of approval, this dairy will be required to feed all animals in accordance with NRC guidelines. This dairy will also be required to flush the freestalls for milk cows and dry cows at least four times per day. Therefore, the control efficiencies for these practices will be used to calculate post-project VOC emissions from the cow housing permit unit.

The post-project VOC emissions from the cow housing permit unit are calculated in the table below:

PE2 for VOC from the Cow Housing Permit at Bar 20 #3 (Dairy 2) (ATC C-5203-8-1)					
Type of Cow	**# of Cows**	**Uncontrolled EF (lb-VOC/hd-yr)**	**Control(s)**		**Emissions (lb-VOC/yr)**
Milk Cow (Freestall)			Feeding to NRC guidelines (5%)	Flushing freestall lanes four times per day (18.2%)	
	6,800	12.4	x (1 - 0.05	x (1 - 0.182) =	**65,525**
Dry Cow (Loafing)			Feeding to NRC guidelines (5%)	Flushing corral lanes four times per day (18.2%)	
	1,000	8.2	x (1 - 0.05	x (1 - 0.182) =	**6,372**
Heifer (15-24 mo.) (corral/loafing)			Feeding to NRC guidelines (5%)	Flushing corral lanes two times per day (0%)	
	2,200	5.7	x (1 - 0.05	x (1 - 0) =	**11,913**
Heifers (7 - 14 mo.) (corral/loafing			Feeding to NRC guidelines (5%)	Flushing corral lanes two times per day (0%)	
	1,800	5.0	x (1 - 0.05	x (1 - 0) =	**8,550**
Heifers (4 - 6 mo.) (Loafing)			Feeding to NRC guidelines (5%)	Flushing corral lanes two times per day (0%)	
	700	4.5	x (1 - 0.05	x (1 - 0) =	**2,993**
Calves (< 3 mo.) (above Hutch)			Feeding to NRC guidelines (5%)	Flushing corral lanes two times per day (0%)	
	1,000	4.3	x (1 - 0.05	x (1 - 0) =	**4,085**
Mature Bulls (Open Corral)			Feeding to NRC guidelines (5%)	Flushing corral lanes two times per day (0%)	
	10	7.7	x (1 - 0.05)	x (1 - 0) =	**73**
PE2 for VOC from Cow Housing Permit at Bar 20 #3 (Dairy 2)				**lb/yr**	**99,511**
				lb/day = lb/yr÷ (365 day/yr)	**272.6**

PM$_{10}$ and NH$_3$

As a condition of approval, this dairy will be required to plant trees (shelterbelt) around the entire dairy in accordance with the NRCS specifications and standards. In addition, the applicant will install shade structures in all open corrals, feed cattle near dusk, scrape the open corrals and freestall exercise pens weekly in the morning hours, construct freestalls such that there are no exercise pens, and sprinkle water over 71% of the heifer corrals area to match the evaporation rate to keep constant moisture content in the soil. Therefore, the post-project PM_{10} emissions from the cow-housing permit will be based on the controlled PM_{10} emission factors given in Section VII.B of the evaluation.

The post-project PM_{10} and NH_3 emissions from the cow housing permit unit are calculated in the table below:

PE2 for PM_{10} and NH_3 from the Cow Housing Permit at Bar 20 #3 (Dairy 2) (ATC C-5203-8-1)							
Type of Cow	**# of Cows**		**EF_{PM10} (lb/cow)**	**EF_{NH3} (lb/cow)**		**lb-PM_{10}/yr**	**lb-NH_3/yr**
Milk Cow (Freestall)	6,600	x	0.24	28.0	=	1,584	184,800
Milk Cow (Loafing Barn)	200	x	3.05	32.3	=	610	6,460
Dry Cow (Loafing Barn)	1,000	x	3.05	20.6	=	3,050	20,600
Heifer (15-24 mo.) (Open Corral)	1,900	x	3.70	14.4	=	7,030	27,360
Heifer (15-24 mo.) (Loafing Barn)	300	x	4.69	14.4	=	1,407	4,320
Heifer (7-14 mo.) (Open Corral)	1,700	x	3.70	12.6	=	6,290	21,420
Heifer (7-14 mo.) (Loafing Barn)	100	x	4.69	12.6	=	469	1,260
Heifer (4-6 mo.) (Loafing barn)	700	x	4.69	11.4	=	3,283	7,980
Calf (under 3 mo.) (Above Hutches)	1,000	x	0.05	9.3	=	50	9,300
Mature Bulls (Open Corrals)	10	x	7.5	19.3	=	75	193
PE2 for PM_{10} & NH_3 from the Cow Housing Permit at Bar 20 #3 (Dairy 2) (ATC C-5203-8-1)					**lb/yr**	**23,848**	**283,693**
					lb/day = lb/yr÷ (365 day/yr)	**65.3**	**777.2**

Total Post-Project Emissions from the Cow Housing Permit at Bar 20 #3 (Dairy 2) (ATC C-5203-8-1):

Post-Project Potential to Emit (PE2) C-5203-8-1		
	Daily Emissions (lb/day)	Annual Emissions (lb/year)
NO_X	0	0
SO_X	0	0
PM_{10}	65.3	23,848
CO	0	0
VOC	272.6	99,511
NH_3	777.2	283,693

PE2 for Liquid Manure Handling System at Bar 20 #3 (Dairy 2) (Lagoon, Storage Pond, & Liquid Manure Land Application) (C-5203-9-2)

The project will involve the construction of an anaerobic digester. As stated above, it is conservatively assumed that 75% of the manure that will enter the lagoon system at Bar 20 #2 will be vacuumed and sent to the digester at Bar 20 #3; therefore, these emissions will be added to the post-project emissions for the liquid manure handling system at Bar 20 #3. This dairy will also be required continue feeding all animals at the dairy in accordance to NRC guidelines. Therefore, the control efficiencies for installation of the digester system and feeding all animals in accordance with NRC guidelines will also be used to calculate post-project VOC emissions from the lagoons/storage ponds and liquid manure land application.

PE2 for Lagoon & Storage Pond at Bar 20 #3 (Dairy 2)

The post-project emissions for VOC and NH_3 from the lagoons/storage ponds are calculated in the tables below.

VOC

PE2 for VOC from Lagoon/Storage Pond at Bar 20 #3 (Dairy 2) (ATC C-5203-9-2)							
Type of Cow	**# of Cows at Dairy 2**	**# of Cows at Dairy 1**	**% Manure From Dairy 1**	**Uncontrolled EF (lb-VOC/hd-yr)**	**Control(s)**		**Emissions (lb-VOC/yr)**
					Feeding to NRC guidelines (5%)	Anaerobic Digester (60%)	
Milk Cow (Freestall)	(6,600 +	0 x	75%)	2.7	x (1 - 0.05)	x (1 - 0.60) =	**6,772**
					Feeding to NRC guidelines (5%)	Anaerobic Digester (60%)	
Milk Cow (corral/loafing)	(200 +	2,600 x	75%)	2.3	x (1 - 0.05)	x (1 - 0.60) =	**1,879**
					Feeding to NRC guidelines (5%)	Anaerobic Digester (60%)	
Dry Cow (corral/loafing)	(1,000 +	500 x	75%)	1.4	x (1 - 0.05)	x (1 - 0.60) =	**732**
					Feeding to NRC guidelines (5%)	Anaerobic Digester (60%)	
Heifer (15-24 mo.) (corral/loafing)	(2,200 +	1,000 x	75%)	1.0	x (1 - 0.05)	x (1 - 0.60) =	**1,121**
					Feeding to NRC guidelines (5%)	Anaerobic Digester (60%)	
Heifer (7 - 14 mo.) (corral/loafing)	(1,800 +	800 x	75%)	0.9	x (1 - 0.05)	x (1 - 0.60) =	**821**
					Feeding to NRC guidelines (5%)	Anaerobic Digester (60%)	
Heifer (4 - 6 mo.) (corral/loafing)	(700 +	400 x	75%)	0.8	x (1 - 0.05)	x (1 - 0.60) =	**304**
					Feeding to NRC guidelines (5%)	Anaerobic Digester (60%)	
Calves (<3 mo.) (Aboveground Hutches)	(1,000 +	0 x	75%)	0.9	x (1 - 0.05)	x (1 - 0.60) =	**342**
					Feeding to NRC guidelines (5%)	Anaerobic Digester (60%)	
Calves (<3 mo.) (On-ground Hutches)	(0 +	300 x	0)	0.7	x (1 - 0.05)	x (1 - 0.60) =	**0**
					Feeding to NRC guidelines (5%)	Anaerobic Digester (60%)	
Mature Bulls (Open Corral)	(10 +	10 x	75%)	1.3	x (1 - 0.05)	x (1 - 0.60) =	**9**
PE2 for VOC from Lagoon/Storage Pond at Bar 20 #3 (Dairy 2) (ATC C-5203-9-2)						**lb/yr**	**11,980**
						lb/day = lb/yr÷ (365 day/yr)	**32.8**

NH3

PE2 for NH_3 from Lagoon/Storage Pond at Bar 20 #3 (Dairy 2) (ATC C-5203-9-2)						
Type of Cow	**# of Cows at Dairy 2**	**# of Cows at Dairy 1**	**% Manure From Dairy 1**	**EF_{NH3} (lb/cow)**		**lb-NH_3/yr**
Milk Cow (Freestall)	(6,600 +	0 x	75%)	15.7	=	103,620
Milk Cow (corral/loafing)	(200 +	2,600 x	75%)	15.5	=	33,325
Dry Cow (corral/loafing)	(1,000 +	500 x	75%)	9.5	=	13,063
Heifer (15-24 mo.) (Corral/Loafing)	(2,200 +	1,000 x	75%)	6.7	=	19,765
Heifer (7-14 mo.) (Corral/Loafing)	(1,800 +	800 x	75%)	5.8	=	13,920
Heifer (4 - 6 mo.) (corral/loafing)	(700 +	400 x	75%)	5.3	=	5,300
Calves (<3 mo.) (Aboveground Hutches)	(1,000 +	0 x	75%)	5.0	=	5,000
Calves (<3 mo.) (On-ground Hutches)	(0 +	300 x	0)	4.9	=	0
Mature Bulls (Open Corral)	(10 +	10 x	75%)	8.9	=	156
PE2 for NH_3 from Lagoon/Storage Pond at Bar 20 #3 (ATC C-5203-9-2)				**lb/yr**		**194,149**
				lb/day = lb/yr÷ (365 day/yr)		**531.9**

PE2 for Liquid Manure Land Application at Bar 20 #3 (Dairy 2):

The post-project emissions for VOC and NH_3 from the liquid manure land application are calculated in the tables below.

VOC

PE2 for VOC from Liquid Manure Land Application at Bar 20 #3 (Dairy 2) (ATC C-5203-9-2)							
Type of Cow	**# of Cows at Dairy 2**	**# of Cows at Dairy 1**	**% Manure From Dairy 1**	**Uncontrolled EF (lb-VOC/hd-yr)**	**Control(s)**		**Emissions (lb-VOC/yr)**
					Feeding to NRC guidelines (5%)	Anaerobic Digester (60%)	
Milk Cow (Freestall)	(6,600 +	0 x	75%)	5.0	x (1 - 0.05)	x (1 - 0.60) =	**12,540**
					Feeding to NRC guidelines (5%)	Anaerobic Digester (60%)	
Milk Cow (corral/loafing)	(200 +	2,600 x	75%)	3.7	x (1 - 0.05)	x (1 - 0.60) =	**3,023**
					Feeding to NRC guidelines (5%)	Anaerobic Digester (60%)	
Dry Cow (corral/loafing)	(1,000 +	500 x	75%)	2.3	x (1 - 0.05)	x (1 - 0.60) =	**1,202**
					Feeding to NRC guidelines (5%)	Anaerobic Digester (60%)	
Heifer (15-24 mo.) (corral/loafing)	(2,200 +	1,000 x	75%)	1.6	x (1 - 0.05)	x (1 - 0.60) =	**1,794**
					Feeding to NRC guidelines (5%)	Anaerobic Digester (60%)	
Heifer (7 - 14 mo.) (corral/loafing)	(1,800 +	800 x	75%)	1.4	x (1 - 0.05)	x (1 - 0.60) =	**1,277**
					Feeding to NRC guidelines (5%)	Anaerobic Digester (60%)	
Heifer (4 - 6 mo.) (corral/loafing)	(700 +	400 x	75%)	1.3	x (1 - 0.05)	x (1 - 0.60) =	**494**
					Feeding to NRC guidelines (5%)	Anaerobic Digester (60%)	
Calves (<3 mo.) (Aboveground Hutches)	(1,000 +	0 x	75%)	1.6	x (1 - 0.05)	x (1 - 0.60) =	**608**
					Feeding to NRC guidelines (5%)	Anaerobic Digester (60%)	
Calves (<3 mo.) (On-ground Hutches)	(0 +	300 x	0)	1.2	x (1 - 0.05)	x (1 - 0.60) =	**0**
					Feeding to NRC guidelines (5%)	Anaerobic Digester (60%)	
Mature Bulls (Open Corral)	(10 +	10 x	75%)	2.1	x (1 - 0.05)	x (1 - 0.60) =	**14**
PE2 for VOC from Liquid Manure Land Application at Bar 20 #3 (Dairy 2) (ATC C-5203-9-2)						**lb/yr**	**20,952**
						lb/day = lb/yr÷ (365 day/yr)	**57.4**

NH_3

PE2 for NH_3 from Liquid Manure Land Application at Bar 20 #3 (Dairy 2) (ATC C-5203-9-2)						
Type of Cow	**# of Cows at Dairy 2**	**# of Cows at Dairy 1**	**% Manure From Dairy 1**	**EF_{NH3} (lb/cow)**		**lb-NH_3/yr**
Milk Cow (Freestall)	(6,600 +	0	x 75%)	29.1	=	192,060
Milk Cow (corral/loafing)	(200 +	2,600	x 75%)	24.9	=	53,535
Dry Cow (corral/loafing)	(1,000 +	500	x 75%)	15.3	=	21,038
Heifer (15-24 mo.) (Corral/Loafing)	(2,200 +	1,000	x 75%)	10.7	=	31,565
Heifer (7-14 mo.) (Corral/Loafing)	(1,800 +	800	x 75%)	9.3	=	22,320
Heifer (4 - 6 mo.) (corral/loafing)	(700 +	400	x 75%)	8.5	=	8,500
Calves (<3 mo.) (Aboveground Hutches)	(1,000 +	0	x 75%)	9.3	=	9,300
Calves (<3 mo.) (On-ground Hutches)	(0 +	300	x 0%)	7.9	=	0
Mature Bulls (Open Corral)	(10 +	10	x 75%)	14.3	=	250
PE2 for NH_3 from Lagoon/Storage Pond at Bar 20 #3 (ATC C-5203-9-2)				**lb/yr**		**338,568**
				lb/day = lb/yr÷ (365 day/yr)		**927.6**

Total Post-Project Emissions from Liquid Manure Handling System at Bar 20 #3 (Dairy 2) (ATC C-5203-9-2):

Post-Project Potential to Emit (PE2) (ATC C-5203-9-2)						
Pollutant	Lagoon Emissions (lb/year)	+	Land Application (lb/year)	=	Total from Liquid Manure Handling	
					Annual Emissions (lb/year)	Daily Emissions (lb/day)
NO_X	0	+	0	=	0	0.0
SO_X	0	+	0	=	0	0.0
PM_{10}	0	+	0	=	0	0.0
CO	0	+	0	=	0	0.0
VOC	11,980	+	20,952	=	32,932	90.2
NH_3	194,149	+	338,568	=	532,717	1,459.5

Feed Storage and Handling Permit Unit (C-5203-11-1 and –12-0)

An emissions factor for feed has not yet been developed. Therefore, emissions from feed will not be quantified in this evaluation.

PE2 for Thermophilic, Mixed Tank, Digester System and Flare at Bar 20 #3 (Dairy 2) (ATC C-5203-13-0):

The daily and annual Post-Project Potential to Emit (PE2) for the flare for the proposed complete-mix digester will be calculated in the tables below. Because the applicant has proposed to calculate mass emission rates, the daily PE for SO_X is based on the emission factor for the worst-case day while the annual PE for SO_X is based on the average annual emission factor.

Daily Post-Project Potential to Emit (PE2) from Digester Flare (C-5203-13-0)							
Pollutant	Emission Factor (lb/scf)	x	Gas Flow Rate (scf/hr)	x	Daily Hours of Operation (hrs/day)	=	PE2 (lb/day)
NO_X	0.0000398	x	194,013	x	24	=	**185.3**
SO_X	0.0000674	x	194,013	x	24	=	**313.8**
PM_{10}	0.0000053	x	194,013	x	24	=	**24.7**
CO	0.0000729	x	194,013	x	24	=	**339.4**
VOC	0.00000179	x	194,013	x	24	=	**8.3**

Annual Post-Project Potential to Emit (PE2) from Digester Flare (C-5203-13-0)							
Pollutant	Emission Factor (lb/scf)	x	Maximum Gas Flared Annually (MMscf/yr)	x	10^6 scf/MMscf	=	PE2 (lb/yr)
NO_X	0.0000398	x	453.21	x	10^6	=	**18,038**
SO_X	0.0000252	x	453.21	x	10^6	=	**11,421**
PM_{10}	0.0000053	x	453.21	x	10^6	=	**2,402**
CO	0.0000729	x	453.21	x	10^6	=	**33,039**
VOC	0.00000179	x	453.21	x	10^6	=	**811**

PE2 for Natural Gas-Fired Boiler at Bar 20 #3 (Dairy 2) (ATC C-5203-14-0):

The daily and annual Post-Project Potential to Emit (PE2) for the natural gas-fired boiler will be calculated in the tables below.

Daily PE2 from Natural Gas-Fired Boiler (C-5203-14-0)							
Pollutant	Emission Factor (lb/MMBtu)	x	Max Heat Input (MMBtu/hr)	x	Daily Hours of Operation (hrs/day)	=	PE2 (lb/day)
NO_x	0.018	x	10.21	x	24	=	**4.4**
SO_x	0.00285	x	10.21	x	24	=	**0.7**
PM_{10}	0.0076	x	10.21	x	24	=	**1.9**
CO	0.084	x	10.21	x	24	=	**20.6**
VOC	0.0055	x	10.21	x	24	=	**1.3**

Annual PE2 from Natural Gas-Fired Boiler (C-5203-14-0)							
Pollutant	Emission Factor (lb/MMBtu)	x	Max Heat Input (MMBtu/hr)	x	Annual Hours of Operation (hrs/yr)	=	PE2 (lb/yr)
NO_x	0.018	x	10.21	x	8,760	=	**1,610**
SO_x	0.00285	x	10.21	x	8,760	=	**255**
PM_{10}	0.0076	x	10.21	x	8,760	=	**680**
CO	0.084	x	10.21	x	8,760	=	**7,513**
VOC	0.0055	x	10.21	x	8,760	=	**492**

Pre-Project Stationary Source Potential to Emit (SSPE1)

Pursuant to Section 4.9 of District Rule 2201, the Pre-Project Stationary Source Potential to Emit (SSPE1) is the Potential to Emit (PE) from all units with valid Authorities to Construct (ATC) or Permits to Operate (PTO) at the Stationary Source and the quantity of emission reduction credits (ERC) which have been banked since September 19, 1991 for Actual Emissions Reductions that have occurred at the source, and which have not been used on-site.

Pre-Project Stationary Source Potential to Emit [SSPE1] (lb/year)						
	NO_X	SO_X	PM_{10}	CO	VOC	NH_3
C-5203-1-0 (Milk Parlor – Dairy 1)	0	0	0	0	2,614	3,775
C-5203-2-0 (Cow Housing– Dairy 1)	0	0	37,606	0	53,490	137,769
ATC C-5203-3-0 (Liquid manure handling– Dairy 1)	0	0	0	0	25,391	170,150
ATC C-5203-4-0 (Solid Manure Handling– Dairy 1)	0	0	0	0	0	0
C-5203-5-0 (250 bhp Diesel Emergency Engine)	551	52	28	168	63	0
ATC C-5203-9-0 (Liquid Manure handling – Dairy 2)	0	0	0	0	69,584	418,212

Pre-Project Stationary Source Potential to Emit [SSPE1] (lb/year)						
	NO_X	SO_X	PM_{10}	CO	VOC	NH_3
ATC C-5203-11-0 (Feed Storage and Handling – Dairy 1)	0	0	0	0	0	0
Pre-Project SSPE (SSPE1)	**551**	**52**	**37,634**	**168**	**151,142**	**729,906**

Post Project Stationary Source Potential to Emit (SSPE2)

Pursuant to Section 4.10 of District Rule 2201, the Post Project Stationary Source Potential to Emit (SSPE2) is the Potential to Emit (PE) from all units with valid Authorities to Construct (ATC) or Permits to Operate (PTO) at the Stationary Source and the quantity of emission reduction credits (ERC) which have been banked since September 19, 1991 for Actual Emissions Reductions that have occurred at the source, and which have not been used on-site.

Post-Project Stationary Source Potential to Emit [SSPE2] (lb/year)						
	NO_X	SO_X	PM_{10}	CO	VOC	NH_3
ATC C-5203-1-2 (Milk Parlor – Dairy 1)	0	0	0	0	1,852	3,380
ATC C-5203-2-3 (Cow Housing– Dairy 1)	0	0	24,054	0	40,464	126,723
ATC C-5203-3-3 (Liquid manure handling– Dairy 1)	0	0	0	0	5,949	42,009
ATC C-5203-4-2 (Solid Manure Handling– Dairy 1)	0	0	0	0	0	0
C-5203-5-0 (250 bhp Diesel Emergency Engine)	551	52	28	168	63	0
ATCC-5203-7-0 (Milk Parlor – Dairy 2)	0	0	0	0	4,843	8,180
ATC C-5203-8-1 (Cow Housing – Dairy 2)	0	0	23,848	0	99,511	283,693
ATC C-5203-9-2 (Liquid Manure handling – Dairy 2)	0	0	0	0	32,932	532,717
ATC C-5203-10-0 (Solid Manure Handling – Dairy 2)	0	0	0	0	0	0
ATC C-5203-11-1 (Feed Storage and Handling – Dairy 1)	0	0	0	0	0	0
ATC C-5203-12-0 (Feed Storage and Handling – Dairy 2)	0	0	0	0	0	0
ATC C-5203-13-0 (Digester & Flare)	18,038	11,421	2,402	33,039	811	0
ATC C-5203-14-0 (Natural Gas-fired boiler)	1,610	255	680	7,513	492	0

Post-Project Stationary Source Potential to Emit [SSPE2] (lb/year)						
	NO_X	SO_X	PM_{10}	CO	VOC	NH_3
ATC C-5203-15-0 (Gas Processing Plant)	0	0	0	0	0	0
Post-Project SSPE (SSPE2)	**20,199**	**11,728**	**51,012**	**40,720**	**186,917**	**996,702**

Stationary Source Increase in Potential to Emit (SSIPE)

Stationary Source Increase in Permitted Emissions [SSIPE]				
Pollutant	SSPE2 (lb/year)	SSPE1 (lb/year)	SSIPE (lb/year)	SSIPE (ton/year)
NO_x	20,199	551	19,648	9.82
SO_x	11,728	52	11,676	5.84
PM_{10}	51,012	37,634	13,378	6.69
CO	40,720	168	40,552	20.28
VOC	186,917	151,142	35,775	17.89
NH_3	996,702	729,906	266,796	133.40

Table 1 - Change in Animal Population

	Change in Animal Population						Uncontrolled Emission Factors[1]						
Animal Type	Expanded Dairy	Existing Dairy	Machado Dairy	JMC Dairy	Bar 20 Dairy Heifer conversion	Reductions from Future Shutdowns [2]	CH4 (Manure) lbs hd/yr	CH4 (Manure) lbs-hd/yr [3]	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	6800	-304	-504	-670	-433	1500	377.2	226.3	283.2	21	0.534	0	310
Dry Cows	1000	57			-53		377.2*	226.3	283.2*	21	0.534*	0	310
Heifers (15-24 mo)	2200	724			389		5.4	3.2	139.4	21	3.2	0	310
Heifers (7-14 mo)	1800	-753					5.4	3.2	88.7	21	3.2	0	310
Heifers (4-6 mo)	700	-21					5.4	3.2	88.7	21	3.2	0	310
Calves (under 3 mo)	1000	-306					5.4**	3.2	88.7**	21	3.2**	0	310
Bulls	10	9					6.2	3.7	116.8	21	0.0	0	310
Total	13510												

[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] Bar 20 has proposed to shutdown existing dairies in the San Joaquin Valley and transfer the cows from the shutdown dairies for use at their expansion project. The number and types of cows transfered to Bar 20 dairy must equal or exceed 10,401.3 tons-CO2 emissions. For emission calculation purposes, 1,500 milk cows were used. Bar 20 Dairy will be required to submit to the District a list of the facilities shutdown, their location, and the number and type of cows being transferred with the calculation showing that the emissions of 10,401.3 tons-CO2 have been achieved. Historical records demonstrating herd capacity shall also be included. In addition, Bar 20 dairy will have to demonstrate to the District that the reductions are permanent.

[3] Since the existing lagoons at Bar 20 Dairy are designed as storage ponds rather than treatment lagoons, and may be potentailly overloaded, the ARB methane Emission Factor of 377.2 lbs-CH4/yr will be reduced by 40%, due to higher volatile solids in these lagoons and their nonconversion to methane by methanogenic bacteria. Lagoons that are not properly designed have the potential of emitting large amount of VOC emissions but inhibit methane production.

*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)

Table 2 - PE1 Enteric Emissions Existing Dairy

PE1 Enteric Emissions Existing Dairy							
Type of Cow	# of Cows	Enteric EF (lbs-hd-yr)[1]					tons-CH4/yr
Milking Cow	2904	283.2					411.21
Dry Cow	443	283.2					62.73
Heifer (15-24 mo)	276	139.4					19.24
Heifer (7-14 mo)	1553	88.7					68.88
Heifer (4-6 mo)	421	88.7					18.67
Calf (under 3 mo)	606	88.7					26.88
Bulls	1	116.8					0.06
Total	6204						607.65

Table 3 - PE1 Manure Emissions (Liquid) - Existing Dairy

PE1 Manure Emissions (Liquid) - Existing Dairy							
Type of Cow	# of Cows	Manure EF (lbs-hd-yr)[2]	% of Manure[3]		Manure removal at least Daily		tons-CH4/yr
Milking Cow	2904	226.3	48%		7.1%		146.54
Dry Cow	443	226.3	48%		7.1%		46.57
Heifer (15-24 mo)	276	3.2	48%		7.1%		0.42
Heifer (7-14 mo)	1553	3.2	48%		7.1%		2.34
Heifer (4-6 mo)	421	3.2	48%		7.1%		0.63
Calf (under 3 mo)	606	3.2	0%		7.1%		0.91
Bulls	1	3.7	48%		7.1%		0.00
Total	6204						197.41

Table 4 - PE1 Manure Emissions (Solid) - Exi

PE1 Manure Emissions (Solid) - Existing Dairy							
Type of Cow	# of Cows	Manure EF (lbs-hd-yr) [1]	% of Manure				tons-CH4/yr
Milking Cow	2904	377.2	52%				284.80
Dry Cow	443	377.2	52%				43.45
Heifer (15-24 mo)	276	5.4	52%				0.39
Heifer (7-14 mo)	1553	5.4	52%				2.18
Heifer (4-6 mo)	421	5.4	52%				0.59
Calf (under 3 mo)	606	5.4	100%				1.64
Bulls	1	6.2	52%				0.00
Total	6204						333.04

Table 5 - PE1 Manure Emissions (Liquid) - Expansion Dairy

PE1 Manure Emissions (Liquid) - Expansion Dairy							
Type of Cow	# of Cows	Manure EF (lbs-hd-yr)[2]	% of Manure[3]		Manure removal at least Daily		tons-CH4/yr
Milking Cow	6600	226.3	100%		7.1%		693.83
Milk cow -Saudi [4]	200	226.3	60%		7.1%		12.62
Dry Cow -Saudi [4]	1000	226.3	60%		7.1%		63.08
Heifer (15-24 mo) open	1900	3.2	48%		7.1%		1.36
Heifer (15-24 mo) Saudi [4]	300	3.2	60%		7.1%		0.27
Heifer (7-14 mo) open	1700	3.2	48%		7.1%		1.23
Heifer (7-14 mo) (saudi) [4]	100	3.2	60%		7.1%		0.09
Heifer (4-6 mo) - Saudi [4]	700	3.2	60%		7.1%		0.63
Calf (under 3 mo)	1000	3.2	100%		7.1%		1.50
Bulls	10	3.7	48%		7.1%		0.01
Total	13510						774.61

Total Pre-Project Emissions =	**1,912.71**	**tons-CH4/yr**
	40,166.94	**tons-CO2e**

Post-Project Potential to Emit (PE2)

Post-Project Emissions Prior to Mitigation

Table 6 - PE2 Enteric Emissions - Existing Dairy

PE2 Enteric Emissions - Existing Dairy							
Type of Cow	# of Cows	Enteric (lbs/hd-yr)					tons-CH4/yr
Milking Cow	2600	283.2					368.16
Dry Cow	500	283.2					70.80
Heifer (15-24 mon)	1000	139.4					69.70
Heifer (7-14 mon)	800	88.7					35.48
Heifer (4-6 mon)	400	88.7					17.74
Calf (under 3 mon)	300	88.7					13.31
Feedlot Cattle/Bulls	10	116.8					0.58
Total	5610						575.77

Table 7 - PE2 Manure Emissions (Liquid) - Existing Dairy

PE2 Manure Emissions (Liquid) - Existing Dairy							
Type of Cow	# of Cows	Manure (lbs-hd-yr)[1]	% of Manure[3]	% of Manure Transferred	Manure removal at least Daily		tons-CH4/yr
Milking Cow	2600	377.2	48%	75%	7.1%		54.67
Dry Cow	500	377.2	48%	75%	7.1%		10.51
Heifer (15-24 mon)	1000	5.4	48%	75%	7.1%		0.30
Heifer (7-14 mon)	800	5.4	48%	75%	7.1%		0.24
Heifer (4-6 mon)	400	5.4	48%	75%	7.1%		0.12
Calf (under 3 mon)	300	5.4	0%	75%	7.1%		0.00
Feedlot Cattle/Bulls	10	5.4	48%	75%	7.1%		0.00
Total							65.84

Table 8 - PE2 Manure Emissions (Solid) - Existing Dairy

PE2 Manure Emissions (Solid) - Existing Dairy							
Type of Cow	# of Cows	Manure (lbs-hd-yr)	% of Manure				tons-CH4/yr
Milking Cow	2600	377.2	52%				254.99
Dry Cow	500	377.2	52%				49.04
Heifer (15-24 mon)	1000	5.4	52%				1.40
Heifer (7-14 mon)	800	5.4	52%				1.12
Heifer (4-6 mon)	400	5.4	52%				0.56
Calf (under 3 mon)	300	5.4	100%				0.81
Feedlot Cattle/Bulls	10	6.2	52%				0.02
Total							307.94

Table 9 - PE2 Enteric Emissions - Expansion Dairy

PE2 Enteric Emissions - Expansion Dairy							
Type of Cow	# of Cows	Enteric (lbs-hd-yr)					tons-CH4/yr
Milking Cow	6600	283.2					934.56
Milk cow -Saudi [4]	200	283.2					28.32
Dry Cow -Saudi [4]	1000	283.2					141.60
Heifer (15-24 mo) open	1900	139.4					132.43
Heifer (15-24 mo) Saudi [4]	300	139.4					20.91
Heifer (7-14 mo) open	1700	88.7					75.40
Heifer (7-14 mo) (saudi) [4]	100	88.7					4.44
Heifer (4-6 mo) - Saudi [4]	700	88.7					31.05
Calf (under 3 mo)	1000	88.7					44.35
Bulls	10	116.8					0.58
Total							1413.63

Table 10 - PE2 Manure Emissions (Liquid) Expansion Dairy

PE2 Manure Emissions (Liquid) Expansion Dairy							
Type of Cow	# of Cows	Manure (lbs-hd-yr)	% of Manure[3]			Digester	tons-CH4/yr
Milking Cow	6600	377.2	100%			95%	62.24
Milk cow -Saudi [4]	200	377.2	60%			95%	1.13
Dry Cow -Saudi [4]	1000	377.2	60%			95%	5.66
Heifer (15-24 mo) open	1900	5.4	48%			95%	0.12
Heifer (15-24 mo) Saudi [4]	300	5.4	60%			95%	0.02
Heifer (7-14 mo) open	1700	5.4	48%			95%	0.11
Heifer (7-14 mo) (saudi) [4]	100	5.4	60%			95%	0.01
Heifer (4-6 mo) - Saudi [4]	700	5.4	60%			95%	0.06
Calf (under 3 mo)	1000	5.4	100%			95%	0.14
Bulls	10	6.2	48%			95%	0.00
Total							69.49

1320.22

Table 11 - PE2 Manure Emissions (Solid) Expansion Dairy

PE2 Manure Emissions (Solid) Expansion Dairy							
Type of Cow	# of Cows	Manure (lbs-hd-yr)	% of Manure				tons-CH4/yr
Milking Cow	6600	377.2	0%				0.00
Milk cow -Saudi [4]	200	377.2	40%				15.09
Dry Cow -Saudi [4]	1000	377.2	40%				75.44
Heifer (15-24 mo) open	1900	5.4	52%				2.67
Heifer (15-24 mo) Saudi [4]	300	5.4	40%				0.32
Heifer (7-14 mo) open	1700	5.4	52%				2.39
Heifer (7-14 mo) (saudi) [4]	100	5.4	40%				0.11
Heifer (4-6 mo) - Saudi [4]	700	5.4	40%				0.76
Calf (under 3 mo)	1000	5.4	0%				0.00
Bulls	10	6.2	52%				0.02
Total							96.79

Table 12 - PE2 Manure Emissions (Liquid) from Existing Dairy sent to Expansion dairy Digester

PE2 Manure Emissions (Liquid) from Existing Dairy sent to Expansion dairy Digester							
Type of Cow	# of Cows	Manure (lbs-hd-yr)[1]	% of Manure[3]	% of Manure Transferred		Digester	tons-CH4/yr
Milking Cow	2600	377.2	48%	75%		95%	8.83
Dry Cow	500	377.2	48%	75%		95%	1.70
Heifer (15-24 mon)	1000	5.4	48%	75%		95%	0.05
Heifer (7-14 mon)	800	5.4	48%	75%		95%	0.04
Heifer (4-6 mon)	400	5.4	48%	75%		95%	0.02
Calf (under 3 mon)	300	5.4	0%	75%		95%	0.00
Feedlot Cattle/Bulls	10	5.4	48%	75%		95%	0.00
Total							10.63

202.00
1522.22

Total Emissions from Existing Dairy (Dairy 1)	949.55	tons-CH4/yr
Total Emission from Expansion	1,590.53	tons-CH4/yr
Total Post-Project Emissions w/o mitigation	2,540.08	tons-CH4/yr
	53,341.74	tons-CO2e
Digester Design Element Benefits	(1,522.22)	tons-CH4/yr
	(31,966.62)	tons-CO2e

Post-Project Emissions Post Mitigation

Table 13 - PE2 Enteric Emissions - Existing Dairy

PE2 Enteric Emissions - Existing Dairy							
Type of Cow	# of Cows	Enteric (lbs/hd-yr)		Cottonseed			tons-CH4/yr
Milking Cow	2600	283.2		12%			323.98
Dry Cow	500	283.2		12%			62.30
Heifer (15-24 mon)	1000	139.4		12%			61.34
Heifer (7-14 mon)	800	88.7		12%			31.22
Heifer (4-6 mon)	400	88.7		12%			15.61
Calf (under 3 mon)	300	88.7		12%			11.71
Feedlot Cattle/Bulls	10	116.8		12%			0.51
Total	5610						506.68

69.09

Table 14 - PE2 Manure Emissions (Liquid) - Existing Dairy

PE2 Manure Emissions (Liquid) - Existing Dairy							
Type of Cow	# of Cows	Manure (lbs-hd-yr)[1]	% of Manure[3]	% of Manure Transferred	Manure removal at least Daily		tons-CH4/yr
Milking Cow	2600	377.2	48%	75%	7.1%		54.67
Dry Cow	500	377.2	48%	75%	7.1%		10.51
Heifer (15-24 mon)	1000	5.4	48%	75%	7.1%		0.30
Heifer (7-14 mon)	800	5.4	48%	75%	7.1%		0.24
Heifer (4-6 mon)	400	5.4	48%	75%	7.1%		0.12
Calf (under 3 mon)	300	5.4	0%	75%	7.1%		0.00
Feedlot Cattle/Bulls	10	5.4	48%	75%	7.1%		0.00
Total							65.84

Table 15 - PE2 Manure Emissions (Solid) - Existing Dairy

PE2 Manure Emissions (Solid) - Existing Dairy							
Type of Cow	# of Cows	Manure (lbs-hd-yr)	% of Manure				tons-CH4/yr
Milking Cow	2600	377.2	52%				254.99
Dry Cow	500	377.2	52%				49.04
Heifer (15-24 mon)	1000	5.4	52%				1.40
Heifer (7-14 mon)	800	5.4	52%				1.12
Heifer (4-6 mon)	400	5.4	52%				0.56
Calf (under 3 mon)	300	5.4	100%				0.81
Feedlot Cattle/Bulls	10	6.2	52%				0.02
Total							307.94

Table 16 - PE2 Enteric Emissions - Expansion Dairy

PE2 Enteric Emissions - Expansion Dairy							
Type of Cow	# of Cows	Enteric (lbs-hd-yr)		Cottonseed			tons-CH4/yr
Milking Cow	6600	283.2		12%			822.41
Milk cow -Saudi [4]	200	283.2		12%			24.92
Dry Cow -Saudi [4]	1000	283.2		12%			124.61
Heifer (15-24 mo) open	1900	139.4		12%			116.54
Heifer (15-24 mo) Saudi [4]	300	139.4		12%			18.40
Heifer (7-14 mo) open	1700	88.7		12%			66.35
Heifer (7-14 mo) (saudi) [4]	100	88.7		12%			3.90
Heifer (4-6 mo) - Saudi [4]	700	88.7		12%			27.32
Calf (under 3 mo)	1000	88.7		12%			39.03
Bulls	10	116.8		12%			0.51
Total							**1243.99**

169.64

Table 17 - PE2 Manure Emissions (Liquid) Expansion Dairy

PE2 Manure Emissions (Liquid) Expansion Dairy							
Type of Cow	# of Cows	Manure (lbs-hd-yr)	% of Manure[3]		Manure removal at least Daily	Digester	tons-CH4/yr
Milking Cow	6600	377.2	100%		7.1%	95%	57.82
Milk cow -Saudi [4]	200	377.2	60%		7.1%	95%	1.05
Dry Cow -Saudi [4]	1000	377.2	60%		7.1%	95%	5.26
Heifer (15-24 mo) open	1900	5.4	48%		7.1%	95%	0.11
Heifer (15-24 mo) Saudi [4]	300	5.4	60%		7.1%	95%	0.02
Heifer (7-14 mo) open	1700	5.4	48%		7.1%	95%	0.10
Heifer (7-14 mo) (saudi) [4]	100	5.4	60%		7.1%	95%	0.01
Heifer (4-6 mo) - Saudi [4]	700	5.4	60%		7.1%	95%	0.05
Calf (under 3 mo)	1000	5.4	100%		7.1%	95%	0.13
Bulls	10	6.2	48%		7.1%	95%	0.00
Total							**64.55**

4.93

Table 18 - PE2 Manure Emissions (Solid) Expansion Dairy

PE2 Manure Emissions (Solid) Expansion Dairy							
Type of Cow	# of Cows	Manure (lbs-hd-yr)	% of Manure		Manure Incorporation		tons-CH4/yr
Milking Cow	6600	377.2	0%		29.0%		0.00
Milk cow -Saudi [4]	200	377.2	40%		29.0%		10.71
Dry Cow -Saudi [4]	1000	377.2	40%		29.0%		53.56
Heifer (15-24 mo) open	1900	5.4	52%		29.0%		1.89
Heifer (15-24 mo) Saudi [4]	300	5.4	40%		29.0%		0.23
Heifer (7-14 mo) open	1700	5.4	52%		29.0%		1.69
Heifer (7-14 mo) (saudi) [4]	100	5.4	40%		29.0%		0.08
Heifer (4-6 mo) - Saudi [4]	700	5.4	40%		29.0%		0.54
Calf (under 3 mo)	1000	5.4	0%		29.0%		0.00
Bulls	10	6.2	52%		29.0%		0.01
Total							**68.72**

28.07

Table 19 - PE2 Manure Emissions (Liquid) from Existing Dairy sent to Expansion dairy Digester

PE2 Manure Emissions (Liquid) from Existing Dairy sent to Expansion dairy Digester							
Type of Cow	# of Cows	Manure (lbs-hd-yr)[1]	% of Manure[3]	% of Manure Transferred	Manure Removal at least Daily	Digester	tons-CH4/yr
Milking Cow	2600	377.2	48%	75%	7.1%	95%	8.20
Dry Cow	500	377.2	48%	75%	7.1%	95%	1.58
Heifer (15-24 mon)	1000	5.4	48%	75%	7.1%	95%	0.05
Heifer (7-14 mon)	800	5.4	48%	75%	7.1%	95%	0.04
Heifer (4-6 mon)	400	5.4	48%	75%	7.1%	95%	0.02
Calf (under 3 mon)	300	5.4	0%	75%	7.1%	95%	0.00
Feedlot Cattle/Bulls	10	5.4	48%	75%	7.1%	95%	0.00
Total							9.88

0.75

Total Emissions from Existing Dairy (1) 880.46 tons-CH4/yr

Total Emissions from Expansion 1,387.14 tons-CH4/yr

Total Post-Project Emissions = 2,267.60 tons-CH4/yr
47,619.57 tons-CO2e

Total Increase in Emissions
Post-Project Pre-Project
2,267.60 1,912.71 = **354.89** tons-CH4/yr
7,452.63 tons-CO2e

Reductions from feeding cottonseed 238.73 tons-CH4/yr 5,013.28 tons-CO2e

Reductions from at least daily manure removal from concrete feedlanes 5.69 tons-CH4/yr 119.45 tons-CO2e

Reductions from Manure Incorporation 28.07 tons-CH4/yr 589.43 tons-CO2e

Table 20 - Emission Reductions from Shut Down/Modifications of Existing Dairies

Emission Reductions from Shut Down/Modifications of Existing Dairies					
	Milk	Dry	Heifers	Tons-CH4/yr	Tons-CO2 eq.
Bar 20 older existing dairy	433	53	11	124.59	2,616.45
allow heifers at above dairy			-400	(28.52)	(598.92)
Machado Dairy	504			128.39	2,696.27
JMC Dairy	670			170.68	3,584.33
Transfer of cows from future dairy shutdowns [5]	1,500			382.13	8,024.63
Total	1607	53	1660	777.27	16,322.76

Increase in emissions after additional reductions =
354.89 - 777.27 (422.39) tons-CH4/yr
(8,870.13) tons-CO2e

[1] CARB Emission Factor

[2] Since the existing lagoons at Bar 20 Dairy are designed as storage ponds rather than treatment lagoons, and may be potentailly overloaded, the ARB methane Emission Factor of 377.2 lbs-CH4/yr will be reduced by 40%, due to higher volatile solids in these lagoons and their nonconversion to methane by methanogenic bacteria. Lagoons that are not properly designed have the potential of emitting large amount of VOC emissions but inhibit methane production.

[3] 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 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 al cow 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)

[4] Since Saudi Style Barns are hybrids between freestall barns and corrals, the pecrentage of manure collected on the concrete feed lanes will be averaged between the values from cows housed in freestall barns and open corrals. Therefore, the % of manure deposited on the concrete feed lanes is equal to 60% [(71 +48)/2] (using the study mentioned above).

[5] Bar 20 has proposed to shutdown existing dairies in the San Joaquin Valley and transfer the cows from the shutdown dairies for use at their expansion project. The number and types of cows transfered to Bar 20 dairy must equal or exceed 10,401.3 tons-CO2 emissions. For emission calculation purposes, 1,500 milk cows were used. Bar 20 Dairy will be required to submit to the District a list of the facilities shutdown, their location, and the number and type of cows being transferred with the calculation showing that the emissions of 10,401.3 tons-CO2 have been achieved. Historical records demonstrating herd capacity shall also be included. In addition, Bar 20 dairy will have to demonstrate to the District that the reductions are permanent.

N2O Emissions Calculations

Pre-Project Potential to Emit (PE1)

Table 21 - PE1 Emissions from Existing Dairy

PE1 Emissions from Existing Dairy					
Type of Cow	# of Cows	EF (lbs-hd-yr)			tons-CH4/yr
Milking Cow	2904	0.534			0.8
Dry Cow	443	0.534			0.1
Heifer (15-24 mo)	276	3.2			0.4
Heifer (7-14 mo)	1553	3.2			2.5
Heifer (4-6 mo)	421	3.2			0.7
Calf (under 3 mo)	606	3.2			1.0
Bulls	1	0.0			0.0
Total	**6204**				**5.46**

Table 22 - PE1 Emissions from Liquid Manure System for Expansion Dairy

PE1 Emissions from Liquid Manure System for Expansion Dairy							
Type of Cow	# of Cows	Manure (lbs-hd-yr)	% of Manure[2]				tons-CH4/yr
Milking Cow	6600	0.534	100%				1.8
Milk cow -Saudi	200	0.534	60%				0.0
Dry Cow -Saudi	1000	0.534	60%				0.2
Heifer (15-24 mo) open	1900	3.200	48%				1.5
Heifer (15-24 mo) Saudi	300	3.200	60%				0.3
Heifer (7-14 mo) open	1700	3.200	48%				1.3
Heifer (7-14 mo) (saudi)	100	3.200	60%				0.1
Heifer (4-6 mo) - Saudi	700	3.200	60%				0.7
Calf (under 3 mo)	1000	3.200	100%				1.6
Bulls	10	0.000	48%				0.0
Total							**7.38**

Total Pre-Project Emissions = 12.84 tons-N2O/yr
3,979.93 tons-CO2 Equivalent

Post-Project Potential to Emit (PE2)

Table 23 - PE2 Enteric Emissions - Existing Dairy

PE2 Enteric Emissions - Existing Dairy						
Type of Cow	# of Cows	Enteric (lbs/hd-yr)				tons-N2O/yr
Milking Cow	2600	0.0				0.0
Dry Cow	500	0.0				0.0
Heifer (15-24 mon)	1000	0.0				0.0
Heifer (7-14 mon)	800	0.0				0.0
Heifer (4-6 mon)	400	0.0				0.0
Calf (under 3 mon)	300	0.0				0.0
Feedlot Cattle/Bulls	10	0.0				0.0
Total	**5610**					**0.00**

Table 24 - PE2 Manure Emissions - Existing Dairy

PE2 Manure Emissions - Existing Dairy						
Type of Cow	# of Cows	Manure (lbs-hd-yr)				tons-N2O/yr
Milking Cow	2600	0.534				0.7
Dry Cow	500	0.534				0.1
Heifer (15-24 mon)	1000	3.2				1.6
Heifer (7-14 mon)	800	3.2				1.3
Heifer (4-6 mon)	400	3.2				0.6
Calf (under 3 mon)	300	3.2				0.5
Feedlot Cattle/Bulls	10	0.0				0.0
Total						**4.83**

Table 25 - PE2 Enteric Emissions - Expansion Dairy

PE2 Enteric Emissions - Expansion Dairy						
Type of Cow	# of Cows	Enteric (lbs-hd-yr)				tons-N2O/yr
Milking Cow	6600	0.0				0.0
Milking Cow - Saudi	200	0.0				0.0
Dry Cow - Saudi	1000	0.0				0.0
Heifer (15-24 mon)	2200	0.0				0.0
Heifer (7-14 mon)	1800	0.0				0.0
Heifer (4-6 mon)	700	0.0				0.0
Calf (under 3 mon)	1000	0.0				0.0
Feedlot Cattle/Bull	10	0.0				0.0
Total						**0.00**

Table 26 - PE2 Emissions from Liquid Manure System for Expansion Dairy

PE2 Emissions from Liquid Manure System for Expansion Dairy							
Type of Cow	# of Cows	Manure (lbs-hd-yr)	% of Manure[2]				tons-CH4/yr
Milking Cow	6600	0.534	100%				1.8
Milk cow -Saudi	200	0.534	60%				0.0
Dry Cow -Saudi	1000	0.534	60%				0.2
Heifer (15-24 mo) open	1900	3.200	48%				1.5
Heifer (15-24 mo) Saudi	300	3.200	60%				0.3
Heifer (7-14 mo) open	1700	3.200	48%				1.3
Heifer (7-14 mo) (saudi)	100	3.200	60%				0.1
Heifer (4-6 mo) - Saudi	700	3.200	60%				0.7
Calf (under 3 mo)	1000	3.200	100%				1.6
Bulls	10	0.000	48%				0.0
Total							**7.38**

Table 27 - PE2 Emissions from Solid Manure for Expansion Dairy

PE2 Emissions from Solid Manure for Expansion Dairy							
Type of Cow	# of Cows	Manure (lbs-hd-yr)	% of Manure				tons-CH4/yr
Milking Cow	6600	0.534	0%				0.0
Milk cow -Saudi	200	0.534	40%				0.0
Dry Cow -Saudi	1000	0.534	40%				0.1
Heifer (15-24 mo) open	1900	3.200	52%				1.6
Heifer (15-24 mo) Saudi	300	3.200	40%				0.2
Heifer (7-14 mo) open	1700	3.200	52%				1.4
Heifer (7-14 mo) (saudi)	100	3.200	40%				0.1
Heifer (4-6 mo) - Saudi	700	3.200	40%				0.4
Calf (under 3 mo)	1000	3.200	0%				0.0
Bulls	10	0.000	52%				0.0
Total							**3.83**

Total Post-Project Emisions = 16.03 tons-N2O/yr
4,969.39 tons-CO2 Equivalent

Increase in Emissions = Post-project - Pre-project
16.03 - 12.84 = 3.19 tons-N2O/yr
989.46 ons-CO2 Equivaler

Table 28 - Emission Reductions from Shut Down/Modifications of Existing Dairies

Emission Reductions from Shut Down/Modifications of Existing Dairies					
	Milk	Dry	Heifers	Tons-N20/yr	Tons (CO2 eq.)
Bar 20 older existing dairy	433	53	11	0.15	45.7
allow heifers at above dairy			-400	(0.64)	(198.4)
Machado Dairy	504			0.13	41.7
JMC Dairy	670			0.18	55.5
Transfer of cows from future dairy shutdowns	1,500			0.40	124.2
Total	1607	53	1660	**0.22**	**68.61**

Increase in emissions after additional reductions =
3.19 - 0.22 = 2.97 tons-N20/yr
920.85 tons-CO2 Equivalent

Estimated Particulate Toxic Air Contaminants

Total PM10: 1,000 lbs/yr
10.000 lbs/hr

Enter the PM10 emissions.

Component	CAS Number	Percent of Total PM10	Annual Emissions (lbs/yr)	Hourly Emissions (lb/hr)
Aluminum	7429905	2.2887	22.887	0.22887000
Lead	7439921	0.0033	0.033	0.00033000
Manganese	7439965	0.0603	0.603	0.00603000
Mercury	7439976	0	-	-
Nickel	7440020	0.0026	0.026	0.00026000
Crystalline Silica	7631869	7.0553	70.553	0.70553000
Silver	7440224	0.0013	0.013	0.00013000
Antimony	7440360	0	-	-
Arsenic	7440382	0.0005	0.005	0.00005000
Barium	7440393	0.0465	0.465	0.00465000
Cadmium	7440439	0.0009	0.009	0.00009000
Hexavalent Chromium	18540299	0.0004	0.004	0.00004000
Cobalt	7440484	0.0003	0.003	0.00003000
Copper	7440508	0.0085	0.085	0.00085000
Vanadium	7440622	0.0114	0.114	0.00114000
Zinc	7440666	0.0235	0.235	0.00235000
Ammonia	7664417	0.4493	4.493	0.04493000
Bromine	7726956	0.0039	0.039	0.00039000
Selenium	7782492	0.0006	0.006	0.00006000
Chlorine	7782505	0.6411	6.411	0.06411000
Sulfates	9960	0.7932	7.932	0.07932000

Note: These emission factors are based on the Air Resources Board's Profile No. 423, Livestock Operations Dust. All Silicon is assumed to be Crystalline Silica. Since this assumption is extremely conservative, any decisions based on this assumption must be carefully considered. Five percent of the chromium is assumed to be hexavalent chromium.

Estimated Toxic Air Contaminant Emissions for Miscellaneous Processes at Dairie

(Does not include emissions from lagoons or enteric emissions from cows)

Total Number of Cows:

Enter the Total Number of Cows.

Component	CAS Number	Alternative Name	Toxic Emissions Factors for Miscellaneous Processes (lb/Head/yr)	Annual Emissions (lbs/yr)	Hourly Emissions (lb/hr)
Xylenes	1210		1.999E-02	-	-
Formaldehyde	50000		4.423E-03	-	-
Carbon tetrachloride	56235		6.523E-04	-	-
2-propanol	67630	Isopropyl Alcohol	1.799E-02	-	-
Chloroform	67663		1.453E-03	-	-
Benzene	71432		3.544E-03	-	-
Chloromethane	74873	Methyl Chloride	8.816E-03	-	-
Chloroethane	75003	Ethyl Chloride	2.659E-03	-	-
Acetaldehyde	75070		2.680E-02	-	-
Carbon disulfide*	75150		2.769E-02	-	-
Bromoform	75252		0.000E+00	-	-
Trichlorofluoromethane*	75694	Freon 11	1.196E-06	-	-
Tetraethyl lead	78002	Lead Compounds	0.000E+00	-	-
2-Butanone	78933	Methyl Ethyl Ketone	1.623E-01	-	-
1,1,2-Trichloroethane	79005		2.516E-03	-	-
Trichloroethene	79016	Trichloroethylene	0.000E+00	-	-
1,1,2,2-Tetrachloroethane	79345		9.710E-05	-	-
Methyl methacrylate	80626		0.000E+00	-	-
Hexachlorobutadiene	87683		0.000E+00	-	-
Napthalene	91203		1.293E-02	-	-
1,2-Dichlorobenzene	95501		6.095E-03	-	-
1,2,4-Trimethylbenzene	95636		0.000E+00	-	-
1,2-Dibromo-3-chloropropane	96128		5.489E-04	-	-
1,2,3-Trichloropropane	96184		3.073E-03	-	-
Isopropylbenzene	98828	Cumene	6.241E-04	-	-
Ethylbenzene	100414		3.859E-03	-	-
Styrene	100425		3.992E-03	-	-
Benzyl chloride	100447		3.210E-03	-	-
1,4-Dichlorobenzene	106467	p-Dichlorobenzene	5.769E-03	-	-
1,2-Dibromoethane	106934	Ethylene Dibromide (EDB)	3.404E-03	-	-
1,2-Dichloroethane	107062	Ethylene Dichloride (EDC)	6.555E-04	-	-
Acrylonitrile	107131		2.697E-03	-	-
Vinyl acetate	108054		2.188E-02	-	-
Methyl Isobutyl Ketone	108101	Hexone	7.883E-03	-	-
Toluene	108883		1.193E-02	-	-
Chlorobenzene	108907		3.025E-03	-	-
Hexane	110543		9.030E-03	-	-
Cyclohexane	110827		7.594E-02	-	-
1,2,4-Trichlorobenzene	120821		8.663E-03	-	-
Butyraldehyde	123728		1.265E-03	-	-
1,4 Dioxane	123911		1.567E-02	-	-
Tetrachloroethene*	127184	Perchloroethylene	7.236E-03	-	-
1,3-Dichlorobenzene	541731		5.450E-03	-	-
1,1,1,2-Tetrachloroethane	630206		0.000E+00	-	-
t-1,4-Dichloro-2-butene	764410		9.921E-03	-	-
Crotonaldehyde	4170303		1.572E-03	-	-

3. Emission Factors for Diesel Powered Dairy Equipment

Emission Source	Diesel Offroad Equipment Emission Factor[a] (g/hp-hr)				
	VOC	NO_x	PM_{10}	$PM_{2.5}$ [b]	CH_4
Agricultural Tractor 121-175 hp	0.680	8.170	0.380	0.350	0.071

[a] Source: CARB. Offroad 2007, version 2.0.1.2. http://www.arb.ca.gov/msei/offroad/offroad.htm. VOC, NOx, and PM emission factors reflect model year 1996 equipment, which is the oldest model year in OFFROAD2007 that would still be operating in calendar year 2008 assuming an average equipment lifetime. The CH4 emission factor was derived from OFFROAD2007 output for an average San Joaquin Valley equipment fleet mix in the year 2008.

[b] The PM2.5 emission factor is scaled from the PM10 factor according to the relative emission rate for diesel vehicle exhaust as reported in CARB, California Emission Inventory and Reporting System (CEIDARS), 2002.

4. Emissions Associated with Diesel Powered Dairy Equipment

Expanded Dairy

Emission Source	Estimated Engine Size (hp)	Load Factor	Hours of Operation		Annual Emissions (ton/yr)				
			(equip-hr/week)	(equip-hr/yr)	VOC	NO_x	PM_{10}	$PM_{2.5}$	CH_4
Dairy Tractor, Diesel	142	0.7	8	416	0.031	0.372	0.017	0.016	0.003

Factors for Converting PM_{10} to $PM_{2.5}$

Emission Source	PM Profile Name	CARB Profile ID	PM_{10} Fraction	$PM_{2.5}$ Fraction	PM2.5/ PM10 Factor
Land Preparation	Agricultural Tilling	417	0.45	0.10	0.22
Crop Harvesting	Agricultural Tilling	417	0.45	0.10	0.22
Windblown Dust - Farm	Windblown Dust-Agric. Lands	418	0.45	0.10	0.22
Cattle in Corrals	Livestock Operations Dust	423	0.48	0.06	0.11
Unpaved Road Dust	Unpaved Road Dust	470	0.59	0.13	0.21
Paved Road Dust	Paved Road Dust	471	0.46	0.08	0.17
Windblown Dust - Dairy	Dust - Unpaved Areas	416	0.59	0.13	0.21
Truck Exhausts	Diesel Vehicle Exhaust	425	1.00	0.92	0.92
Employee Travel	Gasoline Vehicles-Catalyst	400	0.97	0.90	0.93

Source: California Air Resources Board, "California Emission Inventory and Reporting System (CEIDARS). Particulate Matter (PM) Speciation Profiles. Summary of Overall Size Fractions and Reference Documentation." September 26, 2002.

Urbemis 2007 Version 9.2.0

Detail Report for Annual Operational Unmitigated Emissions (Tons/Year)

File Name: C:\John\Projects\Bar 20 Dairy\Urbemis Feed Trucks.urb9

Project Name: Bar 20 Dairy - Expanded Dairy - Feed Trucks

Project Location: Fresno County

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

Off-Road Vehicle Emissions Based on: OFFROAD2007

OPERATIONAL EMISSION ESTIMATES (Annual Tons Per Year, Unmitigated)

Source	ROG	NOX	CO	SO2	PM10	PM25	CO2
Dairy	0.06	1.03	0.32	0.00	0.09	0.04	117.56
TOTALS (tons/year, unmitigated)	0.06	1.03	0.32	0.00	0.09	0.04	117.56

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2008 Season: Annual

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Dairy		16.00	1000 sq ft	1.00	16.00	160.00
					16.00	160.00

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	0.0	2.3	97.5	0.2

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Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Truck < 3750 lbs	0.0	5.6	87.9	6.5
Light Truck 3751-5750 lbs	0.0	1.8	97.7	0.5
Med Truck 5751-8500 lbs	0.0	1.7	98.3	0.0
Lite-Heavy Truck 8501-10,000 lbs	0.0	0.0	76.2	23.8
Lite-Heavy Truck 10,001-14,000 lbs	0.0	0.0	50.0	50.0
Med-Heavy Truck 14,001-33,000 lbs	0.0	7.1	14.3	78.6
Heavy-Heavy Truck 33,001-60,000 lbs	100.0	0.0	0.0	100.0
Other Bus	0.0	0.0	0.0	100.0
Urban Bus	0.0	0.0	0.0	0.0
Motorcycle	0.0	77.1	22.9	0.0
School Bus	0.0	0.0	0.0	100.0
Motor Home	0.0	12.5	75.0	12.5

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	10.0	10.0	10.0	10.0	10.0	10.0
Rural Trip Length (miles)	10.0	10.0	10.0	10.0	10.0	10.0
Trip speeds (mph)	35.0	35.0	35.0	35.0	35.0	35.0
% of Trips - Residential	32.9	18.0	49.1			
% of Trips - Commercial (by land use)						

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Dairy				0.0	0.0	100.0

Operational Changes to Defaults

The urban/rural selection has been changed from Urban to Rural

Home-based work urban trip length changed from 10.8 miles to 10 miles

Home-based work rural trip length changed from 16.8 miles to 10 miles

Home-based shop urban trip length changed from 7.3 miles to 10 miles

Home-based shop rural trip length changed from 7.1 miles to 10 miles

Home-based other urban trip length changed from 7.5 miles to 10 miles

Home-based other rural trip length changed from 7.9 miles to 10 miles

Commercial-based commute urban trip length changed from 9.5 miles to 10 miles

Commercial-based commute rural trip length changed from 14.7 miles to 10 miles

Commercial-based non-work urban trip length changed from 7.35 miles to 10 miles

Commercial-based non-work rural trip length changed from 6.6 miles to 10 miles

Commercial-based customer urban trip length changed from 7.35 miles to 10 miles

Commercial-based customer rural trip length changed from 6.6 miles to 10 miles

Urbemis 2007 Version 9.2.0

Detail Report for Annual Operational Unmitigated Emissions (Tons/Year)

File Name: C:\John\Projects\Bar 20 Dairy\Urbemis Employees.urb9

Project Name: Bar 20 Dairy - Expanded Dairy - Employees and Visitors

Project Location: Fresno County

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

Off-Road Vehicle Emissions Based on: OFFROAD2007

OPERATIONAL EMISSION ESTIMATES (Annual Tons Per Year, Unmitigated)

Source	ROG	NOX	CO	SO2	PM10	PM25	CO2
Dairy	0.16	0.17	2.10	0.00	0.24	0.05	123.36
TOTALS (tons/year, unmitigated)	0.16	0.17	2.10	0.00	0.24	0.05	123.36

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2008 Season: Annual

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Dairy		92.00	1000 sq ft	1.00	92.00	763.60
					92.00	763.60

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	51.8	2.0	97.6	0.4

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Truck < 3750 lbs	11.5	3.7	90.8	5.5
Light Truck 3751-5750 lbs	23.0	0.9	98.6	0.5
Med Truck 5751-8500 lbs	10.0	1.1	98.9	0.0
Lite-Heavy Truck 8501-10,000 lbs	0.0	0.0	75.0	25.0
Lite-Heavy Truck 10,001-14,000 lbs	0.0	0.0	50.0	50.0
Med-Heavy Truck 14,001-33,000 lbs	0.0	0.0	20.0	80.0
Heavy-Heavy Truck 33,001-60,000 lbs	0.0	0.0	0.0	100.0
Other Bus	0.0	0.0	0.0	100.0
Urban Bus	0.0	0.0	0.0	100.0
Motorcycle	3.7	77.1	22.9	0.0
School Bus	0.0	0.0	0.0	100.0
Motor Home	0.0	10.0	80.0	10.0

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	8.3	8.3	8.3	8.3	8.3	8.3
Rural Trip Length (miles)	8.3	8.3	8.3	8.3	8.3	8.3
Trip speeds (mph)	35.0	35.0	35.0	35.0	35.0	35.0
% of Trips - Residential	32.9	18.0	49.1			

% of Trips - Commercial (by land use)

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Dairy				0.0	0.0	100.0

Operational Changes to Defaults

The urban/rural selection has been changed from Urban to Rural

Home-based work urban trip length changed from 10.8 miles to 8.3 miles

Home-based work rural trip length changed from 16.8 miles to 8.3 miles

Home-based shop urban trip length changed from 7.3 miles to 8.3 miles

Home-based shop rural trip length changed from 7.1 miles to 8.3 miles

Home-based other urban trip length changed from 7.5 miles to 8.3 miles

Home-based other rural trip length changed from 7.9 miles to 8.3 miles

Commercial-based commute urban trip length changed from 9.5 miles to 8.3 miles

Commercial-based commute rural trip length changed from 14.7 miles to 8.3 miles

Commercial-based non-work urban trip length changed from 7.35 miles to 8.3 miles

Commercial-based non-work rural trip length changed from 6.6 miles to 8.3 miles

Commercial-based customer urban trip length changed from 7.35 miles to 8.3 miles

Commercial-based customer rural trip length changed from 6.6 miles to 8.3 miles

Urbemis 2007 Version 9.2.0

Detail Report for Annual Operational Unmitigated Emissions (Tons/Year)

File Name: C:\John\Projects\Bar 20 Dairy\Urbemis Milk Trucks.urb9

Project Name: Bar 20 Dairy - Expanded Dairy - Milk.Trucks

Project Location: Fresno County

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

Off-Road Vehicle Emissions Based on: OFFROAD2007

OPERATIONAL EMISSION ESTIMATES (Annual Tons Per Year, Unmitigated)

Source	ROG	NOX	CO	SO2	PM10	PM25	CO2
Dairy	0.04	0.68	0.21	0.00	0.06	0.03	77.15
TOTALS (tons/year, unmitigated)	0.04	0.68	0.21	0.00	0.06	0.03	77.15

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2008 Season: Annual

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Dairy		14.00	1000 sq ft	1.00	14.00	105.00
					14.00	105.00

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	0.0	2.3	97.5	0.2

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Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Truck < 3750 lbs	0.0	5.6	87.9	6.5
Light Truck 3751-5750 lbs	0.0	1.8	97.7	0.5
Med Truck 5751-8500 lbs	0.0	1.7	98.3	0.0
Lite-Heavy Truck 8501-10,000 lbs	0.0	0.0	76.2	23.8
Lite-Heavy Truck 10,001-14,000 lbs	0.0	0.0	50.0	50.0
Med-Heavy Truck 14,001-33,000 lbs	0.0	7.1	14.3	78.6
Heavy-Heavy Truck 33,001-60,000 lbs	100.0	0.0	0.0	100.0
Other Bus	0.0	0.0	0.0	100.0
Urban Bus	0.0	0.0	0.0	0.0
Motorcycle	0.0	77.1	22.9	0.0
School Bus	0.0	0.0	0.0	100.0
Motor Home	0.0	12.5	75.0	12.5

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	7.5	7.5	7.5	7.5	7.5	7.5
Rural Trip Length (miles)	7.5	7.5	7.5	7.5	7.5	7.5
Trip speeds (mph)	35.0	35.0	35.0	35.0	35.0	35.0
% of Trips - Residential	32.9	18.0	49.1			

% of Trips - Commercial (by land use)

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Dairy				0.0	0.0	100.0

Operational Changes to Defaults

The urban/rural selection has been changed from Urban to Rural

Home-based work urban trip length changed from 10.8 miles to 7.5 miles

Home-based work rural trip length changed from 16.8 miles to 7.5 miles

Home-based shop urban trip length changed from 7.3 miles to 7.5 miles

Home-based shop rural trip length changed from 7.1 miles to 7.5 miles

Home-based other rural trip length changed from 7.9 miles to 7.5 miles

Commercial-based commute urban trip length changed from 9.5 miles to 7.5 miles

Commercial-based commute rural trip length changed from 14.7 miles to 7.5 miles

Commercial-based non-work urban trip length changed from 7.35 miles to 7.5 miles

Commercial-based non-work rural trip length changed from 6.6 miles to 7.5 miles

Commercial-based customer urban trip length changed from 7.35 miles to 7.5 miles

Commercial-based customer rural trip length changed from 6.6 miles to 7.5 miles

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Combined Annual Emissions Reports (Tons/Year)

File Name:

Project Name: Bar 20

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	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2005 TOTALS (tons/year unmitigated)	0.03	0.23	0.10	0.00	0.00	0.01	0.01	0.00	0.01	0.01	17.17
2006 TOTALS (tons/year unmitigated)	0.01	0.11	0.05	0.00	0.00	0.01	0.01	0.00	0.01	0.01	8.44

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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	0.03	0.23	0.10	0.00	0.00	0.01	0.01	0.00	0.01	0.01	17.17
Building 05/01/2005-05/01/2006	0.03	0.23	0.10	0.00	0.00	0.01	0.01	0.00	0.01	0.01	17.17
Building Off Road Diesel	0.03	0.23	0.10	0.00	0.00	0.01	0.01	0.00	0.01	0.01	17.17
Building Vendor Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2006	0.01	0.11	0.05	0.00	0.00	0.01	0.01	0.00	0.01	0.01	8.44
Building 05/01/2005-05/01/2006	0.01	0.11	0.05	0.00	0.00	0.01	0.01	0.00	0.01	0.01	8.44
Building Off Road Diesel	0.01	0.11	0.05	0.00	0.00	0.01	0.01	0.00	0.01	0.01	8.44
Building Vendor Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Phase Assumptions

Phase: Building Construction 5/1/2005 - 5/1/2006 - Default Fine Site Grading Description

Off-Road Equipment:

3 Forklifts (145 hp) operating at a 0.3 load factor for 4 hours per day

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Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name:

Project Name: Bar 20

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	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2005 TOTALS (tons/year unmitigated)	0.28	2.87	0.96	0.00	0.00	0.11	0.11	0.00	0.10	0.10	255.91
2006 TOTALS (tons/year unmitigated)	0.04	0.38	0.13	0.00	0.00	0.01	0.01	0.00	0.01	0.01	33.63

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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	0.28	2.87	0.96	0.00	0.00	0.11	0.11	0.00	0.10	0.10	255.91
Building 05/01/2005-02/01/2006	0.28	2.87	0.96	0.00	0.00	0.11	0.11	0.00	0.10	0.10	255.91
Building Off Road Diesel	0.28	2.87	0.96	0.00	0.00	0.11	0.11	0.00	0.10	0.10	255.91
Building Vendor Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2006	0.04	0.38	0.13	0.00	0.00	0.01	0.01	0.00	0.01	0.01	33.63
Building 05/01/2005-02/01/2006	0.04	0.38	0.13	0.00	0.00	0.01	0.01	0.00	0.01	0.01	33.63
Building Off Road Diesel	0.04	0.38	0.13	0.00	0.00	0.01	0.01	0.00	0.01	0.01	33.63
Building Vendor Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Phase Assumptions

Phase: Building Construction 5/1/2005 - 2/1/2006 - Default Fine Site Grading Description

Off-Road Equipment:

3 Off Highway Trucks (479 hp) operating at a 0.57 load factor for 5 hours per day

3/10/2008 10:23:42 AM

Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name:

Project Name: Bar 20

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	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2005 TOTALS (tons/year unmitigated)	0.09	0.92	0.28	0.00	106.92	0.03	106.95	22.33	0.03	22.36	74.65

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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	0.09	0.92	0.28	0.00	106.92	0.03	106.95	22.33	0.03	22.36	74.65
Mass Grading 05/01/2005-11/01/2005	0.09	0.92	0.28	0.00	106.92	0.03	106.95	22.33	0.03	22.36	74.65
Mass Grading Dust	0.00	0.00	0.00	0.00	106.92	0.00	106.92	22.33	0.00	22.33	0.00
Mass Grading Off Road Diesel	0.09	0.92	0.23	0.00	0.00	0.03	0.03	0.00	0.03	0.03	71.27
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	3.38

Phase Assumptions

Phase: Mass Grading 5/1/2005 - 11/1/2005 - Default Fine Site Grading Description

Total Acres Disturbed: 324

Maximum Daily Acreage Disturbed: 81

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

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Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name:

Project Name: Bar 20

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	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2005 TOTALS (tons/year unmitigated)	0.07	0.41	0.27	0.00	141.75	0.04	141.79	29.60	0.04	29.64	33.14
2006 TOTALS (tons/year unmitigated)	0.04	0.20	0.13	0.00	69.66	0.02	69.68	14.55	0.02	14.57	16.28

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

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2005	0.07	0.41	0.27	0.00	141.75	0.04	141.79	29.60	0.04	29.64	33.14
Mass Grading 05/01/2005-05/01/2006	0.07	0.41	0.27	0.00	141.75	0.04	141.79	29.60	0.04	29.64	33.14
Mass Grading Dust	0.00	0.00	0.00	0.00	141.75	0.00	141.75	29.60	0.00	29.60	0.00
Mass Grading Off Road Diesel	0.07	0.40	0.21	0.00	0.00	0.04	0.04	0.00	0.04	0.04	28.65
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	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.48
2006	0.04	0.20	0.13	0.00	69.66	0.02	69.68	14.55	0.02	14.57	16.28
Mass Grading 05/01/2005-05/01/2006	0.04	0.20	0.13	0.00	69.66	0.02	69.68	14.55	0.02	14.57	16.28
Mass Grading Dust	0.00	0.00	0.00	0.00	69.66	0.00	69.66	14.55	0.00	14.55	0.00
Mass Grading Off Road Diesel	0.03	0.20	0.10	0.00	0.00	0.02	0.02	0.00	0.02	0.02	14.08
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	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.20

Phase Assumptions

Phase: Mass Grading 5/1/2005 - 5/1/2006 - Default Fine Site Grading Description

Total Acres Disturbed: 324

Maximum Daily Acreage Disturbed: 81

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 4 hours per day

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Urbemis 2007 Version 9.2.2

Combined Annual Emissions Reports (Tons/Year)

File Name: C:\Documents and Settings\DMitchell\Application Data\Urbemis\Version9a\Projects\Digester 12 Trucks 4 acre.urb9

Project Name: Microgy Digester Truck Emissions

Project Location: San Joaquin Valley APCD

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	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2008 TOTALS (tons/year unmitigated)	0.17	1.22	0.69	0.00	0.33	0.07	0.40	0.07	0.07	0.14	109.59

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	0.01	0.00	0.14	0.00	0.00	0.00	1.71

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	0.27	4.55	1.43	0.00	0.28	0.18	529.02

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	0.28	4.55	1.57	0.00	0.28	0.18	530.73

Construction Unmitigated Detail Report:

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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
2008	0.17	1.22	0.69	0.00	0.33	0.07	0.40	0.07	0.07	0.14	109.59
Mass Grading 01/30/2008-03/14/2008	0.06	0.47	0.28	0.00	0.33	0.02	0.35	0.07	0.02	0.09	41.64
Mass Grading Dust	0.00	0.00	0.00	0.00	0.33	0.00	0.33	0.07	0.00	0.07	0.00
Mass Grading Off Road Diesel	0.05	0.46	0.22	0.00	0.00	0.02	0.02	0.00	0.02	0.02	37.08
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	4.56
Asphalt 03/15/2008-04/01/2008	0.02	0.10	0.08	0.00	0.00	0.01	0.01	0.00	0.01	0.01	11.02
Paving Off-Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.01	0.08	0.04	0.00	0.00	0.01	0.01	0.00	0.01	0.01	5.88
Paving On Road Diesel	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.25
Paving Worker Trips	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.90
Building 04/02/2008-09/22/2008	0.09	0.65	0.33	0.00	0.00	0.04	0.04	0.00	0.04	0.04	56.89
Building Off Road Diesel	0.09	0.65	0.32	0.00	0.00	0.04	0.04	0.00	0.04	0.04	55.39
Building Vendor Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.41
Building Worker Trips	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.10
Coating 09/23/2008-10/23/2008	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
Architectural Coating	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03

Phase Assumptions

Phase: Mass Grading 1/30/2008 - 3/14/2008 - Default Fine Site Grading Description

Total Acres Disturbed: 4

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Maximum Daily Acreage Disturbed: 1

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 6 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

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

Phase: Paving 3/15/2008 - 4/1/2008 - Default Paving Description

Acres to be Paved: 1

Off-Road Equipment:

4 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day

1 Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day

1 Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

Phase: Building Construction 4/2/2008 - 9/22/2008 - Default Building Construction Description

Off-Road Equipment:

1 Cranes (399 hp) operating at a 0.43 load factor for 4 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

Phase: Architectural Coating 9/23/2008 - 10/23/2008 - Default Architectural Coating Description

Rule: Residential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Residential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

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Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

Source	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
Natural Gas	0.00	0.00	0.00	0.00	0.00	0.00	1.46
Hearth	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Landscape	0.01	0.00	0.14	0.00	0.00	0.00	0.25
Consumer Products	0.00						
Architectural Coatings	0.00						
TOTALS (tons/year, unmitigated)	0.01	0.00	0.14	0.00	0.00	0.00	1.71

Area Source Changes to Defaults

Operational Unmitigated Detail Report:

OPERATIONAL EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

Source	ROG	NOX	CO	SO2	PM10	PM25	CO2
Dairy Digester	0.27	4.55	1.43	0.00	0.28	0.18	529.02
TOTALS (tons/year, unmitigated)	0.27	4.55	1.43	0.00	0.28	0.18	529.02

Operational Settings:

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2009 Season: Annual

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Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Dairy Digester		24.00	1000 sq ft	1.00	24.00	720.00
					24.00	720.00

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	0.0	2.0	97.6	0.4
Light Truck < 3750 lbs	0.0	3.7	90.8	5.5
Light Truck 3751-5750 lbs	0.0	0.9	98.6	0.5
Med Truck 5751-8500 lbs	0.0	1.1	98.9	0.0
Lite-Heavy Truck 8501-10,000 lbs	0.0	0.0	75.0	25.0
Lite-Heavy Truck 10,001-14,000 lbs	0.0	0.0	50.0	50.0
Med-Heavy Truck 14,001-33,000 lbs	0.0	0.0	20.0	80.0
Heavy-Heavy Truck 33,001-60,000 lbs	100.0	0.0	0.0	100.0
Other Bus	0.0	0.0	0.0	100.0
Urban Bus	0.0	0.0	0.0	100.0
Motorcycle	0.0	77.1	22.9	0.0
School Bus	0.0	0.0	0.0	100.0
Motor Home	0.0	10.0	80.0	10.0

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Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	30.0	30.0	30.0	30.0	30.0	30.0
Rural Trip Length (miles)	30.0	30.0	30.0	30.0	30.0	30.0
Trip speeds (mph)	35.0	35.0	35.0	35.0	35.0	35.0
% of Trips - Residential	32.9	18.0	49.1			
% of Trips - Commercial (by land use)						
Dairy Digester				0.0	0.0	100.0

Appendix B

Health Risk Assessment and Ambient Air Quality Analysis

San Joaquin Valley
Unified Air Pollution Control District

Date: March 12, 2008

To: Sheraz Gill, Supervising Air Quality Engineer

From: Glenn Reed, Senior Air Quality Specialist

Subject: Health Risk Assessment and Ambient Air Quality Analysis of Emissions from the Proposed Expansion of the Bar 20 Dairy to Meet the Requirements of the California Environmental Quality Act

The Bar 20 Dairy is proposing to expand its operation by adding 6,800 milk cows, 1,000 dry cows, 2,200 large heifers (15-24 months), 1,800 medium heifers (7-14 months), 700 small heifers (4-6 months), 1,000 calves (under three months), and 10 bulls to the dairy In addition, Bar 20 Dairy has proposed to install an anaerobic digester as an integral part of the project. The anaerobic digester will collect and digest cow manure from the dairy expansion and from the existing dairy to produce biogas. The biogas will then be piped approximately 5.5 miles by a pipeline that will extend from the Bar 20 Dairy to an existing PG&E pipeline. San Joaquin Valley Unified Air Pollution Control District regulations require that an air quality standard analysis be performed for all sources that are subject to a public notice requirement during the permitting process to determine if the emissions from the proposed sources will cause or contribute significantly to a violation of the State or National Ambient Air Quality Standards. The only pollutant for which an analysis is required for the proposed expansion is particulate matter with an aerodynamic diameter of 10 microns or less (PM10). The PM10 air quality impacts from the emissions from this expansion were determined on July 17, 2007. The estimated maximum 24-hour concentration of PM10 was 9.57 micrograms per cubic meter. Because this predicted concentration is less than the District's draft interim significance threshold of 10.4 micrograms per cubic meter 24-hour PM10 concentration, there will be no significant contribution to violation of the State's ambient air quality standard for PM10. The District also has a risk management review policy that requires an assessment of risk from toxic air contaminants emitted by every proposed modified or new source. The risk resulting from the emissions of toxic air contaminants from the proposed sources was assessed on May 16, 2007 and determined not to be significant in accordance with the District's risk management policy.

Although these analyses were adequate for District permitting, they did not address the risks and ambient air quality impacts from all the sources that must be considered to comply with the requirements of the California Environmental Quality Act (CEQA). To comply with CEQA, all sources including mobile sources and construction emissions that are attributed to the project must be included in the analysis. In accordance with District CEQA guidance these additional sources would include the emissions from milk trucks traveling to and from the milk barn from Whitesbridge Road, feed trucks traveling to and from the feed storage are from Whitesbridge Road, and trucks hauling manure for land application from the solids handling area to the fields; emissions during idling of milk trucks at the milk barn, feed trucks at the feed storage area, and manure hauling trucks at the solids handling area; and emissions from the tractor used to scrape manure from the corrals. In addition, the risk from diesel particulates and fugitive dust emitted during construction of the dairy was assessed.

Emissions

For this analysis, emissions of PM10 and toxic air contaminants were estimated for both permitted and non-permitted sources. The emissions for toxic air contaminants from permitted sources differ from those used in the analyses for permitting because emissions estimates for PM10 have changed because of proposed controls. Thus, it was necessary to perform a new analysis for all permitted sources as well as the mobile sources that were not included in the previous permitting risk assessment. The estimates for emissions of PM10 and toxic air contaminants are discussed below.

PM10 Emissions

Emissions of PM10 from sources in the proposed expansion were estimated using the District's PM10 emission factors. Emissions reductions were estimated based on the Dairy's proposed control technology and the District's determinations of control efficiency for individual technologies. The total PM10 emissions from the cow housing at the proposed expansion will be 11.13 tons per year. The Dairy has also proposed to reduce PM10 emissions from the existing dairy operations by 6.83 tons per year.

Exhaust emissions from mobile sources that must be considered include those from the following sources:

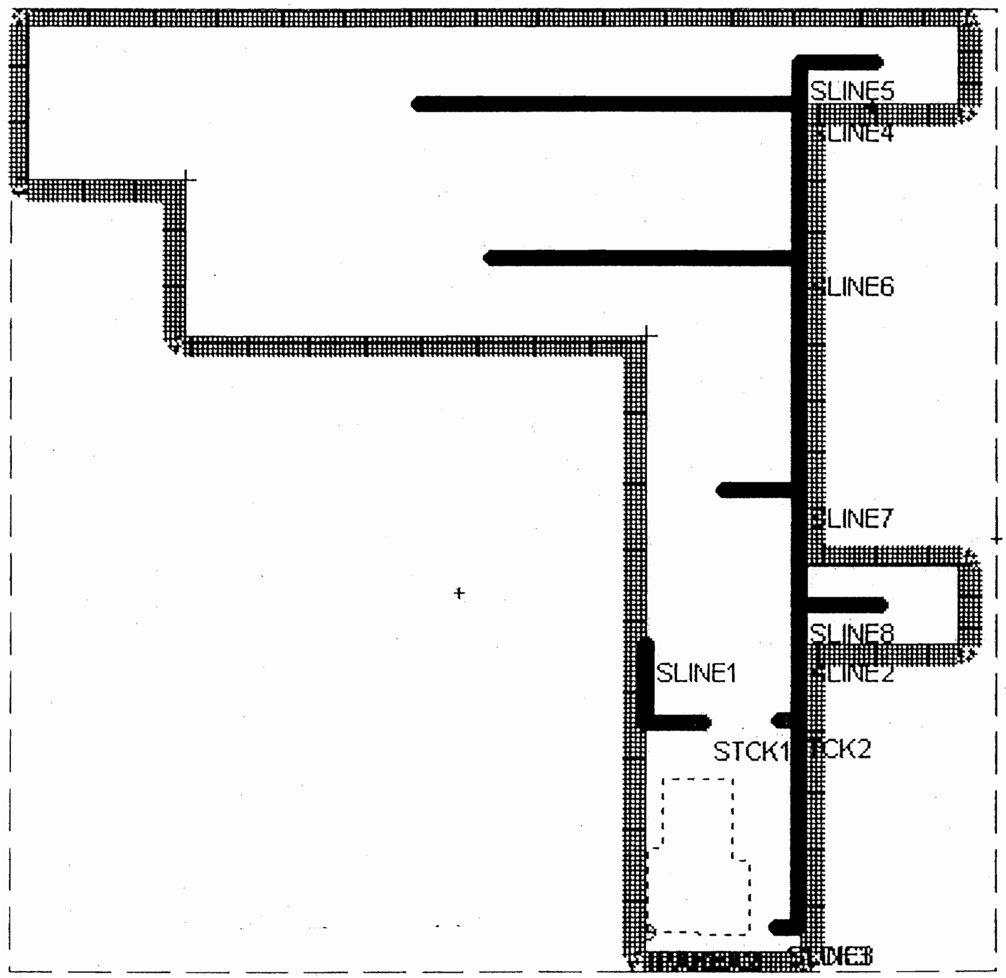
1. Trucks hauling milk, feed, and manure for land application traveling within the boundaries of the facility.
2. Idling of trucks hauling milk, feed, and manure.
3. Tractors used to scrape manure in the corrals.

The methodology for estimating emissions from these sources and the estimates are described below.

Truck Travel Emissions. The latest version of the California Air Resources Board's (ARB's) Emission Factor model (EMFAC2007) was used to estimate exhaust emissions from truck travel. It was assumed that all trucks hauling milk or feed would be heavy heavy-duty (HHD) diesel trucks. All trucks hauling manure were assumed to be medium heavy duty (MHD) diesel trucks. EMFAC2007 was run to estimate emission factors for HHD and MHD diesel trucks for Fresno County for 2008. It was assumed that travel speed within the facility would be 15 miles per hour. Travel routes were identified for all three types of truck. Milk and feed trucks were assumed to travel from Whitesbridge

Road to and from the milk barn and the feed storage area. A single main travel route for manure hauling trucks from the solids handling area to the northernmost field was identified. Other travel routes branching from this main route to the center of other fields were also identified. The travel routes are shown in Figure 1. Estimated numbers of trucks were 7 milk trucks per day, 8 feed trucks per day, and 2000 manure hauling truck trips per year. All emissions estimates for truck travel emissions are shown in Table 1.

Figure 1. Travel Routes, Truck Idling Locations, and Manure Scraping Area



Note: SLINE1 is the milk truck travel route. SLINE2 is the feed truck travel route. SLINE3, SLINE4, SLINE5, SLINE6, SLINE7, and SLINE9 are manure hauling truck travel routes. STCK1 is the point where milk trucks idling. STCK2 and STCK3 are the points where feed trucks and manure hauling trucks idle. PAREA2 is the corral area where manure scraping occurs. The green and gold crosses are receptors. The boundary of the facility is outlined with a red line.

Table 1. Truck Travel Emission Estimates

Type of Vehicles	Route	Start X-Coordinate	Start Y-Coordinate	End X-Coordinate	End Y-Coordinate	Distance (mi)	Emission Factor (g/mi)	Trucks/Week	Emissions (g/sec)	Emissions (lb/yr)
Milk Trucks	A	7.79	1614.42	7.79	1202.2	0.26				
	B	7.79	1202.2	300.2	1202.2	0.18				
					Total	0.44	1.328	49	9.40E-05	6.53
Feed Trucks	A	805.55	1614.08	805.55	1213.96	0.25				
	B	805.55	1213.96	703.07	1213.96	0.06				
					Total	0.31	1.328	56	7.66E-05	5.32
Manure Hauling Trucks	1A	698.61	128.56	805.55	128.56	0.07				
	1B	805.55	128.56	805.55	4693.85	2.84				
					Total	2.90	0.544	38.5	2.00E-04	13.91
Manure Hauling Trucks	2	805.55	4472.61	-1200	4472.63	1.25	0.544	7.7	1.72E-05	1.19
	3	805.55	4693.85	1200	4693.85	0.25	0.544	7.7	3.38E-06	0.23
	4	805.55	3660	-815	3660	1.01	0.544	7.7	1.39E-05	0.97
	5	805.55	2430	400	2430	0.25	0.544	7.7	3.48E-06	0.24
	6	805.55	1815	1218	1815	0.26	0.544	7.7	3.54E-06	0.25

Note: Diesel exhaust emission factors were taken from an EMFAC2007 model run for 2008 for Fresno County. It was assumed that Milk and Feed Trucks would be heavy heavy duty diesel vehicles and that Manure Hauling Trucks would be medium heavy duty diesel vehicles.

Truck Idling Emissions. It was assumed that all trucks would idle for 5 minutes a day. Idling locations at the milk barn, feed storage area, and solids handling area were identified. Emission factors from EMFAC2007 (i.e., those for a travel speed of 0 miles per hour) were used. Emissions estimates are shown in Table 2.

Manure Scraping Emissions. Data from ARB's Off-Road Emissions model (OFFROAD2007) were used to estimate exhaust emissions from the tractor used to scrape manure in the corrals. It was assumed that the tractor would have a horsepower rating of 142 hp which is the average horsepower rating of California tractors in the range from 120 to 175 hp. A 70 percent load factor was used. The emission factor used was 0.38 g/bhp-hr which is the worst-case emission factor because this is the emission factor for the oldest tractor in the fleet that might be operating in 2008. Based on information provided by the applicant as to the procedure to be used for scraping manure from the corrals, it was assumed that the tractor would operate for 8 hours per week. Emissions calculations are provided in Table 3.

Construction Emissions

During construction of the dairy, diesel particulate matter is emitted from diesel construction emissions. These emissions were estimated using the URBEMIS model. Similarly, fugitive dust will be emitted during the construction period.

Toxic Air Contaminant Emissions

Previously, the District developed toxic air contaminant emission factors for lagoons and miscellaneous processes based on data from a number of studies that were used to define the volatile organic compound emission factor for dairies. These emission factors are based on the total number of cows at the dairy. They are used in all risk management reviews for dairies. A copy of these emission factors is given in Appendix A. PM10 emitted from the corrals contain toxic air contaminants. To estimate these emissions of toxic air contaminants, a profile from ARB was used. This profile is also included in the Appendix A. All PM10 emissions calculated for diesel exhaust from mobile sources discussed above are toxic. As stated in the engineering evaluation, an approved hydrogen sulfide emission factor does not exist for dairy operations. However, a recent study conducted by Dr. Schmidt entitled *On-site Dairy Emissions Using Flux Chambers,* suggests an H_2S emission factor in the range of 0.02 lbs/hd-yr to 0.3 lbs/hd-yr (0.16 lbs/hd-yr Average). The District has not yet properly vetted this study. In addition, before the District can establish an appropriate H_2S emission factor, other studies must also be evaluated. Until that scientific review process is complete and the District has had opportunity to consider public comments on the emission factor, the premature, and therefore potentially flawed, use of such emissions data would be inconsistent with good governance and good science. However, as a note to the commenter, the District did internally evaluate the potential health impacts of hydrogen sulfide based on the study and found the health impact to be insignificant to the surrounding receptors. Emission estimates for toxic air contaminants emitted during construction are included in Appendix B. A speciation profile from ARB for construction dust (i.e., Profile No. 420) was used to estimate toxic air contaminant emissions from construction fugitive dust.

Modeling Methodology

The U.S. Environmental Protection Agency's (EPA's) approved model (i.e., the American Meteorological Society/Environmental Protection Agency Regulatory Model or AERMOD) was used to predict ambient concentrations of pollutants from emission estimates. AERMOD was developed by a joint committee of the American Meteorological Society (AMS) and EPA as a replacement for EPA's previously approved model, the Industrial Source Complex – Short-Term model or ISCST3. AERMOD implements a more sophisticated method for characterizing dispersion within the planetary boundary layer than ISCST3 does. AERMOD is the only approved model for predicting ambient concentrations from emissions from these types of sources since December 6, 2006.

In addition to the emission estimates discussed above, the following are major inputs used in this analysis:

1. All truck travel emissions were modeled as a line sources (i.e., a series of line sources). It was assumed that each of the volume sources for milk or feed truck travel would have a width of 12 ft, a vertical dimension of 6 ft, and a release height of 6 ft. Volume sources for manure hauling truck travel have a width of 12 ft, a vertical dimension of 0.6 m and a release height of 0.6 m.
2. The idling emissions from milk and feed trucks were modeled as point sources with a stack height of 12.6 ft, gas exit temperature of 366K, stack inside diameter of 0.1 m, and gas exit velocity of 51.71 m/s. Manure handling truck idling emissions were modeled as point sources with a stack height of 0.6 ft, gas exit temperature of 366K, stack inside diameter of 0.1 m, and gas exit velocity of 0.001 m/s.
3. Exhaust emissions from the manure-scraping tractor were modeled as a polygonal area source with the dimensions of the corral area and a release height of 10 ft.
4. Emissions from miscellaneous sources were modeled as a polygonal area source with the dimensions of the entire cow housing and a release height of 1 m.
5. Rectangular area sources with the dimensions of each lagoon were used to model emissions from the two lagoons. The release height modeled was 0 m.
6. A full year of meteorological data collected in 2004 at the Fresno-Yosemite International Airport in Fresno, CA were modeled. The corresponding upper air data from the Oakland, CA airport were also modeled.
7. The regulatory default options and rural dispersion coefficients were used.
8. Annual and 24-hour average concentrations of diesel particulate matter (DPM) were modeled. The averaging times modeled for other toxic air contaminants were 1-hour, 4-hour, 6-hour, monthly, and annual.

All inputs were in accordance with the District's *Guidance for Dispersion Modeling* (August 2006, Revision 1.2).

Table 2. Truck Idling Emissions

Type of Vehicles	Emission Factor (g/sec)	Minutes Idling/Truck	Trucks/Week	Emissions (g/sec)	Emissions (lb/yr)
Milk Trucks	1.804	5	49	1.21E-05	0.84
Feed Trucks	1.804	5	56	1.39E-05	0.96
Manure Hauling Trucks	0.988	5	38.5	5.23E-06	0.36
				Total	2.17

Table 3. Manure Scraping Tractor Emissions

	HP	Load	Hours/Week	Weeks/Year	Emission Factor (g/hp-hr)	Emissions (g/sec)	Emissions (lb/yr)
Manure Scraping Tractor	142	0.7	8	52	0.38	4.98E-04	34.61

Risk Assessment Methodology

The ARB's Hot Spots Analysis and Reporting Program (HARP), Version 1.3, Build 23.04.05, October 2006, was used to determine risk from emissions non-DPM toxic air contaminants. The following options in HARP were used:

1. Inhalation, soil ingestion, dermal absorption, vegetable intake, and mother's milk pathways were used.
2. A 70-year lifetime residential cancer risk was calculated using the Derived (OEHHA) Method.
3. A deposition rate of 0.2 m/s was used.
4. The percentage of vegetables that are home-grown was assumed to be 15 percent for each category.

Cancer, chronic non-carcinogenic, and acute risks were calculated.

DPM is primarily a carcinogen. To estimate the cancer risk from DPM emissions, a factor of 4.1453E-04 was used. This factor is based upon a cancer slope factor of 1.1, a 70-year lifetime, a 350 day/yr exposure frequency, and a daily breathing rate of 393 l. Predicted annual average DPM concentrations were multiplied by this factor to estimate cancer risk. DPM cancer risks were added to those predicted by HARP for other toxic air contaminants to determine total cancer risks at each receptor. For the risk during construction which will occur over a 1-year period, the 9-year adult cancer risk was calculated in accordance with previous guidance from the Office of Environmental Health Hazard Assessment.

Results

The following are the results of the analyses:

1. The maximum 24-hour PM10 concentration predicted is 9.58 micrograms per cubic meter.
2. The maximum cancer risk predicted at a residential receptor is 1.19 in a million.
3. The maximum chronic non-carcinogenic hazard index (HI) predicted at a residential receptor is 0.0236.
4. The maximum acute HI predicted at any receptor is 0.70. The receptor at which this risk was predicted is a worker receptor.

No cancer or chronic non-carcinogenic risks for worker receptors were estimated because all the worker sites surrounding the dairy expansion are agricultural fields. Although it is reasonable to believe that workers in those fields might be subjected to acute risks, it is not probable that any workers would be spending a significant amount of time during a year at a single location such that they would have cancer or chronic risks.

The following are the results of the analysis for construction emissions:

1. The maximum cancer risk predicted at a residential receptor is 0.65 in a million.
2. The maximum chronic non-carcinogenic HI predicted is 0.33.
3. The maximum acute HI predicted at any receptor is 0.18. The receptor at which this risk was predicted is a worker receptor.

Conclusions

The following conclusions can be drawn from these analyses:

1. There will be no significant contributions to a violation of the State Ambient Air Standards for PM10 because the maximum predicted 24-hour PM10 concentration is less than the District's draft interim significance threshold.
2. Cancer, chronic non-carcinogenic, and acute risks from emissions of toxic air contaminants at the proposed dairy expansion will not be significant. The maximum impacts are below the District's significance levels for CEQA (i.e., a cancer risk less than 10 in a million and chronic non-carcinogenic and acute HIs less than 1). Risk during construction will not be significant.

Attachment A

Emissions of Toxic Air Contaminants from Construction Fugitive Dust

Source	Area (sq ft)	Diesel Particulate Matter (lbs/yr)					Fugitive Dust (lbs/yr)				
		Mass Grading	Fine Grading	Building	Digester	Total	Mass Grading	Fine Grading	Building	Digester	Total
Lagoon 1	478951	7.24902059	3.62451	14.49804118	140	165.3716	25,541.92	12,917.75	-	660	39,119.68
Lagoon 2	478951	7.24902059	3.62451	14.49804118	0	25.37157	25,541.92	12,917.75	-	0	38,459.68
Cowhousing	6970633.9	105.501959	52.75098	211.0039176	0	369.2569	371,736.15	188,004.49	-	0	559,740.64
Total	7928535.9	120	60	240	140	560	422,820.00	213,840.00	-	660	637,320.00

Facility: Bar 20 Dairy
ID#:
Project #:

PM_{10} Emissions from Construction Dust

Process Rate PM10 637,320.00 lbs/yr

EMISSIONS	CAS#	WT FRAC*	LB/YR
Ammonia	**7664417**	0.000158	**100.69656**
Arsenic	**1016**	0.000024	**15.29568**
Antimony	**7440360**	0.000019	**12.10908**
Cadmium	**7440439**	0.000039	**24.85548**
Copper	**7440508**	0.000138	**87.95016**
Lead	**7439921**	0.000701	**446.76132**
Manganese	**7439965**	0.00115	**732.918**
Mercury	**7439976**	0.000015	**9.5598**
Nickel	**7440020**	0.000076	**48.43632**
Selenium	**7782492**	0.000003	**1.91196**
Sulfates	**9960**	0.005895	**3757.0014**
Zinc	**7440666**	0.000664	**423.18048**

*Based on CARB PM Speciation Profile #420

TAC	Lagoon 1	Lagoon 2	Cowhousing
Ammonia	6.180909242	6.076629242	88.4390215
Arsenic	0.93887229	0.92303229	13.4337754
Antimony	0.743273896	0.730733896	10.6350722
Cadmium	1.525667471	1.499927471	21.8298851
Copper	5.398515667	5.307435667	77.2442087
Lead	27.4228948	26.9602348	392.37819
Manganese	44.98763056	44.22863056	643.701739
Mercury	0.586795181	0.576895181	8.39610964
Nickel	2.973095585	2.922935585	42.5402888
Selenium	0.117359036	0.115379036	1.67922193
Sulfates	230.6105062	226.7198062	3299.67109
Zinc	25.97546669	25.53722669	371.667787

		Diesel Particulate Matter (lbs/yr)					Fugitive Dust (lbs/hr)				
Source	Area (sq ft)	Mass Grading	Fine Grading	Building	Digester	Total	Mass Grading	Fine Grading	Building	Digester	Total
Lagoon 1	478951	0.00082751	0.000414	0.001655028	0.015982	0.018878	2.92	1.47	-	0.07534247	4.47
Lagoon 2	478951	0.00082751	0.000414	0.001655028	0	0.002896	2.92	1.47	-	0	4.39
Cowhousing	6970633.9	0.0120436	0.006022	0.024087205	0	0.042153	42.44	21.46	-	0	63.90
Total	7928535.9	0.01369863	0.006849	0.02739726	140	140.0479	48.27	24.41	-	0.07534247	72.75

Facility: Bar 20 Dairy
ID#:
Project #:

PM_{10} Emissions from Construction Dust

Process Rate PM10 [redacted] lbs/hr

EMISSIONS	CAS#	WT FRAC*	LB/YR
Ammonia	**7664417**	0.000158	**0.011495041**
Arsenic	**1016**	0.000024	**0.001746082**
Antimony	**7440360**	0.000019	**0.001382315**
Cadmium	**7440439**	0.000039	**0.002837384**
Copper	**7440508**	0.000138	**0.010039973**
Lead	**7439921**	0.000701	**0.051000151**
Manganese	**7439965**	0.00115	**0.083666438**
Mercury	**7439976**	0.000015	**0.001091301**
Nickel	**7440020**	0.000076	**0.00552926**
Selenium	**7782492**	0.000003	**0.00021826**
Sulfates	**9960**	0.005895	**0.428881438**
Zinc	**7440666**	0.000664	**0.048308274**

*Based on CARB PM Speciation Profile #420

TAC	Lagoon 1	Lagoon 2	Cowhousing
Ammonia	0.000705583	0.000693679	0.01009578
Arsenic	0.000107177	0.000105369	0.00153354
Antimony	8.48486E-05	8.34171E-05	0.00121405
Cadmium	0.000174163	0.000171225	0.002492
Copper	0.000616269	0.000605872	0.00881783
Lead	0.003130467	0.003077652	0.04479203
Manganese	0.005135574	0.00504893	0.07348193
Mercury	6.69858E-05	6.58556E-05	0.00095846
Nickel	0.000339394	0.000333668	0.0048562
Selenium	1.33972E-05	1.31711E-05	0.00019169
Sulfates	0.0263254	0.025881256	0.37667478
Zinc	0.002965236	0.002915209	0.04242783

Estimated Toxic Air Contaminant Emissions for Miscellaneous Processes at Dairies

(Does not include emissions from lagoons or enteric emissions from cows)

Total Number of Cows:

Enter the Total Number of Cows.

Component	CAS Number	Alternative Name	Toxic Emissions Factors for Miscellaneous Processes (lb/Head/yr)	Annual Emissions (lbs/yr)	Hourly Emissions (lb/hr)
Xylenes	1210		1.999E-02	-	-
Formaldehyde	50000		4.423E-03	-	-
Carbon tetrachloride	56235		6.523E-04	-	-
2-propanol	67630	Isopropyl Alcohol	1.799E-02	-	-
Chloroform	67663		1.453E-03	-	-
Benzene	71432		3.544E-03	-	-
Chloromethane	74873	Methyl Chloride	8.816E-03	-	-
Chloroethane	75003	Ethyl Chloride	2.659E-03	-	-
Acetaldehyde	75070		2.680E-02	-	-
Carbon disulfide*	75150		2.769E-02	-	-
Bromoform	75252		0.000E+00	-	-
Trichlorofluoromethane*	75694	Freon 11	1.196E-06	-	-
Tetraethyl lead	78002	Lead Compounds	0.000E+00	-	-
2-Butanone	78933	Methyl Ethyl Ketone	1.623E-01	-	-
1,1,2-Trichloroethane	79005		2.516E-03	-	-
Trichloroethene	79016	Trichloroethylene	0.000E+00	-	-
1,1,2,2-Tetrachloroethane	79345		9.710E-05	-	-
Methyl methacrylate	80626		0.000E+00	-	-
Hexachlorobutadiene	87683		0.000E+00	-	-
Napthalene	91203		1.293E-02	-	-
1,2-Dichlorobenzene	95501		6.095E-03	-	-
1,2,4-Trimethylbenzene	95636		0.000E+00	-	-
1,2-Dibromo-3-chloropropane	96128		5.489E-04	-	-
1,2,3-Trichloropropane	96184		3.073E-03	-	-
Isopropylbenzene	98828	Cumene	6.241E-04	-	-
Ethylbenzene	100414		3.859E-03	-	-
Styrene	100425		3.992E-03	-	-
Benzyl chloride	100447		3.210E-03	-	-
1,4-Dichlorobenzene	106467	p-Dichlorobenzene	5.769E-03	-	-
1,2-Dibromoethane	106934	Ethylene Dibromide (EDB)	3.404E-03	-	-
1,2-Dichloroethane	107062	Ethylene Dichloride (EDC)	6.555E-04	-	-
Acrylonitrile	107131		2.697E-03	-	-
Vinyl acetate	108054		2.188E-02	-	-
Methyl Isobutyl Ketone	108101	Hexone	7.883E-03	-	-
Toluene	108883		1.193E-02	-	-
Chlorobenzene	108907		3.025E-03	-	-
Hexane	110543		9.030E-03	-	-
Cyclohexane	110827		7.594E-02	-	-
1,2,4-Trichlorobenzene	120821		8.663E-03	-	-
Butyraldehyde	123728		1.265E-03	-	-
1,4 Dioxane	123911		1.567E-02	-	-
Tetrachloroethene*	127184	Perchloroethylene	7.236E-03	-	-
1,3-Dichlorobenzene	541731		5.450E-03	-	-
1,1,1,2-Tetrachloroethane	630206		0.000E+00	-	-
t-1,4-Dichloro-2-butene	764410		9.921E-03	-	-
Crotonaldehyde	4170303		1.572E-03	-	-

Estimated Particulate Toxic Air Contaminants

Total PM10: 1,000 lbs/yr
10,000 lbs/hr

Enter the PM10 emissions.

Component	CAS Number	Percent of Total PM10	Annual Emissions (lbs/yr)	Hourly Emissions (lb/hr)
Aluminum	7429905	2.2887	22.887	0.22887000
Lead	7439921	0.0033	0.033	0.00033000
Manganese	7439965	0.0603	0.603	0.00603000
Mercury	7439976	0	-	-
Nickel	7440020	0.0026	0.026	0.00026000
Crystalline Silica	7631869	7.0553	70.553	0.70553000
Silver	7440224	0.0013	0.013	0.00013000
Antimony	7440360	0	-	-
Arsenic	7440382	0.0005	0.005	0.00005000
Barium	7440393	0.0465	0.465	0.00465000
Cadmium	7440439	0.0009	0.009	0.00009000
Hexavalent Chromium	18540299	0.0004	0.004	0.00004000
Cobalt	7440484	0.0003	0.003	0.00003000
Copper	7440508	0.0085	0.085	0.00085000
Vanadium	7440622	0.0114	0.114	0.00114000
Zinc	7440666	0.0235	0.235	0.00235000
Ammonia	7664417	0.4493	4.493	0.04493000
Bromine	7726956	0.0039	0.039	0.00039000
Selenium	7782492	0.0006	0.006	0.00006000
Chlorine	7782505	0.6411	6.411	0.06411000
Sulfates	9960	0.7932	7.932	0.07932000

Note: These emission factors are based on the Air Resources Board's Profile No. 423, Livestock Operations Dust. All Silicon is assumed to be Crystalline Silica. Since this assumption is extremely conservative, any decisions based on this assumption must be carefully considered. Five percent of the chromium is assumed to be hexavalent chromium.

Estimated Toxic Air Contaminant Emissions for Lagoons at Dairies

(Does not include emissions from Miscellaneous Processes or enteric emissions from cows)

Total Number of Cows: 2,000

Enter the Total Number of Cows.

Component	CAS Number	Toxic Emissions Factors for Miscellaneous Processes (lb/Head/yr)	Annual Emissions (lbs/yr)	Hourly Emissions (lb/hr)
Xylenes	1210	0.011	22.00	0.00251
carbon tetrachloride	56235	0.020	40.00	0.00457
isopropyl alcohol	67630	-	-	-
Chloroform	67663	0.010	20.00	0.00228
Benzene	71432	0.010	20.00	0.00228
1,1,1-trichloroethane	71556	0.040	80.00	0.00913
bromomethane	74839	-	-	-
chloromethane	74873	-	-	-
chloroethane	75003	-	-	-
vinyl chloride	75014	-	-	-
methylene chloride	75092	-	-	-
Carbon disulfide	75150	-	-	-
tribromomethane	75252	0.444	888.00	0.10137
bromodichloromethane	75274	-	-	-
1,1-dichloroethane	75343	-	-	-
1,1-dichloroethene	75354	-	-	-
Trichloromonofluoromethane	75694	0.022	44.00	0.00502
1,1,2-trichloro-1,2,2-trifluoroethane	76131	0.020	40.00	0.00457
1,2-dichloropropane	78875	-	-	-
Methyl Ethyl Ketone (2-butanone)	78933	0.244	488.00	0.05571
1,1,2-trichloroethane	79005	-	-	-
Trichloroethylene	79016	0.010	20.00	0.00228
1,1,2,3,4,4-hexachloro-1,3-butadiene	87683	-	-	-
1,2-dichlorobenzene	95501	1.413	2,826.00	0.32260
1,2,4-trichlorobenzene	95636	0.010	20.00	0.00228
Ethylbenzene	100414	-	-	-
Styrene	100425	0.014	28.00	0.00320
1,4-Dichlorobenzene	106467	0.025	50.00	0.00571
1,2-dibromoethane	106934	-	-	-
1,3-Butadiene	106990	0.010	20.00	0.00228
1,2-dichloroethane	107062	-	-	-
vinyl acetate	108054	0.100	200.00	0.02283
Methyl Isobutyl Ketone	108101	0.057	114.00	0.01301
Toluene	108883	0.120	240.00	0.02740
Chlorobenzene	108907	-	-	-
n-hexane	110543	-	-	-
Cyclohexane	110827	0.010	20.00	0.00228
propylene	115071	0.130	260.00	0.02968
1,2,4-trimethylbenzene	120821	-	-	-
1,4-dioxane	123911	-	-	-
dibromochloromethane	124481	-	-	-
Tetrachloroethylene	127184	-	-	-
cis-1,2-dichloroethene	540590	-	-	-
1,3-dichlorobenzene	541731	0.025	50.00	0.00571

Appendix C

Report of Discharge
Larry A. Shehadey Dairy
(Bar 20 Dairy)

Livingston Dairy Consulting, Inc.
99 North Tower Square Tulare, California 93274 (559) 687-1440

Report of WASTE DISCHARGE

Prepared for:

LARRY A. SHEHADEY DAIRY

24387 WEST WHITESBRIDGE ROAD
KERMAN, CA 93630

Fresno County

February, 2004

Larry A. Shehadey Dairy
A New Facility

A. Summary

- Larry A. Shehadey Dairy consists of 2,256 acres owned by Larry A. Shehadey in western Fresno County, California.
- The predominant soils for the dairy facility area have clay content that varies from 5 to 35% with moderate permeability.
- The historic average groundwater level near the site is between 40 and 75 feet below ground surface by the Department of Water Resources.
- The dairy facility is planned to consist of 325 acres of operations area with freestall barns, corrals, dairy barn, feed storage area, manure management area, process water storage, and 1,847 acres of irrigated crop land.
- The facility will house a milking herd of 6,000 and 7,680 head of support stock.
- The entire dairy site is designed to drain all manure storage, feed storage and corrals to the liquid retention system.
- Storage volume needed to contain 120 days of dairy process water, 120 days of rainfall runoff, and runoff from a 25 year-24 hour storm event is estimated at 9,367,510 cubic feet. Planned storage capacity, allowing for 2 feet of freeboard, is 9,745,527.
- Dairy lagoon water storage is to be constructed of soils with a clay content of 10% or greater. The lagoon inverts are separated by at least five feet from the highest anticipated groundwater.
- Annual nitrogen demand of the planned crop rotation is 473 pounds per acre. Estimated nitrogen in the stored process water contains 487,263 pounds of Nitrogen per year (264 pounds per acre). Stored dairy process water can supply 56% of the crop requirement.
- Until monitoring determines adjustment may be needed, at least 14,631 tons of dry manure will be transported off-site for use as a fertilizer/soil amendment.

One – Description

Larry A. Shehadey Dairy
A New Facility

B. Description

Larry Shehadey Dairy is located 12 miles west of the city of Kerman on Whitesbridge Road. The property consists of 2,256.07 owned contiguous acres in western Fresno County, including portions of Sections 31, 32, and 33, T13S, R16E, and portions of Sections 4 and 9 of T14S, R16E. Assessors Parcel Numbers are included below

ASSESSOR'S PARCEL NUMBER	***ACREAGE***
Fresno County	
15 - 06 - 12	160.00
15 - 06 - 14	240.00
15 - 06 - 44	240.00
15 - 06 - 46	160.00
15 - 06 - 52	119.48
15 - 06 - 53	367.75
15 - 06 - 54	80.00
15 - 06 - 55	160.00
15 - 10 - 08	326.00
15 - 10 - 19	78.00
15 - 10 - 21	325.00
TOTAL	2,256.07 acres

The site has been used for row crop farming since the mid-sixties. The proposed dairy covers 325 acres, milking 6,000 cows with all support stock kept on site. Milk cows are housed in freestalls and support stock is housed in open corrals with shades. Manure collection will be accomplished by regular flushing of all free stall barns and the feed lanes of the open corrals. Hutches for the small calves are located in the middle of the dairy on the west side. All corrals and feed storage areas are sloped to a collection system connected by pipeline to multiple pond liquid retention facility. The principal features of the dairy are shown on the site plan. Development consists of corrals, freestalls, shades, commodity barn, hay barns, and liquid storage ponds. The planned facility will house 6,000 Holstein milk cows with a total of 14,474 Animal Units on site.

C. Soils

There are numerous soil types within the boundaries of this property. Table 4, in the Hydrological / Geological Report (Section 7) summarizes the included soil types by map symbol, depth, and percentage of clay content. This information was obtained from the Soil Survey of Fresno County, prepared by the U. S. Department of Agriculture, Soil Conservation Service. Soils under the dairy site are dominated by the Chino and Traver series. These soils have been leveled, are moderately well drained soils with a clay subsoil formed in old alluvium from sedimentary rock.

Clay content of soils underlying the dairy facility averages from 5% to 35% with moderate permeability. As such, the potential for rapid downward migration of nitrogen and salt may be limited when applying irrigation water at rates adequate to satisfy crop needs.

D. Groundwater

A review of the State of California Department of Water Resources Groundwater Level Data Retrieval Map Interface shows on average, since 1962, shallowest water depth to be between 22 feet and 26 feet below ground surface in the wells nearest the proposed dairy. Table 1. In the Hydrological / Geological Report details shallowest, deepest, and average depth to groundwater reported by the Department of Water Resources web site for 15 area wells. Individual well data is included as Appendix A.

Depth to groundwater beneath the proposed lagoon bottom is estimated to be greater than twenty-five (25) feet. See the Hydrological / Geological Report, Section 6, of this report page 10.
Typically groundwater gradient tends to follow topography, in this case, to the southwest. Water needs for the dairy will be supplied by well(s) located near the milk barn.

Water from fifteen (15) agricultural wells and one domestic well were analyzed and found to be of fair quality. Nitrate nitrogen was less than 10 mg/L in all samples.

The site is located outside the 100 year flood-zone, entirely in Flood Zone C which is defined as "Areas of minimal flooding." FEMA FIRM Community Panel Number 065029 0850 B, 12/1/82.

Annual rainfall for the 120 day period averages 6.30 inches per year. The 25 year 24 hour storm event for the area is 2.00 inches (page 6 of the Hydrological/Geological Report, Section 6).

E. Dairy Operation

The dairy and feed storage areas take up about 325 acres twelve (12) miles west of the city of Kerman in Fresno County. The balance of the 2,256 acres (1,847 acres) is open farm ground. The planned rotation of crops on the open ground includes alfalfa, wheat (silage)double cropped to corn (silage) almonds and grapes. These crops utilize nutrients in manure water which will be generated in the operation of the dairy.

1. Dairy Manure Generated

The quantity and makeup of manure generated by a dairy depends on the breed, total number of animals, the distribution of animal numbers within age groups, and housing facilities. Animal unit factors are from Fact Sheet for Dairies No. 4

Breed: **Holstein**

Age group	Head	Animal Unit Factor	Animal Units
Milk Cows	6,000	1.40	8,400
Dry Cows	1,200	1.12	1,344
Heifers 1 to 2 years	3,240	1.02	3,305
Heifers 3 months to 1 year	2,430	0.49	1,191
Calves	810	0.29	235
TOTAL	13,680		14,474

The following table demonstrates the herd makeup in animal units and the respective volumes of manure in its wet or dry category where the milking and dry cows are housed in freestalls, and all support stock are kept in open lot corrals with shades.

Age Group	Animal Units	%Collected In flush	Wet Manure	Dry Manure
Milk Cows	8,400	80.00	6,720	1,680
Dry Cows	1,344	60.00	806	538
Heifers 1 to 2 years	3,305	60.00	1,938	1,322
Heifers 3 months to 1 year	1,191	60.00	714	476
Calves	235	0	0	235
TOTAL	13,680		10,224	4,251

Process water generated will consist of barn wash water, sprinkler pen runoff and water used to cool barn equipment. This water will be collected by the drainage collection system and transported to the solid separation system. Some of the solids collected are transported off site for use as fertilizer/soil amendment. Rain runoff is conveyed to the storage pond to be blended with irrigation water for application to crops. Dry manure is scraped into piles in the corrals where it is stored prior to removal for application to fields or transportation offsite for use as fertilizer or soil amendment.

2. Manure Water Storage

The manure water is conveyed to the storage pond. The Clean Water Act requires storage capacity to contain all dairy process water and contaminated rain runoff without discharge off of diary property, except during storms exceeding the 25 year - 24 hour event criteria. Section 4, Sheet D shows the designed combined capacity of the proposed water storage ponds. Available storage capacity, net of the required two(2) feet of freeboard, is calculated to be 9,745,527 cubic feet. "Freeboard" refers to an unused space between the maximum water level in regular use and the top of the lagoon bank. This area provides additional storage during emergency situations. Section 4, Sheet C demonstrates how the capacity required to support the proposed animal population liquid waste, wash water, and contaminated rainwater runoff was determined. This storage requirement is calculated to be 9,367,510 cubic feet. The excess storage capacity is available in the event of a very wet year, irrigation timing and accumulation of solids.

3. Dry Manure

The corrals will be built on soils with 10% to 35% clay in the upper 60 inches of the soil profile. All corral areas are sloped to prevent creation of ponds of water and to divert and convey rainwater runoff to the storage ponds. Livestock traffic on generated solid wastes overlying soils tend to form a seal that prevents downward movement of wastes. The seal will be very effective on soils having up to 35% clay.

The corrals will be periodically scraped to limit manure accumulation and to enhance drainage. Care will be taken to assure that the seal will not be disturbed during scraping. Collected manure will be stored in a location which drains to the liquid storage system for convenient transportation either on-site or off-site for use as a fertilizer and/or soil amendment. On-site use will be in amounts appropriate for crop needs with verification by regular analysis of both the dry manure and soils. Records will be kept on the amount of dry manure (if any) taken off-site.

Section 5, Sheet B shows that 13,598 tons of dry manure (60% dry matter) will need to be removed annually to assure compliance with current regulations. Manure will be analyzed to insure that application rates and removal amounts are appropriate.

4. Manure Water Utilization

Manure water accumulated in the storage pond will be used to supply nutrients to crops. The nutrients contained in manure water will be used to support growth of the planned crop rotation of alfalfa, double cropped silages, grapes and almonds. No manure water is proposed to be applied within 100 feet of a water well which is not protected by an annular seal.

Lagoon water will be picked up by a sump pump and pumped to a mixing structure where it will be blended with fresh irrigation water prior for distribution to various fields through a connected pipeline system.

Mixed irrigation water and manure water will be regularly analyzed to monitor fertilizer application rates.

F. Nutrient Management Plan

1. Irrigation Requirements of Growing Crops

Irrigation of the typical crop rotation of alfalfa , wheat silage, and corn silage requires a total of 6,231 acre feet of water to meet crop requirements on an annual basis (Section 5, Sheet E). The amount of water generated by the dairy operation, normal rainwater runoff, and the runoff from a 25 year, 24 hour storm event will be approximately 408 acre feet. This is approximately 6.5 percent of the total crop water requirements. This will allow sufficient flexibility to match nitrogen application of manure water with the crop needs during scheduled irrigations. The lagoons are sized to accommodate a minimum of 120 days of generated manure water. The liquid storage ponds are plumbed so that accumulated water and manure can be distributed to all contiguous crop producing areas.

2. Nutrient Uptake

Section 5, Sheet A shows that 487,263 pounds of nitrogen will be produced in the wet manure by the dairy as operated. Section 5, Sheet B demonstrates that under the normal crop rotation, nitrogen demand is 873,805 lbs. annually. The additional nitrogen needed will come from a combination of some of the dry manure produced and specifically selected chemical fertilizers.

Section 5, Sheet A shows that the 4,813,829 pounds of "salts" in the "wet" manure, would result in an application rate of 2,606 pounds per net farmable acre. Total annual "salt" production of 6,815,271 pounds requires removal of at least 13,598 tons of dry manure will result in an application rate below the suggested 3,000 pounds per acre maximum annually.

3. Nutrient Distribution

The liquid manure water will be metered into the irrigation system and blended in a ratio not to exceed one part manure water to three parts fresh irrigation water. This ratio is consistent with manure water application rates recommended by the University of California Co-Operative Extension. The metered blending of manure water with fresh irrigation water in the system will provide an even distribution of both nitrogen and water the full length of the irrigation area. The permeability of the soils being farmed assists in even distribution of irrigation water and included nutrients. Irrigation tailwater will be collected in the existing tailwater collection system which returns the collected tailwater to the irrigation system.

Section 5, Sheet E demonstrates the approximate amount and timing of applications of mixed irrigation/manure water through the growing cycle of the crop rotation proposed. These calculations include adjustments for the relative permeability of the soil types found on the property, irrigation efficiency of border and row irrigation, and of average slope.

Applications of early-spring dry manure and rates of application of metered manure water will be adjusted in response to shallow bore soil samples and periodic petiole samples. The monitoring of soils and crops will help prevent over-use of manure and the resulting possibility of forcing excess nitrogen into the underground water supply.

Summary, Conclusions, and Recommendations

The recommended plan herein for management of manure, manure water and stormwater runoff from this dairy is designed to minimize the potential for surface and groundwater quality impact. The plan is based, in part, on anticipated values, manure water volume, and nitrogen and salinity constituent concentrations. The recommended cropland application program is consistent with acceptable agronomic practices given the site conditions and typical crops of wheat silage, corn silage, alfalfa, grapes, and almonds. Should changes in crop selection occur, revisions to the plan may be necessary to be consistent with acceptable agronomic practice.

Upon implementation, the cropland and manure water monitoring programs will allow for evaluation of possible modifications to the cropland application program to ensure continued protection of groundwater quality and maintaining crop productivity.

Limitations

This report has been prepared for the exclusive use of Larry A. Shehadey Dairy and the California Regional Water Quality Control Board. It is expressly prohibited for others to rely on this report unless given written consent by Livingston Dairy Consulting, Inc.

This report has been prepared in accordance with generally accepted methodologies and standards of practice in the area and is limited to the scope of work described herein. No other warranty, either expressed or implied, is made as to the findings or conclusions included in this report. The findings and conclusions presented are based on field review and observations, and the data obtained from the sources listed in the report, and are valid as of the date of the report. The passage of time, natural processes or human intervention on the Site or adjacent properties and changes in the regulations can cause changed conditions which can invalidate the findings and conclusions presented in this report.

It should be noted that the California Regional Water Quality Control Board, Central Valley Region relies on Fact Sheet 4 in determining animal unit values based on a 1,000 pound cow. In addition to the new values for animal units, those for manure volume and nutrient content and denitrification have also been changed to conform to Fact Sheet 4. All applications and reports must be submitted using these values.

California Regional Water Quality Control Board

DATE: February 6, 2004

WASTE DISCHARGE REPORT

FOR: **Larry A. Shehadey Dairy**
24387 W. Whitesbridge Road
Kerman, CA 93630

APN:		Gross Acres
	15-06-12	160
	15-06-14	240
	15-06-44	240
	15-06-46	160
	15-06-52	119.48
	15-06-53	367.75
	15-06-54	80
	15-06-55	160
	15-10-08	326
	15-10-19	78
	15-10-21	325
	TOTAL ACRES	2,256 ±

\. **Proposed Site:** 2,256 Total acres

NEW DAIRY

Dairy site: 324.6 ± acres

Net farmable acres: 1,847 ±

. **Animal Unit Calculations:** Based on CRWQCB Fact Sheet #4 for Holstein cows

	HEAD	FACTOR	ANIMAL UNITS
Milk cows	6,000	1.4	8,400
Dry cows	1,200	1.12	1,344
Heifers 1 to 2 years	3,240	1.02	3,305
Heifers 3 mo to 1 year	2,430	0.49	1,191
Calves	810	0.29	235
TOTALS	13,680		14,474

Animal units per net crop acre: 7.84

C. LIQUID MANURE GENERATION CALCULATIONS - SEE ATTACHED SHEET 'A'

Nitrogen requires: 1,147 acres Salt requires: [illegible] acres

NUTRIENT DISTRIBUTION CALCULATIONS - SEE ATTACHED SHEET 'B'

Minimum dry manure taken off site: **13,598** tons

MANURE WATER AND STORM WATER GENERATION CALCULATIONS - SEE ATTACHED SHEET 'C'

Capacity required: **9,367,510** cubic feet

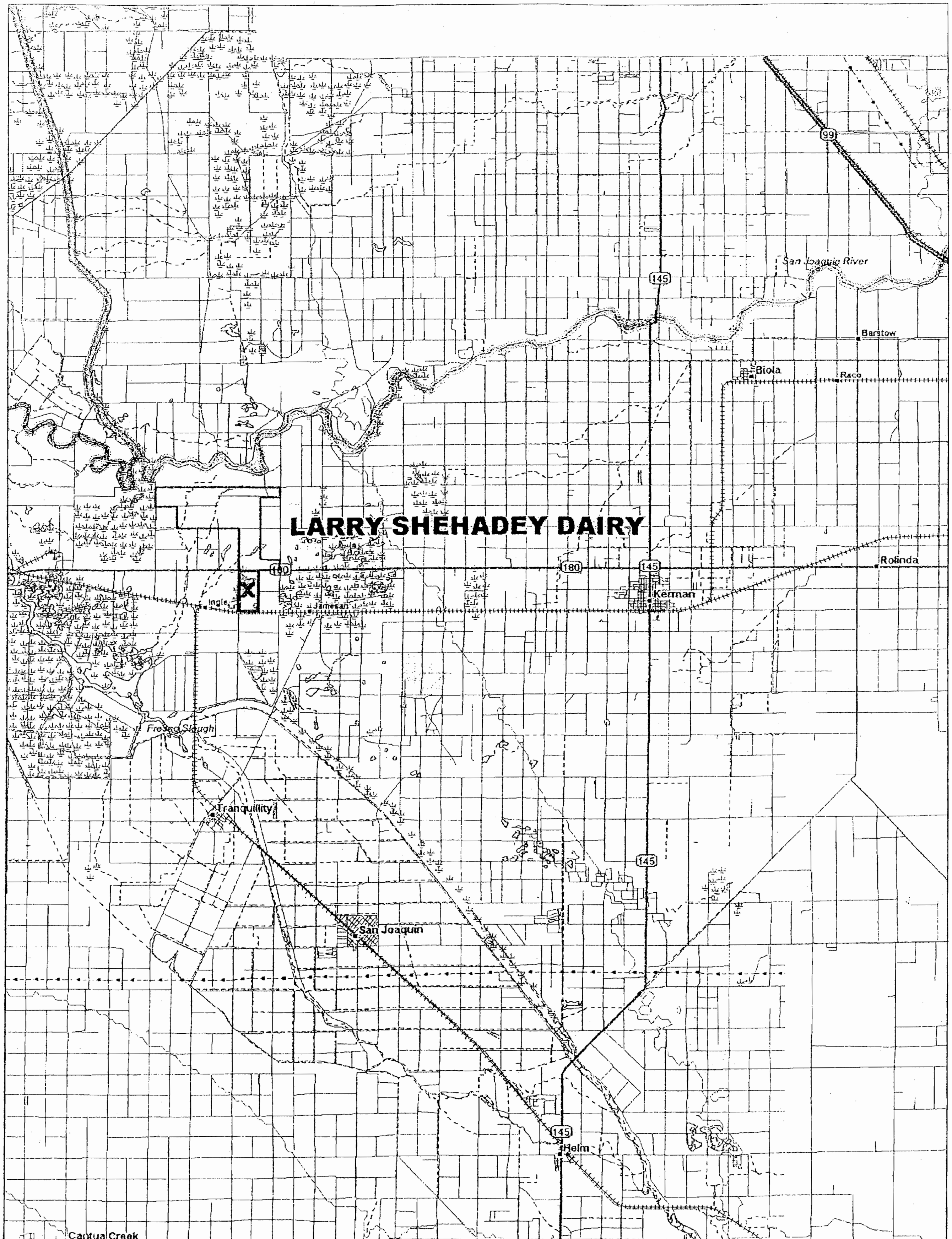
LAGOON CAPACITY CALCULATIONS - SEE ATTACHED SHEET 'D'

Capacity proposed: 9,745,527 cubic feet

IRRIGATION WATER USE CALCULATIONS - SEE ATTACHED SHEET 'E'

FEHMA FLOOD ZONE DESIGNATION AREA: Zone C "areas of minimal flooding"
FIRM Community Panel Number 065029 0850 B December 1, 1982

Two – Facility Maps



DeLORME
Scale 1 : 200,000
1" = 3.16 mi

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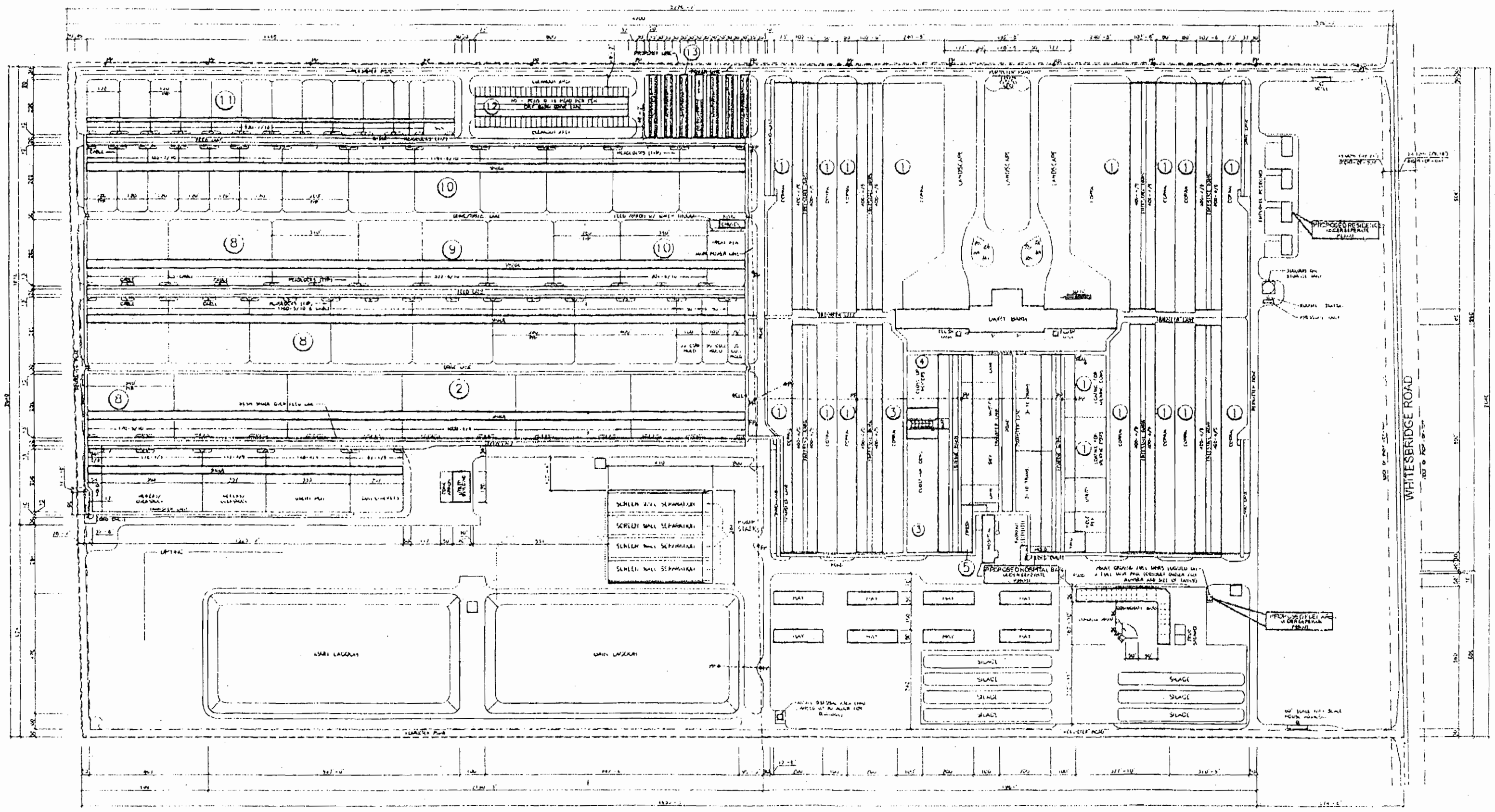


SITE PLAN

SCALE: 1" = 200'-0"

N

HERD MAKE-UP				
#	TYPE	STANCHIONS	ANIMALS (AS DESIGNED)	ANIMALS (REQUIRED)
1	MILK COWS	4/9	6216	6192
2	DRY COWS	4/9	1067	856
3	F/C HEIFER	4/9	400	290
4	TRANSITION COWS	4/9	340	290
5	FRESH	4/9	34	285
6	CLOSE-UP	4/9	216	231
7	SPRINGERS	4/9	310	280
8	HEIFER 17-23mo	5/10&CABLE	1695	1559
9	HEIFER 14-16mo	6/10&CABLE	822	816
10	HEIFER 9-13mo	CABLE	1398	1355
11	YOUNG STOCK 5-8mo	CABLE	1,350	1,250
12	YOUNG STOCK 3-4mo	CABLE	960	626
13	CALVES 0-2mo	HUTCHES	1,952	550
	TOTAL ANIMALS		15,411	14,688

V M S

VALLEY MANAGEMENT SYSTEMS

DESIGN and ENGINEERING

A NEW DAIRY FACILITY FOR

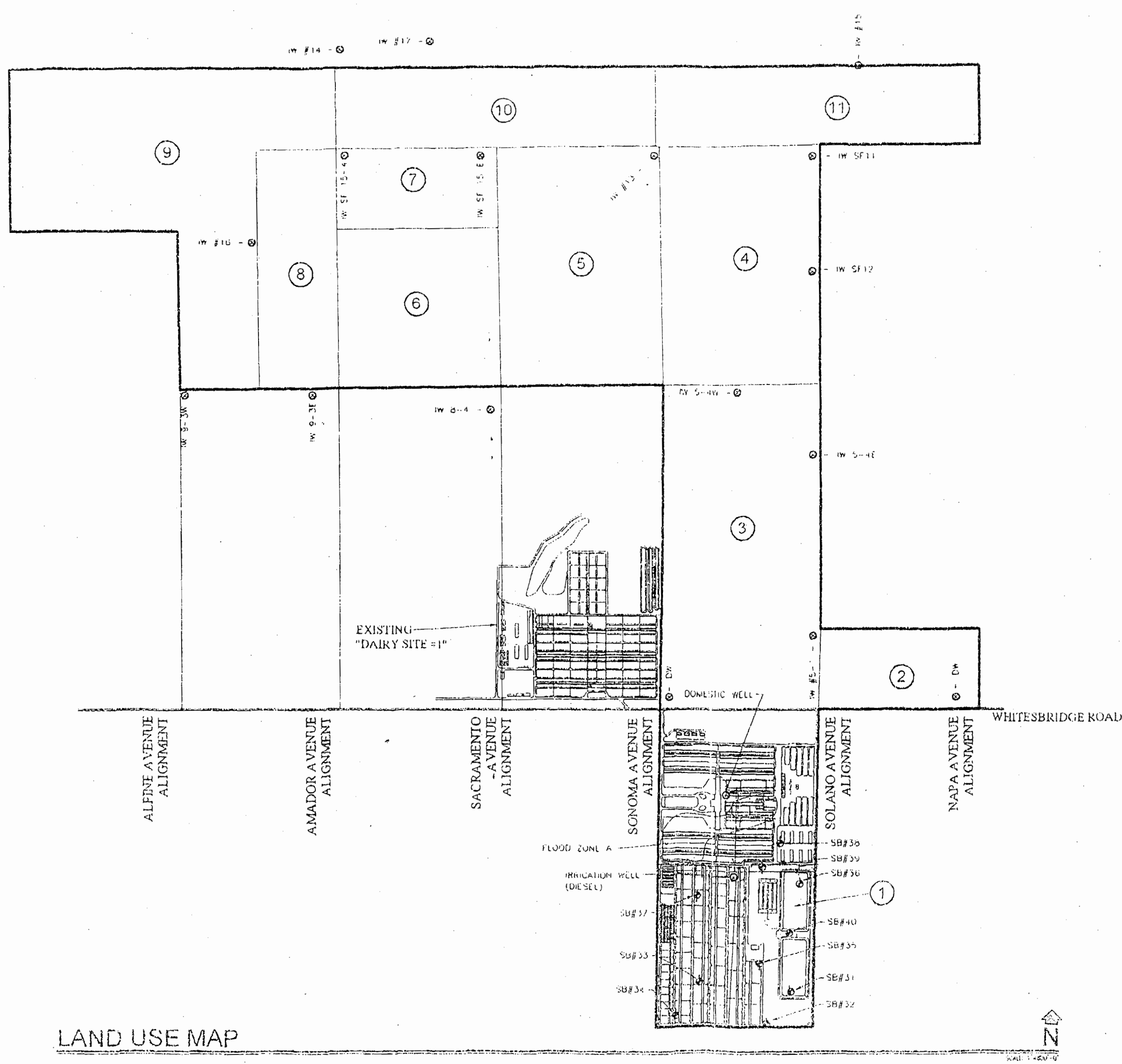
LARRY A. SHEHADEY

FRESNO COUNTY, CALIFORNIA

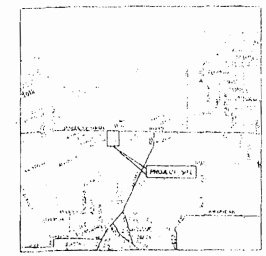
DATE ISSUED

SHEET

2



LAND USE MAP



VICINITY MAP

NO SCALE

SITE DATA	
OWNER:	Larry A. Shehadey 559-917-5055 P.O. Box 231 Fresno, CA 93715
JURISDICTION:	Fresno County
ZONE:	Agriculture
SITE AREA:	324.00
A.P.N.:	015-100-21s
SITE ADDRESS:	24387 Whitesbridge Road Kerman, CA
WATER:	Domestic Well
SEWER:	Septic Tank
GAS:	Propane
ELECTRIC:	PG &E

DAIRY SITE 2
SUPPORTING ACRES

#	APN #	ACRES
1	015-100-21s	324.00
2	015-100-19s	78.00
3	015-100-08s	326.00
4	015-060-44s	240.00
5	015-060-14s	240.00
6	015-060-46s	160.00
7	015-060-54s	80.00
8	015-060-52s	119.48
9	015-060-53s	368.00
10	015-060-55s	160.00
11	015-060-12s	160.00
	DAIRY SITE #2	324.00
	FARM ACRES	1931.00

V M S

VALLEY MANAGEMENT SYSTEMS
DESIGN and ENGINEERING

A NEW DAIRY FACILITY FOR

LARRY A. SHEHADEY

FRESNO COUNTY, CALIFORNIA

DATE ISSUED
08-21-2003
10-22-2003
01-27-2004

SHEET 1

Three – Nutrient Disposal Plan

HERD SIZE AND MANURE PRODUCED

Larry A. Shehadey Dairy

	Head	Factor	AU	% Flush	AU Flushed	%Collected Flush	Total Wet manure	Total Dry manure
Milk Cows	6,000	1.4	8,400	100.00%	8,400	80.00%	6,720	1,680
Dry Cows	1,200	1.12	1,344	100.00%	1,344	60.00%	806	538
Heifers 1-2 years	3,240	1.02	3,305	100.00%	3,305	60.00%	1,983	1,322
Heifers 3 mo to 1 year	2,430	0.49	1,191	100.00%	1,191	60.00%	714	476
Calves	810	0.29	235	0.00%	0	0.00%	0	235
Total	13,680		14,474				10,224	4,251

NITROGEN - WET MANURE

Source	AU	N excretion value/day	TOTAL N Produced	minus 75% Denitrification anerobic pond	minus 0% Denitrification solid separator	N produced	
Milk Cows	6,720	0.56	1,373,568	1,030,176	0	343,392	
Dry Cows & Heifers	3,504	0.45	575,483	431,612	0	143,871	
Total	10,224					487,263	lbs.

REQUIRES
1,147
'@ 425 lbs. N per acre

SALTS - WET MANURE

Total AU	"Salts" Production Rate/day	TOTAL "Salts" Produced	minus Separator Removed "Salts"	"Salts" Production	
10,224	1.29	4,813,829	0	4,813,829	lbs.

REQUIRES
1,605 acres
@ 3,000 lbs. "SALTS" per acre

NITROGEN - DRY MANURE

Source	AU	N excretion value/day	TOTAL N Produced	plus N from Solids Separator	minus 75.00% Denitrification	N Produced	
Milk Cows	1,680	0.56	343,392	0	257,544	85,848	
Dry Cows & Heifers	2,571	0.45	422,237	0	316,678	105,559	
Total	4,251					191,407	lbs.

SALTS - DRY MANURE

Total AU	"Salts" Production Rate/day	TOTAL "Salts" Produced	plus Separator Removed "Salts"	NET "Salts" Production	
4,251	1.29	2,001,442	0	2,001,442	lbs.

Notes:
1. Excretion values used by Regional Water Quality Control Board for a high producing herd.
2. Denitrification values accepted by Regional Water Quality Control Board.

SHEET "A"

Larry A. Shehadey Dairy

24387 W.Whitesbridge Road, Kerman, CA 93630 (559) 264-6583

AU		Produces	0.56 lbs.	Nitrogen	per head per day	
	and					
		Produces	1.29 lbs.	"Salts"	per head per day	
14474.4 AU	X	0.56 lbs.	X	365 days	= 678,670 lbs/year	N
14474.4 AU	X	1.29 lbs.	X	365 days	= 6,815,271 lbs/year	"Salts"

	N	"Salts"
	678,670	6,815,271
Potential Crop Nutrient Uptake		
Alfalfa 1396 acres	670,080 lbs.	[illegible] lbs.
Oat Silage - Double Cropped 312 acres	101,400 lbs..	152,256 lbs.
Corn Silage - Double Cropped 312 acres	78,000 lbs.	152,256 lbs.
Almonds 139 acres	24,325	[illegible]
0 acres	0	0
	0	0
	873,805 lbs/year	[illegible] lbs/year
DIFFERENCE	-195,135 lbs.	[illegible]

TO BALANCE N:

OFF SITE minimum **0** TONS OF DRY (60% DM) MANURE

* "Salts" content=4.5lbs lbs. "salts" X 1 lbs. N)

6,815,271 lbs. divided by 1,847 acres = **3,690 lbs/acre**

TO BALANCE "SALTS": @ 3,000 per acre for double crop, 2000 lbs per acre single crop

OFF SITE minimum **13,598** TONS OF DRY (60% DM) MANURE

SHEET 'B'

Larry A. Shehadey Dairy

IRRIGATION SCHEDULE - ACRE FEET PER MONTH

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
ALFALFA	0	0.2	0.3	0.3	0.4	0.5	0.6	0.6	0.3	0.2	0	0	3.4
[illegible]	0	0.3	0.3	0.3	0	0	0	0	0	0.2	0.2	0	[illegible]
CORN	0	0	0	0	0.3	0.3	0.4	0.5	0.4	0	0	0	1.9
ALMONDS	0	0.3	0.4	0.4	0.4	0.5	0.5	0.5	0	0.3	0.2	0	3.5
Total/mo	0	0.8	1	1	1.1	1.3	1.5	1.6	0.7	0.7	0.4	0	10.1

1,847 Acres farmed

IRRIGATION WATER

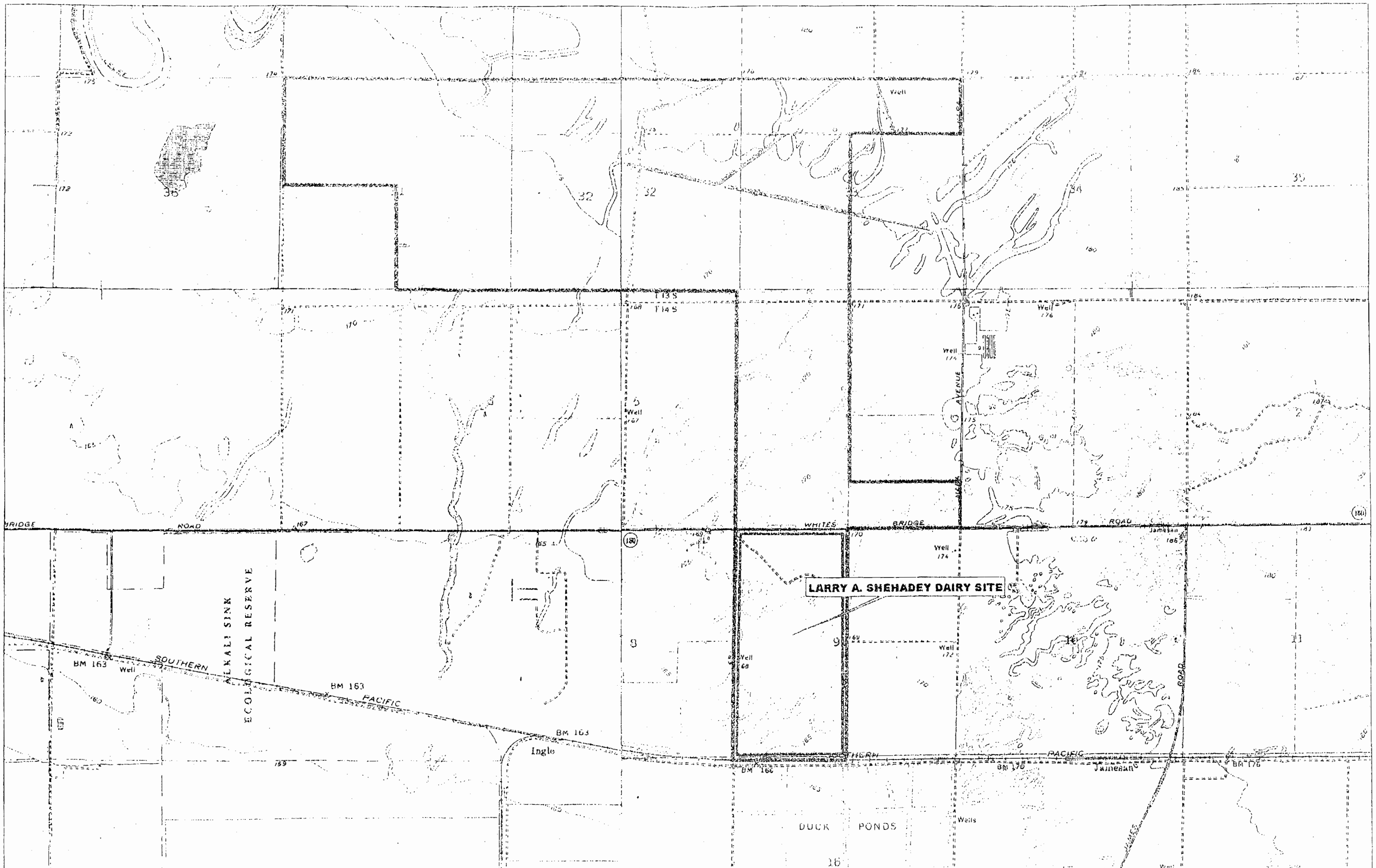
Required	0	414	568	568	708	861	1,032	1,063	544	383	90	0	6,231.30

LAGOON WATER 300,000 gallons per day

ACRE FEET PER MONTH

														Percent total water use
Generated	28	28	28	28	28	28	28	28	28	28	28	28	342	5.48%
Rainwater	17	17									17	17	66	1.06%
Total/mo	45	45	28	28	28	28	28	28	28	28	45	45	408	6.55%

SHEET "E"



Scale: 1 : 25,000 Map Rotation: 0° Magnetic Declination: 14.7°E

Four – Hydrological/Geological Report

HYDROLOGICAL / GEOLOGICAL

REPORT

Prepared for

SHEHADEY DAIRY

September 5, 2003

Prepared by

NAT DELLAVALLE, CPAG/SS
ARCPACS NO 01538
President

ARCPACS
NAT B. DELLAVALLE
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SHEHADEY DAIRY

HYDROLOGICAL / GEOLOGICAL REPORT

TABLE OF CONTENTS

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LIST OF FIGURE(S)

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I INTRODUCTION

This Hydrological / Geological Report was prepared to provide information pertaining to possible permitting requirements set forth by the California Regional Water Quality Control Board and the County of Fresno for the Shehadey Dairy. Shehadey Dairy is seeking a permit for the operation of a new 2,255 acreage dairy facility.

The facility property is located in northwest ¼ and east half of section 31, all of section 32, the west half of section 33, and the north half of the northeast ¼ of section 33 in Township 13S, Range 16E. Also included is the west half of section 4, the south half of the southeast ¼ of section 4 and the west half of section 9 in Township 14S, Range 16E. The specific location of the proposed dairy site will be in the west half of section 9 in Township 14S, Range 16E.

A.P.N. parcel numbers are 015-010-008, 015-010-019, 015-010-021, 015-006-044, 015-006-014, 015-006-046, 015-006-054, 015-006-052, 015-006-053, 015-006-055, and 015-006-012. The property location is depicted in **Exhibit 1, "Site Location Map".**

Purpose of this report is to assess the hydrological and geological conditions of the proposed dairy site.

II. HYDROLOGICAL CONDITIONS

A. Groundwater Conditions

1. Water Table Depth

Depths to groundwater for wells in the vicinity of the proposed dairy reported by Department of Water Resources (**DWR**) are summarized in **Table 1, "Depth to Groundwater in Wells".** Average groundwater depth for the nine wells listed for the past 30 years ranged from 40 feet to 74 feet. Shallowest and deepest groundwater depth recorded for each well is listed in **Table 1.** The annual **DWR** data can be seen in **Appendix A**. Minimum depth to groundwater during the period was 22 feet below ground level.

Kings River Conservation District's (**KRCD**) 2000 Annual Groundwater Report presents depth to groundwater in the area. According to KRCD, depth to groundwater in the area of the proposed dairy is approximately 70 ft. to 80 ft. This aquifer supplies the majority, if not all, of the irrigation and residential water for the area. A map of the depth to groundwater contours is included as **Exhibit 3.**

Ten soil borings were drilled with a hand auger in the southern half of the proposed dairy facility which includes the manure pond and gravity separation pit area. The borings were sampled to a total depth of 25 feet. Boring locations are depicted in **Exhibit 2, "Land Use Map"**. Groundwater was encountered in two of the soil borings (SB#31 and SB#32) at depths of 25 feet and 18 feet respectively. See **Appendix B, "Hand Auger Soil Boring Log"**.

Table 1. Depth to Groundwater in Wells

Well Number	Date	Shallowest Depth to Groundwater Depth (ft)	Date	Deepest Depth to Groundwater Depth (ft)	Time Period (years)	Average Depth (ft)
14S16E08J001M	1962	22	1981	79	1961-2001	40
14S16E04C001M	1987	46	1975	95	1971-1993	69
14S16E04L001M	1998	35	1996	110	1969-2001	74
14S16E05J001M	1984	34	1992	111	1976-2001	65
14S16E05F001M	1988	33	1992	112	1980-2001	60
14S16E06G001M	1987	22	1994	110	1978-2001	58
14S16E06B001M	1987	30	1992	110	1987-2001	65
13S16E32F001M	1962	26	1997	119	1961--2001	53
13S16E32E001M	1984	5	1997	121	1974-2001	68
13S16E30R001M	1962	26	1994	113	1961- 2000	54
14S16E04D001M	1998	41	1991	114	1980-2001	67
13S16E33L001M	1986	4	1994	118	1977-2001	70
13S16E33F001M	1970	36	1977	128	1967-2001	75
13S16E33BOO2M	1962	26	1991	125	1961-2003	66
14S16E04A001M	1962	26	1994	107	1961-2001	68

Pump tests were performed on each of the irrigation wells during the period of 1990 to 2002. The depth to the "standing water level" for each of the wells is presented in **Table 2. "PG&E Pump Test Results"**. The complete results for each of the pump tests can be seen in **Appendix G " PG&E Pump Tests.**

Table 2. PG&E Pump Test Results

		Standing Water Level (feet)												
Well	Meter #	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
14	632R83													150.4
15	789R69							129.0	129.0	111.5	121.2	126.3	137.5	148.0
16	33449R							141.5	145.4	132.0	130.0	132.0	135.5	150.0
5-1	02936R	96.5	144.2	154.3	155.2	150.8	144.5	143.5	158.4	141.5	141.0	150.0	156.0	158.5
5-4E	59R205	80.4	117.0	134.3	147.0	150.4	142.3		147.7	136.3	134.0	143.0	1454.5	154.0
5-4W	4089R9	88.7		166.9	153.4	156.5	145.5	147.2	150.5	137.3		148.0	148.5	151.9
8-4	92929R	85.2	137.1	145.6		150.2	133.5	154.0	141.5	126.3	126.0	136.4	145.0	142.5
9-3E	66590T	71.5	132.0		121.0	137.5	124.5	129.5	131.0	116.3	124.3	123.2	123.0	
10-4	R05985			133.9	120.4	139.3	123.8	129.7	130.8	113.8	122.7	121.2	118.9	126.2
SF 11	4086R	90.2	126.1	146.6	130.6	143.5	141.6	133.2	129.0	124.3	116.0	126.1	128.0	140.0
SF 12	2400R0		83.1	168.2	162.5	169.8	155.7	155.9	155.0	148.4	138.0	113.5	150.0	158.5
SF 13	6473R7	90.4	131.7	156.0	128.7	159.0	147.3	142.7	140.5	138.4	132.0	144.3	145.0	160.2
SF 15E	R06337	94.5	146.0	155.5	141.7	158.5	142.9	148.5	142.6	138.5	129.2	124.7	139.0	162.0
SF15-4	45R771		131.7	127.4	125.2		124.5	133.0	129.5	114.5	120.0	113.0	129.3	140.3

2. Groundwater Flow

Groundwater flows towards the southeast. Flow gradients can be seen in **Exhibit 4, "Lines of Equal Elevation of Water in Wells Unconfined Aquifer for the Kings Groundwater Basin"**, prepared by Kings River Conservation District.

3. Area Influences

The San Joaquin River is approximately 2.5 to 3 miles north of the dairy site. Highway 180 is adjacent to the north boundary of the dairy site between the dairy site and the San Joaquin River. Highway 180 acts as a barrier between the dairy and the San Joaquin River.

The Fresno Slough Bypass is located approximately 2.5 miles south of the dairy site and between 3.5 to 6 miles south of the reclamation fields. Water has run in the Fresno Slough Bypass in twenty out of the past forty-six years (1954-2000). Floodwater flow is presented in **Appendix H, "Flood Release Data"**, recorded by the Kings River Conservation District

The Southern Pacific Railroad track is adjacent to the southern boundary of the dairy site and provides a boundary between the dairy and irrigated cropland south of the dairy.

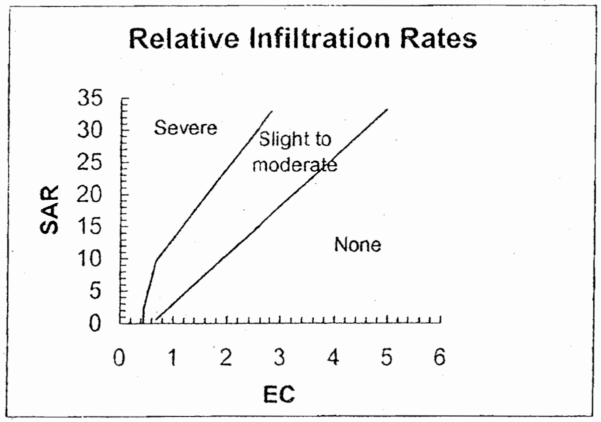
The proposed dairy is located on and bordered by irrigated cropland to the east. The property to the west is native. Lenses of clay layers in the soil profile may restrict the amount of water that seeps down to the deeper aquifers.

B. Groundwater Quality

Salinity impacts plant growth by reducing the ability of plants to extract water from soil. Yield reduction occurs when salinity induced water stress results over a significant period of time. As salinity increases above threshold salinity, plant growth and yield are reduced. Both threshold salinities and the rates at which yields decrease above the thresholds, (salt tolerance coefficients), are presented for selected crops in **Table 4. "Relative Salt Tolerance and Yield of Selected Crops"** of **Section III. A. Soil Conditions**. Actual tolerances are determined by factors beyond the scope of this report.

Salinity and sodicity interact to effect permeability including infiltration and percolation rates. Where salinity is sufficient, permeably will be adequate, even if exchangeable sodium is high. The relationship between salinity, sodicity, and permeability for irrigation water is presented below in **Figure 1. "Relative Infiltration Rates"**. As the Sodium Absorption Ratio (SAR) increases, permeability decreases if salinity (EC_w) remains constant. If sufficient salinity (EC_w) is maintained as the SAR increases, permeability will also be sustained. A similar relation exists for soil salinity, ESP and permeability. These relationships are discussed in **Section III. A. Soil Conditions**.

Figure 1. "Relative Infiltration Rates



1. Well Water Quality

Well water samples were taken during April, May and October of 2002 from fifteen agricultural wells and one domestic well located on the property. Laboratory analyses results (Lab No's. 57799, 57845, 57919, 63164, & 63293) are attached as **Appendix C.** Well locations are depicted in **Exhibit 2. "Land Use Map"**. Well water salinity levels (EC), Sodium Absorption Ratio's (SAR), Nitrogen levels (NO3-N, NH4-N, and TKN), boron (B), and chloride (Cl) levels are listed in **Table 3. "Well Water Quality"**.

Table 3. Well Water Quality

Sample Description	NO_3-N mg/l (ppm)	NH_4-N mg/l (ppm)	TKN mg/l (ppm)	Total Nitrogen (Lbs/AF)	Total Salt ECw (mmhos/cm)	Sodium Absorption Ratio (SAR)	B mg/l (ppm)	Cl meq/l
Well # 14	<0.1	<0.1	0.7	1.9	0.2	3.8	<0.1	0.4
Well # 15	<0.1	<0.1	0.3	0.8	0.4	11.6	<0.1	1.3
Well # 16	<0.1	<0.1	<0.1	0	0.7	29.0	0.2	3.2
Well 5-1	<0.1	<0.1	0.4	1.1	2.3	19.7	0.2	19.1
Well 5-4E	<0.1	<0.1	<0.1	0	1.7	23.3	0.1	12.1
Well 5-4W	<0.1	<0.1	<0.1	0	1.1	27.9	0.1	8.5
Well # 8-4	<0.1	<0.1	<0.1	0	0.4	11.2	0.1	0.5
Well # 9-3E	<0.1	<0.1	<0.1	0	0.8	43.7	0.2	4.6
Well # 10-4	<0.1	<0.1	<0.1	0	0.9	38.1	0.3	5.9
Well SF-12	<0.1	<0.1	0.3	0.8	0.7	47.6	<0.1	4.6
Well SF-11	<0.1	<0.1	0.1	0.3	0.7	26.1	<0.1	3.6
Well SF-13	<0.1	<0.1	0.1	0.3	0.6	36.9	<0.1	2.5
Well SF-15 E	0.1	<0.1	0.5	1.6	0.6	26.9	0.1	2.5
Well SF 15-4	<0.1	<0.1	<0.1	0	0.4	30.4	0.1	1.4
Dairy #2 domestic	<0.025	<0.1	0.5	1.4	2.8	19.7	0.3	20.8
Dairy #2 Diesel Ag Well	0.2	<0.1	0.3	1.4	5.4	24.0	1.4	47.5

Relative infiltration rates for one of the agricultural wells is in the "None" (no restriction) range, four are in the "Slight to Moderate" range and ten are in the "severe" range. All the wells in the "Severe" range have low total salt contents (EC_w at 0.7 mmhos/cm or below). As stated previously, it will be important to maintain adequate salinity (ECw) to maintain adequate water infiltration for the wells in the "Severe" range.

Salinity (EC_w) concentrations for eleven of the wells are at or below 0.7 mmhos/cm, which may cause water penetration problems. Although the overall salt concentration is low, the predominating salt present is sodium (Na), which will also contribute to possible water penetration problems. Sodium will accumulate in the soil over time and will require occasional gypsum applications to help leach the sodium from the root zone. Soil drainage will be important in preventing salts from accumulating in the soil.

Salinity (EC_w) concentrations in most of the well waters are satisfactory for wheat, barley, cotton, corn, alfalfa and most vegetable crops, see **Table 4. "Relative Salt Tolerance and Yield of Selected Crops"**.

Boron (B) concentrations are in the <0.1 to 0.3 mg/l range for fourteen of the agricultural wells with the diesel ag well (south of Highway 180) having a boron concentration of 1.4 mg/L. Wheat is sensitive to boron in the 0.75 – 1.0 mg/l range. All the other forage crops, field crops, and vegetable crops are tolerant to boron at or above 2.0 mg/l. Boron (B) levels are in satisfactory ranges for crop production.

Overall chloride (Cl) concentrations are in satisfactory ranges for field and forage crops in most of the agricultural wells. Most annual crops and short season perennials are moderately .to highly tolerant to chlorides. Moderately tolerant crops can sustain chloride concentrations in the 4 – 10 meq/L range, while tolerant crops can handle concentrations above 10 meq/L. Twelve of the wells have chloride (Cl) concentrations in the 0.4 to 8.5 meq/l range. Wells 5-1 and 5-4E have chloride (Cl) concentrations 19.1 and 12.1 meq/L respectively, while the well south of Highway 180 is at 47.5 meq/L. Those wells with elevated chloride (Cl) concentrations should be blended with water containing lower chloride (Cl) concentrations to minimize possible chloride injury to crops.

State drinking water maximum contamination limit for nitrate nitrogen (NO_3-N) established by California Department of Health Sciences is 10 mg/L. The limit for livestock suggested by Ayer & Westcot (1985) is 100 mg/L. All wells had nitrate nitrogen (NO_{-3}N) concentrations at 0.2 mg/l or less.

The total nitrogen concentrations for all wells are at concentration of 0.6 mg/L or less. The total nitrogen (TN) present is calculated by adding nitrate-nitrogen (NO_3-N), ammonia-nitrogen (NH_4-N), and organic-nitrogen (Org-N). Total kjeldahl nitrogen (TKN) is made up of both ammonia-nitrogen and organic-nitrogen. Subtract the ammonia portion from the TKN to obtain the organic portion.

Nitrogen in the organic form is not available to crops. Microorganisms utilize organic material resulting in conversion of organic nitrogen to ammonium and then nitrate nitrogen. The neutralization rate, and therefore timing of plant availability is dependent upon environmental factors and has not been presently determined.

This property has been actively farmed for over twenty years using the water from these irrigation wells. Crop yields have been maintained or have increased over time.

2. Well Logs

Well logs for wells located on the property were requested from California Department of Water Resources (**DWR**). Well locations and the corresponding well numbers can be seen in **Exhibit 2. "Land Use Map"**. Due to inadequate well location descriptions, we were not able to match all the well logs provided to specific wells. We were able to match fourteen out of sixteen wells to specific well logs. Well identification numbers have been added to the well logs and can be seen in **Appendix D**.

C. Surface Water

No surface water is available. All irrigation water is supplied by wells on the property.

D. Flood Plain Evaluation

FEMA Flood Zone map for the proposed dairy and reclamation area is shown in **Exhibit 5. "Flood Zone Map"**. The proposed dairy facility and reclamation fields are located in zone X that is outside any 100-year flood zones. There is small areas of Zone A (no base flood elevation determined) designated in the freestall barn and corral area of the dairy facility and one small Zone A area is designated in the reclamation fields.

E. Rainfall Data

A 25-year 24-hr storm event in the vicinity of the proposed dairy is reported as producing approximately 2.0 inches of water, see **Exhibit 6. "Isopluvials of 25-Year 24-Hour Precipitation in Tenths of an Inch"**. Records provided by Western Regional Climate Center show that the average 120-days (Dec., Jan., Feb., & March) rainfall for surrounding vicinities of the property is 6.30 inches. This average was calculated from 120-day average rainfall data collected from Fresno (a distance of approximately 20 miles east of the dairy facility), which receives an average of 7.8 inches. Five Points (a distance of approximately 30 miles southeast of the dairy facility), which receives an average of 4.71 inches, and Los Banos, (a distance of approximately 48 miles northwest of the dairy facility), which receives an average of 6.38 inches. See **Appendix E. "Period of Record Monthly Climate Summary"**.

III. GEOLOGICAL CONDITIONS

A. Soil Conditions

1. USDA Soil Survey Information

Soil types, as reported by the United States Department of Agriculture Soil Conservation Service, on the dairy site are depicted in **Exhibit 7. "Soil Survey Map"**. The property is approximately 35% Chino series (Cr, Cs), 35% Traver (Tr, Ts, Tt, Tu). and 30% combined varieties that include; Grangeville (Gf,), Hesperia (Hsa, Hsc, Hse, Hsn, Hst), Playas (Pl), Pond (Pu, Pw), and Wunjey (Ws, Wu) soil series. Soil unit descriptions are presented in **Table 4. "Soil Map Unit Description"**. and soil descriptions in **Appendix F. "USDA NRCS Soil Description".**

Table 4. Soil Map Unit Description

Series	Name	Soil Depth	USDA Texture	% Clay
Cr, Cs	Chino	0-12"	Loam	20
		12-18"	Clay Loam	23
		18-25"	Heavy Fine Sandy Loam	31
		25-60"	Fine Sandy Loam	17-20
Gf	Grangeville	0-60"	Fine Sandy Loam	7-9
Hsa, Hsc, Hse, Hsn, Hst	Hesperia	0-43"	Fine Sandy Loam	No data
		43-75"	Silt	
Pl	Playas	---	Too variable to rate*	35-70**
Pu, Pw	Pond	0-5"	Fine Sandy Loam	8-10
		5-8"	Sandy Loam	12
		8-17"	Sandy clay Loam	24
		17-20"	Clay Loam	27
		20-35"	Sandy Loam	11
		35"+	Sand	5
Tr, Ts Tt, Tu	Traver	0-10"	Sandy Loam	6
		10-23"	Light Sandy Clay Loam	5
		23-53"	Sandy Loam	21
		53+"	Silt	8-10
Ws, Wu	Wunjey	0-66"	Silt Loam	9-15

*Playas is not a soil but considered a miscellaneous area or miscellaneous land type that can consist of clay loam, silty clay loam, silty clay or clay with perhaps some thin layers of fine sand.
**USDA soil dataset (estimates) suggests an overall clay percentage of 35 to 70 percent.

Chino (Cr, Cs) soil is moderately well drained soil. Permeability is moderate with moderate to high water holding capacities. Effective rooting depth is 60 inches or more. The Cs series (Chino loam, saline-alkali) is affected by slightly saline–alkaline conditions, but can be managed similar to Chino loam (Cr) if it has been reclaimed.

Traver soil is typically well drained, moderately deep over compacted silt. It is also typically saline-alkaline affected. The Traver sandy loam (Tr) series does not have the compacted silty substratum and is saline-alkaline free in the surface layer. Reclamation of the sub soil is easier because no compacted silty substratum is present. Traver sandy loam, moderately deep (Ts) has compact silty layers at a depth ranging from 36 to 60 inches. The subsoil and the horizons beneath it are normally saline-alkali affected. Traver fine sandy loam (Tt) is similar to that of Traver sandy loam, moderately deep, but has a fine sandy loam surface layer and lacks a compact silty substratum within 6 feet of the surface. Traver fine sandy loam, moderately deep (Tu) is similar to that of Traver sandy loam, moderately deep and strongly saline-alkali affected with only a modest acreage surface layer that was saline-alkali free.

Grangeville (Gf) fine sandy loam series have effective root zone depths of 60 inches or more. Water holding capacities are high. Permeability is moderately rapid. The surface soils (0-8 inches) overlay thick layers of neutral to alkaline fine sandy loam soils. Weak mottling can be present as well as calcareous conditions below 20 inches. Under irrigated conditions, these soils are suited to trees and vines as well as field and truck crops.

Hesperia soils are moderately well drained and are variably saline-alkali affected. Water holding capacities are moderate. These soils are on irrigated cropland that have been leveled, ripped, and reclaimed with soil amendments. Salinity and sodicity limits the kinds of crops that can be grown.

Pond (Pu, Pw) soils consist of saline alkaline soils that are somewhat poorly drained. The surface sandy loam soils are underlain by clay loam and or silty loam soils.

Wunjey (Ws, Wu) soils are typically saline-alkaline silt loam soils. Water holding capacity is high. Soils that have been reclaimed are generally well drained.

Commonly grown crops are; cotton, alfalfa, corn, wheat, barley, grain sorghum, and sugar beets. Addition of organic matter to the soil from solid manure applications should improve soil productivity. However, under sodic conditions, organic matter can contribute to low permeability. Soil organic matter has cation exchange capacity and reacts to sodium, as does clay. The key is the same, maintain adequate salinity, and depress ESP

Threshold salinities and the rates at which yields decrease above the thresholds, known as salt tolerance coefficients, are presented for selected crops in **Table 5. "Relative Salt Tolerance and Yield of Selected Crops".**

Crops are listed in order of decreasing tolerance to salinity with the most tolerant at the top. Relative EC_e values associated with increasing degrees of yield reduction due to salinity are listed for each crop. Threshold salinity values are listed under the 100% yield potential. For example, with average root zone salinity of 8 dS/m or less, barley can be expected to produce 100% of its yield potential. As salinity increases above threshold value, yield potential is reduced. Values listed under 0% yield potential represent those at which plants cannot extract any water.

Table 5. Relative Salt Tolerance & Yield Potential of Crops[1/]

CROP	Yield Potential								
	100%		90%		75%		50%		0%
	EC_e[2/]	EC_w[7/]	EC_e	EC_w	EC_e	EC_w	EC_e	EC_w	EC_e[3/]
Barley grain[4,5]	8.0	5.3	10.0	6.7	13.0	8.7	18.0	12.0	28.0
Barley forage[4,5]	6.0	4.0	7.4	4.9	9.5	6.3	13	8.7	20
Wheat[4,5]	6.0	4.0	7.4	4.9	9.5	6.4	13	8.7	20
Wheat grass, tall	7.5	5.0	9.9	6.6	13	9.0	19	13.0	31
Cotton	7.5	5.1	9.6	6.4	13	8.4	17	12.0	27
Wheat grass, standard crested	3.5	2.3	6.0	4.0	9.8	6.5	16	11.0	28
Tomato	2.5	1.7	3.5	2.3	5.0	3.4	7.6	5.0	13
Cantaloupe	2.2	1.5	3.6	2.4	5.7	3.8	9.1	6.1	16
Alfalfa, not tolerant	2.0	1.3	3.4	2.2	5.4	3.6	8.8	5.9	16
Corn Forage	1.7	1.1	2.5	1.7	3.8	2.5	5.9	3.9	10
Grape	1.5	1.0	2.5	1.7	4.1	2.7	6.7	4.5	12
Almond	1.5	1.0	2.0	1.4	2.8	1.9	4.1	2.7	7
Lettuce	1.3	0.9	2.1	1.4	3.2	2.1	5.2	3.4	9

1. *Taken from Ayers and Westcot (1985), as are notes 1 through 7. Data is for relative tolerances. Absolute tolerances vary depending upon environmental conditions and cultural practices. These data serve as a guide to relative tolerances among crops. Absolute tolerance varies depending upon climate, soil conditions and cultural practices.*
2. *EC_e means average salinity of the root zone.*
2. *The zero yield potential or maximum EC_e indicates the theoretical soil salinity (EC_e) at which crop growth ceases.*
3. *Barley and wheat are less tolerant during germination and seeding stage. EC_e should not exceed 4-5 dS/m in the upper (3 to 6 inches) soil during this period.*
4. *Grains grown for forage are normally less tolerant than when grown for grain.*
5. *Ranking estimates based upon tests in progress. Grattan, 2001*
6. *EC_w means the electrical conductivity of the irrigation water in dS/m.*

Management of sodic soils involves application of a source of soluble calcium to increase salinity; replacement of exchangeable sodium with calcium and leaching to displace sodium from the soil profile. Increasing salinity and reducing ESP enhances flocculation. Addition of a salt, such as gypsum, to the soil both increases salinity and provides a source of calcium ions for replacement of exchangeable sodium. Permeability improves as salinity is increased and ESP decreases.

Where salinity is sufficient, permeably will be adequate even if exchangeable sodium is high. **Figure 1, "Relative Infiltration Rates"** in **Section IV. B. 1. Well Water Quality** presents the relationship between salinity, sodicity, and permeability for irrigation water. A similar relation exists for soil salinity, ESP and permeability. Resulting salinity can then be leached from the soil profile. If salinity is reduced too much before ESP is reduced sufficiently deflocculation occurs and permeability is reduced or stopped.

Keys of effective management of saline sodic soils are to maintain sufficient salinity and calcium ions to maintain permeability; and to leach salts from the root zone until salinity and sodicity are at desirable levels and growing a sequence of crops as with saline soils.

Growth of crops provides several roles. Crops are a source of revenue and remove nutrients from effluent applied to the area. Crop roots penetrate soil promoting soil structure that results in enhanced permeability. Decomposition of crop residues also results in improved soil structure.

2. Soil Borings Drilled in the Proposed Pond Areas

Ten soil borings were drilled with a hand auger to a depth of approximately 25 feet in the area where the dairy facility is to be constructed. Six of the soil borings were drilled in the area of the manure pond and gravity separation pits (SB#31, SB#35, SB#36, SB#38, SB#39, and SB #40). Four of the soil borings were drilled south and west of the manure ponds and gravity separation pits (SB#32, SB#33, SB#34, and SB #37). Boring locations are depicted in **Exhibit 2. "Land Use Map"**. See **Appendix B** for boring logs.

3. Soil Borings in the Manure Pond and Gravity Separation Pit Area

Six soil borings were drilled with a hand auger in the area of the proposed dairy manure ponds and gravity separation pits. Borings were drilled to a total depth of 25 feet. Groundwater was encountered in soil boring SB#31 at a depth of 25 feet. No groundwater was encountered in the other five soil borings.

Soil samples from all six borings were submitted to the laboratory for analysis of percent sand, silt, and clay. Mechanical testing is conducted per Western States Laboratory Proficiency Testing Program, Soil & Plant Analytical Methods 1998 Version 4.10, Hydrometer Method S-14.10. Laboratory results can be seen in **Appendix C. "Laboratory Analysis, Report of Mechanical Analysis"** (reports Lab No's: 63178, 63184, 63219, 63532, 63536, and 69768). Soil boring depths, textures and clay content are also listed as follows.

Table 6. Soil Boring – SB31 (Lab No: 69768)

BORING DEPTH	USDA SOIL TEXTURE	PERCENT CLAY
0-2'	Sandy Loam	11
2-4'	Loam	19
4-5'	Loam	11
5-6'	Silt Loam	11
6-7'	Silt Loam	10
7-11'	Silty Clay Loam	37
11-12'	Sandy Loam	15
12-13'	Clay	46
13-17'	Silt Loam	8
17-18'	Loam	9
18-25'	Loamy Sand	6

Table 7. Soil Boring – SB35 (Lab No. 63532)

BORING DEPTH	USDA SOIL TEXTURE	PERCENT CLAY
0-1'	Sandy Loam	7
1-2'	Loam	15
2-5'	Sandy Loam	9
5-7'	Loamy Sand	3
7-10'	Clay Loam	28
10-14'	Loam	11
14-16'	Sandy Loam	7
16-18'	Loamy Sand	5
18-25'	Sandy Loam	9

Table 8. Soil Boring – SB36 (Lab No. 63536)

BORING DEPTH	USDA SOIL TEXTURE	PERCENT CLAY
0-3'	Loam	8
3-7'	Loamy Sand	1
7-10'	Sand	0
10-11'	Sand	1
11-12'	Sand	1
12-16'	Loam	9
16-18'	Sandy Loam	10
18-19'	Sandy Loam	7
19-24'	Loamy Sand	3

Table 9. Soil Boring – SB38 (Lab No. 63178)

BORING DEPTH	USDA SOIL TEXTURE	PERCENT CLAY
0-2'	Sandy Loam	10
2-4'	Loam	10
4-5'	Silty Loam	18
5-6'	Sandy Loam	10
6-7'	Silty Loam	14
7-8'	Loam	8
8-9'	Silty Loam	11
9-10'	Silty Loam	14
10-11'	Sandy Loam	8
11-14'	Silty Loam	22
14-15'	Silty Loam	10
15-16'	Silty Loam	8
16-17'	Loamy Sand	7
17-25'	Sandy Loam	10

Table 10. Soil Boring – SB39 (Lab No. 63184)

BORING DEPTH	USDA SOIL TEXTURE	PERCENT CLAY
0-2'	Sandy Loam	9
2-3'	Sandy Loam	8
3-4'	Loam	10
4-5'	Sandy Loam	8
5-8'	Sandy Loam	6
8-12'	Loamy Sand	6
12-13'	Sandy Loam	9
13-14'	Sandy Loam	6
14-15'	Loam	13
15-17'	Loamy Sand	8
17-20'	Loamy Sand	6
20-21'	Loamy Sand	8
21-23	Sandy Loam	12
23-25'	Loam	10

Table 11. Soil Boring – SB40 (Lab No. 63219)

BORING DEPTH	USDA SOIL TEXTURE	PERCENT CLAY
0-2'	Sandy Loam	9
2-3'	Sandy Loam	7
3-5'	Loamy Sand	4
5-10'	Sand	3
10-15'	Sandy Loam	7
15-22'	Loam	19
22-23'	Sandy Loam	9
23-24'	Sandy Loam	11
24-25'	Sandy Loam	8

These six soil profiles have alternating soil stratums with more than 10% clay and soils with less than 10% clay. All six soil-boring profiles are characterized by sand, sandy loam, loam, silt loam, silty clay loam and clay loam soils. Clay contents of most of the soils are in the 0% to 28% range.

During excavation of the manure ponds any low clay soils encountered will need to be lined with soils containing 10% clay or more. Soils with adequate clay contents will need to be stockpiled and used to line the low clay areas.

4. Soil Borings West of the Manure Pond Gravity Separation Pits

Four of the soil borings were drilled south and west of the manure ponds and gravity separation pits. Borings were drilled to a total depth of 21 to 25 feet. Groundwater was encountered in soil boring SB#32 at a depth of 18 feet. No groundwater was found in the other three soil borings.

Soil textures in the soil borings were evaluated by feel in accordance with methods outlined in Soil Survey Manual, U.S. Dept. Agriculture Handbook No. 18.

Table 12. Soil Boring – SB32

BORING DEPTH	TEXTURE By FEEL
0-2'	Sandy Clay Loam
2-3'	Sandy Loam
3-4'	Loamy Sand
4-8.5'	Sand
8.5-9'	Clay Loam
9-10'	Fine Sandy Loam
10-11'	Fine Sandy Clay Loam
11-14'	Clay Loam
14-16'	Fine Sand
16-18'	Fine Sandy Loam
18-21'	Sand

Table 13. Soil Boring – SB33

BORING DEPTH	TEXTURE BY FEEL
0-1'	Sandy Clay Loam
1-2'	Loam
2-3'	Silty Clay Loam
3-5.5'	Clay Loam
5.5-6'	Course Sandy Loam
6-7'	Sand
7-8'	Clay Loam
8-11'	Fine Sand
11-12'	Fine Sandy Loam
12-17'	Fine Sand
17-23'	Sand
23-25'	Silty Clay Loam

Table 14. Soil Boring – SB34

BORING DEPTH	TEXTURE BY FEEL
0-3'	Loam
3-4'	Sand
4-5'	Fine Sand
5-7'	Clay Loam
7-9'	Sand
9-13'	Fine Sand
13-15'	Sand
15-18'	Clay Loam
18-21'	Fine Sandy Clay Loam

Table 15. Soil Boring – SB37

BORING DEPTH	TEXTURE BY FEEL
0-5'	Silt Loam
5-7'	Clay Loam
7-9'	Fine Sandy Loam
9-10'	Clay Loam
10-12'	Fine Sandy Loam
12-15'	Clay Loam
15-20'	Fine Sandy Loam
20-21'	Sand
14-15'	Loam
15-17'	Loamy Sand
17-20'	Loamy Sand
20-21'	Loamy Sand
21-23	Sandy Loam
23-25'	Loam

Copies of Figure 1, Exhibits 1 through 7 and Appendices A through H are available on request.

Appendix D

California Regional Water Quality Control
Board Central Valley Region
Order No. R5-2007-0035

Waste Discharge Requirements General Order
For Existing Milk Cow Dairies

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

Order No. R5-2007-0035

WASTE DISCHARGE REQUIREMENTS GENERAL ORDER
FOR
EXISTING MILK COW DAIRIES

The California Regional Water Quality Control Board, Central Valley Region (hereafter, Central Valley Water Board), finds that:

SCOPE OF COVERAGE OF THIS ORDER

1. This Order serves as general waste discharge requirements for discharges of waste from existing milk cow dairies (defined in Finding 7) of all sizes.

2. This Order applies to owners and operators of existing milk cow dairies (hereinafter Dischargers) that: (1) submitted a complete Report of Waste Discharge in response to the Central Valley Water Board's 8 August 2005 request for such a report (2005 Report of Waste Discharge Request Letter) and (2) have not been expanded since October 17, 2005. Following formal written notification by the Central Valley Water Board, these Dischargers are required to comply with the terms and conditions of this Order. Dischargers that do not qualify for coverage under this Order will be covered under separate general or individual waste discharge requirements or a waiver of waste discharge requirements.

REASON FOR THE CENTRAL VALLEY WATER BOARD ISSUING THIS ORDER

3. The Central Valley Water Board authority to regulate waste discharges that could affect the quality of the waters of the state, which includes both surface water and groundwater and the prevention of nuisances, is found in the Porter-Cologne Water Quality Control Act (California Water Code Division 7).

4. California Water Code Section 13260 requires any person discharging waste, or proposing to discharge waste, within the Central Valley Region, that could affect the quality of the waters of the state (which includes both surface waters and groundwaters) to file a report of waste discharge with the Central Valley Water Board.

5. The Central Valley Water Board is required to prescribe waste discharge requirements for proposed, existing, or material changes in discharges of waste and must implement the relevant water quality control plans. The Central Valley Water Board may prescribe general waste discharge requirements as to a category of discharges if all the following criteria apply to the discharges in that category:

a. The discharges are produced by the same or similar operations.

b. The discharges involve the same or similar types of waste.

c. The discharges require the same or similar treatment standards.

d. The discharges are more appropriately regulated under general requirements than individual requirements.

6. In regulating discharges of waste, the Central Valley Water Board implements State laws and regulations. California regulations governing discharges from confined animal facilities are contained in Title 27 of the California Code of Regulations (CCR), Division 2, Subdivision 1, Chapter 7, Subchapter 2, Article 1 (Title 27).

7. For the purposes of this Order, "existing milk cow dairies" means all dairies that were operating as of 17 October 2005, filed a complete Report of Waste Discharge in response to the 2005 Report of Waste Discharge Request Letter, and have not expanded ("expansion" is defined in Attachment E) since October 17, 2005.

8. Existing dairy operations include herd sizes that may vary in order to ensure a constant milk production volume. Doing so requires a dairy operator to manage the herd, continually producing calves, raising support stock to replace cows that die or fail to produce, and selling some of the mature cows and support stock.

9. Professionals at the University of California Davis estimate the normal variation in California dairy herd sizes ranges from about 10 to 15 percent.

10. For the purposes of this Order, existing herd size is defined as the maximum number of mature dairy cows reported in the Report of Waste Discharge filed in response to the 2005 Report of Waste Discharge Request Letter, plus or minus 15 percent of that reported number to account for the normal variation in herd sizes.

11. For the purposes of this Order, an increase in the number of mature dairy cows of more than 15 percent beyond the maximum number reported in the Report of Waste Discharge filed in response to the 2005 Report of Waste Discharge Request Letter is considered an expansion.

12. There are approximately 1,600 milk cow dairies within the Central Valley Region (Region) that will be required to operate under the requirements of this Order. Each facility represents a significant source of waste discharge with a potential to affect the quality of the waters of the State.

13. For the purposes of this Order, "waste" includes, but is not limited to, manure, leachate, process wastewater and any water, precipitation or rainfall runoff that contacts raw materials, products, or byproducts such as manure, compost piles, feed, silage, milk, or bedding.

14. This Order implements the requirements of State Water Resources Control Board Resolution 68-16 (*Statement of Policy with Respect to Maintaining High Quality of Waters in California*) (Resolution 68-16), Title 27 CCR for confined animal facilities, the Central Valley Water Board's Water Quality Control Plan for the Sacramento and San Joaquin River Basins (4th Ed.) and the Water Quality Control Plan for the Tulare Lake Basin (2nd Ed.) (Basin Plans) and other applicable plans and policies of the State Water Resources Control Board (State Water Board) and the Central Valley Water Board described in the Information Sheet, which is attached to and made part of this Order.

15. This Order does not authorize any further degradation to groundwater and prohibits discharges from production areas to surface waters. This Order also contains many restrictions, including the requirement to comply with a Nutrient Management Plan, for the application of waste to land application areas. However, it is possible that some minor degradation to surface waters from the application of waste to land application areas could occur despite compliance with this Order. That degradation would be limited because any such discharge may not cause or contribute to the exceedance of any water quality objective in the surface water. Such possible minor degradation is consistent with the maximum benefit to the people of the state. This Order would impose significantly more stringent requirements on these existing facilities than has been imposed in the past and as a result, water quality will be improved. While this Order will impose stringent new requirements, it will still accommodate important economic activities in mostly rural areas of the Central Valley Region, which is considered to be a benefit to the people of the State. Given that these are existing facilities, this Order would reduce the impacts that may have occurred under previous regulation of these facilities.

    This Order will result in implementation of best practicable treatment or control as set forth in the Information Sheet.

    This Order will assure that pollution or nuisance will not occur and that the highest water quality consistent with maximum benefit to the people of the State will be maintained. For example, the proposed order prohibits discharges to surface water from the production area and prohibits discharges from land application areas unless, among other requirements, the dairy prepares and implements a Nutrient Management Plan. Any authorized discharge from the land application area must not cause or contribute to an exceedance of any applicable water quality objective or federal water quality criteria. The proposed order prohibits any further degradation of groundwater. The Order addresses impacts from future discharges of waste, but does not address the cleanup of existing degraded surface and groundwater from past dairy operations. Any required cleanup would be handled under separate authority under the Water Code.

CALIFORNIA ENVIRONMENTAL QUALITY ACT

16. The Central Valley Water Board is the lead agency for purposes of the California Environmental Quality Act (CEQA) (Public Resources Code Section 21000 et seq.) with respect to adoption of this Order.

17. In accordance with CEQA, the Central Valley Water Board adopted a Negative Declaration in 1982 with the adoption of Central Valley Water Board Resolution 82-036 (Waiving Waste Discharge Requirements for Specific Types of Discharge), which waived waste discharge requirements for confined animal facilities where the Discharger complies with Central Valley Water Board guidelines. That waiver program expired on 1 January 2003.

18. Food and Agricultural Code Section 33487 provides a statutory exemption from CEQA for dairy farms under the following circumstances: (1) when the dairy will be constructed and operated in accordance with the minimum standards in Chapter 5 of the Food and Agricultural Code; (2) where the applicable local agencies have completed all necessary reviews and approvals including that required by CEQA; and (3) where a permit for construction was issued by a local agency on or after the effective date of Food and Agricultural Code Section 33487 and construction has begun.

19. The benchmark for evaluating whether this Order will have impacts on the environment is the "environmental baseline." The environmental baseline normally consists of "a description of the physical environmental conditions in the vicinity of the project at the time...environmental analysis is commenced." (Title 14, California Code of Regulations, Section 15125(a).) The receipt of a permit application is one event that can be used to mark the beginning of the environmental review process and therefore an appropriate date for the environmental baseline. (*Fat v. County of Sacramento* (2002) 97 Cal.App.4th 1270, 1278.) The applications for coverage under these General WDRs were solicited by Regional Board staff on August 8, 2005. The applications themselves (Reports of Waste Discharge) were due on October 17, 2005. The information contained in the applications, particularly herd size, presented staff with a description of the dairies, as they existed on the same date. The environmental baseline for the General WDRs, therefore, consists of the milk cow dairies (defined by their size and scope of herd, facilities, and operation) as they and their surrounding physical environment existed on October 17, 2005. Dairy herd size fluctuation is accounted for in that the environmental baseline incorporates the normal 15 percent variation in the number of mature dairy cows contained in a given herd.

20. CEQA provides several categorical exemptions from CEQA that apply to this Order including:

    a. CEQA Guidelines Exemption 1 for Existing Facilities (Title 14 CCR Section 15301) that applies to "*...the operation, repair, maintenance, permitting, leasing, licensing, or minor alteration of existing public or private structures, facilities, mechanical equipment, or topographical features, involving negligible or no expansion of use beyond that existing at the time of the lead agency's determination...*"

    b. CEQA Guidelines Exemption 2 for Replacement of Existing Structures (Title 14 CCR Section 15302) that applies to "*...replacement or reconstruction of existing structures and facilities where the new structure will be located on the same site as the structure replaced and will have substantially the same purpose and capacity as the structure replaced...*"

    c. CEQA Guidelines Exemption 4 for Minor Alterations (Title 14 CCR Section 15304) that applies to "*minor public or private alterations in the condition of land, water, and/or vegetation which do not involve removal of healthy, mature, scenic trees except for forestry and agricultural purposes...*"

21. The adoption of this Order is categorically exempt from CEQA because:

    a. Consistent with the "existing facility" exemption in Title 14 CCR Section 15301, eligibility under this Order is limited to milk cow dairies that were existing facilities as of 17 October 2005. This Order does not authorize expansion of use beyond that existing as of 17 October 2005. Restoration of, or improvements to dairy waste management systems to ensure proper function in compliance with this Order will involve minor alterations of existing private facilities.

    b. Consistent with the categorical exemption in Title 14 CCR Section 15302, this Order will require covered dairies to replace or reconstruct waste management systems to ensure proper function in compliance with this Order.

    c. Consistent with the categorical exemption in Title 14 CCR Section 15304, this Order will require covered dairies to make improvements to their waste management systems that will result in minor alterations to land, water, and/or vegetation.

22. This Order imposes significant new and more stringent requirements compared to previous waste discharge requirements or waivers of waste discharge requirements that have applied in the past to these existing facilities. This Order requires compliance with State Water Resources Control Board Resolution 68-16,

Title 27 CCR for confined animal facilities, and the Basin Plans. As a result, existing milk cow dairies will reduce their impacts to surface water and groundwater upon compliance with this Order. This Order does not authorize expansions of facilities. Such facilities must demonstrate compliance with CEQA and obtain separate waste discharge requirements. This Order prohibits:

a. Discharges of waste and/or storm water to surface waters from the production area;

b. Discharges of waste to surface waters which causes or contributes to an exceedance of any applicable water quality objective in the Basin Plans or water quality criteria set forth in the California Toxics Rule or the National Toxics Rule;

c. The collection, treatment, storage, discharge or disposal of wastes at an existing milk cow dairy that results in (1) discharge of waste constituents in a manner which could cause degradation of surface water or groundwater except as allowed by this Order, (2) contamination or pollution of surface water or groundwater, or (3) a condition of nuisance (as defined by the California Water Code Section 13050);

d. Discharges of wastewater to surface waters during or following wastewater application to cropland; and

e. Discharges of storm water to surface water from the land application area where manure or process wastewater has been applied unless the land application area has been managed consistent with a certified Nutrient Management Plan (see Attachment C, which is attached to and made part of this Order).

This Order requires that discharges of waste from existing milk cow dairies shall not cause groundwater to be further degraded[1], to exceed water quality objectives, unreasonably affect beneficial uses, or cause a condition of pollution or nuisance. This Order also requires monitoring of surface water and groundwater to demonstrate reduced impacts to surface water and groundwater upon compliance with this Order.

DAIRY IMPACTS ON WATER QUALITY

23. Groundwater monitoring shows that many dairies in the Region have impacted groundwater quality. A study of five dairies in a high-risk groundwater area in the Region found that groundwater beneath dairies that were thought to have good

[1] Further degradation will only be allowed under individual waste discharge requirements following an analysis as required by State Water Board Resources Control Board Resolution 68-16 (*Statement of Policy with Respect to Maintaining High Quality of Waters in California*).

waste management and land application practices had elevated levels of salts and nitrates beneath the production and land application areas. The Central Valley Water Board requested monitoring at 80 dairies with poor waste management practices in the Tulare Lake Basin. This monitoring has also shown groundwater pollution under many of the dairies, including where groundwater is as deep as 120 feet and in areas underlain by fine-grained sediments.

24. No set of waste management practices has been demonstrated to be protective of groundwater quality in all circumstances. Since groundwater monitoring is the most direct way to determine if management practices at a dairy are protective of groundwater, Monitoring and Reporting Program No. R5-2007-0035, which is attached to and made part of this Order, requires groundwater monitoring to determine if a dairy is in compliance with the groundwater limitations of this Order, unless the Executive Officer determines that an alternative method of environmental monitoring is appropriate and issues an individual monitoring and reporting program to the individual dairy pursuant to Water Code Section 13267.

25. The Central Valley Water Board has documented many discharges of waste from existing milk cow dairies to surface water and has taken appropriate enforcement actions in such cases. This Order prohibits discharges of: waste and/or storm water to surface water from the production area; wastewater to surface waters from cropland; and storm water to surface water from a land application area where manure or process wastewater has been applied unless the land application area has been managed consistent with a certified Nutrient Management Plan. When such discharges do occur, this Order requires the Discharger to monitor these discharges.

26. The milk cow dairies at which this Order is directed were in existence prior to October 2005 and many were constructed several decades ago. The waste management systems at these existing dairies are commonly not capable of preventing adverse impacts on waters of the state either because of their outdated design or need for maintenance or both. Historic operation of these dairies has presumptively resulted in an adverse effect on the quality of waters of the state. Groundwater data are needed to determine the existence and magnitude of these impacts. If data document impacts, continued operation of dairies without waste management improvements will perpetuate the ongoing adverse water quality effects caused by the generation and disposal of dairy waste.

27. As stated in Finding 22 above, this Order imposes new and more stringent requirements than these existing facilities have had applied to them in the past. Many Dischargers will need to make significant improvements in their facilities to meet these requirements. Improvements needed may include recycling flush water, grading, establishing setbacks, installing flow meters, exporting manure, leasing or purchasing land, etc. The Discharger may be able to make some of these improvements relatively quickly while some improvements may require more

time to implement. It is reasonable to allow Dischargers time to phase in elements of the required Waste Management Plan and Nutrient Management Plan in order to adequately design and construct major infrastructure changes needed to comply with all the requirements of this Order. This Order requires Dischargers to make any necessary interim facility modifications first in order to prevent discharges to surface water, improve storage capacity, and improve the facility's nitrogen balance before completing any necessary infrastructure changes.

STATE WATER RESOURCES CONTROL BOARD RESOLUTION 68-16

28. State Water Resources Control Board Resolution 68-16 requires that a Regional Water Quality Control Board maintain the high quality of waters of the state unless the Board determines that some degradation is consistent with the maximum benefit to the people of the state. The Board must assure that any activity which discharges a waste to existing high quality waters must meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that pollution, i.e., exceedance of water quality objectives, or nuisance will not occur and the highest water quality consistent with the maximum benefit to the people of the State will be maintained. This Order does not authorize degradation of waters of the State. It requires actions to be taken to assure that degradation does not occur, that water quality objectives are not exceeded, and that nuisance does not occur.

29. All dairies must be in compliance with Title 27. As explained in the Information Sheet, the Title 27 design standards for ponds have been determined to not be protective of groundwater quality and there are technologies available which can provide more groundwater protection. Because Section 13360 of the California Water Code requires that waste discharge requirements not specify the design, location, type of construction, or particular manner in which compliance may be had with the requirements, this Order cannot specify any particular pond design. This Order does however establish requirements for ponds that are more stringent than Title 27 in order to provide groundwater protection by including a performance standard and allowing a very conservative pond design without a demonstration of the pond's performance or an alternative design with a performance demonstration.

30. Consistent with State Water Resources Control Board Resolution 68-16, this Order requires use of best practicable treatment or control, specifically that new ponds or reconstructed existing ponds be designed and constructed to comply with the groundwater limitations in the Order.

31. Consistent with State Water Resources Control Board Resolution 68-16, this Order requires that all waste from a dairy that is applied to land application areas under the Discharger's control: (1) be managed according to a certified Nutrient Management Plan that is consistent with the technical standards specified in

Attachment C, and (2) not cause groundwater to exceed the groundwater limitations of this Order.

ENVIRONMENTAL STEWARDSHIP PROGRAMS

32. Environmental stewardship programs, such as the California Dairy Quality Assurance Program, and local ordinances can greatly assist the Central Valley Water Board efforts to assure compliance with this Order. Since its inception in 1998, the California Dairy Quality Assurance Program's efforts have resulted in dairy operators having a greater understanding of the need for water quality protection. Recently adopted local ordinances in several counties throughout the Region have also increased dairy operators' understanding of the needs for water quality protection. Dairies that are certified under a quality assurance program approved by the State Water Board or under a County regulatory program approved by the Central Valley Water Board receive a 50 percent reduction in their annual fee.

33. Participation in an Environmental Stewardship Program or operation of a dairy in a county that has a local ordinance regulating dairies may assist an existing dairy facility in meeting the requirements of this Order but these programs are not a substitute for regulation under this Order.

GENERAL FINDINGS

34. This Order does not authorize violation of any federal, state, or local law or regulation.

35. As stated in California Water Code Section 13263(g), the discharge of waste into waters of the state is a privilege, not a right, and this Order does not create a vested right to continue the discharge of waste. Failure to prevent conditions that create or threaten to create pollution or nuisance will be sufficient reason to modify, revoke, or enforce this Order, as well as prohibit further discharge.

36. This Order is <u>not</u> a National Pollutant Discharge Elimination System Permit issued pursuant to the Federal Clean Water Act. Coverage under this Order does not exempt a facility from the Clean Water Act. Any facility required to obtain such a permit must notify the Central Valley Water Board.

37. The Findings of this Order, supplemental information and details in the attached Information Sheet, and the administrative record of the Central Valley Water Board relevant to milk cow dairies, were considered in establishing the conditions of discharge.

38. The Central Valley Water Board recognizes that this Order imposes new and more stringent requirements on existing milk cow dairies than they have previously been

required to comply with and that some revisions to this Order may be necessary in the future in order to address issues that are not presently foreseen. The Executive Officer will provide annual updates to the Central Valley Water Board on the overall compliance with the Order and make recommendations for revisions to the Order if necessary.

39. The Central Valley Water Board has notified interested agencies and persons of its intent to issue this Order for discharges of wastes from existing milk cow dairies, and has provided them with an opportunity for a public hearing and an opportunity to submit comments.

40. The Central Valley Water Board, in a public meeting, heard and considered all comments pertaining to the proposal to regulate discharges of wastes from existing milk cow dairies under this Order.

41. Any person affected by this action of the Central Valley Water Board may petition the State Water Board to review this action. The State Water Board must receive the petition within 30 days of the date on which the Central Valley Water Board adopted this Order. Copies of the law and regulations applicable to filing petitions will be provided upon request.

IT IS HEREBY ORDERED that, pursuant to California Water Code Sections 13260, 13263, and 13267 and in order to meet the provisions contained in Division 7 of the California Water Code and regulations and policies adopted thereunder; all Dischargers specified by the Central Valley Water Board and all Dischargers that have submitted the appropriate fee and a complete Report of Waste Discharge in response to the Central Valley Water Board's 8 August 2005 request, their agents, successors, and assigns shall comply with the following:

A. PROHIBITIONS

1. The discharge of waste, other than as defined in Finding 13 above, or hazardous waste, as defined in California Water Code Section 13173 and Title 23 CCR Section 2521(a), respectively, is prohibited[2].

2. Except when authorized by a National Pollutant Discharge Elimination System permit, the direct or indirect discharge of waste and/or storm water from the production area to surface waters is prohibited[3].

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[2] Discharges of waste other than as defined in Finding 13 may be covered under other waste discharge requirements.

[3] Discharges of pollutants from the production area to waters of the United States may not lawfully occur except in compliance with a National Pollutant Discharge Elimination System (NPDES) permit. NPDES permit coverage is not provided by this Order, but must be obtained separately.

3. The discharge of waste from existing milk cow dairies to surface waters which causes or contributes to an exceedance of any applicable water quality objective in the Basin Plans or any applicable state or federal water quality criteria, or a violation of any applicable state or federal policies or regulations is prohibited[4].

4. The collection, treatment, storage, discharge or disposal of wastes at an existing milk cow dairy that results in (1) discharge of waste constituents in a manner which could cause degradation of surface water or groundwater except as allowed by this Order, (2) contamination or pollution of surface water or groundwater, or (3) a condition of nuisance (as defined by the California Water Code Section 13050) is prohibited.

5. The disposal of waste not generated by on-site animal production activities is prohibited except where a Report of Waste Discharge for the disposal has been submitted to the Executive Officer and the Central Valley Water Board has issued or waived waste discharge requirements (WDRs).

6. The disposal of dead animals in any liquid manure or process wastewater system is prohibited. The disposal of dead animals at a dairy facility is prohibited except when federal, state or local officials declare a State of Emergency and where all other options for disposal have been pursued and failed and the onsite disposal complies with all state and local policies for disposal of dead animals[5].

7. All animals shall be prohibited from entering any surface water within the animal confinement area (Title 27 CCR Section 22561).

8. The application of waste to lands not owned, leased, or controlled by the Discharger without written permission from the landowner or in a manner not approved by the Executive Officer, is prohibited.

9. The land application of manure or process wastewater to cropland for other than nutrient recycling is prohibited.

10. The discharge of wastewater to surface waters from cropland is prohibited. Irrigation supply water that comes into contact or is blended with waste or wastewater shall be considered wastewater under this Prohibition.

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[4] It is important to note that this General Order prohibits the direct or indirect discharge of waste and/or storm water from the production area to surface waters, the discharge of wastewater to surface waters from cropland, and the discharge of storm water to surface water from a land application area where manure or process wastewater has been applied unless the land application area has been managed consistent with a certified Nutrient Management Plan.

[5] In an emergency, guidance is provided by the *CAL/EPA Emergency Animal Disease Regulatory Guidance for Disposal and Decontamination* (October 20, 2004).

11. The application of process wastewater to a land application area before, during, or after a storm event that would result in runoff of the applied water is prohibited.

12. The discharge of storm water to surface water from a land application area where manure or process wastewater has been applied is prohibited unless the land application area has been managed consistent with a certified Nutrient Management Plan.

13. The use of manure to construct containment structures or to repair, replace, improve, or raise existing containment structures is prohibited.

14. The direct discharge of wastewater into groundwater via backflow through water supply or irrigation supply wells is prohibited.

15. The expansion of the existing milk cow dairy facility is prohibited[6].

B. GENERAL SPECIFICATIONS

1. The existing milk cow dairy shall have facilities that are designed, constructed, operated, and maintained to retain all facility process wastewater generated during the storage period (maximum period of time anticipated between land application of process wastewater), together with all precipitation on and drainage through manured areas, up to and including during a 25-year, 24-hour storm (see item II of Attachment B, which is attached to and made part of this Order).

2. In the Sacramento and San Joaquin River Basins, ponds and manured areas at existing milk cow dairies in operation on or before 27 November 1984 shall be protected from inundation or washout by overflow from any stream channel during 20-year peak stream flows. Existing milk cow dairies that were in operation on or before 27 November 1984 and that are protected against 100-year peak stream flows must continue to provide such protection. Existing milk cow dairies built or expanded after 27 November 1984 shall be protected against 100-year peak stream flows (Title 27 Section 22562(c)).

3. In the Tulare Lake Basin, existing milk cow dairies that existed as of 25 July 1975 shall be protected from inundation or washout from overflow from any stream channel during 20-year peak stream flows and existing milk cow dairies constructed after 25 July 1975 shall be protected from 100-year peak stream flows. Existing milk cow dairies expanded after 8 December 1984 shall be protected from 100-year peak stream flows.

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[6] Dischargers must submit a Report of Waste Discharge, document compliance with CEQA, and obtain coverage under individual waste discharge requirements before any material facility expansion. "Expansion" is defined in Attachment E.

4. Wastes and land application areas shall be managed to prevent contamination of crops grown for human consumption. The term "crops grown for human consumption" refers only to crops that will not undergo subsequent processing which adequately removes potential microbial danger to consumers.

5. Dischargers shall provide an engineering evaluation of an existing pond and propose and implement approved remedial measures when groundwater monitoring demonstrates that the existing pond has adversely impacted groundwater quality.

6. New ponds installed in order to comply with the requirements of this Order (i.e., to increase the storage capacity to meet the existing facility conditions, not related to an expansion) or existing ponds reconstructed for the same purpose shall be designed and constructed to comply with the groundwater limitations in this Order.

7. Pond design must be reviewed and approved by the Executive Officer prior to construction. This Order provides a tiered approach to pond design requirements to provide an option that will significantly reduce the time required for approval by the Executive Officer as defined below:

   a. Tier 1: A pond designed to consist of a double liner constructed with 60-mil high density polyethylene or material of equivalent durability with a leachate collection and removal system (constructed in accordance with Section 20340 of Title 27) between the two liners will be considered to be consistent with Resolution 68-16. Review for ponds designed to this standard will be conducted in less than 30 days of receipt of a complete design plan package submitted to the Board.

   b. Tier 2: A pond designed in accordance with California Natural Resource Conservation Service (NRCS) Conservation Practice Standard 313 (as described in the Information Sheet) or equivalent and which the Discharger must demonstrate through submittal of technical reports that the alternative design is protective of groundwater quality as required in General Specification B.8 below.

8. Prior to the enlargement of an existing settling, storage, or retention pond or the construction of any such new pond not associated with an expansion, the Discharger shall submit to the Executive Officer:

   a. For Tier 1 and 2 pond design, a design report prepared by, or under the direct supervision of, and certified by, a Civil Engineer who is registered pursuant to California law or other person as may be permitted under the provisions of the California Business and Professions Code to assume responsible charge of such work. The design report shall include the following, as specified in Section II.B of Attachment B to this Order:

i. Design calculations demonstrating that adequate containment will be achieved,

ii. Details on the liner and leachate collection and removal system (if appropriate) materials,

iii. A schedule for construction and certification of completion to comply with the Schedule of Tasks J.1 of this Order,

iv. A construction quality assurance plan describing testing and observations needed to document construction of the pond in accordance with the design and Sections 20323 and 20324 of Title 27, and

v. An operations and maintenance plan for the pond.

b. For Tier 2 pond design, the design report shall also include a technical report and groundwater model that demonstrates the proposed pond is in compliance with the groundwater limitations in this Order, including calculations that demonstrate the amount and quality of seepage from the proposed pond and its effect on groundwater quality, and include proposed groundwater monitoring to evaluate the impact of pond seepage on groundwater quality.

Enlargement of any existing pond or construction of any new pond shall not begin until the Executive Officer notifies the Discharger in writing that the design report is acceptable.

9. Prior to the placement of waste in any enlarged existing settling, storage, or retention pond or any such newly constructed pond, the Discharger shall submit a post construction report prepared by, or under the direct supervision of, and certified by, a Civil Engineer who is registered pursuant to California law or other person as may be permitted under the provisions of the California Business and Professions Code to assume responsible charge of such work. Waste shall not be placed into the pond until the Executive Officer notifies the Discharger in writing that the post construction report is acceptable. The post construction report shall include: (1) verification that the pond meets the requirements of this Order as specified in General Specification B.7 including documentation of the results of the construction quality assurance testing and observations, (2) certification that the pond was constructed as designed, and (3) as-built diagrams.

10. The level of waste in the process wastewater retention ponds shall be kept a minimum of two (2) feet from the top of each aboveground embankment and a minimum of one (1) foot from the ground surface of each belowground pond. Less freeboard may be approved by the Executive Officer when a Civil Engineer who is registered pursuant to California law, or other person as may be permitted under the provisions of the California Business and Professions Code to assume responsible charge of such work, demonstrates that the structural integrity of the pond will be maintained with the proposed freeboard.

11. Ponds shall be managed and maintained to prevent breeding of mosquitoes and other vectors. In particular,

    a. Small coves and irregularities shall not be allowed around the perimeter of the water surface;

    b. Weeds shall be minimized through control of water depth, harvesting, or other appropriate method;

    c. Dead algae, vegetation, and debris shall not accumulate on the water surface; and

    d. Management shall be in accordance with the requirements of the Mosquito Abatement District.

12. All precipitation and surface drainage from outside of the existing milk cow dairy (i.e., "run on") shall be diverted away from any manured areas unless such drainage is fully contained (Title 27 Section 22562(b)).

13. Ponds designated to contain the 25-year, 24-hour storm event runoff must have a depth marker that clearly indicates the minimum capacity necessary to contain the runoff and direct precipitation from a 25-year, 24-hour storm event.

14. All roofs, buildings, and non-manured areas located in the production area of the existing milk cow dairy shall be constructed or otherwise designed so that clean rainwater is diverted away from manured areas and waste containment facilities, unless such drainage is fully contained in the wastewater retention system (Title 27 Section 22562(b)).

15. Roof drainage from barns, milk houses, or shelters shall not drain into the corrals unless the corrals are properly graded and drained (Title 3 CCR, Division 2, Chapter 1, Article 22, Section 661).

16. The milk parlor, animal confinement area (including corrals), and manure and feed storage areas shall be designed and maintained to convey all water that has contacted animal wastes or feed to the wastewater retention system and to minimize standing water as of 72 hours after the last rainfall and the infiltration of water into the underlying soils.

17. Unlined ditches, swales, and/or earthen-berm channels may not be used for storage of process wastewater, manure, or tailwater and may only be used for conveyance of process wastewater collected in the production area to the retention pond, conveyance of process wastewater from the retention pond to the land application area, irrigation return water management, or temporary control of accidental spills, or rainfall-induced overflows at existing milk cow dairies designed, constructed, operated, and maintained in compliance with General Specification B.1.

C. LAND APPLICATION SPECIFICATIONS

1. Land application of all waste from the facility to areas under the Discharger's control shall be conducted in accordance with a certified Nutrient Management Plan (required in Required Reports and Notices H.1.c below) consistent with the technical standards for nutrient management as specified in Attachment C. The Nutrient Management Plan shall be modified within 90 days if monitoring shows that discharge from the land application fails to comply with the Groundwater Limitations of this Order or surface water quality objectives or criteria. The modifications must be designed to bring Dischargers into compliance with this Order.

2. No later than 31 December 2007, the Discharger shall have a written agreement with each third party that receives process wastewater from the Discharger for its own use. Each written agreement shall be included in the Discharger's Existing Conditions Report, Nutrient Management Plan, and Annual Report. The written agreement(s) shall be effective until the third party is covered under waste discharge requirements or a waiver of waste discharge requirements that are adopted by the Central Valley Water Board. The written agreement shall:

   a. Clearly identify:

      i. The Discharger and dairy facility from which the process wastewater originates,

      ii. The third party that will control the application of the process wastewater to cropland,

iii. The Assessor's Parcel Number(s) and the acreage(s) of the cropland where the process wastewater will be applied, and

iv. The types of crops to be fertilized with the process wastewater.

b. Include an agreement by the third party to:

i. Use the process wastewater at agronomic rates appropriate for the crops to be grown, and

ii. Prevent the runoff to surface waters of wastewater, storm water or irrigation supply water that has come into contact with manure or is blended with wastewater.

c. Include a certification statement, as specified in General Reporting Requirements C.7 of the Standard Provision and Reporting Requirements (which is attached to and made part of this Order), which is signed by both the Discharger and third party.

3. Land application of wastes for nutrient recycling from existing milk cow dairies shall not cause the underlying groundwater to contain any waste constituent, degradation product, or any constituent of soil mobilized by the interactions between applied wastes and soil or soil biota, to exceed the groundwater limitations set forth in this Order.

4. The application of animal waste and other materials containing nutrients to any cropland under control of the Discharger shall meet the following conditions:

a. The application is in accordance with a certified Nutrient Management Plan developed and implemented in accordance with Required Reports and Notices H.1.c and Attachment C of this Order; and

b. Records are prepared and maintained as specified in the Record-Keeping Requirements of Monitoring and Reporting Program No. R5-2007-0035.

5. The application of waste to cropland shall be at rates that preclude development of vectors or other nuisance conditions and meet the conditions of the certified Nutrient Management Plan.

6. Land application areas that receive dry manure shall be managed through implementation of erosion control measures to minimize erosion and must be consistent with a certified Nutrient Management Plan.

7. All process wastewater applied to land application areas must infiltrate completely within 72 hours after application.

8. Process wastewater shall not be applied to land application areas during periods when the soil is at or above field moisture capacity unless consistent with a certified Nutrient Management Plan (see Attachment C).

9. Manure and process wastewater shall not be applied closer than 100 feet to any down gradient surface waters, open tile line intake structures, sinkholes, agricultural or domestic well heads, or other conduits to surface waters, unless a 35-foot wide vegetated buffer or physical barrier is substituted for the 100-foot setback or alternative conservation practices or field-specific conditions will provide pollutant reductions equivalent or better than the reductions achieved by the 100-foot setback.

D. GROUNDWATER LIMITATIONS

1. Discharge of waste at existing milk cow dairies shall not cause the underlying groundwater to be further degraded, to exceed water quality objectives, unreasonably affect beneficial uses, or cause a condition of pollution or nuisance. The appropriate water quality objectives are summarized in the Information Sheet, which is attached to and part of this Order, and can be found in the Central Valley Water Board's Water Quality Control Plan for the Sacramento and San Joaquin River Basins (4th Ed.) and the Water Quality Control Plan for the Tulare Lake Basin (2nd Ed.).

E. PROVISIONS

1. The Discharger shall comply with the *Standard Provisions and Reporting Requirements for Waste Discharge Requirements General Order No. R5-2007-0035 for Existing Milk Cow Dairies* (Standard Provisions) dated 3 May 2007, which is attached to and made part of this Order.

2. The Discharger shall comply with all applicable provisions of the California Water Code, Title 27 CCR, and the applicable Water Quality Control Plans.

3. The Discharger shall comply with the attached Monitoring and Reporting Program No. R5-2007-0035 which is part of this Order, and future revisions thereto or with an individual monitoring and reporting program, as specified by the Central Valley Water Board or the Executive Officer.

4. The Discharger shall submit a complete Report of Waste Discharge in accordance with the California Water Code Section 13260 at least 140 days prior to any material change or proposed change in the character, location, or volume of the discharge, including any expansion of the facility or

development of any treatment technology, or construction of an anaerobic digester.

5. If the Preliminary Dairy Facility Assessment[7] indicates that facility improvements are necessary (see Required Reports and Notices H.1.d), the Discharger shall make continual facility improvements while completing implementation of the Waste Management Plan and/or Nutrient Management Plan.

6. This Order does not apply to facilities where wastes such as, but not limited to, whey, cannery wastes, septage, municipal or industrial sludge, municipal or industrial biosolids, ash or similar types of waste are generated onsite or are proposed to be brought onto the dairy or associated croplands for the purpose of nutrient recycling or disposal. The Discharger shall submit a complete Report of Waste Discharge and receive WDRs or a waste-specific waiver of WDRs from the Central Valley Water Board prior to receiving such waste.

7. If site conditions threaten to violate Prohibition A.2 or Prohibition A.4, the Discharger shall take immediate action to preclude the violation, documenting the condition and all corrective actions. Records of such actions shall be kept and maintained as required in Monitoring and Reporting Program No. R5-2007-0035. Alterations of the Waste Management Plan (see Required Reports and Notices H.1.a) for the production area to avoid a recurrence shall be submitted as a modification to the Waste Management Plan.

8. If a discharge of waste creates, or threatens to create, significant objectionable odors or nuisance odor and vector conditions, enforcement and/or revocation of coverage under this Order may result.

9. The Discharger shall comply with all requirements of this Order and all terms, conditions, and limitations specified by the Executive Officer.

10. Any instance of noncompliance with this Order constitutes a violation of the California Water Code and its regulations. Such noncompliance is grounds for enforcement action, and/or termination of the authorization to discharge.

11. The Discharger must maintain coverage under this Order or a subsequent revision to this Order until all manure, process wastewater, and animal waste impacted soil, including soil within the pond(s), is disposed of or utilized in a manner which does not pose a threat to surface water or groundwater quality or create a condition of nuisance. At least 90 days before desiring to terminate coverage under this Order, the Discharger shall submit to the

[7] The Preliminary Dairy Facility Assessment is required as part of the Existing Conditions Report (Attachment A).

Executive Officer a closure plan that ensures protection of surface water and groundwater. No more than 30 days after completion of site closure, the Discharger shall submit a closure report which documents that all closure activities were completed as proposed and approved in the closure plan. Coverage under this Order will not be terminated until cleanup is complete.

12. This Order shall become effective upon adoption by the Central Valley Water Board.

13. The Discharger must comply with all conditions of this Order, including timely submittal of technical and monitoring reports as directed by the Executive Officer. Accordingly, the Discharger shall submit to the Central Valley Water Board on or before each report due date the specified document or, if an action is specified, a written report detailing evidence of compliance with the task. If noncompliance is being reported, the reasons for such noncompliance shall be stated, plus an estimate of the date when the Discharger will be in compliance. The Discharger shall notify the Central Valley Water Board by letter when it returns to compliance with the time schedule. Violations may result in enforcement action, including Central Valley Water Board or court orders requiring corrective action or imposing civil monetary liability, or in terminating the applicability of this Order to a specific facility or Discharger.

14. Technical reports (Monitoring Well Installation and Sampling Plan, Monitoring Well Installation Completion Report, Groundwater Monitoring Report, Waste Management Plan Certification, and portions of the Waste Management Plan) required by this Order must be certified by an appropriately licensed professional as required in this Order and its Attachments (see Schedule of Tasks J.1 below). If the Executive Officer provides comments on any technical report, the Discharger will be required to address those comments.

15. The Discharger shall maintain a copy of this Order at the site so as to be available at all times to site-operating personnel. The Discharger, landowner and his/her designee shall be familiar with the content of this Order.

F. EFFECTIVE DATE OF COVERAGE UNDER THIS ORDER

1. Coverage under this Order is effective upon notification by the Executive Officer that this Order applies to the Discharger.

G. PERMIT REOPENING, REVISION, REVOCATION, AND RE-ISSUANCE

1. If more stringent applicable water quality standards are adopted in the Basin Plans, the Central Valley Water Board may revise and modify this Order in accordance with such standards.

2. This Order may be reopened to address any changes in state plans, policies, or regulations that would affect the water quality requirements for the discharges and as authorized by state law.

3. The Central Valley Water Board or the Executive Officer may revoke coverage under this Order at any time and require the Discharger to submit a Report of Waste Discharge and obtain individual waste discharge requirements.

H. REQUIRED REPORTS AND NOTICES

1. Dischargers must submit the following in accordance with the Schedule of Tasks J.1:

   a. **Existing Conditions Report**: The Discharger shall submit an Existing Conditions Report for the dairy facility, prepared in accordance with Attachment A. The Existing Conditions Report shall provide additional information on existing conditions at the dairy that was not provided in the Report of Waste Discharge submitted in response to the Central Valley Water Board's 8 August 2005 request. The Existing Conditions Report requires the Discharger to complete a Preliminary Dairy Facility Assessment. The Preliminary Dairy Facility Assessment is available on the Central Valley Water Board's web site at http://www.waterboards.ca.gov/centralvalley/available_documents/index.html#confined and must be completed electronically. The Discharger shall include a copy of the results of the Preliminary Dairy Facility Assessment in the Existing Conditions Report. Monitoring and Reporting Program No. R5-2007-0035 requires the Discharger to include in each Annual Report an Annual Dairy Facility Assessment, which will provide annual updates to the Preliminary Facility Assessment.

   b. **Waste Management Plan:** The Discharger shall submit a Waste Management Plan for the production area of the dairy facility, prepared in accordance with Attachment B. The Waste Management Plan shall provide an evaluation of the existing milk cow dairy's design, construction, operation, and maintenance for flood protection and waste containment and whether the facility complies with Prohibition A.14 and General Specifications B.1 through B.3, and B.10 through B.16. If the design, construction, operation, and/or maintenance of the dairy facility does not comply with these specifications and prohibition, the Waste Management Plan must propose modifications and a schedule for modifications that will bring the dairy facility into compliance. Certification that the modifications have been implemented shall be submitted in accordance with the Schedule of Tasks J.1.

c. **Nutrient Management Plan:** A Discharger who applies manure, bedding, or process wastewater to land for nutrient recycling must develop and implement management practices that control nutrient losses and describe these in a Nutrient Management Plan. The Nutrient Management Plan must be certified as specified in Attachment C, maintained at the dairy, submitted to the Executive Officer upon request and must ultimately provide for protection of both surface water and groundwater. Certification that the Nutrient Management Plan has been completed shall be in accordance with the Schedule of Tasks J.1, shall incorporate the elements specified in Attachment C based on a field-specific assessment of the potential for pollutant transport to surface water and groundwater, and shall be submitted to the Executive Officer. The Nutrient Management Plan shall be updated as specified in the Technical Standards for Nutrient Management in Attachment C or if the Executive Officer requests that additional information be included. Groundwater monitoring will be used to determine if implementation of the Nutrient Management Plan is protective of groundwater quality.

d. **Proposed Interim Facility Modifications**: A Discharger whose Preliminary Dairy Facility Assessment (see Required Reports and Notices H.1.a above) shows that the Whole Farm Nitrogen Balance[8] is greater than 1.65 and/or that the existing retention pond(s) total storage capacity is less than the total storage capacity required shall submit Proposed Interim Facility Modifications as Necessary to Balance Nitrogen and/or Proposed Interim Facility Modifications as Necessary to Improve Storage Capacity, respectively. Such Dischargers shall also submit Documentation of Interim Facility Modifications Completion as Necessary for Storage Capacity and to Balance N.

e. **Salinity Report**: The Discharger shall submit a report that identifies sources of salt in waste generated at the dairy, evaluates measures that can be taken to minimize salt in the dairy waste, and certifies that they will implement the approved measures identified to minimize salt in the dairy waste. If a third party (for example, the California Dairy Quality Assurance Program) produces an industry-wide report that is acceptable to the Executive Officer, the Discharger may refer to that report rather than generating his own report, but must certify that the appropriate measures will be implemented to reduce salt in his dairy waste.

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[8] The Whole Farm Nitrogen Balance is to be determined as the ratio of (total nitrogen in storage – total nitrogen exported + nitrogen imported + irrigation nitrogen + atmospheric nitrogen)/(total nitrogen removed by crops) as reported in the Preliminary Dairy Facility Assessment in the Existing Conditions Report (Attachment A).

2. Reporting Provisions:

   a. All Reports of Waste Discharge, applications, annual reports, or information submitted to the Central Valley Water Board shall be signed and certified in accordance with C. 7 and C.8 of the Standard Provisions.

   b. The Discharger shall submit all reports as specified in the attached Monitoring and Reporting Program No. R5-2007-0035.

   c. Any Discharger authorized to discharge waste under this Order shall furnish, within a reasonable time, any information the Central Valley Water Board may request, to determine whether cause exists for modifying, revoking, and reissuing, or terminating their authorization for coverage under this Order. The Discharger shall, upon request, also furnish to the Central Valley Water Board copies of records required to be kept by this Order.

   d. All reports prepared and submitted to the Executive Officer in accordance with the terms of this Order shall be available for public inspection at the offices of the Central Valley Water Board.

I. RECORD-KEEPING REQUIREMENTS

1. The Discharger shall create, maintain for five years, and make available to the Central Valley Water Board upon request by the Executive Officer any reports or records required by this Order including those required under Monitoring and Reporting Program No. R5-2007-0035.

J. SCHEDULE OF TASKS

1. Dischargers who receive coverage under this Order are required to develop and implement a Waste Management Plan and Nutrient Management Plan and submit an Existing Conditions Report, Proposed Interim Facility Modifications, Salinity Report, Preliminary Infrastructure Needs Checklist, and Annual Reports according to the schedule shown in Table 1. All elements of the Waste Management Plan shall be submitted to the Executive Officer by the deadlines specified in Table 1 and signed and certified by the Discharger as required in Required Reports and Notices H.2.a above and the additional professional specified in Table 1. For the elements of the Nutrient Management Plan, Dischargers shall submit a statement to the Executive Officer by each of the deadlines that the item due has been completed. All statements must be signed and certified by the Discharger as required in Required Reports and Notices H.2.a above and the additional professional specified in Table 1.

2. If changes are made to the required submittals through Central Valley Water Board or Executive Officer review, those changes shall be implemented.

3. Any Discharger may be requested to complete the Nutrient Management Plan and/or Waste Management Plan prior to the due date identified in Table 1 if the Executive Officer has determined the facility presents a significant risk to groundwater or surface water.

I, PAMELA C. CREEDON, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Valley Region, on 3 May 2007.

PAMELA C. CREEDON, Executive Officer

PAL: 9 May 2007

Table 1. Schedule for Submittal of Existing Conditions Report, Waste Management Plan, Nutrient Management Plan, Salinity Report, Preliminary Infrastructure Needs Checklist, and Annual Reports

Due Date	Submittal Due	Contents of Submittal	Professional Certification Requirements
31 December 2007	**Existing Conditions Report** (Attachment A)	Preliminary Dairy Facility Assessment, maps, etc.	None
1 July 2008	**Annual Report**	Per Monitoring and Reporting Program No.R5-2007-0035, including Annual Dairy Facility Assessment with proposed interim facility modifications considered to be implemented.	None
1 July 2008	Statement of Completion of the Following Items in Attachment C (Nutrient Management Plan):*		
	Items I.A.1, I.B, I.C, I.D	Land Application Area Information.	None
	Item II	Sampling and Analysis Plan.	Certified Nutrient Management Specialist
	Item IV	Setbacks, Buffers, and Other Alternatives to Protect Surface Water.	None
	Item VI	Record-Keeping Requirements.	None
1 July 2008	The following items in Attachment B (Waste Management Plan):		
	Items I.A, I.B, I.C, I.D, I.E, I.F.1a, I.F.2a, I.F.3, I.F.4, I.F.5	Facility Description.	None
	Item V	Operation and Maintenance Plan.	None

Table 1. Schedule for Submittal of Existing Conditions Report, Waste Management Plan, Nutrient Management Plan, Salinity Report, Preliminary Infrastructure Needs Checklist, and Annual Reports

Due Date	Submittal Due	Contents of Submittal	Professional Certification Requirements
1 July 2008	Identification of Backflow Problems	Identify backflow problems with proposed remediation and schedule.	Trained Professional**
	Proposed Interim Facility Modifications as Necessary to Improve Storage Capacity	Proposed interim facility modifications (e.g., recycling flush water, diverting roof runoff, resizing nozzles, removing pond solids, etc.) that can be completed within the next 12 months to decrease storage capacity needs or increase existing storage capacity, with schedule to implement proposed modifications within 12 months.	None
	Proposed Interim Facility Modifications as Necessary to Balance Nitrogen	Proposed interim facility modifications (e.g., acquiring more cropland, exporting more wastes, reducing herd size, etc.) that can be completed within 12 months to balance the nitrogen generated and imported with the nitrogen removed by crops and exported, with schedule to implement proposed modifications within 12 months.	None
31 December 2008	Statement of Completion of Item V of Attachment C (Nutrient Management Plan)*	Field Risk Assessment – Evaluate the effectiveness of management practices to control waste discharges from land application areas.	None
	Preliminary Infrastructure Needs Checklist	Identification of infrastructure changes needed to properly manage wastes (e.g., piping, pumps, meters, etc.).	None

Table 1. Schedule for Submittal of Existing Conditions Report, Waste Management Plan, Nutrient Management Plan, Salinity Report, Preliminary Infrastructure Needs Checklist, and Annual Reports

Due Date	Submittal Due	Contents of Submittal	Professional Certification Requirements
1 July 2009	**Annual Report**	Per Monitoring and Reporting Program No. R5-2007-0035 including Annual Dairy Facility Assessment with modifications implemented to date.	None
1 July 2009	Documentation of Interim Facility Modifications Completion for Storage Capacity and to Balance Nitrogen	Document all interim modifications completed and identify those that were proposed but not completed.	None
1 July 2009	**Nutrient Management Plan** Retrofitting Plan with Schedule	Retrofitting needed to improve nitrogen balance (may include piping, meters, pumps, etc.).	None
	Statement of Completion of the Following Items in Attachment C (Nutrient Management Plan)*:		
	Item I.A.2	Land Application Area Information	None
	Item III	Nutrient Budget	Certified Nutrient Management Specialist
1 July 2009	**Waste Management Plan** (with Retrofitting Plan/Schedule) Including the Following Items in Attachment B (Waste Management Plan):	Retrofitting needed to improve storage capacity, flood protection, or design of production area- may include design/construction of new pond, berms for flood protection, grading for drainage, etc.	California Registered Professional
	Items I.F.1.b, I.F.2.b	Facility Description	None

Table 1. Schedule for Submittal of Existing Conditions Report, Waste Management Plan, Nutrient Management Plan, Salinity Report, Preliminary Infrastructure Needs Checklist, and Annual Reports

Due Date	Submittal Due	Contents of Submittal	Professional Certification Requirements
1 July 2009	Item II	Storage Capacity	California Registered Professional
	Item III	Flood Protection	California Registered Professional***
	Item IV	Production Area Design/Construction	None
	Item VI	Documentation there are no cross connections.	Trained Professional**
1 July 2009	**Salinity Report**	Identification of salt sources at dairy, evaluation of measures to minimize salt in the dairy waste, and commitment to implement measures identified to minimize salt in the dairy waste.	None
1 July 2010	**Annual Report**	Per Monitoring and Reporting Program No. R5-2007-0035 including Annual Dairy Facility Assessment with facility modifications implemented to date.	None
1 July 2010	Status on facility retrofitting completed or in progress	Status on facility retrofitting completion as proposed (1 July 2009) for the Nutrient Management Plan and Waste Management Plan.	None
1 July 2011	**Annual Report**	Per Monitoring and Reporting Program No. R5-2007-0035 including Annual Dairy Facility Assessment with facility modifications implemented to date.	None

Table 1. Schedule for Submittal of Existing Conditions Report, Waste Management Plan, Nutrient Management Plan, Salinity Report, Preliminary Infrastructure Needs Checklist, and Annual Reports

Due Date	Submittal Due	Contents of Submittal	Professional Certification Requirements
1 July 2011	Certification of Facility Retrofitting Completion For Nutrient Management Plan	Certify completion of retrofitting proposed (1 July 2009) to improve nitrogen balance.	Certified Nutrient Management Specialist
	The Following Items in Attachment B (Waste Management Plan): Item II.C	Certification of completion of modifications made to meet storage capacity requirements.	California Registered Professional
1 July 2011	Item III.D	Certification of completion of modifications made to meet flood protection requirements.	California Registered Professional
	Item IV.C	Certification of modifications made to meet construction criteria for corrals, pens, animal housing area, and manure and feed storage areas.	None
1 July 2012	**Annual Report**	Per Monitoring and Reporting Program No. R5-2007-0035 including Annual Dairy Facility Assessment with facility modifications implemented to date.	None
1 July 2012	Certification of Nutrient Management Plan implementation	Certification that the Nutrient Management Plan has been completely implemented.	None

* The Discharger must certify in a statement that these items have been completed and certified by the appropriate professional as specified. These items are to be maintained at the dairy, made available to Central Valley Water Board staff during their inspections of the dairy, and submitted to the Executive Officer when requested by the Executive Officer.

** A trained professional could be a person certified by the American Backflow Prevention Association, an inspector for a state or local governmental agency who has experience and/or training in backflow prevention, or a consultant with such experience and/or training.

*** A California Registered Professional is not required to demonstrate the facility has adequate flood protection if the Discharger provides a published flood zone map that shows the facility is outside of the relevant flood zone (see item III of Attachment B).

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM NO. R5-2007-0035

GENERAL ORDER
FOR
EXISTING MILK COW DAIRIES

This Monitoring and Reporting Program (MRP) is issued pursuant to California Water Code (CWC) Section 13267. The Discharger shall not implement any changes to this MRP unless a revised MRP is issued by the Executive Officer.

This MRP includes Monitoring, Record-Keeping, and Reporting requirements. Monitoring requirements include monitoring of discharges of manure and/or process wastewater, storm water, and tailwater from the production area and land application areas and groundwater monitoring in order to determine if the Discharger's dairy is in compliance with the discharge limitations of Waste Discharge Requirements General Order No. R5-2007-0035 (Order). Discharge monitoring should be infrequent for those dairies that are operating in compliance with the Order.

Monitoring requirements also include monitoring of nutrients applied to, and removed from, land application areas in order for the Discharger to develop and implement a Nutrient Management Plan that will minimize leaching of nutrients and salts to groundwater and transport of these constituents to surface water.

In addition, monitoring requirements include periodic visual inspections of the dairy to ensure the dairy is being operated and maintained to ensure continued compliance with the Order.

This MRP requires the Discharger to keep and maintain records for five years of the monitoring activities for the production and land application areas and to prepare and submit reports containing the results of specified monitoring as indicated below.

Except where indicated, all monitoring must begin immediately. Note that some types of events require that a report be submitted to the Central Valley Water Board within 24 hours (see section C).

Dischargers must follow sampling and analytical procedures approved by the Executive Officer. Approved procedures will be posted on the Board's web site and copies may be obtained by contacting staff. A Discharger may submit alternative procedures for consideration, but must receive written approval from the Executive Officer before using them.

The Discharger shall conduct monitoring, record-keeping, and reporting as specified below.

A. MONITORING REQUIREMENTS

Visual Inspections

Effective immediately, the Discharger shall conduct and record the inspections specified in Table 1 below and maintain records of the results on-site for a period of five years.

Table 1. INSPECTIONS
Production Area Weekly during the wet season (1 October to 31 May) and monthly between 1 June and 30 September: Inspect all waste storage areas and note any conditions or changes that could result in discharges to surface water and/or from property under control of the Discharger. Note whether freeboard within each liquid storage structure is less than, equal to, or greater than the minimum required (two feet for above ground ponds and one foot for below ground ponds). During and after each significant storm event[1]: Visual inspections of storm water containment structures for discharge, freeboard, berm integrity, cracking, slumping, erosion, excess vegetation, animal burrows, and seepage. Monthly on the 1st day of each month: Photograph each pond showing the current freeboard on that date. All photos shall be dated and maintained as part of the discharger's record.
Land Application Areas Daily when process wastewater is being applied: Inspect the land application area and note: the condition of land application berms including rodent holes, piping, and bank erosion; the presence (or lack) of field saturation, ponding, erosion, runoff (including tailwater discharges from the end of fields, pipes, or other conveyances), and nuisance conditions; and the conditions of any vegetated buffers or alternative conservation practices.

Nutrient Monitoring

Starting no later than 12 months after adoption of this Order, the Discharger shall begin monitoring process wastewater, manure, and plant tissue produced at the facility, soil in each land application area, and irrigation water used on each land application area for the constituents and at the frequency as specified in Table 2 below. This information is for use in conducting nutrient management on the individual land application areas and at the facility on the whole. It must be used to develop and implement the Nutrient Management Plan. The Discharger is encouraged to collect and use additional data, as necessary, to refine nutrient management.

[1] A significant storm event is defined as a storm event that results in continuous runoff of storm water for a minimum of one hour, or intermittent runoff for a minimum of three hours in a 12-hour period.

Table 2. NUTRIENT MONITORING
Process Wastewater Each application: Record the volume (gallons or acre-inches) and date of process wastewater application to each land application area. Quarterly during one application event: Field measurement of electrical conductivity. Laboratory analyses for nitrate-nitrogen (only when retention pond is aerated), ammonium-nitrogen, total Kjeldahl nitrogen, total phosphorus, and potassium. Once within 12 months and annually for two years after groundwater monitoring wells are required: Laboratory analyses for general minerals (calcium, magnesium, sodium, bicarbonate, carbonate, sulfate, and chloride).
Manure Each application to each land application area: Record the total volume (cubic yards) applied and density (pounds per cubic foot) or total weight (tons) applied and percent moisture. Once within 12 months: Laboratory analyses for general minerals (calcium, magnesium, sodium, bicarbonate, carbonate, sulfate, and chloride). Twice per year: Laboratory analyses for total nitrogen, total phosphorus, potassium, and density (if volume manure applied is reported) or percent moisture (if weight manure applied is reported). Each offsite export of manure: Record the total volume (cubic yards) exported and density (grams per liter) or total weight (tons) exported and percent moisture. Laboratory analyses for density (if volume manure exported is reported) or percent moisture (if weight manure exported is reported). Annually: Record the total dry weight (tons) of manure applied annually to each land application area and the total dry weight (tons) of manure exported offsite.
Plant Tissue At harvest: Record the total weight (tons) and percent wet weight or volume (cubic yards) and density (grams per liter) of harvested material removed from each land application area. Laboratory analyses for total nitrogen, phosphorus, and potassium (expressed on a dry weight basis), and percent wet weight (if weight of harvested material is reported) or density (if volume of harvested material is reported). The following test is only required if the Discharger wants to add fertilizer in excess of 1.4 times the nitrogen expected to be removed by the harvested portion of the crop (see Attachment C for details): Mid-season, if necessary to assess the need for additional nitrogen fertilizer during the growing season. Laboratory analyses for total nitrogen, expressed on a dry weight basis.

Table 2. NUTRIENT MONITORING
Soil <u>Beginning in the summer of 2008 and then once every 5 years from each land application area</u>: Laboratory analyses for: Total phosphorus ***The following soil tests are recommended but not required:*** <u>Spring pre-plant for each crop</u>: Laboratory analyses for: 0 to 1 foot depth: Nitrate-nitrogen and organic matter. 1 to 2 foot depth: Nitrate-nitrogen. <u>Fall pre-plant for each crop</u>: Laboratory analyses for: 0 to 1 foot: Electrical conductivity, nitrate-nitrogen, soluble phosphorus, potassium and organic matter. 1 to 2 foot: Nitrate-nitrogen. 2 to 3 foot: Nitrate-nitrogen.
Irrigation Water[2] <u>Each irrigation event for each land application area</u>: Record volume (gallons or acre-inches)[3] and source (well or canal) of irrigation water applied and dates applied. <u>One irrigation event during each irrigation season during actual irrigation events</u>: For each irrigation water source (well and canal): Electrical conductivity and total nitrogen.[4] Data collected to satisfy the groundwater monitoring requirements (below) will satisfy this requirement.

Monitoring of Surface Runoff

Effective 1 October 2007, the Discharger shall monitor discharges of manure and/or process wastewater, storm water, and tailwater from the production area and land application area for the constituents and at the frequency as specified in Table 3 below.

Table 3. DISCHARGE MONITORING
Unauthorized Discharges (Including Off-Property Discharges) of Manure or Process Wastewater from the Production Area or Land Application Area <u>Daily during each discharge</u>: Record date, time, approximate volume (gallons) or weight (tons), duration, location, source, and ultimate destination of the discharge. Field measurements of the discharge for electrical conductivity, temperature, and pH. Laboratory analyses of the discharge for nitrate-nitrogen, total ammonia-nitrogen, unionized ammonia-nitrogen, total Kjeldahl nitrogen, total phosphorus, potassium, total dissolved solids, BOD_5[5], total suspended solids, and total and fecal coliform.

[2] The Discharger shall monitor irrigation water (from each water well source and canal) that is used on all land application areas.
[3] Initial volume measurements may be the total volume for all land application areas. Volume measurements for each irrigation source for each land application area shall be recorded no later than **1 July 2011**.
[4] In lieu of sampling the irrigation water, the Discharger may provide equivalent data from the local irrigation district.
[5] Five-day Biochemical Oxygen Demand.

Table 3. DISCHARGE MONITORING
Daily during each discharge to surface water: For surface water upstream[6] and downstream[7] of the discharge: Field measurements for electrical conductivity, dissolved oxygen, temperature, and pH. Laboratory analyses for nitrate-nitrogen, total ammonia-nitrogen, unionized ammonia-nitrogen, total Kjeldahl nitrogen, total phosphorus, potassium, total dissolved solids, BOD_5, total suspended solids, and total and fecal coliform.
Storm Water Discharges to Surface Water from the Production Area Daily during each discharge to surface water: Record date, time, approximate volume, duration, location, source, and ultimate destination of the discharge. For (1) the discharge and surface water (2) upstream and (3) downstream of the discharge: Field measurements of electrical conductivity, temperature, pH, total ammonia-nitrogen, and unionized ammonia-nitrogen. Laboratory analyses for nitrate-nitrogen, turbidity, total phosphorus, and total and fecal coliform.
Storm Water Discharges to Surface Water from Each Land Application Area[8] First storm event of the wet season[9] and during the peak storm season (typically February)[10] each year from one third of the land application areas[11] with the land application areas sampled rotated each year[12]: Record date, time, approximate volume, duration, location, and ultimate destination of the discharge. Field measurements of the discharge for electrical conductivity, temperature, pH, total ammonia-nitrogen, and unionized ammonia-nitrogen. Laboratory analyses of the discharge for nitrate-nitrogen, phosphorus, turbidity, and total and fecal coliform.

[6] Upstream samples shall be taken just far enough upstream so as not to be influenced by the discharge.
[7] Downstream samples shall be taken just far enough downstream where the discharge is blended with the receiving water but not influenced by dilution flows or other discharges.
[8] Sample locations must be chosen such that the samples are representative of the quality and quantity of storm water discharged.
[9] This sample shall be taken from the first storm event of the season that produces significant storm water discharge such as would occur during continuous storm water runoff for a minimum of one hour, or intermittent storm water runoff for a minimum of three hours in a 12-hour period.
[10] This sample shall be taken during a storm event that produces significant storm water discharge and that is preceded by at least three days of dry weather. The sample shall be taken during the first hour of the discharge.
[11] One land application area shall be sampled for Dischargers that have one to three land application areas, two land application areas shall be sampled for Dischargers that have four to six land application areas, etc.
[12] The Discharger may propose in the annual storm water report to reduce the constituents and/or sampling frequency of storm water discharges to surface water from any land application area based on the previous year's data (see Storm Water Reporting below).

Table 3. DISCHARGE MONITORING
***Tailwater Discharges to Surface Water from Land Application Areas*[13]**
Each discharge from each land application area where irrigation has occurred less than 60 days after application of manure and/or process wastewater: Record date, time, approximate volume (gallons), duration, location, and ultimate destination of the discharge. Field measurements of discharge for electrical conductivity, temperature, pH, total ammonia-nitrogen, and unionized ammonia-nitrogen. First discharge of the year from any land application area where irrigation has occurred less than 60 days after application of manure and/or process wastewater: Laboratory analyses for nitrate-nitrogen, total phosphorus, and total and fecal coliform.

1. If conditions are not safe for sampling, the Discharger must provide documentation of why samples could not be collected and analyzed. For example, the Discharger may be unable to collect samples during dangerous weather conditions (such as local flooding, high winds, tornados, electrical storms, etc.). However, once the dangerous conditions have passed, the Discharger shall collect a sample of the discharge or, if the discharge has ceased, from the waste management unit from which the discharge occurred.

2. Discharge and surface water sample analyses shall be conducted by a laboratory certified for such analyses by the California Department of Health Services. These laboratory analyses shall be conducted in accordance with the Title 40 Code of Federal Regulations Part 136 (*Guidelines Establishing Test Procedures for the Analysis of Pollutants*) or other test methods approved by the Executive Officer.

3. All discharges shall be reported as specified in the Reporting Requirements (Priority Reporting of Significant Events and Annual Reporting) below, as appropriate.

4. The rationale for all discharge sampling locations shall be included in the Annual Report (in Storm Water Report for storm water discharges from land application areas).

5. Parties interested in coordinating or combining surface water monitoring conducted by an individual dairy or group of dairies with monitoring conducted pursuant to the Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Lands (Order No. R5-2006-0053 for Coalition Group or Order No. R5-2006-0054 for Individual Discharger, or updates thereto) may propose an alternative monitoring program for the Executive Officer's consideration. The alternative program shall not begin until the Discharger receives written approval from the Executive Officer.

[13] Tailwater samples shall be collected at the point of discharge to surface water.

Groundwater Monitoring

Beginning within six months of adoption of the Order, the Discharger shall sample each domestic and agricultural supply well and subsurface (tile) drainage system present in the production and/or land application areas to characterize existing groundwater quality. This monitoring shall be conducted at the frequency and for the parameters specified in Table 4 below.

Table 4. GROUNDWATER MONITORING
Domestic and Agricultural Supply Wells Annually: Field measurements of electrical conductivity. Laboratory analyses of nitrate-nitrogen.
Subsurface (Tile) Drainage System Annually: Field measurements of electrical conductivity. Laboratory analyses of nitrate-nitrogen and total phosphorus.

1. Groundwater samples from domestic wells shall be collected from the tap nearest to the pressure tank (and before the pressure tank if possible) after water has been pumped from this tap for 10 to 20 minutes. Groundwater samples from agricultural supply wells shall be collected after the pump has run for a minimum of 30 minutes or after at least three well volumes have been purged from the well. Samples from subsurface (tile) drains shall be collected at the discharge point into a canal or drain.

General Monitoring Requirements

1. The Discharger shall comply with all the "Requirements Specifically for Monitoring Programs and Monitoring Reports" as specified in the Standard Provisions and Reporting Requirements.

2. Approved sampling procedures are listed on the Central Valley Water Board's web site at http://www.waterboards.ca.gov/centralvalley/available_documents/index.html #confined. When special procedures appear to be necessary at an individual dairy, the Discharger may request approval of alternative sampling procedures for nutrient management. The Executive Officer will review such requests and if adequate justification is provided, may approve the requested alternative sampling procedures.

3. The Discharger shall use clean sample containers and sample handling, storage, and preservation methods that are accepted or recommended by the selected analytical laboratory or, as appropriate, in accordance with approved United States Environmental Protection Agency analytical methods.

4. All samples collected shall be representative of the volume and nature of the material being sampled.

5. All samples containers shall be labeled and records maintained to show the time and date of collection as well as the person collecting the sample and the sample location.

6. All samples collected for laboratory analyses shall be preserved and submitted to the laboratory within the required holding time appropriate for the analytical method used and the constituents analyzed.

7. All samples submitted to a laboratory for analyses shall be identified in a properly completed and signed Chain of Custody form.

8. Field test instruments used for pH, electrical conductivity and dissolved oxygen may be used provided:

   a. The operator is trained in the proper use and maintenance of the instruments;

   b. The instruments are field calibrated prior to each monitoring event; and

   c. Instruments are serviced and/or calibrated by the manufacturer at the recommended frequency.

B. RECORD-KEEPING REQUIREMENTS

Dischargers shall maintain on-site for a period of five years from the date they are created all information as follows:

1. All information necessary to document implementation and management of the minimum elements of the nutrient management plan (NMP);

2. All records for the production area including:

   a. Records documenting the inspections required under the Monitoring Requirements above;

   b. Records documenting any corrective actions taken to correct deficiencies noted as a result of the inspections required in the Monitoring Requirements above. Deficiencies not corrected in 30 days must be accompanied by an explanation of the factors preventing immediate correction;

c. Records of the date, time, and estimated volume of any overflow;

d. Records of mortality management and practices;

e. Steps and dates when action is taken to correct unauthorized releases as reported in accordance with Priority Reporting of Significant Events below; and

f. Records of monitoring activities and laboratory analyses conducted as required in Standard Provisions and Reporting Requirements D.5.

3. All records for the land application area including:

a. Expected and actual crop yields;

b. Identification of crop, acreage, and dates of planting and harvest for each field;

c. Dates, locations, and approximate weight and moisture content, or volume and density, of manure applied to each field;

d. Dates, locations, and volume of process wastewater applied to each field;

e. Weather conditions at time of manure and process wastewater applications and for 24 hours prior to and following applications;

f. Records documenting the inspections conducted as required under the Monitoring Requirements above;

g. Dates, locations, and test methods for soil, manure, process wastewater, irrigation water, and plant tissue sampling;

h. Results from manure, process wastewater, irrigation water, soil, plant tissue, discharge (including tailwater), and storm water sampling;

i. Explanation for the basis for determining manure or process wastewater application rates, as provided in the Technical Standards for Nutrient Management established by the Order (Attachment C);

j. Calculations showing the total nitrogen, phosphorus, and potassium to be applied to each field, including sources other than manure or process wastewater;

k. Total amount of nitrogen, phosphorus, and potassium actually applied to each field, including documentation of calculations for the total amount applied;

l. The method(s) used to apply manure and/or process wastewater;

m. Dates of manure and/or process wastewater application equipment inspections;

n. Records documenting any corrective actions taken to correct deficiencies noted as a result of the inspections required in the Monitoring Requirements above. Deficiencies not corrected in 30 days must be accompanied by an explanation of the factors preventing immediate correction; and

o. Records of monitoring activities and laboratory analyses conducted as required in Standard Provisions and Reporting Requirements D.5.

4. A copy of the Discharger's site-specific NMP;

5. All Manure/Process Wastewater Tracking Manifest forms (Attachment D) which includes information on the manure hauler, destination of the manure, dates hauled, amount hauled, and certification; and

6. All analyses of manure, process wastewater, irrigation water, soil, plant tissue, discharges (including tailwater discharges), surface water, storm water, subsurface (tile) drainage, and groundwater.

C. REPORTING REQUIREMENTS

Priority Reporting of Significant Events (Prompt Action Required)

The Discharger shall report any noncompliance that endangers human health or the environment or any noncompliance with Prohibitions A.1, A.2, A.3, A.4, A.5, A.8, A.9, A.10, A.11, and A.12 in the Order, **within 24 hours** of becoming aware of its occurrence. The incident shall be reported to the Central Valley Water Board Office, local environmental health department, and to the California Office of Emergency Services (OES). During non-business hours, the Discharger shall leave a message on the Central Valley Water Board's voice mail. The message shall include the time, date, place, and nature of the noncompliance, the name and number of the reporting person, and shall be recorded in writing by the Discharger. The OES is operational 24 hours a day. A written report shall be submitted to the Central Valley Water Board office **within two weeks** of the Discharger becoming aware of the incident. The report shall contain a description of the noncompliance, its causes, duration, and the actual or anticipated time for achieving compliance. The report shall include complete details of the steps that the Discharger has taken or intends to take, in order to prevent recurrence. All intentional or accidental spills shall be reported as required by this provision. The written submission shall contain:

1. The approximate date, time, and location of the noncompliance including a description of the ultimate destination of any unauthorized discharge and the flow path of such discharge to a receiving water body;

2. A description of the noncompliance and its cause;

3. The flow rate, volume, and duration of any discharge involved in the noncompliance;

4. The amount of precipitation (in inches) the day of any discharge and for each of the seven days preceding the discharge;

5. A description (location; date and time collected; field measurements of pH, temperature, dissolved oxygen and electrical conductivity; sample identification; date submitted to laboratory; analyses requested) of noncompliance discharge samples and/or surface water samples taken to comply with the Monitoring Requirements above for *Unauthorized Discharges (Including Off-Property Discharges) of Manure or Process Wastewater From the Production Area or Land Application Area* and *Storm Water Discharges to Surface Water from the Production Area*;

6. The period of noncompliance, including dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue;

7. A time schedule and a plan to implement corrective actions necessary to prevent the recurrence of such noncompliance; and

8. The laboratory analyses of the noncompliance discharge sample and/or upstream and downstream surface water samples shall be submitted to the Central Valley Water Board office within 45 days of the discharge.

Annual Reporting

An annual monitoring report is due by **1 July of each year** beginning **1 July 2008**. It will consist of a General Section, Groundwater Reporting Section and a Storm Water Reporting Section, as described below.

General Section

The General section of the annual report shall be completed on an annual report form provided by the Executive Officer (available on the Central Valley Water Board website at http://www.waterboards.ca.gov/centralvalley/available_documents/index.html#confined) and shall include all the information as specified below. This section of the annual report shall cover information on crops harvested during the previous calendar year, whether or not the crop was planted prior to this period.

1. Identification of the beginning and end dates of the annual reporting period;

2. An Annual Dairy Facility Assessment (an update to the Preliminary Dairy Facility Assessment in Attachment A) using the tool provided by the Executive Officer or any future revisions thereto;

3. Number and type of animals, whether in open confinement or housed under roof;

4. Estimated amount of total manure (tons) and process wastewater (gallons or acre-inches) generated by the facility during the annual reporting period and a calculation of the nitrogen, phosphorus, potassium and total salt content of this waste;

5. Estimated amount of total manure (tons) and process wastewater (gallons or acre-inches) applied to each land application area during the annual reporting period and a calculation of the nitrogen, phosphorus, potassium and total salt content of this waste;

6. Estimated amount of total manure (tons) and process wastewater (gallons or acre-inches) transferred to other persons by the facility during the annual reporting period and a calculation of the nitrogen, phosphorus, potassium and total salt content of this waste;

7. Total number of acres and the Assessor Parcel Numbers for all land application areas;

8. Total number of acres and the Assessor Parcel Numbers of property that were used for land application of manure and process wastewater during the annual reporting period;

9. Summary of all manure and process wastewater discharges from the production area to surface water or to land areas (land application areas or otherwise) when not in accordance with the facility's Nutrient Management Plan that occurred during the annual reporting period, including date, time,

location, approximate volume, a map showing discharge and sample locations, rationale for sample locations, and method of measuring discharge flows;

10. Summary of all storm water discharges from the production area to surface water during the annual reporting period, including the date, time, approximate volume, duration, location, and a map showing the discharge and sample locations, rationale for sample locations, and method of measuring discharge flows;

11. Summary of all discharges from the land application area to surface water that have occurred during the annual reporting period, including the date, time, approximate volume, location, source of discharge (i.e., tailwater, process wastewater, or blended process wastewater), a map showing the discharge and sample locations, rationale for sample locations, and method of measuring discharge flows;

12. A statement indicating if the NMP has been updated and whether the current version of the facility's NMP was developed or approved by a certified nutrient management planner as specified in Attachment C of the Order;

13. Copies of all manure/process wastewater tracking manifests for the reporting period;

14. Copies of all written agreements with each third party that receives solid manure or process wastewater from the Discharger for its own use;

15. Copies of laboratory analyses of all discharges (manure, process wastewater, or tailwater), surface water (upstream and downstream of a discharge), and storm water, including chain-of-custody forms and laboratory quality assurance/quality control results;

16. Tabulated analytical data for samples of manure, process wastewater, irrigation water, soil, and plant tissue. The data shall be tabulated to clearly show sample dates, constituents analyzed, constituent concentrations, and detection limits; and

17. Results of the Record-Keeping Requirements for the production and land application areas specified in Record-Keeping Requirements B.2.b, B.2.c, B.3.a, B.3.b, B.3.c, B.3.d, B.3.e, B.3.k, and B.3.n above.

Groundwater Reporting Section

Groundwater monitoring results shall be included with the annual reports.

1. Dischargers that monitor supply wells and subsurface (tile) drainage systems only shall submit information on the location of sample collection and all field and laboratory data, including all laboratory analyses (including chain-of custody forms and laboratory quality assurance/quality control results).

2. Dischargers that have monitoring well systems shall include all laboratory analyses (including chain-of-custody forms and laboratory quality assurance/quality control results) and tabular and graphical summaries of the monitoring data. Data shall be tabulated to clearly show the sample dates, constituents analyzed, constituent concentrations, detection limits, depth to groundwater, and groundwater elevations. Graphical summaries of groundwater gradients and flow directions shall also be included. Each groundwater monitoring report shall include a summary data table of all historical and current groundwater elevations and analytical results. The groundwater monitoring reports shall be certified by a California registered professional as specified in General Reporting Requirements C.9 of the Standard Provisions and Reporting Requirements of the Order.

Storm Water Reporting Section

Storm water monitoring results will be included in the annual report. The report shall include a map showing all sample locations for all land application areas, rationale for all sampling locations, a discussion of how storm water flow measurements were made, the results (including the laboratory analyses, chain of custody forms, and laboratory quality assurance/quality control results) of all samples of storm water, and any modifications made to the facility or sampling plan in response to pollutants detected in storm water. The annual report must also include documentation if no significant discharge of storm water occurred from the land application area(s) or if it was not possible to collect any of the required samples or perform visual observations due to adverse climatic conditions.

If the storm water monitoring for any land application area indicates pollutants have not been detected in storm water samples, the Discharger may propose to the Executive Officer to reduce the constituents and/or sampling frequency for that area.

General Reporting Requirements

1. The results of any monitoring conducted more frequently than required at the locations specified herein shall be reported to the Central Valley Water Board.

2. Laboratory analyses for manure, process wastewater, and soil shall be submitted to the Central Valley Water Board upon request by the Executive Officer.

3. Each report shall be signed by the Discharger or a duly authorized representative as specified in the General Reporting Requirements C.7 of the Standard Provisions and Reporting Requirements (SPRR), and shall contain the following statement:

   "*I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.*"

4. For facilities in Fresno, Kern, Kings, Madera, Mariposa, and Tulare counties, submit reports to:

   California Regional Water Quality Control Board
   Central Valley Region
   1685 E Street
   Fresno, CA 93706
   Attention: Confined Animal Regulatory Unit

   For facilities in Butte, Lassen, Modoc, Plumas, Tehama, and Shasta counties, submit reports to:

   California Regional Water Quality Control Board
   Central Valley Region
   415 Knollcrest Drive, Suite 100
   Redding, CA 96002
   Attention: Confined Animal Regulatory Unit

   For facilities in all other counties, submit reports to:

   California Regional Water Quality Control Board
   Central Valley Region
   11020 Sun Center Drive #200
   Rancho Cordova, CA 95670
   Attention: Confined Animal Regulatory Unit

ODERED BY: ________________________________
PAMELA C. CREEDON, Executive Officer

____
Date

PAL: 9 May 2007

MONITORING AND REPORTING PROGRAM ORDER NO. R5-2007-0035
ATTACHMENT A

Additional Groundwater Monitoring,
Monitoring Well Installation And Sampling Plan
And
Monitoring Well Installation Completion Report
For
Existing Milk Cow Dairies

A. Additional Groundwater Monitoring

The Executive Officer has authority pursuant to California Water Code Section 13267 to order Dischargers to implement monitoring and reporting programs. Pursuant to Section 13267, the Executive Officer will order Dischargers to install monitoring wells to comply with Monitoring and Reporting Program Order No. R5-2007-0035 based on an evaluation of the threat to water quality at each dairy. It is anticipated that this will occur in phases of approximately 100 to 200 dairies per year. The first group of dairies ordered to install groundwater monitoring wells will be those dairies where nitrate-nitrogen is detected at 10 mg/l or more in any one domestic well, agricultural well, or subsurface (tile) drainage system in the vicinity of the dairy. If necessary, the Executive Officer will further prioritize these groundwater monitoring requirements based on the factors in Table 5 below. Pursuant to Section 13267, the Executive Officer may order implementation of a monitoring and reporting program at a dairy at any time. Such order may occur, for instance, if violations of the General Order are documented and/or the dairy is found to be in an area where site conditions and characteristics pose a high risk to groundwater quality.

1. When ordered by the Executive Officer, the Discharger shall install sufficient monitoring wells to:

    a. Characterize groundwater flow direction and gradient beneath the site;

    b. Characterize natural background (unaffected by the Discharger or others) groundwater quality upgradient of the facility; and

    c. Characterize groundwater quality downgradient of the corrals, downgradient of the retention ponds, and downgradient of the land application areas.

2. It may be necessary to install more than one upgradient monitoring well (i.e., for the production area and the land application area). The Executive Officer may order more extensive monitoring based on site-specific conditions.

TABLE 5. GROUNDWATER MONITORING FACTORS FOR RANKING PRIORITY[1]			
FACTOR	**SITE CONDITION**	**POINTS**	**SCORE**
Highest nitrate concentration (nitrate-nitrogen in mg/l) in any existing domestic well, agricultural supply well, or subsurface (tile) drainage system at the dairy or associated land application area.*	< 10	0	
	10 - 20	10	
	>20	20	
Location of production area or land application area relative to a Department of Pesticide Groundwater Protection Area[2] (GWPA).	Outside GWPA	0	
	In GWPA	20	
Distance (feet) of production area or land application area from an artificial recharge area[3] as identified in the California Department of Water Resources Bulletin 118 or by the Executive Officer.	> 1,500	0	
	601 to 1,500	10	
	0 to 600	20	
Nitrate concentration (nitrate-nitrogen in mg/l) in domestic well on property adjacent to the dairy production area or land application area (detected two or more times).	< 10 or unknown	0	
	10 or greater	20	
Distance (feet) from dairy production area or land application area and the nearest off-property domestic well.*	> 600	0	
	301 to 600	10	
	0 to 300	20	
Distance (feet) from dairy production area or land application area and the nearest off-property municipal well.*	> 1,500	0	
	601 to 1,500	10	
	0 to 600	20	
Number of crops grown per year per field.*	1	5	
	2	10	
	3	15	
Nutrient Management Plan completed by **1 July 2009***	Yes	0	
	No	100	
Whole Farm Nitrogen Balance.[4]*	<1.65	0	
	1.65 to 3	10	
	>3	20	

Total Score: _________

*This information will be provided by the Discharger. All other information will be obtained by the Executive Officer.

1 Information on each factor may not be available for each facility. Total scores will be the ratio of the points accumulated to the total points possible for each facility. Dairies with higher total scores will be directed to install monitoring wells first.

2 The Department of Pesticide Regulation (DPR) defines a Groundwater Protection Area (GWPA) as an area of land that is vulnerable to the movement of pesticides to groundwater according to either leaching or runoff processes. These areas include areas where the depth to groundwater is 70 feet or less. The DPR GWPAs can be seen on DPRs website at http://www.cdpr.ca.gov/docs/gwp/gwpamaps.htm.

3 An artificial recharge area is defined as an area where the addition of water to an aquifer is by human activity, such as putting surface water into dug or constructed spreading basins or injecting water through wells.

4 The Whole Farm Nitrogen Balance is to be determined as the ratio of (total nitrogen in storage – total nitrogen exported + nitrogen imported + irrigation nitrogen + atmospheric nitrogen)/(total nitrogen removed by crops) as reported in the Preliminary Dairy Facility Assessment in the Existing Conditions Report (Attachment A).

After 24 months, 100 points will be added if the preparation or implementation of the nutrient management plan is behind schedule.

3. Prior to installation of monitoring wells, the Discharger shall submit to the Executive Officer a Monitoring Well Installation and Sampling Plan (MWISP) (see below) and schedule prepared by, or under the direct supervision of, and certified by, a California registered civil engineer or a California registered geologist with experience in hydrogeology. Installation of monitoring wells shall not begin until the Executive Officer notifies the Discharger in writing that the MWISP is acceptable.

4. All monitoring wells shall be constructed in a manner that maintains the integrity of the monitoring well borehole and prevents the well from acting as a conduit for pollutant/contaminant transport. The sampling interval of each monitoring well shall be appropriately screened and fitted with an appropriate filter pack to enable collection of representative groundwater samples of the first encountered groundwater.

5. The construction and destruction of monitoring wells and supply wells shall be in accordance with the standards under *Water Wells* and *Monitoring Wells* in the *California Well Standards Bulletin 74-90 (June 1991)* and *Bulletin 74-81 (December 1981),* adopted by the Department of Water Resources (DWR). Should any county or local agency adopt more stringent standards than that adopted by the DWR, then these local standards shall supercede the Well Standard of DWR, and the Discharger shall comply with the more stringent standards.

6. The horizontal and vertical position of each monitoring well shall be determined by a registered land surveyor or other qualified professional. The horizontal position of each monitoring well shall be measured with one-foot lateral accuracy using the North American Datum 1983 (NAD83 datum). The vertical elevations of each monitoring well shall be referenced to the North American Vertical Datum 1988 (NAVD88 datum) to an absolute accuracy of at least 0.5 feet and a relative accuracy between monitoring wells of 0.01 feet.

7. Within 45 days after completion of any monitoring well, the Discharger shall submit to the Executive Officer a Monitoring Well Installation Completion Report (MWICR) (see below) prepared, by or under the direct supervision of, and certified by, a California registered civil engineer or a California registered geologist with experience in hydrogeology.

8. The Discharger shall sample monitoring wells for the constituents and at the frequency as specified in Table 6 below. Groundwater monitoring shall include monitoring during periods of the expected highest and lowest water table levels.

Table 6. ADDITIONAL GROUNDWATER MONITORING
Monitoring Wells Semi-annually: Measurement of the depth to groundwater from a surveyed reference point to the nearest 0.010 foot in each monitoring well. Field measurements of electrical conductivity and pH. Laboratory analyses for nitrate and ammonia. Within six months of well construction and every five years thereafter: Laboratory analyses for general minerals (calcium, magnesium, sodium, bicarbonate, carbonate, sulfate, and chloride).

9. Groundwater samples from monitoring wells shall be collected as specified in an approved Monitoring Well Installation and Sampling Plan.

10. The Discharger shall submit to the Executive officer an evaluation of the groundwater monitoring data within six months of obtaining sufficient data to evaluate trends in the data (usually about 8 independent samples). The submittal shall include a description of the statistical or non-statistical methods used in evaluating the groundwater monitoring data. The evaluation must use methods approved by the Executive Officer.

B. Monitoring Well Installation and Sampling Plan

At a minimum, the MWISP must contain all of the information listed below.

1. General Information:

   a. Topographic map showing any existing nearby (about 2000 feet) domestic, irrigation, and municipal supply wells and monitoring wells known to the Discharger, utilities, surface water bodies, drainage courses and their tributaries/destinations, and other major physical and man-made features, as appropriate.

   b. Site plan showing proposed well locations, other existing wells, unused and/or abandoned wells, major physical site structures (such as corrals, freestall barns, milking barns, feed storage areas, etc.), waste handling facilities (including solid separation basins, retention ponds, manure storage areas), irrigated cropland and pasture, and on-site surface water features.

   c. Rationale for the number of proposed monitoring wells, their locations and depths, and identification of anticipated depth to groundwater.

d. Local permitting information (as required for drilling, well seals, boring/well abandonment).

e. Drilling details, including methods and types of equipment for drilling and logging activities. Equipment decontamination procedures (as appropriate) should be described.

f. Health and Safety Plan.

2. Proposed Drilling Details:

a. Drilling techniques.

b. Well logging method.

3. Proposed Monitoring Well Design: All proposed well construction information must be displayed on a construction diagram or schematic to identify the following:

a. Well depth.

b. Borehole depth and diameter.

c. Well construction materials.

d. Casing material and diameter – include conductor casing, if appropriate.

e. Location and length of perforation interval, size of perforations, and rationale.

f. Location and thickness of filter pack, type and size of filter pack material, and rationale.

g. Location and thickness of bentonite seal.

h. Location, thickness, and type of annular seal.

i. Surface seal depth and material.

j. Type of well cap(s).

k. Type of well surface completion.

l. Well protection devices (such as below-grade water tight-vaults, locking steel monument, bollards, etc.).

4. Proposed Monitoring Well Development:

   a. Schedule for development (at least seven days after well completion).

   b. Method of development.

   c. Method of determining when development is complete.

   d. Parameters to be monitored during development.

   e. Method for storage and disposal of development water.

5. Proposed Surveying:

   a. How horizontal and vertical position of each monitoring well will be determined.

   b. The accuracy of horizontal and vertical measurements to be obtained.

   c. The California licensed professional (licensed land surveyor or civil engineer) to perform the survey.

6. Proposed Groundwater Monitoring:

   a. Schedule (at least 48 hours after well development).

   b. Depth to groundwater measuring equipment (e.g., electric sounder or chalked tape capable of ±0.01-foot measurements).

   c. Well purging method, equipment, and amount of purge water.

   d. Sample collection (e.g., bottles and preservation methods), handling procedures, and holding times.

   e. Quality assurance/quality control (QA/QC) procedures (as appropriate).

   f. Analytical procedures.

   g. Equipment decontamination procedures (as appropriate).

7. Proposed Schedule:

   a. Fieldwork.

b. Laboratory analyses.

c. Report submittal.

C. Monitoring Well Installation Completion Report

At a minimum, the MWICR shall summarize the field activities as described below.

1. General Information:

   a. Brief overview of field activities including well installation summary (such as number, depths), and description and resolution of difficulties encountered during field program.

   b. Topographic map showing any existing nearby domestic, irrigation, and municipal supply wells and monitoring wells, utilities, surface water bodies, drainage courses and their tributaries/destinations, and other major physical and man-made features.

   c. Site plan showing monitoring well locations, other existing wells, unused and/or abandoned wells, major physical site structures (such as corrals, freestall barns, milking barns, feed storage areas, etc.), waste handling facilities (including solid separation basins, retention ponds, manure storage areas), land application area(s), and on-site surface water features.

   d. Period of field activities and milestone events (e.g., distinguish between dates of well installation, development, and sampling).

2. Monitoring Well Construction:

   a. Number and depths of monitoring wells installed.

   b. Monitoring well identification (i.e., numbers).

   c. Date(s) of drilling and well installation.

   d. Description of monitoring well locations including field-implemented changes (from proposed locations) due to physical obstacles or safety hazards.

   e. Description of drilling and construction, including equipment, methods, and difficulties encountered (such as hole collapse, lost circulation, need for fishing).

   f. Name of drilling company, driller, and logger (site geologist to be identified).

g. Driller's/Lithologic log.

h. As-builts for each monitoring well with the following details:

  i. Well identification.

  ii. Total borehole and well depth.

  iii. Date of installation.

  iv. Boring diameter.

  v. Casing material and diameter (include conductor casing, if appropriate).

  vi. Location and thickness of slotted casing, perforation size.

  vii. Location, thickness, type, and size of filter pack.

  viii. Location and thickness of bentonite seal.

  ix. Location, thickness, and type of annular seal.

  x. Depth of surface seal.

  xi. Type of well cap.

  xii. Type of surface completion.

  xiii. Depth to water (note any rises in water level from initial measurement) and date of measurement.

  xiv. Well elevation (measuring point to nearest ± 0.01 foot) at top of casing.

  xv. Well protection device (such as below-grade water tight vaults, stovepipe, bollards, etc).

i. All depth to groundwater measurements during field program.

j. Field notes from drilling, installation, and surveying activities (e.g., all subcontractor dailies, as appropriate).

k. Construction summary table of pertinent information such as date of installation, well depth, casing diameter, screen interval, bentonite seal interval, and well elevation.

3. Monitoring Well Development:

   a. Date(s) and time of development.

   b. Name of developer.

   c. Method of development.

   d. Methods used to identify completion of development.

   e. Development log: volume of water purged and measurements of temperature, pH and electrical conductivity during and after development.

   f. Disposal of development water.

   g. Field notes (such a bailing to dryness, recovery time, number of development cycles).

4. Monitoring Well Survey:

   a. Identify coordinate system or reference points used.

   b. Description of measuring points (i.e. ground surface, top of casing, etc.).

   c. Horizontal and vertical coordinates of well casing with cap removed.

   d. Name, license number, and signature of California licensed professional who conducted survey.

   e. Surveyor's field notes.

   f. Tabulated survey data.

INFORMATION SHEET

Waste Discharge Requirements General Order No. R5-2007-0035
Existing Milk Cow Dairies

INTRODUCTION

This Information Sheet provides background information relative to General Order No. R5-2007-0035 and discusses the various requirements of the General Order.

This General Order implements the State laws and regulations relevant to confined animal facilities. This General Order will serve as general Waste Discharge Requirements (WDRs) for discharges of waste from existing milk cow dairies and is intended to be compatible with the United States Environmental Protection Agency's regulations for concentrated animal feeding operations (CAFOs). This General Order is not a National Pollutant Discharge Elimination System (NPDES) Permit and does not authorize discharges of pollutants to surface water that are subject to NPDES permit requirements of the Clean Water Act. This Information Sheet is a part of the General Order.

All dairies covered under this General Order are required to:

- Comply with all provisions of the General Order
- Submit a Waste Management Plan for the production area
- Develop and implement a Nutrient Management Plan (NMP) for all land application areas
- Monitor wastewater, soil, crops, manure, surface water discharges, and storm water discharges
- Monitor surface water and groundwater
- Keep records for the production and land application areas
- Submit annual monitoring reports

CENTRAL VALLEY WATER BOARD AUTHORITY TO ISSUE WASTE DISCHARGE REQUIREMENT ORDERS

The Central Valley Water Board authority to regulate waste discharges that could affect the quality of the waters of the state, which includes both surface water and groundwater, and the prevention of nuisance, is found in the Porter-Cologne Water Quality Control Act (California Water Code Division 7). Regulation is accomplished through issuance of WDRs or the waiver of such requirements. All confined animal facilities are subject to this regulatory authority.

Confined animal facilities are defined in Title 27 California Code of Regulations (CCR) Section 20164 as "... any place where cattle, calves, sheep, swine, horses, mules, goats, fowl, or other domestic animals are corralled, penned, tethered, or otherwise enclosed or held and where feeding is by means other than grazing." Designation as a confined animal facility under these state regulations is not based on facility size.

California Water Code Section 13263(i) authorizes the issuance of general orders to regulate discharges of waste that meet specified criteria. The criteria in the California Water Code includes the following:

- The discharges are produced by the same or similar types of operations
- The discharges involve the same or similar types of wastes
- The discharges require the same or similar treatment standards
- The discharges are more appropriately regulated under general WDRs rather than individual WDRs

A general order for existing dairy facilities is appropriate because they: (a) involve the same or substantially similar types of operations, where animals are confined and wastes are managed by onsite storage, land application, or removal offsite; (b) discharge the same type of waste, primarily animal waste; (c) are subject to State regulations that impose the same or similar treatment standards; (d) have the same potential to impact surface water and groundwater; and (e) given the large number of facilities and their similarities, existing dairies are more appropriately regulated under general WDRs rather than individual WDRs.

DAIRY FACILITIES IN THE CENTRAL VALLEY REGION AFFECTED BY THIS GENERAL ORDER

There are approximately 1,600 milk cow dairy operations within the Central Valley Region (Region) that will be affected by this General Order. Consistent with California Water Code Section 13260, any person who owns and/or operates any confined animal facility in the Central Valley must file a Report of Waste Discharge (ROWD) with the appropriate Regional Water Quality Control Board (Regional Board). The requirement to submit a ROWD was waived for most dairies pursuant to Central Valley Water Board Resolution No. 82-036. Pursuant to California Water Code Section 13269 (as amended by Senate Bill (SB) 390), that waiver expired on 1 January 2003 unless the Central Valley Water Board renewed it.

To replace the expiring waiver for confined animal facilities, the Central Valley Water Board adopted Resolution R5-2002-0205 on 6 December 2002. This Resolution required all dairies to file a ROWD and each facility would be regulated in one of three ways: 1) an individual or general waste discharge requirement (under State law), 2) a conditional waiver of waste discharge requirements (Waiver) (under State law), or 3) an individual or general National Pollutant Discharge Elimination System (NPDES) permit (under Federal law). The rules for obtaining a Waiver were included as part of Resolution R5-2002-0205.

The Central Valley Water Board rescinded Resolution R5-2002-0205 on 13 March 2003 because neither general waste discharge requirements nor a general NPDES permit were available as options for facility operators to consider before the Resolution R5-2002-0205 deadlines to apply for a Waiver.

The waiver rescission however left all dairy operators without a clear understanding of their responsibility to comply with Water Code section 13260, which describes the need to file a ROWD for coverage under a Waste Discharge Requirement. To clarify the issue, on 27 May 2003, Central Valley Water Board staff wrote to all dairies that were in operation as of the date of that letter and staff stated in the letter "*owners and/or operators of existing dairies are not expected to submit any information to the Regional Board until requested to do so.*" On 8 August 2005, Central Valley Water Board staff notified (by certified mail) the owners and/or operators of known existing dairy facilities that they were required to file a Report of Waste Discharge for their existing dairy facility by 17 October 2005 (hereafter referred to as "ROWD Request Letter").

This General Order only applies to owners and operators of existing milk cow dairies (Dischargers) in the Central Valley Region. For the purposes of this General Order, existing milk cow dairies are those that were operating as of 17 October 2005 and filed a ROWD in response to the 8 August 2005 ROWD Request Letter.

Existing dairy operations include herd sizes that may vary in order to ensure a constant milk production volume. Maintaining constant milk production requires a dairy operator to manage the herd, continually producing calves, raising support stock to replace cows that die or fail to produce, and selling some of the mature cows and support stock. Professionals at the University of California Davis estimate the normal variation in California dairy herd sizes ranges from about 10 to 15 percent.

For the purposes of this Order, existing herd size is defined as the maximum number of mature dairy cows reported in the Report of Waste Discharge submitted in response to the 8 August 2005 ROWD Request Letter, plus or minus 15 percent of that reported number to account for the normal variation in herd sizes.

For the purposes of this Order, an increase in the number of mature dairy cows of more than 15 percent beyond the number reported in the Report of Waste Discharge submitted in response to the 8 August 2005 ROWD Request Letter is considered an expansion.

Forty-two (42) existing milk cow dairies in the Region are currently regulated under General WDRs for Milk Cow Dairies, Order No. 96-270. Forty-four (44) additional existing milk cow dairies in the Region are currently regulated under individual WDRs. All of these existing facilities will be placed under this General Order.

On 17 April 1997, the State Water Resources Control Board (State Water Board) adopted the General Industrial Storm Water Permit, Order No. 97-03-DWQ, NPDES No. CAS000001. Order No. 97-03-DWQ implements the final federal regulations (Title 40 Code of Federal Regulations Parts 122, 123, and 124) for storm water runoff published on 16 November 1990, by US EPA in compliance with Section 402(p) of the federal Clean Water Act. Approximately 250 dairy facilities in the Region are currently subject to Order No. 97-03-DWQ.

The Central Valley Water Board may also determine that some individual facilities are not appropriately regulated under a general order and may require owners and operators of such facilities to be regulated under individual WDRs.

DAIRY WASTES

For the purposes of this General Order, dairy waste includes, but is not limited to, manure, leachate, process wastewater and any water, precipitation or rainfall runoff that came into contact with raw materials, products, or byproducts such as manure, compost piles, feed, silage, milk, or bedding.

Waste generated at dairies is stored dry in piles or in liquid form in waste retention ponds. The wastes are then applied to cropland or transported off-site for utilization on cropland as a nutrient source. These nutrient-laden materials are applied to soils of varying character and drainage characteristics, varying proximity to surface drainages and waterways, different character of geology and depth to groundwater. Because of the site variability, this General Order requires the development of a Nutrient Management Plan that is field specific to ensure that optimum nutrient utilization takes place. Although the waste materials provide nutrients to crops, they can create nuisance conditions if improperly managed or cause pollution of surface water and/or groundwater if site conditions are not taken into account in preparing a nutrient utilization and management strategy. This General Order regulates the management of dairy wastes onsite and requires monitoring and continuous tracking of materials being taken off-site for utilization.

Dairy operators typically use chemicals such as cleaning products to disinfect their milking equipment, footbaths to maintain the health of their herd, and pesticides in both the production area and land application area. Some portion of some of these chemicals may be commingled with process wastewater before it is stored in the retention pond. This General Order requires Dischargers to identify the chemicals that are stored in the waste storage system or that could be discharged to surface water or ground water and the approximate amounts used annually at their dairy.

Manure from dairies contains high concentrations of salts (total dissolved solids, including constituents such as sodium and chloride) derived primarily from the feed and water sources used in the dairy production activities. Some dairies also use water softening devices for milk barn cleaning and other activities and the concentrated brines or reject water is usually sent to the retention pond, thus increasing the salt concentrations further.

Manure from dairies contains nutrients (including nitrogen, ammonia, phosphorus and potassium compounds) that can be used in crop production. A recent review of dairy manure by a University of California Committee of Experts (UCCE) indicates that dairy cows in the Central Valley Region excrete approximately one (1) pound (lb) of nitrogen per head per day and approximately 1.29 lbs of inorganic salts (including only Na^+, K^+, and Cl^-) per head per day. Thus, a 1,000-cow dairy generates approximately 365,000 lbs of nitrogen and 470,000 lbs of inorganic salts (Na^+, K^+, and Cl^-) per year that must be managed to prevent impacts to water quality.

The application of dairy waste to cropland as a source of nitrogen provides some challenges due to the complexity of nitrogen in the crop-soil system. Nitrogen in the soil-crop system occurs in three different forms - organic nitrogen, ammonium, and nitrate. Organic nitrogen is strongly sorbed to soil particles and is not available for plant uptake. Ammonium nitrogen is plant available, but also sorbs to soil particles. Ammonium nitrogen is converted to nitrate within days to weeks under most California conditions. Nitrate is plant available, does not adsorb to soil particles, and moves readily with soil water.

The source of organic nitrogen in soil is crop residue, the soil organic matter pool, and dairy waste applications. Organic nitrogen will mineralize to ammonium over time with the rate of mineralization dependent upon microbial processes that are dependent upon temperature, moisture, and other conditions. The UCCE review of dairy waste reported that a study of organic nitrogen mineralization in California showed that mineralization of organic nitrogen is essentially complete within one to seven years.
Thus, organic nitrogen provides a steady, relatively slow release of plant available and leachable nitrogen. Applying manure with high organic nitrogen content may not meet a crop's nitrogen need during the most rapid growth stage, while exceeding the crop nitrogen uptake during the remainder of the crop's growing season, when the nitrogen may be subject to leaching.

The application of manure or process wastewater to a land application area results in the discharge of salts and nitrogen compounds. Oxidation of nitrogen compounds (i.e., ammonia and organic nitrogen compounds) to nitrites and nitrates has the potential to degrade the quality of surface water and groundwater in the Region, if not properly managed. Runoff from, or over-application on, these land application areas poses a threat to surface water quality. A similar threat to groundwater exists if the wastes are applied to the land application area at rates that exceed crop needs. The recent UCCC review of dairy waste states that based on field experiments and computer models, the appropriate nitrogen loading rate that minimizes nitrogen leaching and maximizes nitrogen harvest is between 140 to 165% of the nitrogen harvested. This is a slightly higher loading rate than what is allowed under New Mexico regulations which require

"...the total nitrogen in effluent that is applied to a crop that is harvested shall not exceed by more than 25 percent the maximum amount of nitrogen reasonably expected to be taken up by the crop..." (20.6.2.3109 NMAC). New Mexico does not allow adjustment of the nitrogen content to account for volatilization or mineralization processes.

Surface water can also be degraded and polluted by both the type and high concentrations of pollutants in dairy cow manure and manure wastewater. Ammonia in the waste is highly toxic to aquatic life and can suppress dissolved oxygen concentrations. In addition, nitrogen and phosphorus compounds in the waste can cause excessive algal growth in surface waters, resulting in lower oxygen levels and which in turn causes fish and other organisms to die. The presence of pathogens in the waste can create a public health threat through human contact with affected waters.

The Central Valley Water Board has documented many discharges of waste from existing milk cow dairies to surface water. Since 2004, approximately 70 Dischargers have received Notices of Violation from the Central Valley Water Board for such discharges. The Notices of Violation require immediate cleanup of the discharge and either remediation of the cause of the discharge or a plan with an implementation schedule for such remediation. Information regarding off-property discharges that result in a Notice of Violation is provided to the Northern Dairy Task Force per their standing request. The Northern Dairy Task Force reviews the information to determine if they should pursue additional legal action against the Discharger. Typical legal action by the Northern Dairy Task Force includes an offer of a settlement agreement. If an agreement cannot be reached, the Northern Dairy Task Force proceeds with civil action through the court system.

This General Order includes prohibitions, specifications, and provisions for the production and land application areas that are consistent with the state regulations. Consistent with Title 27, this General Order prohibits the direct or indirect discharge of waste from the production area to surface water. This General Order also prohibits discharges of: (1) wastewater to surface waters from cropland, and (2) waste to surface waters that causes pollution or nuisance, or that causes or contributes to an exceedance of any water quality objective in the Basin Plans or water quality criteria set forth in the California Toxics Rule and the National Toxics Rule. This General Order includes groundwater limitations, which specify "Discharge of waste at existing milk cow dairies shall not cause the underlying groundwater to be further degraded, to exceed water quality objectives, unreasonably affect beneficial uses, or cause a condition of pollution or nuisance." This General Order also requires monitoring of: (1) any discharges to surface water, including surface water upstream and downstream of the discharge (but not during tailwater discharges to surface water), and discharges of tailwater to surface water to ensure that no unforeseen impacts are occurring, and (2) groundwater.

Storm water may contain pollutants from dairy wastes if the storm water is allowed to contact manured areas or commingle with wastewater from the dairy. This General Order prohibits discharges of storm water from the production area to surface water and any discharge of storm water to surface water from the land application areas being used for nutrient utilization unless that discharge is from land that has been managed consistent with a certified Nutrient Management Plan.

APPLICABLE REGULATIONS, PLANS, AND POLICIES

Title 27 California Code of Regulations (CCR)

Division 2, Subdivision 1, Chapter 7, Subchapter 2, Article 1 of Title 27 of the California Code of Regulations (Title 27) prescribes minimum standards for discharges of animal waste at confined animal facilities to protect both surface water and groundwater. For surface water protection, Title 27 includes requirements for adequate design of containment facilities for both storm water and process wastewater and for adequate flood protection.

For groundwater protection, the minimum standards in Title 27 requires existing milk cow dairies to: minimize percolation of wastewater to groundwater in disposal fields; apply manure and wastewater to disposal fields at reasonable agronomic rates; minimize infiltration of water into underlying soils in manured areas; and locate retention ponds in, or line retention ponds with, soils of at least 10% clay and no more than 10% gravel.

The Central Valley Water Board has received documentation of impacts to groundwater quality that indicates the Title 27 minimum standards may not be sufficient to adequately protect groundwater quality at all confined animal facilities in the Region. Adverse impacts to groundwater due to discharges from existing milk cow dairies have been detected in areas where groundwater is as deep as 120 feet below ground surface and in areas underlain by fine-grained sediments.

Most of the existing milk cow dairies covered under the General Order have been operating for many years and it is expected that groundwater quality may already be impacted at many of these dairies due to the past operations, including those dairies in compliance with the Title 27 regulations. For example, groundwater samples collected from 425 water supply wells (domestic and agricultural – stock watering and irrigation) on 88 dairies in Tulare County between August 2000 and June 2006 showed that approximately 39% of the wells sampled had nitrate concentrations greater than the maximum contaminant level for drinking water. At least one nitrate polluted well was found at approximately 63% of these dairies.

This General Order requires Dischargers to monitor groundwater to ensure that groundwater protection is being achieved. Groundwater monitoring at existing dairies is necessary to: determine background groundwater quality; determine existing groundwater conditions near retention ponds, corrals, and land application areas; and determine the effect of the improved management practices required in the General Order on groundwater quality.

It is impractical to require all existing dairies to install monitoring wells within a short time period due to the limited number of professionals available to design and install groundwater monitoring systems and the limited staff to review Monitoring Well Installation and Sampling Plans. To determine the existing groundwater conditions at each dairy within the shortest time period requires establishment of priorities. This General Order requires each Discharger to immediately begin sampling of each domestic and agricultural well present at the dairy and discharges from any subsurface (tile) drains. The Executive Officer will issue monitoring and reporting program orders to install monitoring wells based on an evaluation of the threat to water quality at each site. It is anticipated that this will occur in phases of approximately 100 to 200 dairies per year.

The first phase of dairies ordered to install groundwater monitoring wells will be those dairies where nitrate-nitrogen is detected at 10 mg/l or more in any one domestic well, agricultural well, or subsurface (tile) drainage system in the vicinity of the dairy. The monitoring and reporting program will determine existing groundwater conditions first in areas with suspected groundwater impacts. If necessary, the Executive Officer will further prioritize these groundwater monitoring requirements based on factors such as: proximity to a municipal or domestic supply well, artificial recharge area, or Department of Pesticide Regulation Groundwater Protection Area; nitrate concentrations in neighboring domestic wells; number of crops grown per year; whether or not the NMP is completed by **1July 2009**; and any other pertinent site-specific conditions. Pursuant to Section 13267 of the California Water Code, the Executive Officer may order implementation of a monitoring and reporting program at a dairy at any time. Such order may occur, for instance, if violations of the General Order are documented and/or the dairy is found to be in an area where site conditions and characteristics pose a high risk to groundwater quality.

A summary of how the Executive Officer will determine priorities for installation of monitoring wells is provided in Table 5 of Attachment A to Monitoring And Reporting Program No. R5-2007-0035. This table may be revised as needed by the Executive Officer to ensure proper prioritization is being implemented.

In the future, the Executive Officer or Central Valley Water Board may determine that a proposed alternative method of environmental monitoring is appropriate to determine if groundwater protection is being achieved. One suggested alternative has been to allow regional groundwater monitoring as a substitute for groundwater monitoring at individual dairies. Any proposed alternative will require sufficient details for consideration by either the Executive Officer or Central Valley Water Board. The Executive Officer or the Central Valley Water Board must issue a monitoring and reporting program order for any alternative environmental monitoring.

California Environmental Quality Act (CEQA)
The Central Valley Water Board adopted a Negative Declaration in accordance with CEQA in 1982 with the adoption of Central Valley Water Board Resolution 82-036, which waived waste discharge requirements for confined animal facilities where the Discharger complies with Central Valley Water Board guidelines. That waiver program expired on 1 January 2003.

The Central Valley Water Board's preliminary review of this General Order determined that the adoption of this General Order is exempt from the requirements of CEQA based on three categorical exemptions allowed in Title 14 California Code of Regulations (CCR). These categorical exemptions are discussed below.

- CEQA Guidelines Exemption 1 for Existing Facilities (Title 14 CCR Section 15301) that applies to "*...the operation, repair, maintenance, permitting, leasing, licensing, or minor alteration of existing public or private structures, facilities, mechanical equipment, or topographical features, involving negligible or no expansion of use beyond that existing at the time of the lead agency's determination...*"

- CEQA Guidelines Exemption 2 for Replacement of Existing Structures (Title 14 CCR Section 15302) that applies to the "*...replacement or reconstruction of existing structures and facilities where the new structure will be located on the same site as the structure replaced and will have substantially the same purpose and capacity as the structure replaced...*"

- CEQA Guidelines Exemption 4 for Minor Alterations (Title 14 CCR Section 15304) that applies to "*minor public or private alterations in the condition of land, water, and/or vegetation which do not involve removal of healthy, mature, scenic trees except for forestry and agricultural purposes...*"

The adoption of this Order is categorically exempt from CEQA because:

- Consistent with the "existing facility" exemption in Title 14 CCR Section 15301, eligibility under this Order is limited to milk cow dairies that were existing facilities as of 17 October 2005. This Order does not authorize expansion of use beyond that existing as of 17 October 2005. Restoration of, or improvements to dairy waste management systems to ensure proper function in compliance with this Order will involve minor alterations of existing private facilities.

- Consistent with the categorical exemption of Title 14 CCR Section 15302, this Order will require covered dairies to replace or reconstruct waste management systems to ensure proper function in compliance with this Order.

- Consistent with the categorical exemption of Title 14 CCR Section 15304, this Order will require covered dairies to make improvements to their waste management systems that will result in minor alterations to land, water, and/or vegetation.

Compliance with this General Order will reduce or avoid impacts to surface water and groundwater from existing milk cow dairies. The majority of the approximately 1,600 existing milk cow dairies potentially covered under this General Order operated under a waiver program that was in effect from 1982 to December 2002. Approximately 86 of these existing facilities are currently operating under either an individual WDR Order or a 1996 General WDR Order. The majority of existing milk cow dairies will be covered under this General Order, which imposes significantly more stringent requirements compared to the previous WDRs or the waiver of WDRs.

This General Order will reduce impacts to surface water and groundwater at existing milk cow dairies by requiring Dischargers to demonstrate compliance with State Water Board Resolution 68-16 (*Statement of Policy with Respect to Maintaining High Quality Waters in California*), Title 27 CCR for confined animal facilities, and the Basin Plans. This General Order reduces impacts to surface water by prohibiting discharges of: (1) waste and/or storm water to surface water from the production area, (2) wastewater to surface waters from cropland, and (3) storm water to surface water from the land application area where manure or process wastewater has been applied, unless the land application has been managed consistent with a certified Nutrient Management Plan. This General Order also prohibits discharges that cause or contribute to exceedances of any water quality standards.

This General Order reduces impacts to groundwater by requiring Dischargers to: (1) develop and implement Nutrient Management Plans that will control nutrient losses from land application areas; (2) provide an engineering evaluation of an existing pond and propose and implement approved remedial measures when groundwater monitoring demonstrates that an existing pond has adversely impacted groundwater quality; (3) design and construct new ponds and reconstructed existing ponds to comply with the groundwater limitations of the General Order; (4) document that no cross connections exist that would allow the backflow of wastewater into a water supply well or irrigation well; and (5) submit an Operation and Maintenance Plan to ensure that (a) procedures have been established for solids removal from retention ponds to prevent pond liner damage and (b) corrals and/or pens, animal housing areas, and manure and feed storage areas are maintained to collect and divert process wastewater and runoff to the retention pond and minimize infiltration of wastewater and leachate from these areas to the underlying soils. This General Order also reduces impacts to groundwater by requiring that discharges of waste from existing milk cow dairies shall not cause groundwater to be further degraded, to exceed water quality objectives, unreasonably affect beneficial uses of the groundwater, or cause a condition of pollution or nuisance.

This General Order requires monitoring of discharges, surface water, groundwater, storm water, and tailwater to determine compliance with this General Order.

Water Quality Control Plans
The Central Valley Water Board has adopted Water Quality Control Plans (Basin Plans) for the Sacramento River and San Joaquin River Basins (4th ed.) and for the Tulare Lake Basin (2nd ed.). These two Basin Plans designate the beneficial uses of groundwater and surface waters of the Region, specify water quality objectives to protect those uses, and include implementation programs for achieving water quality objectives. The Basin Plans also include plans and policies of the State Water Board incorporated by reference, including State Water Board Resolution No. 68-16 (*Statement of Policy with Respect to Maintaining High Quality Waters in California*), State Water Board Resolution 88-63 (*Sources of Drinking Water Policy*), and State Water Board Resolution No. 92-49 (*Policies and Procedures for Investigation and Cleanup or Abatement of Discharges Under Water Code Section 13304*). This General Order specifies requirements necessary to comply with the Basin Plans, including requirements to meet the water quality objectives and protect beneficial uses specified in the Basin Plans, and other applicable plans and policies.

Beneficial Uses of Surface Water and Groundwater
Pursuant to Chapter II of the Basin Plans, the beneficial uses of surface water may include: municipal and domestic supply; agricultural supply; agricultural stock watering; industrial process supply; industrial service supply; hydro-power generation; body contact water recreation; canoeing and rafting; other non-body contact water recreation; warm freshwater aquatic habitat; cold freshwater aquatic habitat; warm fish migration habitat; cold fish migration habitat; warm spawning habitat; cold spawning habitat; wildlife habitat; navigation; rare, threatened, and endangered species; groundwater recharge; freshwater replenishment; aquaculture; and preservation of biological habitats of special significance. Both Basin Plans contain a Table that lists the surface water bodies and the beneficial uses and where not listed, the Basin Plans designate beneficial uses based on the waters to which they are tributary or applicable state or federal requirements. These beneficial uses are protected in this General Order by, among other requirements, the prohibition of a direct or indirect discharge of waste and/or storm water from the production area to surface waters, the prohibition of discharge of wastewater to surface waters from cropland, the prohibition of any discharge of storm water to surface water from the land application areas unless the land application area has been managed consistent with a certified Nutrient Management Plan, and the prohibition of discharge of waste from existing milk cow dairies to surface waters which causes or contributes to an exceedance of any applicable water quality objective in the Basin Plans or any applicable state or federal water quality criteria, or a violation of any applicable state or federal policies or regulations.

Chapter II of the Sacramento River and San Joaquin River Basin Plan states: "*Unless otherwise designated by the Regional Water Board, all groundwaters in the Region are considered as suitable or potentially suitable, at a minimum, for municipal and domestic water supply, agricultural supply, industrial service supply, and industrial process* *supply*." Chapter II of the Tulare Lake Basin Plan designates the beneficial uses of groundwater to include municipal and domestic supply, agricultural supply, industrial service supply, industrial process supply, water contact recreation, and wildlife habitat. The Tulare Lake Basin Plan includes a Table that lists the designated beneficial uses of groundwater within the Basin. These beneficial uses are protected in this Order by, among other requirements, the specification that the discharge of waste at an existing milk cow dairy shall not cause a violation of water quality objectives, cause pollution or nuisance, or degrade the groundwater.

Water Quality Objectives

Pursuant to the California Water Code Section 13263(a), WDRs must implement the Basin Plans, which require consideration of the beneficial uses of water, water quality objectives reasonably required to protect the beneficial uses, other waste discharges, the need to prevent nuisance conditions in the disposal area, and the receiving water. The water quality objectives are implemented in WDRs consistent with the Basin Plans' *Policy for Application of Water Quality Objectives*. The Basin Plans require that WDRs apply the most stringent objective for each constituent to ensure that discharges do not cause adverse affects to any beneficial use.

Water quality objectives are the limits or levels of water quality constituents or characteristics that are established for the reasonable protection of beneficial uses of water or the prevention of nuisance within a specific area. Water quality objectives apply to all waters within a surface water or groundwater resource for which beneficial uses have been designated. Water quality objectives are listed separately for surface water and groundwater in Chapter III of the Basin Plans and are either numeric or narrative.

The primary waste constituents of concern due to discharges of waste from dairies are ammonia, nitrates, phosphorus, chloride, boron, salts, pathogens, and organic matter. The discharge of waste from dairies must not cause surface water or groundwater to exceed the applicable water quality objectives for those constituents.

Water Quality Objectives and Federal Criteria for Surface Water[1]

Water quality objectives that apply to surface water include, but are not limited to, (1) the numeric objectives, including the bacteria objective, the chemical constituents objective (includes listed chemicals and state drinking water standards, i.e., maximum contaminant levels (MCLs) promulgated in Title 22 CCR Division 4, Chapter 15 Sections 64431 and 64444 that are applicable through the Basin Plans to waters designated as municipal and domestic supply), dissolved oxygen objectives, pH objectives, and the

[1] It is important to note that this General Order prohibits the direct or indirect discharge of waste and/or storm water from the production area to surface waters, the discharge of wastewater to surface waters from cropland, and the discharge of storm water to surface water from the land application areas where manure or process wastewater has been applied unless the land application area has been managed consistent with a certified Nutrient Management Plan.

salinity objectives; and (2) the narrative objectives, including the biostimulatory substances objective, the chemical constituents objective, and the toxicity objective. The Basin Plans also contain numeric water quality objectives that apply to specifically identified water bodies, including for example, electrical conductivity objectives for the Delta.

Federal water quality criteria that apply to surface water are contained in federal regulations referred to as the California Toxics Rule and the National Toxics Rule. See 40 CFR Sections 131.36 and 131.38.

Water Quality Objectives for Groundwater
Water quality objectives that apply to groundwater include, but are not limited to, (1) numeric objectives, including the bacteria objective and the chemical constituents objective (includes state MCLs promulgated in Title 22 CCR Division 4, Chapter 15 Section 64431 and 64444 and are applicable through the Basin Plans to municipal and domestic supply), and (2) narrative objectives including the chemical constituents, taste and odor, and toxicity objectives. The Tulare Lake Basin Plan also includes numeric salinity limits for groundwater.

Implementation of Water Quality Objectives
The Basin Plans include an implementation program for water quality objectives called the *Policy for Application of Water Quality Objectives*, which applies to implementation of both numeric and narrative water qualtiy objectives. To evaluate compliance with narrative objectives, the Policy requires the Regional Board to consider, on a case-by-case basis, various factors and information, including direct evidence of beneficial use impacts (e.g., a fish kill), information submitted by the discharger and other interested parties (e.g., levels that constitute natural background or site-specific conditions, such as soil types), and "*relevant numerical criteria and guidelines developed and/or published by other agencies and organizations*", such as the State Water Resources Control Board, California Department of Health Services, Department of Fish and Game, and the United States Environmental Protection Agency (USEPA). The Policy requires the Regional Board to consider this information and determine what specific numerical limit is "relevant and appropriate" to the situation at hand, and, therefore should be used in determining compliance with the narrative objective.

Narrative Water Quality Objectives
Some of the considerations of relevant numerical criteria and guidelines developed or published by other agencies and organizations include:

Agriculture
The Basin Plans contain a narrative chemical constituents objective for both groundwater and surface water that states that "*[waters] shall not contain chemical constituents in concentrations that adversely affect beneficial uses.*" This objective applies to the protection of agricultural beneficial uses. Relevant numerical criteria and

guidelines for agricultural uses of groundwater are included in publications from the National Academy of Sciences, the University of California Cooperative Extension, and the Food and Agricultural Organization of the United Nations. This information is summarized in a 1985 publication *Water Quality for Agriculture, Food and Agriculture Organization of the United Nations - Irrigation and Drainage Paper No. 29*, (hereafter U.N. Guidelines) and includes detailed information to evaluate the quality of irrigation water necessary to sustain various crops.

The major constituents used to assess the quality of water for beneficial uses of irrigated agriculture are salinity (expressed as total dissolved solids, or TDS), boron, chloride, and sodium. Salinity reduces crop growth by reducing the ability of plant roots to absorb water. Boron is an essential element in very low concentrations but can become toxic to plants when concentrations in water even slightly exceed the amount required for optimal growth. While boron sensitivity appears to affect a wide variety of crops, sodium and chloride toxicities are mostly limited to tree crops and woody perennials (e.g., citrus, stone-fruit, and vineyard). A predominance of sodium relative to other ions in irrigation water may also disperse soil aggregates, which in turn, affects virtually all crops by decreasing the permeability of the soil to water and air.

Nitrogen in the form of nitrate and ammonium can also affect some nitrogen sensitive crops such as sugar beets, grapes, apricots, citrus, avocado, and some grain crops. Production of nitrogen sensitive crops may be affected at nitrogen concentrations above 5 mg/L nitrate (as nitrogen) or ammonium-nitrogen.

The U.N. Guidelines conclude that salt tolerance of crops and yield reductions can vary depending on various factors, such as irrigation management, the crop being grown, and the site conditions. The U.N. Guidelines recommend that a site-specific assessment be conducted to determine if water quality above or below the U.N. Guidelines would provide protection of irrigated agricultural uses. The U.N. Guidelines divide water quality characteristics as having "No Problem – Increasing Problems – Severe Problems" and show numerical criteria that protect a full range of crops and would likely be protective under all irrigated agricultural uses. The numerical criteria for agricultural irrigation use are:

Problem and Related Constituent	No Problem	Increasing Problems
Salinity of irrigation water (micromhos per centimeter (µmhos/cm))	< 700	700 – 3,000
Salinity of irrigation water (total dissolved solids (mg/L))	< 450	450 – 2,000
Specific Ion Toxicity		
From ROOT absorption		
Sodium (mg/L)	< 69	69 – 207
Chloride (mg/L)	< 142	142 – 355
Boron (mg/L)	< 0.7	0.7 – 3.0
From FOLIAR absorption		
Sodium (mg/L)	< 69	> 69
Chloride (mg/L)	< 106	> 106
Miscellaneous		
NH_4-N (mg/L) (for sensitive crops)	< 5	5 – 30
NO_3-N (mg/L) (for sensitive crops)	< 5	5 – 30
HCO_3 (mg/L) (only with overhead sprinklers)	< 90	90 – 520
pH	normal range =	6.5 – 8.4

In determining the concentrations of the constituents listed above that will not result in adverse affects on agricultural beneficial uses in a given area, multiple criteria can apply. While the most stringent concentration becomes the constraining criterion, it is not necessarily the concentration that is required to protect all crops typically grown in the area. The U.N. Guidelines reflect the highest tolerable level of quality necessary to sustain the most sensitive crops but those crops may or may not be grown in the area. An evaluation of the existing crops grown in an area and crops that could be grown in that area is necessary to determine what the most stringent water quality criteria are that will protect all beneficial uses of water in that area. The highest water quality that is reasonable must be maintained.

Animal Drinking Water
As shown in the U.N. Guidelines, water quality needed to protect dairy animal drinking water uses are less sensitive than irrigated agriculture for all constituents shown above.

Municipal and Domestic Supply
With respect to water quality needed to protect municipal and domestic supply, the Basin Plans contain the narrative taste or odor objective that state in summary that waters shall not contain taste- or odor-producing substances in concentrations that cause nuisance, adversely affects any beneficial use, or impart undesirable tastes or odors in fish flesh or other edible products. Waste from a dairy contains organic nitrogen, a decomposition by-product of which is ammonia, a taste-producing substance that, if present in excessive concentrations, can adversely affect the beneficial use of groundwater for municipal and domestic supply. J.E. Amoore and E. Hautala have

determined an odor threshold for ammonia-nitrogen of 1.5 mg/L (*Odor as an Aid to Chemical Safety: Odor Thresholds Compared with Threshold Limit Values and Volatilities for 214 Industrial Chemicals in Air and Water Dilution*, Journal of Applied Toxicology, Vol. 3, No. 6 (1983)). While this numeric level is a value that is to be met at the point of use (i.e., the tap, rather than the receiving water), the Basin Plans state that "[w]ater quality objectives apply to all waters within a surface water or ground water resource for which beneficial uses have been designated, rather than at an intake, wellhead or other point of consumption." In accordance with the *Policy on Application of Water Quality Objectives*, it is relevant, appropriate, and reasonable to use this numeric level of 1.5 mg/L ammonia-nitrogen to protect beneficial use of area groundwaters and surface waters for human consumption.

Aquatic Life

Ammonia is known to cause toxicity to aquatic organisms in surface waters. Waste from a dairy contains both ammonia and un-ionized ammonia, both of which can cause impact to aquatic life. The US EPA has established Ambient Water Quality Criteria for Ammonia for the protection of freshwater aquatic life. These criteria include an acute criterion (1-hour average) for total ammonia (including ionized and un-ionized ammonia) that is dependent on pH and fish species and a chronic criterion (30-day average) that is dependent on pH and temperature, and at temperatures less than 15 degrees centigrade (59° F) is also dependent on fish species. For freshwater aquatic life protection, the acute criterion for total ammonia-nitrogen ranges from 0.885 (at pH 9.0) to 32.6 (at pH 6.5) milligrams nitrogen per liter (mg N/L) when salmonids are present and from 1.32 (at pH 9.0) to 48.4 (at pH 6.5) mg N/L when salmonids are absent. The chronic criterion for total ammonia-nitrogen ranges from 0.179 (at pH 9.0) to 10.8 (at pH 6.5). These criteria are based on total (un-ionized plus ionized) ammonia.

The California Department of Fish and Game criteria to protect freshwater aquatic life is 0.02 mg/L un-ionized ammonia. The equilibrium between un-ionized and ionized ammonia is controlled by temperature and pH. The California Department of Fish and Game determines the concentration of un-ionized ammonia based on the known percentage of un-ionized ammonia in a concentration of total ammonia at a given temperature and pH.

<u>*Numeric Water Quality Objectives*</u>

Maximum Contaminant Levels (Drinking Water Standards)

The Basin Plan's incorporation of MCLs by reference is prospective to incorporate changes to MCLs as changes in Title 22 CCR take effect. Should a change occur to an MCL and that MCL thereby becomes the most or more stringent objective, implementation of the changed objective would be effected through reopening of this General Order and consideration of a time schedule if compliance cannot be achieved immediately.

Water Quality Objectives for Bacteria
The majority of waste collected at a dairy is fecal matter or manure. This waste contains pathogenic bacteria and can impact water quality if not properly handled. The Basin Plans contain numeric water quality objectives for bacteria in surface waters and in groundwater. For surface water, the Basin Plans specify that "*[i]n waters designated for contact recreation (REC-1), the fecal coliform concentration based on a minimum of not less than five samples for any 30-day period shall not exceed a geometric mean of 200/100 ml, nor shall more than ten percent of the total number of samples taken during any 30-day period exceed 400/100 ml.*" For groundwater, the Basin Plans specify that "*[i]n ground waters used for domestic or municipal supply the most probable number of coliform organisms over any seven-day period shall be less than 2.2/100 ml.*"

<u>*Receiving Water Limitations for Dairies*</u>
The numeric water quality objectives and numeric limits that are relevant and appropriate to implement narrative water quality objectives applicable to the primary waste constituents of concern in discharges of waste at dairy facilities that could affect groundwater and surface water are as follows: For groundwater, the most stringent limitations to implement narrative and numeric water quality objectives are for total coliform 2.2/100 milliliter (ml), for ammonia-nitrogen 1.5 mg/L, for boron 0.7 mg/L, for chloride 106 mg/L, for nitrate-nitrogen 5 mg/L, for EC 700 µmhos/cm, and for TDS 450 mg/L. For surface water, the most stringent limitations to implement narrative and numeric water quality objectives and criteria are for total coliform 2.2/100 ml, for chloride 106 mg/L, for nitrate-nitrogen 5 mg/L, for EC 700 umhos/cm, and for TDS 450 mg/L. For surface water, the appropriate limitation for ammonia is 0.02 mg/L un-ionized ammonia or a concentration of total ammonia determined by the pH and fish species, whichever is less. Less stringent limitations may apply to different areas but can only be determined through a site-specific assessment. Individual dischargers may propose the application of less stringent limitations for consideration in monitoring and reporting programs or through revision of this General Order. Dairy waste may include other waste constituents not mentioned here. This General Order requires the discharge to comply with all water quality objectives and federal water quality critiera for surface waters applicable to the discharge.

State Water Board Resolution 68-16
State Water Board Resolution 68-16 requires that any discharge of waste to waters must be regulated to achieve the highest water quality consistent with the maximum benefit of the people of the state. Further, it states that high quality water must be maintained unless it is demonstrated that any change in water quality will, among other things, not unreasonably affect present and anticipated beneficial uses or violate the Basin Plans. Further, it states that any activity that discharges waste must be required to meet waste discharge requirements which will result in the best practicable treatment or control (BPTC) of the discharge necessary to assure that (a) pollution or nuisance will not occur and (b) the highest water quality consistent with the maximum benefit to the people of the state will be maintained. With respect to surface water, Resolution 68-16

must be implemented consistent with the federal "antidegradation" policy (Title 40 Code of Federal Regulations Section 131.12). This General Order is consistent with these policies because it: (1) prohibits the direct or indirect discharge of waste and/or storm water from the production area to surface waters; (2) prohibits the discharge of waste to surface waters that causes or contributes to exceedances of water quality objectives in the Basin Plan or any applicable state or federal water quality criteria; (3) prohibits the collection, treatment, storage, discharge or disposal of waste that results in contamination or pollution of surface water or groundwater or a condition of nuisance; and (4) contains groundwater limitations that, at a minimum, prohibit further degradation and adverse impacts to beneficial uses of groundwater or violations of water quality objectives specified in the Basin Plans.

To be consistent with State Water Resources Control Board Resolution 68-16, Dischargers must employ best practicable treatment or control measures to assure that pollution or nuisance will not occur and the highest water quality consistent with the maximum benefit to the people of the State will be maintained.

Best Practicable Treatment Or Control Measures For Retention Ponds
Title 27 CCR Division 2 requires that retention ponds be located in, or lined with, soils of at least 10% clay and no more than 10% gravel. An October 2003 report (Task 2 Report) by Brown, Vence, and Associates (BVA) concluded that the "...current Title 27 requirements are insufficient to prevent groundwater contamination from confined animal facilities, particularly in vulnerable geologic environments." Three counties in the Region, many other states, and the Natural Resources Conservation Service have pond design requirements that are more stringent than is required by Title 27 (see Table 1 at the end of this Information Sheet).

Kings County and Merced County require pond liners to have a maximum seepage rate of 1×10^{-6} cm/sec. Four of the top ten milk producing states require ponds to be designed to comply with the state's Natural Resources Conservation Service Practice Standard 313 (CPS 313). These states' CPS 313s have pond liner requirements that range from in-place soils (two to three feet thick with more than 50 percent fines or maximum permeability of 1×10^{-6} centimeters per second (cm/sec)), or a liner of one foot thick compacted clay with maximum permeability of 1×10^{-7} or maximum seepage rate of 1×10^{-5} cm/sec, bentonite, a geomembrane, geosynthetic clay, or concrete.

One state (Idaho) requires pond liners to comply with NRCS Agricultural Waste Management Field Handbook Appendix 10D, which recommends either: two feet of in-place soils with maximum permeability of 1×10^{-6} cm/sec or a liner of compacted clay (minimum one foot thick with allowable seepage rate of 1×10^{-5} cm/sec if manure sealing credit allowed or 1×10^{-6} cm/sec if manure sealing credit not allowed), concrete, geomembrane, or geosynthetic clay. New Mexico and Texas require pond liners have a maximum permeability of 1×10^{-7} cm/sec and Minnesota requires pond liners with a maximum seepage rate of 5×10^{-7} cm/sec.

California CPS 313 requires pond liners have a maximum target seepage rate of 1×10^{-6} cm/sec, except where aquifer vulnerability or risk is high in which case a synthetic liner or other alternative liner is required (see Table 1 of this Information Sheet).

While these other pond design requirements provide more groundwater protection than the Title 27 requirements, there are no known studies that evaluate the ability of any of these county, state, or NRCS pond liner requirements to protect groundwater quality. It would be impossible to determine if any proposed pond design would be protective of groundwater quality without an evaluation of site-specific information on depth to groundwater, existing groundwater quality beneath the facility, nature of the geologic material between the bottom of the retention pond and the first encountered groundwater, nature of the leachate from the retention pond, and proximity to existing supply wells. Any proposed pond design that does not include such an evaluation should be the most conservative possible to assure protection of groundwater under any conditions.

The most conservative pond design would include a double lined pond with a leachate collection and removal system between two geosynthetic liners. Such pond designs are currently being approved by the Central Valley Water Board to contain landfill leachate.

Consistent with State Water Resources Control Board Resolution 68-16, this Order requires that new retention ponds or reconstructed existing ponds be designed and constructed to comply with the groundwater limitations in the Order. The Order provides a two-tiered approach that will allow the Discharger two options to retention pond design. This approach will significantly reduce the time required for approval by the Executive Officer. Tier 1 includes a retention pond designed to consist of a double liner constructed with 60-mil high density polyethylene or material of equivalent durability with a leachate collection and removal system (constructed in accordance with Section 20340 of Title 27) between the two liners. This design will be considered to be consistent with Resolution 68-16. Review for retention ponds designed to this standard will be conducted in less than 30 days of receipt of a complete design plan package submitted to the Board.

Tier 2 includes a retention pond designed in accordance with California Natural Resource Conservation Service (NRCS) Conservation Practice Standard 313 or equivalent and which the Discharger must demonstrate through submittal of technical reports that the alternative design is protective of groundwater quality.

Best Practicable Treatment or Control Measures for Land Application Areas
Pursuant to Title 40 Code of Federal Regulations Section 122.23(e), precipitation-related discharges from land application areas are considered agricultural storm water discharges and are not subject to the United States Environmental Protection Agency (USEPA) regulations for concentrated animal feeding operations (CAFOs) if the

"...manure, litter, or process wastewater has been applied in accordance with site specific nutrient management practices that ensure appropriate agricultural utilization of the nutrients in the manure, litter, or process wastewater, as specified in Section 122.42(e)(1)(vi)-(ix)..."

The USEPA has established best practicable control technology currently available for application of waste from large concentrated animal feeding operations to land application areas. The best practicable control technology includes best management practices required by Title 40 Code of Federal Regulations Section 122.42(e)(1)(vi)-(ix).

The technical standards for nutrient management as specified in Attachment C of this Order are consistent with the USEPA best practicable control technology and the best management practices required by Title 40 Code of Federal Regulations Section 122.42(e)(1)(vi)-(ix) and the large CAFO best practicable control technology. Therefore, precipitation-related discharges from land application areas at facilities operating in compliance with this Order are agricultural storm water discharges. And since they are consistent with USEPA best practicable control technology, the technical standards for nutrient management represent best practicable treatment or control for the purposes of State Water Resources Control Board Resolution 68-16.

Normal commercial farming practices, including those involving dairy waste, contribute salts, nutrients, pesticides, trace elements, sediments and other by-products that can affect the quality of surface water and groundwater. Evaporation and crop transpiration remove water from soils, which can result in an accumulation of salts in the root zone of the soils at levels that retard or inhibit plant growth. Additional amounts of water often are applied to leach the salts below the root zones. The leached salts can reach groundwater or surface water. Even using the most efficient irrigation systems and appropriate fertilizer application rates and timing to correspond to crop needs, irrigation of cropland will have some measurable impact on existing high quality groundwater as a result of the leaching required to protect the crops from salt buildup in the root zone.

In land applications areas where groundwater is shallow, some Dischargers have installed subsurface (tile) drainage systems to maintain the groundwater level below the crop's root zone. Drainage from these systems may be discharged directly to surface water bodies or to drainage ditches that discharge to surface water bodies. Some of these systems discharge to evaporation basins that are subject to waste discharge requirements. Discharges from these systems have elevated concentrations of salts, including nitrates and other nutrients. This Order requires Dischargers who have these systems to identify their location and discharge point and to monitor discharges from these systems.

The majority of the Dischargers that will be covered under this Order have been operating for many years without a Nutrient Management Plan, which would have minimized the impacts of land applications of dairy waste to surface water and groundwater quality. This Order requires each Discharger to develop and implement a Nutrient Management Plan, which should result in improved water quality by requiring appropriate management of dairy waste applied to the land application areas.

Consistent with State Water Resources Control Board Resolution 68-16, this Order requires that process wastewater that is applied to land application areas under the Discharger's control: (1) be managed according to a certified Nutrient Management Plan that is consistent with the technical standards specified in Attachment C, and (2) not cause groundwater to exceed the groundwater limitations of this Order.

State Water Board Resolution 88-63
State Water Board Resolution 88-63 specifies that all surface waters and groundwaters of the state are considered to be suitable, or potentially suitable, for municipal or domestic water supply except where the groundwater meets one or more of the criteria specified in the Basin Plan, including:

a. The TDS exceeds 3,000 milligrams per liter (mg/L) (5,000 micromhos per centimeter (umhos/cm) electrical conductivity) and the aquifer cannot reasonably be expected by the Regional Board to supply a public water system;

b. There is contamination, either by natural processes or by human activity (unrelated to a specific pollution incident), that cannot reasonably be treated for domestic use using either Best Management Practices or best economically achievable treatment practices; or

c. The water source does not provide sufficient water to supply a single well capable of producing an average, sustained yield of 200 gallons per day.

Both Basin Plans include criteria for granting exceptions to municipal and domestic supply designation based on Resolution 88-63. The Tulare Lake Basin Plan also includes criteria for granting exceptions to the designation of beneficial uses for agricultural supply and industrial supply. De-designation of a beneficial use requires an amendment to the Basin Plan. The Tulare Lake Basin Plan specifies exceptions to the designated beneficial uses for some groundwater within the Tulare Lake Basin. Exceptions to Resolution 88-63 are not self-implementing, but must be established in an amendment to the Basin Plan.

State Water Board Resolution 92-49
State Water Board Resolution 92-49 contains policies and procedures for Regional Water Quality Control Boards (Regional Boards) to follow for the oversight and regulation of investigations and cleanup and abatement activities from all types of discharge or threat of discharge subject to Section 13304 of the California Water Code. It directs the Regional Boards to ensure that dischargers cleanup and abate the effect of discharges. This cleanup and abatement is to be done in a manner that promotes

attainment of background water quality, or the highest water quality that is reasonable if background levels of water quality cannot be restored. Any cleanup less stringent than background water quality shall be consistent with maximum benefit to the people of the state and not unreasonably affect present and anticipated beneficial uses of such water.

The Central Valley Water Board may order cleanup and/or abatement actions pursuant to California Water Code Section 13304 and State Water Board Resolution 92-49 where groundwater monitoring indicates discharges from a dairy have impacted groundwater quality.

Title 40 Code of Federal Regulations
Title 40 Code of Federal Regulations Section 122.21 (a)(1), as promulgated on 12 February 2003, requires that "All concentrated animal feeding operations have a duty to seek coverage under an NPDES permit..." The federal regulations allow an exception to this requirement. The exception applies if the permitting authority determines that a large concentrated animal feeding operation has no potential to discharge.

On 28 February 2005, the 2nd Circuit Court of Appeals, in a decision on an appeal to the federal regulations (*Waterkeeper Alliance, Inc. et al v. U.S. Environmental Protection Agency, __F.3d__, Case No. 03-4470*), vacated the requirement for all CAFOs to either apply for an NPDES permit (whether or not they had an actual discharge) or demonstrate they have no potential to discharge. US EPA is currently revising the federal regulations to incorporate the 2nd Circuit Court's decision.

RECEIVING WATER LIMITATIONS
The appropriate receiving water limitations for a particular dairy covered under this General Order depend on the beneficial uses of the water as designated in the Basin Plan(s) and the water quality objectives necessary to protect all beneficial uses of the water. Specific receiving water limitations for dairies are discussed above under the heading **Water Quality Control Plans** – *Receiving Water Limitations for Dairies*.

This Order prohibits: the direct or indirect discharge of waste and/or storm water from the production area to surface waters; the discharge of waste from existing milk cow dairies to surface waters which causes or contributes to an exceedance of any applicable water quality objective in the Basin Plans or any applicable state or federal water quality criteria, or a violation of any applicable state or federal policies or regulations.
The groundwater limitations of this Order require that "Discharge of waste at existing milk cow dairies shall not cause the underlying groundwater to be further degraded, to exceed water quality objectives, unreasonably affect beneficial uses, or cause a condition of pollution or nuisance." These limitations are consistent with the Basin Plan(s) and State Water Board Resolution 68-16.

LAND APPLICATION SPECIFICATIONS

This General Order includes land application specifications that require Dischargers to develop and implement a NMP that provides protection of both surface water and groundwater. The contents of the NMP and technical standards for nutrient management are specified in Attachment C to this General Order. The land application specifications also require Dischargers to have a written agreement with each third party that receives process wastewater from the Discharger for its own use. The written agreement will be effective until the third party is covered under waste discharge requirements or a waiver of waste discharge requirements that are adopted by the Central Valley Water Board and that are specific to the application of the Discharger's process wastewater to land under the third party's control.

The written agreement must identify the Discharger, the third party, the Assessor's Parcel Number and acreage of the cropland where the process wastewater will be applied, and the types of crops to be fertilized with the process wastewater. The written agreement must also include an agreement by the third party to: (1) use the process wastewater at agronomic rates appropriate for the crop(s) grown, and (2) prevent the runoff to surface waters of wastewater, storm water or irrigation supply water that has come into contact with manure or is blended with wastewater.

The technical standards for nutrient management require Dischargers to monitor soil, manure, process wastewater, irrigation water, and plant tissue as specified in Monitoring and Reporting Program No. R5-2007-0035. The results of this monitoring are to be used in the development and implementation of the NMP.

This General Order also requires Dischargers to create and maintain specific records to document implementation and management of the minimum elements of the NMP, records for the land application area, a copy of the Discharger's NMP, and records on manure, bedding, and process wastewater transferred to other persons.

PROVISIONS

Standard Provisions

This General Order includes Central Valley Water Board Standard Provisions and Reporting Requirements.

Monitoring and Reporting Program Requirements

This General Order includes a provision that requires compliance with Monitoring and Reporting Program No. R5-2007-0035, and future revisions thereto, or with an individual monitoring and reporting program, as specified by the Central Valley Water Board or the Executive Officer. The Monitoring and Reporting Program requires:

- periodic inspections of the production area and land application areas
- monitoring of manure, process wastewater, crops, and soil
- recording of operation and maintenance activities

- groundwater monitoring
- storm water monitoring
- monitoring of surface water and discharges to surface water
- annual reporting
- annual reporting of groundwater monitoring
- annual storm water reporting
- noncompliance reporting
- discharge reporting

COMPLIANCE SCHEDULE

This General Order establishes a schedule for Dischargers to develop and implement their WMP and NMP and requires them to make interim facility modifications as necessary to protect surface water, improve storage capacity, and improve the facility's nitrogen balance before all infrastructure changes are completed. This General Order requires that all Dischargers submit:

- By **31 December 2007**
  - Existing Conditions Report (Attachment A).

- By **1 July 2008**
  - Annual Report including Annual Dairy Facility Assessment (an update to the Preliminary Dairy Facility Assessment of Attachment A) with interim facility modifications considered to be implemented.

  - Statement of Completion of the following items in Attachment C (Nutrient Management Plan):

    - Items I.A.1, I.B, I.C. and I.D. (Land Application information), II (Sampling and Analysis Proposal), IV (Setbacks, Buffers, and Other Alternatives to Protect Surface Water), and VI (Record-Keeping Requirements).

  - The following items in Attachment B (Waste management Plan):

    - Items I.A. I.B, I.C, I.D, I.E, I.F.1.a, I.F.2.a, I.F.3, I.F.4, and I.F.5 (Facility Description) and V (Operation and Maintenance Plan).

    - Identification of Backflow Problems.

  - Proposed interim facility modifications to improve storage capacity and balance nitrogen.

- By **31 December 2008**
  - Statement of Completion of item V (Field Risk Assessment) of Attachment C.
  - Preliminary Infrastructure Needs Checklist.
- By **1 July 2009**
  - Annual Report including Annual Dairy Facility Assessment with modifications implemented to date.
  - Documentation of interim facility modifications completion for storage capacity and to balance nitrogen.
  - Nutrient Management Plan – Retrofitting Plan to improve nitrogen balance with schedule.
  - Statement of Completion of items I.A.2 (Land Application Information) and III (Nutrient Budget) of Attachment C.
  - Waste Management Plan with Retrofitting Plan and Schedule
  - Items I.F.1.b and I.F.2.b (Facility Description), II (Storage Capacity), III (Flood Protection), IV (Production Area Design and Construction), and VI (Documentation there are no cross-connections) of Attachment B.
  - Salinity Report.
- By **1 July 2010**
  - Annual Report including the Annual Dairy Facility Assessment with facility modifications implemented to date.
  - Status on facility retrofitting completed or in progress.
- By **1 July 2011**
  - Annual Report including the Annual Dairy Facility Assessment with facility modifications implemented to date.
  - Certification of facility retrofitting completion including:
    - Retrofitting to improve nitrogen balance.
    - Items II.C (certification of completion of modifications for storage capacity needs), III.D (certification of completion of modifications for flood protection needs), and IV.C (certification of modifications for production area construction criteria) of Attachment B.

- By **1 July 2012**
  - Annual Report including the Annual Dairy Facility Assessment with facility modifications implemented to date.
  - Certification that the Nutrient Management Plan has been completely implemented.

ENFORCEMENT

The State Water Board's Water Quality Enforcement Policy (Enforcement Policy) allows progressive enforcement action for violations of waste discharge requirements when appropriate and recommends more formal enforcement as a first response to more consequential violations. Progressive enforcement is an escalating series of actions that allows for the efficient and effective use of enforcement resources to: 1) assist cooperative dischargers in achieving compliance; 2) compel compliance for repeat violations and recalcitrant violaters; and 3) provide a disincentive for noncompliance. Progressive enforcement actions may begin with informal enforcement actions such as a verbal, written, or electronic communication between the Central Valley Water Board and a Discharger. The purpose of an informal enforcement action is to quickly bring the violation to the discharger's attention and to give the discharger an opportunity to return to compliance as soon as possible. The highest level of informal enforcement is a Notice of Violation.

The Enforcement Policy recommends formal enforcement actions for the highest priority violations, chronic violations, and/or threatened violations. Violations of the General Order that will be considered as high priority violations include, but are not limited to:

1. Any discharge of waste and/or storm water from the production area to surface waters.

2. The application of waste to lands not owned, leased, or controlled by the Discharger without written permission from the landowner.

3. The discharge of wastewater to surface water from cropland.

4. Failure to submit notification of a discharge to surface water in violation of the General Order.

5. Falsifying information or intentionally withholding information required by applicable laws, regulations or an enforcement order.

6. Failure to submit a Design Report for any new or enlarged existing settling, storage, or retention pond prior to construction and/or Post Construction Report for such construction.

7. Failure to pay annual fee, penalties, or liabilities.

8. Failure to monitor as required.

9. Failure to submit required reports on time.

Table 1. Regional, State, and National Pond Liner Design Requirements

Central Valley Water Board	Pond Liner Design Requirements
Waste Discharge Requirements General Order No. R5-2007-0035	**Tier 1 or Tier 2 option:** Tier 1: A pond designed to consist of a double liner constructed with 60-mil high density polyethylene or material of equivalent durability with a leachate collection and removal system (constructed in accordance with Section 20340 of Title 27) between the two liners will be acceptable without a demonstration that the pond design is protective of groundwater quality. Tier 2: A pond designed in accordance with California Natural Resource Conservation Service (NRCS) Conservation Practice Standard 313 or equivalent and which the Discharger can demonstrate through submittal of technical reports that the alternative design is protective of groundwater quality as required in General Specification B. 8 of the General Order.
Central Valley Counties	**Pond Liner Design Requirements**
Kings County	The specific discharge (seepage rate) of process water through the soils lining the bottom and sides of the manure separation pits and lagoons shall not be greater than 1×10^{-6} centimeters per second (cm/sec).
Merced County	Liner shall be designed and constructed with a seepage rate of 1×10^{-6} cm/sec or less (with no credit for manure sealing) and a minimum thickness of one foot.
Solano County	Large dairies (700 or more mature dairy cows): Liner placed atop bedrock or foundation materials comprised of (from bottom to top): (1) Two feet of compacted clay with permeability less than or equal to 1×10^{-7} cm/sec, (2) 60 mil high-density polyethylene geomembrane with a permeability less than or equal to 1×10^{-13} cm/sec, (3) Geomembrane filter fabric, and (4) 24-inch thick soil operations layer. Medium sized dairies (200 to 699 mature dairy cows): Liner of compacted clay that is a minimum of one foot thick, with maximum permeability of 1×10^{-6} cm/sec. Small dairies (14 to 199 mature dairy cows): No pond liner requirements.

Table 1. Regional, State, and National Pond Liner Design Requirements

Top 10 Milk Producing States (in order of highest to lowest milk production)	Pond Liner Design Requirements
California	Title 27 of the California Code of Regulations: 10% clay and no greater than 10% gravel.
Wisconsin	Wisconsin Natural Resources Conservation Service (NRCS) Practice Standard 313: In-place soils (more than 50 percent fines and three feet thick), clay (maximum permeability of 1×10^{-7} cm/sec), geomembrane (60 mil high density polyethylene or 60 mil linear low density polyethylene), geosynthetic clay liner, or concrete .
New York	No pond liner design requirements.
Pennsylvania	Pennsylvania NRCS Conservation Practice Standard 313: In place soils with acceptable permeability (see Appendix 10D below) or lined (soil liner with maximum seepage rate of 1×10^{-5} cm/sec, flexible membrane, bentonite, soil dispersant, or concrete)
Minnesota	Any material that meets maximum seepage rate of 500 gallons per acre per day (5.0×10^{-7} cm/sec).
Idaho	NRCS Agricultural Waste Management Field Handbook Appendix 10D (see below).
New Mexico	Case-by-case but compacted clay or synthetic is standard, maximum permeability of 1×10^{-7} cm/sec
Michigan	Michigan NRCS Conservation Practice Standard 313: In soils with acceptable permeability (per Appendix 10D (see below) or lined (with one foot compacted earth with maximum seepage rate of 1×10^{-5} cm/sec and a minimum one foot compacted operations layer, flexible membrane, bentonite, or concrete).
Washington	Washington NRCS Conservation Practice Standard 313: Maximum soil permeability of 1×10^{-6} cm/sec or a compacted clay liner, amended soil or synthetic liner required meeting requirements of NRCS Conservation Practice Standards 521A through 521D.
Texas	When no site specific assessment completed, one and a half foot of compacted clay with maximum permeability of 1×10^{-7} cm/sec. Otherwise, "designed and constructed in accordance with technical standards of NRCS, ASAE, ASCE, or ASTM that are in effect at time of construction."

Table 1. Regional, State, and National Pond Liner Design Requirements

Natural Resources Conservation Service (NRCS)	**Pond Liner Design Requirements**
NRCS Agricultural Waste Management Field Handbook Appendix 10D – Geotechnical, Design, and Construction Guidelines	In-place soils at least two feet thick and maximum permeability of 1×10^{-6} cm/sec. Consider liner if: aquifer is unconfined and shallow and/or aquifer is a vital water supply; site underlain by less than two feet soil over bedrock, coarse-grained soils with less than 20 percent low plasticity fines, or soils with flocculated clays or highly plastic clays with blocky structure. Acceptable liners: Compacted clay liner (allowable seepage rate of 1×10^{-6} cm/sec if manure sealing cannot be credited or 1×10^{-5} cm/sec if manure sealing can be credited, minimum thickness of one foot), concrete, geomembranes, or geosynthetic clay liners.
California NRCS Conservation Practice Standard 313	Target maximum seepage rate of 1×10^{-6} cm/sec for all vulnerability/risk categories, except that: (1) Synthetic liner required when aquifer vulnerability and risk are high (i.e., groundwater is within five to 20 feet of the pond bottom or coarse soils are present <u>and</u> the pond is within 600 feet from a domestic supply well), or (2) Other storage alternatives required when the aquifer vulnerability and risk are very high (i.e., groundwater is within five feet of the pond bottom or the pond is less than 600 feet from an improperly abandoned well <u>and</u> the pond is less than 1,500 feet from a public supply well or less than 100 feet from a domestic supply well).

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

STANDARD PROVISIONS AND REPORTING REQUIREMENTS
FOR

WASTE DISCHARGE REQUIREMENTS GENERAL ORDER NO. R5-2007-0035
FOR
EXISTING MILK COW DAIRIES
3 May 2007

A. Introduction:

1. These Standard Provisions and Reporting Requirements (SPRR) are applicable to existing milk cow dairies that are regulated pursuant to the provisions of Title 27 California Code of Regulations (CCR) Division 2, Subdivision 1, Chapter 7, Subchapter 2, Sections 22560 et seq.

2. Any violation of the Order constitutes a violation of the California Water Code and, therefore, may result in enforcement action.

3. If there is any conflicting or contradictory language between the Order, the Monitoring and Reporting Program (MRP) associated with the Order, or the SPRR, then language in the Order shall govern over the MRP and the SPRR, and language in the MRP shall govern over the SPRR.

B. Standard Provisions:

1. The requirements prescribed in the Order do not authorize the commission of any act causing injury to the property of another, or protect the Discharger from liabilities under federal, state, or local laws.

2. The Discharger shall comply with all federal, state, county, and local laws and regulations pertaining to the discharge of wastes from the facility that are at least as stringent as the requirements of the Order.

3. All discharges from the facility must comply with the lawful requirements of municipalities, counties, drainage districts, and other local agencies regarding discharges of storm water to storm drain systems or to other courses under their jurisdiction that are at least as stringent as the requirements of the Order.

4. The Order does not convey any property rights or exclusive privileges.

5. The provisions of the Order are severable. If any provision of the Order is held invalid, the remainder of the Order shall not be affected.

6. The Discharger shall take all reasonable steps to minimize any adverse impact to the waters of the State resulting from noncompliance with the Order. Such steps

shall include accelerated or additional monitoring as necessary to determine the nature and impact of the noncompliance.

7. The fact that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the Order shall not be a defense for violations of the Order by the Discharger.

8. The filing of a request by the Discharger for modification, revocation and reissuance, or termination of the Order, or notification of planned changes or anticipated noncompliance, does not stay any condition of the Order.

9. The Order is not transferable to any person except after notice to the Central Valley Water Board. The Central Valley Water Board may modify or revoke and reissue the Order to change the name of the Discharger and incorporate such other requirements as may be necessary under the California Water Code.

10. The Discharger shall provide to the Executive Officer, within a reasonable time, any information which the Executive Officer may request to determine whether cause exists for modifying, revoking, and reissuing, or terminating the Discharger's coverage under the Order or to determine compliance with the Order. The Discharger shall also provide to the Executive Officer upon request, copies of records required by the Order to be kept.

11. After notice and opportunity for a hearing, the Order may be terminated or modified for cause, including but not limited to:

    a. Violation of any term or condition contained in the Order;

    b. Obtaining the Order by misrepresentation, or failure to disclose fully all relevant facts;

    c. A change in any condition that results in either a temporary or permanent need to reduce or eliminate the authorized discharge; or

    d. A material change in the character, location, or volume of discharge.

12. The Order may be modified if new state statutes or regulations are promulgated, and if more stringent applicable water quality standards are approved pursuant to Title 27 of the CCR, or as adopted into the Central Valley Water Board *Water Quality Control Plans* (Basin Plans) *for the Sacramento River and San Joaquin River Basins (4th Ed), and for the Tulare Lake Basin (2nd Ed.).* The Order may also be modified for incorporation of land application plans, and/or changes in the waste application to cropland.

13. The Central Valley Water Board may review and revise the Order at any time upon application of any affected person or by motion of the Regional Board.

14. The Discharger shall ensure compliance with existing and/or future promulgated standards that apply to the discharge.

15. The Discharger shall permit representatives of the Central Valley Water Board and the State Water Resources Control Board (State Water Board), upon presentations of credentials at reasonable hours, to:

    a. Enter premises where wastes are treated, stored, or disposed and where any records required by the Order are kept;

    b. Copy any records required to be kept under terms and conditions of the Order;

    c. Inspect facilities, equipment (monitoring and control), practices, or operations regulated or required by the Order; and

    d. Sample, photograph, and/or video tape any discharge, waste, waste management unit, or monitoring device.

16. The Discharger shall properly operate and maintain in good working order any facility, unit, system, or monitoring device installed to achieve compliance with the Order. Proper operation and maintenance includes best practicable treatment and controls, and the appropriate quality assurance procedures.

17. Animal waste storage areas and containment structures shall be designed, constructed, and maintained to limit, to the greatest extent possible, infiltration, inundation, erosion, slope failure, washout, overtopping, by-pass, and overflow.

18. Setbacks or separation distances contained under Water Wells, Section 8, Part II, in the *California Well Standards, Supplemental Bulletin 74-90 (June 1991)*, and *Bulletin 94-81 (December 1981),* California Department of Water Resources (DWR), shall be maintained for the installation of all monitoring wells and groundwater supply wells at existing dairies. A setback of 100 feet is required between supply wells and animal enclosures in the production area. A minimum setback of 100 feet, or other control structures (such as housing, berming, grading), shall be required for the protection of existing wells or new wells installed in the cropland. If a county or local agency adopts more stringent setback standards than that adopted by the DWR, then these local standards shall carry precedence over the Well Standards of DWR, and the Discharger shall comply with the more stringent standards.

19. Following any storm event that causes the freeboard of any wastewater holding pond to be less than one (1) foot for below-grade ponds, or two (2) feet for above-grade ponds, the Discharger shall take action as soon as possible to provide the appropriate freeboard in the wastewater holding pond.

20. For any electrically operated equipment at the facility, the failure of which would cause loss of control or containment of waste materials, or violation of this Order, the Discharger shall employ safeguards to prevent loss of control over wastes or violation of this Order. Such safeguards may include alternate power sources, standby generators, standby pumps, additional storage capacity, modified operating procedures, or other means.

C. General Reporting Requirements:

1. The Discharger shall give at least 60 days advance notice to the Central Valley Water Board of any planned changes in the ownership or control of the facility.

2. In the event of any change in control or ownership of land or waste discharge facilities presently owned or controlled by the Discharger, the Discharger shall notify the succeeding owner or operator of the existence of the Order by letter at least 60 days in advance of such change, a copy of which shall be immediately forwarded to the appropriate Central Valley Water Board office listed below in the General Reporting Requirements C.11.

3. To assume operation under the Order, any succeeding owner or operator must request, in writing, that the Executive Officer transfer coverage under the Order. The Central Valley Water Board will provide a form for this request that will allow the succeeding owner or operator to provide their full legal name, address and telephone number of the persons responsible for contact with the Central Valley Water Board and a responsibility statement and a signed statement in compliance with General Reporting Requirement C.7 below. The form will also include a statement for signature that the new owner or operator assumes full responsibility for compliance with the Order and that the new owner or operator will implement the Waste Management Plan and the NMP prepared by the preceding owner or operator. Transfer of the Order shall be approved or disapproved in writing by the Executive Officer. The succeeding owner or operator is not authorized to discharge under the Order and is subject to enforcement until written approval of the coverage transfer from the Executive Officer.

4. The Executive Officer may require the Discharger to submit technical reports pursuant to the Order and California Water Code Section 13267.

5. The Discharger shall identify any information that may be considered to be confidential under state law and not subject to disclosure under the Public Records Act. The Discharger shall identify the basis for confidentiality. If the Executive Officer cannot identify a reasonable basis for treating the information as confidential, the Executive Officer will notify the Discharger that the information will be placed in the public file unless the Central Valley Water Board receives, within 10 calendar days, a written request from the Discharger to keep the information confidential containing a satisfactory explanation supporting the information's confidentiality.

6. Except for data determined to be exempt from disclosure under the Public Records Act (California Government Code Sections 6275 to 6276), and data determined to be confidential under Section 13267(b)(2) of the California Water Code, all reports prepared in accordance with the Order and submitted to the Executive Officer shall be available for public inspection at the offices of the Central Valley Water Board. Data on waste discharges, water quality, meteorology, geology, and hydrogeology shall not be considered confidential.

7. All technical reports and monitoring program reports shall be accompanied by a cover letter with the certification specified in C.8 below and be signed by a person identified below:

    a. For a sole proprietorship: by the proprietor;

    b. For a partnership: by a general partner;

    c. For a corporation: by a principal executive officer of at least the level of senior vice-president; or

    d. A duly authorized representative if:

        (1) The authorization is made in writing by a person described in Subsection a, b, or c of this provision;

        (2) The authorization specifies either an individual or a position having responsibility for the overall operation of the facility, such as the position of manager. A duly authorized representative may thus be either a named individual or an individual occupying a named position; and

        (3) The written authorization is submitted to the Central Valley Water Board.

8. Each person, as specified in C.7 above, signing a report required by the Order or other information requested by the Central Valley Water Board shall make the following certification:

    "I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

9. In addition to Item C.7 above, all technical reports required in the Order that involve planning, investigation, evaluation, or design, or other work requiring interpretation and proper application of engineering or geologic sciences, shall be prepared by, or

under the direction of, and signed by persons registered to practice in California pursuant to California Business and Professions Code, Sections 6735, 7835, and 7835.1 or federal officers and employees who are exempt from these Sections by California Business and Professions Code, Section 6739 or 7836. To demonstrate compliance with Title 16 CCR, Sections 415 and 3065, all technical reports must contain a statement of the qualifications of the responsible registered professional(s). As required by these laws, completed technical reports must bear the signature(s) and seal(s) of the registered professional(s) in a manner such that all work can be clearly attributed to the professional responsible for the work.

10. The Discharger shall file a Report of Waste Discharge with the Central Valley Water Board at least 140 days before making any material change in the character, location, or volume of the discharge. A material change includes, but is not limited to, the following:

    a. The addition of a new wastewater that results in a change in the character of the waste;

    b. Significantly changing the disposal or waste application method or location;

    c. Significantly changing the method of treatment;

    d. Increasing the discharge flow beyond that specified in the Order; and/or

    e. Expanding existing herd size beyond 15 percent.

11. All reports shall be submitted to the following address:

    For facilities in Fresno, Kern, Kings, Madera, Mariposa, and Tulare counties, submit reports to:

    California Regional Water Quality Control Board
    Central Valley Region
    1685 E Street
    Fresno, CA 93706
    Attention: Confined Animal Regulatory Unit

    For facilities in Butte, Lassen, Modoc, Plumas, Tehama, and Shasta counties, submit reports to:

    California Regional Water Quality Control Board
    Central Valley Region
    415 Knollcrest Drive, Suite 100
    Redding, CA 96002
    Attention: Confined Animal Regulatory Unit

For facilities in all other counties, submit reports to:

California Regional Water Quality Control Board
Central Valley Region
11020 Sun Center Drive #200
Rancho Cordova, CA 95670
Attention: Confined Animal Regulatory Unit

D. Requirements Specifically for Monitoring Programs and Monitoring Reports:

1. The Discharger shall file self-monitoring reports and/or technical reports in accordance with the detailed specifications contained in the MRP attached to the Order.

2. The Discharger shall maintain a written monitoring program sufficient to assure compliance with the terms of the Order. Anyone performing monitoring on behalf of the Discharger shall be familiar with the written program.

3. The monitoring program shall include observation practices, sampling procedures, and analytical methods designed to ensure that monitoring results provide a reliable indication of water quality at all monitoring points.

4. All instruments and devices used by the Discharger for the monitoring program shall be properly maintained and shall be calibrated as recommended by the manufacturer and at least once annually to ensure their continued accuracy.

5. The Discharger shall retain records of all monitoring information, including all calibration and maintenance records, copies of all reports required by the Order, and records of all data used to complete the reports. Records shall be maintained for a minimum of five years from the date of sample, measurement, report, or application. Records shall also be maintained after facility operations cease if wastes that pose a threat to water quality remain at the site. This five-year period may be extended during the course of any unresolved litigation regarding the discharge or when requested in writing by the Central Valley Water Board Executive Officer.

    a. Records of on-site monitoring activities shall include the:

        (1) Date that observations were recorded, measurements were made, or samples were collected;

        (2) Name and signature of the individual(s) who made the observations, made and recorded the measurements, or conducted the sampling;

        (3) Location of measurements or sample collection;

(4) Procedures used for measurements or sample collection;

(5) Unique identifying number assigned to each sample; and

(6) Method of sample preservation utilized.

b. Records of laboratory analyses shall include the:

(1) Results for the analyses performed on the samples that were submitted;

(2) Chain-of-custody forms used for sample transport and submission;

(3) Form that records the date that samples were received by the laboratory and specifies the analytical tests requested;

(4) Name, address, and phone number of the laboratory which performed the analysis;

(5) Analytical methods used;

(6) Date(s) analyses were performed;

(7) Identity of individual(s) who performed the analyses or the lab manager; and

(8) Results for the quality control/quality assurance (QA/QC) program for the analyses performed.

E. Enforcement

1. California Water Code Section 13350 provides that any person who violates WDRs or a provision of the California Water Code is subject to civil liability of up to $5,000 per day or $15,000 per day of violation, or when the violation involves the discharge of pollutants, is subject to civil liability of up to $10 per gallon, or $20 per gallon; or some combination thereof, depending on the violation, or upon the combination of violations. In addition, there are a number of other enforcement provisions that may apply to violation of the Order.

ATTACHMENT A

Existing Conditions Report
For
Existing Milk Cow Dairies

DAIRY FACILITY INFORMATION

A. NAME OF DAIRY OR BUSINESS OPERATING THE DAIRY: ____________________

PHYSICAL ADDRESS OF DAIRY:

____
Number and Street | City | County | Zip Code

STREET AND NEAREST CROSS STREET (IF NO ADDRESS): ____________________

COUNTY ASSESSOR PARCEL NUMBER(S) FOR DAIRY FACILITY: ____________________

COUNTY ASSESSOR PARCEL NUMBER(S) FOR EACH LAND APPLICATION AREA (WHERE MANURE AND/OR PROCESS WASTEWATER IS APPLIED UNDER CONTROL OF THE OWNER OR OPERATOR WHETHER IT IS OWNED, RENTED, OR LEASED):

____

____

____

B. OPERATOR NAME: ____________________ TELEPHONE NO. ____________________

MAILING ADDRESS OF OPERATOR OF DAIRY: ____________________
Number And Street | City | Zip Code

C. NAME OF LEGAL OWNER OF THE DAIRY PROPERTY: ____________________

MAILING ADDRESS OF LEGAL OWNER:

____
Number and Street | City | Zip Code

CONTACT PERSON: ____________________ TELEPHONE NO. ____________________

D. PERSON TO RECEIVE REGIONAL BOARD CORRESPONDENCE (CHECK): _____OWNER _____OPERATOR ____BOTH

DAIRY FACILITY ASSESSMENT

A. <u>WASTE MANAGEMENT PLAN AND NUTRIENT MANAGEMENT PLAN:</u>

HAVE YOU COMPLETED A WASTE MANAGEMENT PLAN AND NUTRIENT MANAGEMENT PLAN IN ACCORDANCE WITH THE REQUIREMENTS OF THE WASTE DISCHARGE REQUIREMENTS GENERAL ORDER NO.R5-2007-0035?
_____YES _____NO

IF YES, PLEASE ATTACH A COPY OF THE WASTE MANAGEMENT PLAN AND NUTRIENT MANAGEMENT PLAN TO THIS REPORT.

IF NO, PLEASE COMPLETE A PRELIMINARY FACILITY ASSESSMENT OF YOUR DAIRY AS DESCRIBED IN B BELOW.

B. <u>PRELIMINARY DAIRY FACILITY ASSESSMENT:</u>
IF YOU HAVE NOT COMPLETED A WASTE MANAGEMENT PLAN AND NUTRIENT MANAGEMENT PLAN AS DESCRIBED IN A, ABOVE, PLEASE COMPLETE AND ATTACH A PRELIMINARY DAIRY FACILITY ASSESSMENT[1] FOR YOUR DAIRY. THE PRELIMINARY DAIRY FACILITY ASSESSMENT IS AVAILABLE ELECTRONICALLY ON THE CENTRAL VALLEY

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[1] THE PRELIMINARY DAIRY FACILITY ASSESSMENT IS ONLY INTENDED TO PROVIDE A PRELIMINARY ASSESSMENT OF YOUR DAIRY FACILITY'S ABILITY TO STORE WASTEWATER GENERATED AT YOUR DAIRY AND THE ABILITY OF YOUR CROPLAND TO UTILIZE THE NUTRIENTS GENERATED AT YOUR DAIRY. IT WILL PROVIDE: (1) A PRELIMINARY ESTIMATE OF YOUR DAIRY'S WASTEWATER STORAGE NEEDS VERSUS THE EXISTING WASTEWATER STORAGE CAPACITY; AND

WATER BOARD WEBSITE AT http://www.waterboards.ca.gov/centralvalley/available_documents/index.html#confined. THE ASSESSMENT MUST BE COMPLETED ELECTRONICALLY AND A COPY OF THE RESULTS ATTACHED TO THIS EXISTING CONDITIONS REPORT THAT YOU SUBMIT TO THE EXECUTIVE OFFICER.

ADDITIONAL DAIRY FACILITY INFORMATION

A. REPORT OF WASTE DISCHARGE SUBMITTED:

IS ALL OF THE INFORMATION YOU PROVIDED IN THE REPORT OF WASTE DISCHARGE THAT WAS DUE ON 17 OCTOBER 2005 STILL CORRECT? _____YES _____NO

IF NO, PLEASE ATTACH A COPY OF YOUR REPORT OF WASTE DISCHARGE WITH THE CORRECTED INFORMATION AND YOUR CORRECTIONS INITIALED AND DATED.

B. GROUNDWATER MONITORING:

ARE THERE ANY GROUNDWATER MONITORING WELLS AT YOUR DAIRY? ______YES _____NO

HAS A MONITORING WELL INSTALLATION AND SAMPLING PLAN BEEN SUBMITTED TO THE CENTRAL VALLEY WATER BOARD? ______YES ______NO

IS GROUNDWATER MONITORING BEING CONDUCTED AT YOUR DAIRY? ______YES _____NO

C. SUBSURFACE (TILE) DRAINAGE:

DO ANY OF YOUR LAND APPLICATION AREAS HAVE A SUBSURFACE (TILE) DRAINAGE SYSTEM? ______YES ______NO

IF YES, PLEASE INDICATE BELOW THE ASSESSOR PARCEL NUMBER FOR EACH LAND APPLICATION AREA THAT HAS A SUBSURFACE (TILE) DRAINAGE SYSTEM AND THE POINT OF DISCHARGE (E.G., DRAINAGE DITCH, CREEK, STREAM, EVAPORATION BASIN):

ASSESSOR PARCEL NUMBER(S)	POINT OF DISCHARGE
____________________	____________________
____________________	____________________
____________________	____________________

D. THIRD PARTY USE OF PROCESS WASTEWATER:

DO YOU PROVIDE PROCESS WASTEWATER TO A THIRD PARTY FOR THEIR OWN USE?

______YES _____NO

IF YES, YOU MUST ATTACH TO THIS REPORT A COPY OF A WRITTEN AGREEMENT WITH EACH SUCH THIRD PARTY. THE WRITTEN AGREEMENT MUST COMPLY WITH LAND APPLICATION SPECIFICATION C.2 OF WASTE DISCHARGE REQUIREMENTS GENERAL ORDER NO. R5-2007-0035.

E. ANAEROBIC DIGESTERS:

DOES YOUR DAIRY TREAT PROCESS WASTEWATER IN AN ANAEROBIC DIGESTER? _____YES _____NO

F. MORTALITY:

INDICATE HOW MORTALITY IS HANDLED:

RENDERING SERVICE________ BURIAL________ OTHER (DESCRIBE)______________________________

(2) A PRELIMINARY ESTIMATE OF THE NITROGEN AND PHOSPHORUS GENERATED AT, AND IMPORTED TO, YOUR DAIRY, THE NITROGEN AND PHOSPHORUS REMOVED BY CROPS GROWN AT YOUR DAIRY, AND THE NITROGEN AND PHOSPHORUS EXPORTED FROM YOUR DAIRY. THE PRELIMINARY FACILITY ASSESSMENT IS NOT A SUBSTITUTE FOR A WASTE MANAGEMENT PLAN OR NUTRIENT MANAGEMENT PLAN AND SHOULD NOT BE USED FOR DESIGN PURPOSES. THE PRELIMINARY DAIRY FACILITY ASSESSMENT WAS DEVELOPED BY THE MERCED COUNTY ENVIRONMENTAL HEALTH DEPARTMENT IN COOPERATION WITH THE CENTRAL VALLEY WATER BOARD, THE UNIVERSITY OF CALIFORNIA, WESTERN UNITED DAIRYMEN, THE CALIFORNIA DAIRY CAMPAIGN, AND THE MILK PRODUCER'S COUNCIL.

G. CHEMICAL USE:

INDICATE ALL CHEMICALS USED AT THE FACILITY THAT ARE STORED IN THE WASTE STORAGE SYSTEM OR THAT COULD BE DISCHARGED TO SURFACE WATER OR GROUNDWATER AND THE APPROXIMATE AMOUNTS USED ANNUALLY (ATTACH ADDITIONAL SHEETS AS NECESSARY):

	TYPE	APPROXIMATE ANNUAL AMOUNT USED
SOAPS	____________	____________
DISINFECTANTS	____________	____________
PESTICIDES	____________	____________
FOOTBATHS	____________	____________
OTHER	____________	____________

H. SITE MAP:

PROVIDE A SITE MAP (AERIAL OR TOPOGRAPHIC) OF YOUR DAIRY WHICH SHOWS THE FOLLOWING IN SUFFICIENT DETAIL: DAIRY FACILITY PROPERTY BOUNDARIES; LOCATIONS OF ALL MONITORING, DOMESTIC, AND IRRIGATION WELLS; PROCESS WASTEWATER RETENTION PONDS; MILKING PARLOR; ANIMAL HOUSING; CORRALS; AND ALL LAND APPLICATION AREAS WITH IDENTIFICATION OF LAND USED FOR APPLICATION OF MANURE AND/OR PROCESS WASTEWATER.

CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA) COMPLIANCE

A. WAS YOUR DAIRY OPERATING AT ITS CURRENT LOCATION AS OF 17 OCTOBER 2005? _____ YES ______NO

IF YES, HAS YOUR DAIRY EXPANDED BY MORE THAN 15% SINCE 17 OCTOBER 2005? _____YES _____ NO

IF YES (I.E., YOUR DAIRY DID EXPAND BY MORE THAN 15%), DID YOU SUBMIT A REPORT OF WASTE DISCHARGE (ROWD) TO THE CENTRAL VALLEY WATER BOARD FOR THE EXPANSION? _____YES _____NO

CERTIFICATION

"I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED IN THIS DOCUMENT AND ALL ATTACHMENTS AND THAT, BASED ON MY INQUIRY OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION, I BELIEVE THAT THE INFORMATION IS TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT. IN ADDITION, I CERTIFY THAT THE PROVISIONS OF WASTE DISCHARGE REQUIREMENTS GENERAL ORDER NO. R5-2007-0035, INCLUDING THE DEVELOPMENT AND IMPLEMENTATION OF A NUTRIENT MANAGEMENT PLAN AND WASTE MANAGEMENT PLAN, WILL BE COMPLIED WITH."

SIGNATURE OF OWNER OF FACILITY	SIGNATURE OF OPERATOR OF FACILITY
PRINT OR TYPE NAME	PRINT OR TYPE NAME
TITLE AND DATE	TITLE AND DATE

ATTACHMENT B

Waste Management Plan for the Production Area For Existing Milk Cow Dairies

A Waste Management Plan (WMP) for the production area is required for all existing milk cow dairies subject to Waste Discharge Requirements General Order No. R5-2007-0035 and shall address all of the items below. The portions of the WMP that are related to facility and design specifications (items II and III) must be prepared by, or under the responsible charge of, and certified by a civil engineer who is registered pursuant to California law or other person as may be permitted under the provisions of the California Business and Professions Code to assume responsible charge of such work.

The purpose of the WMP is to ensure that the production area of the dairy facility is designed, constructed, operated and maintained so that dairy wastes generated at the dairy are managed in compliance with Waste Discharge Requirements General Order No. R5-2007-0035 in order to prevent adverse impacts to groundwater and surface water quality.

I. A description of the facility that includes:

   A. The name of the facility and the county in which it is located;

   B. The address, Assessor's Parcel Number, and Township, Range, Section(s), and Baseline Meridian of the property;

   C. The name(s), address(es), and telephone number(s) of the property owner(s), facility operator(s), and the contact person for the facility;

   D. Present and maximum animal population as indicated below (this information is in the Report of Waste Discharge submitted in response to the Central Valley Water Board's 8 August 2005 request);

Type of Animals	Present Number of Animals	Maximum Number of Animals in Past 12 months	Breed of Animals
Milking Cows			
Dry Cows			
Heifers: 15 – 24 months			

Type of Animals	Present Number of Animals	Maximum Number of Animals in Past 12 months	Breed of Animals
Heifers: 7 to 14 months			
Heifers: 4 to 6 months			
Calves: up to 3 months			
Other types of commercial animals			

E. Total volume (gallons) of process wastewater (e.g., milk barn washwater, fresh (not recycled) corral flush water, etc.) generated daily and how this volume was determined; and

F. A Site Map (or Maps) of appropriate scale to show property boundaries and the following in sufficient detail:

1. The location of the features of the production area including:

    a. Structures used for animal housing, milk parlor, and other buildings; corrals and ponds; solids separation facilities (settling basins or mechanical separators); other areas where animal wastes are deposited or stored; feed storage areas; drainage flow directions and nearby surface waters; all water supply wells (domestic, irrigation, and barn wells) and groundwater monitoring wells; and

    b. Process wastewater conveyance structures, discharge points, and discharge/mixing points with irrigation water supplies; pumping facilities and flow meter locations; upstream diversion structures, drainage ditches and canals, culverts, drainage controls (berms/levees, etc.), and drainage easements; and any additional components of the waste handling and storage system.

2. The location and features of all land application areas (land under the Discharger's control, whether it is owned, rented, or leased, to which manure or process wastewater from the production area is or may be applied for nutrient recycling) including:

a. A field identification system (Assessor's Parcel Number; field by name or number; total acreage of each field; crops grown; indication if each field is owned, leased, or used pursuant to a formal agreement); indication what type of waste is applied (solid manure only, wastewater only, or both solid manure and wastewater); drainage flow direction in each field, nearby surface waters, and storm water discharge points; tailwater and storm water drainage controls; subsurface (tile) drainage systems (including discharge points and lateral extent); irrigation supply wells and groundwater monitoring wells; sampling locations for discharges of storm water and tailwater to surface water from the field; and

b. Process wastewater conveyance structures, discharge points and discharge.mixing points with irrigation water supplies; pumping facilities; flow meter locations; drainage ditches and canals, culverts, drainage controls (berms, levees, etc.), and drainage easements.

3. The location of all cropland that is part of the dairy but is not used for dairy waste application including the Assessor's Parcel Number, total acreage, crops grown, and information on who owns or leases the field. The Waste Management Plan shall indicate if such cropland is covered under the Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Lands (Order No. R5-2006-0053 for Coalition Group or Order No. R5-2006-0054 for Individual Discharger, or updates thereto);

4. The location of all off-property domestic wells within 600 feet of the production area or land application area(s) associated with the dairy and the location of all municipal supply wells within 1,500 feet of the production area or land application area(s) associated with the dairy; and

5. A map scale, vicinity map, north arrow, and the date the map was prepared. The map shall be drawn on a published base map (e.g., a topographic map or aerial photo) using an appropriate scale that shows sufficient details of all facilities.

II. An engineering report demonstrating that the existing facility has adequate containment capacity. The report shall include calculations showing if the existing containment structures are able to retain all facility process wastewater generated, together with all precipitation on and drainage through manured areas, up to and including during a 25-year, 24-hour storm.

A. The determination of the necessary storage volume shall reflect:

1. The maximum period of time, as defined in the Nutrient Management Plan (item III.B of Attachment C), anticipated between land application events (storage period), which shall consider application of process wastewater or manure to the land application area as allowed by Waste Discharge Requirements General Order No. R5-2007-0035 using proper timing and rate of applications;

2. Manure, process wastewater, and other wastes accumulated during the storage period;

3. Normal precipitation, or normal precipitation times a factor of one and a half, less evaporation on the surface area during the entire storage period. If normal precipitation is used in the calculation of necessary storage volume, the Waste Management Plan shall include a Contingency Plan as specified in II.C below;

4. Normal runoff (runoff from normal precipitation), or runoff due to normal precipitation times a factor of one and a half, from the production area during the storage period. If normal runoff is used in the calculation of necessary storage volume, the Waste Management Plan shall include a Contingency Plan as specified in II.C below;

5. 25-year, 24-hour precipitation on the surface (at the required design storage volume level) of the facility;

6. 25-year, 24-hour runoff from the facility's drainage area;

7. Residual solids after liquids have been removed; and

8. Necessary freeboard (one foot of freeboard for belowground retention ponds and two feet of freeboard for aboveground retention ponds).

B. If the existing facility's storage capacity is inadequate, the WMP shall include proposed modifications or improvements. Any proposed modifications or improvements must be: prepared by, or under the responsible charge of, and certified by a civil engineer who is registered pursuant to California law or other person as may be permitted under the provisions of the California Business and Professions Code to assume responsible charge of such work; and include:

1. Design calculations demonstrating that adequate containment will be achieved;

2. Details on the liner and leachate collection and removal system (if appropriate) materials;

3. A schedule for construction and certification of completion to comply with the Schedule of Tasks J.1 of Waste Discharge Requirements General Order No. R5-2007-0035;

4. A construction quality assurance plan describing testing and observations need to document construction of the pond in accordance with the design and Sections 20323 and 20324 of Title 27; and

5. An operation and maintenance plan for the pond.

C. Contingency Plan: If the necessary storage volume calculated in II.A or II.B above is based on normal precipitation and/or runoff rather than precipitation or runoff from normal precipitation times a factor of one and a half (see II.A.3 and II.A.4 above), then the engineering report shall include a Contingency Plan that includes a plan on how the excess precipitation and/or runoff that is generated during higher than normal precipitation will be managed. If the Contingency Plan includes plans to discharge the excess runoff and/or precipitation to land without being in conformance with the NMP, then the Contingency Plan shall include a Monitoring Well Installation and Sampling Plan (MWISP) with a schedule for implementation that proposes monitoring wells to determine the impacts of such disposal on groundwater quality.

III. An engineering report showing if the facility has adequate flood protection. If the Discharger can provide to the Executive Officer an appropriate published flood zone map that shows the facility is outside the relevant flood zone, an engineering report showing adequate flood protection is not required for that facility. The engineering report shall include a map and cross-sections to scale, calculations, and specifications as necessary. The engineering report shall also describe the size, elevation, and location of all facilities present to protect the facility from inundation or washout as follows:

A. For facilities in the Sacramento River and San Joaquin River Basins showing if:

1. The ponds and manured areas at facilities in operation on or before November 27, 1984 are protected from inundation or washout by overflow from any stream channel during 20-year peak storm flow; or

2. Existing facilities in operation on or before November 27, 1984 that are protected against 100-year peak storm flows will continue such protection; or

3. Facilities, or portions thereof, which began operation after November 27, 1984, are protected against 100-year peak storm flows.

B. For facilities in the Tulare Lake Basin showing if the facility is protected from overflow from stream channels during 20-year peak stream flows for facilities that existed as of 25 July 1975 and protected from 100-year peak stream flows for facilities constructed after 25 July 1975. Facilities expanded after 8 December 1984 must be protected from 100-year peak stream flows.

C. If the facility's flood protection does not meet these minimum requirements, the WMP shall include proposed modifications or improvements with the corresponding design to achieve the necessary flood protection and a schedule for construction and certification of completion to comply with the Schedule of Tasks J.1 of Waste Discharge Requirements General Order No. R5-2007-0035.

IV. A report assessing if the animal confinement areas, animal housing, and manure and feed storage areas are designed and constructed properly.

A. The report shall assess if the following design and construction criteria are met:

1. Corrals and/or pens are designed and constructed to collect and divert all process wastewater to the retention pond;

2. The animal housing area (i.e., barn, shed, milk parlor, etc.) is designed and constructed to divert all water that has contacted animal wastes to the retention pond; and

3. Manure and feed storage areas are designed and constructed to collect and divert runoff and leachate from these areas to the retention pond.

B. If the facility does not meet the above design and construction criteria, the WMP shall include proposed modifications or improvements to achieve the criteria and a schedule for construction and certification of completion to comply with the Schedule of Tasks J.1 of Waste Discharge Requirements General Order No. R5-2007-0035.

V. An operation and maintenance plan to ensure that:

A. All precipitation and surface drainage from outside manured areas, including that collected from roofed areas, is diverted away from manured areas, unless such drainage is fully contained and is included in the storage requirement calculations required in item II, above;

B. Ponds are managed to maintain the required freeboard and to prevent odors, breeding of mosquitoes, damage from burrowing animals, damage from equipment during removal of solids, embankment settlement, erosion, seepage, excess weeds, algae, and vegetation;

C. Holding ponds provide necessary storage volume prior to winter storms (by November 1st at the latest), maintain capacity considering buildup of solids, and comply with the minimum freeboard required in Waste Discharge Requirements General Order No. R5-2007-0035;

D. There is no discharge of waste or storm water to surface waters from the production area;

E. Procedures have been established for removal of solids from any lined pond to prevent damage to the pond liner;

F. Corrals and/or pens are maintained to collect and divert all process wastewater to the retention pond and to prevent ponding of water and to minimize infiltration of water into the underlying soils;

G. The animal housing area (e.g., barn, shed, milk parlor, etc.) is maintained to collect and divert all water that has contacted animal wastes to the retention pond and to minimize the infiltration of water into the underlying soils;

H. Manure and feed storage areas are maintained to ensure that runoff and leachate from these areas are collected and diverted to the retention pond and to minimize infiltration of leachate from these areas to the underlying soils;

I. All dead animals are disposed of properly;

J. Chemicals and other contaminants handled at the facility are not disposed of in any manure or process wastewater, or storm water storage or treatment system unless specifically designed to treat such chemicals and other contaminants;

K. All animals are prevented from entering any surface water within the confined area; and

L. Salt in animal rations is limited to the amount required to maintain animal health and optimum production.

VI. Documentation from a trained professional (i.e., a person certified by the American Backflow Prevention Association, an inspector from a state or local governmental agency who has experience and/or training in backflow prevention, or a consultant with such experience and/or training) that there are no cross-connections that would allow the backflow of wastewater into a water supply well, irrigation well, or surface water as identified on the Site Map required in I.F above.

VII. The certification required in Required Reports and Notices H.2.a of Waste Discharge Requirements General Order No. R5-2007-0035.

ATTACHMENT C

Contents Of A Nutrient Management Plan
And
Technical Standards For Nutrient Management
For
Existing Milk Cow Dairies

Waste Discharge Requirements General Order No. R5-2007-0035 (Order) requires owners and operators of existing milk cow dairies (Dischargers) who apply manure, bedding, or process wastewater to land for nutrient recycling to develop and implement management practices that control nutrient losses and that are described in a Nutrient Management Plan (NMP). The purpose of the NMP is to budget and manage the nutrients applied to the land application area(s) considering all sources of nutrients, crop requirements, soil types, climate, and local conditions in order to prevent adverse impacts to surface water and groundwater quality. The NMP must take the site-specific conditions into consideration in identifying steps that will minimize nutrient movement through surface runoff or leaching past the root zone.

The NMP must contain, at a minimum, all of the elements listed below under Contents of a Nutrient Management Plan and must be in conformance with the applicable Technical Standards for Nutrient Management (Technical Standards), also listed below. Note that the NMP must be updated in response to changing conditions, monitoring results and other factors.

A specialist who is certified in developing nutrient management plans shall develop the NMP. A certified specialist is a Professional Soil Scientist, Professional Agronomist, or Crop Advisor certified by the American Society of Agronomy or a Technical Service Provider certified in nutrient management in California by the Natural Resources Conservation Service (NRCS). The Executive Officer may approve alternative proposed specialists. Only NMPs prepared and signed by these parties will be considered certified.

The NMP is linked to other sections of the WDRs. The Monitoring and Reporting Program specifies minimum amounts of monitoring that must be conducted at the dairy. As indicated below, this information must be used to make management decisions related to nutrient management. Likewise, the timing and amounts of wastewater applications to crops must be known to correctly calculate the amount of storage needed in holding ponds.

Wastes and land application areas shall be managed to prevent contamination of crops grown for human consumption. The term “crops grown for human consumption” refers only to crops that will not undergo subsequent processing which adequately removes potential microbial danger to consumers.

Contents of a Nutrient Management Plan

Dairy Facility Assessment
The NMP will include the initial Preliminary Dairy Facility Assessment (Attachment A) and the annual updates as required by Monitoring and Reporting Program No. R5-2007-0035. Copies of these assessments shall be maintained for 10 years.

The NMP shall identify the name and address of the dairy, the dairy operator, and legal owner of the dairy property as reported in the Report of Waste Discharge and shall contain all of the following elements to demonstrate that the Discharger can control nutrient losses that may impact surface water or groundwater quality and comply with the requirements of the Order and the Technical Standards for Nutrient Management (Technical Standards).

I. Land Application Area Information

A. Identify each land application area (under the Discharger's control, whether it is owned, rented, or leased, to which manure or process wastewater from the production area is or may be applied for nutrient recycling) on a single published base map (topographic map or aerial photo) at an appropriate scale which includes:

1. A field identification system (Assessor's Parcel Number; land application area by name or number; total acreage of each land application area; crops grown; indication if each land application area is owned, rented, or leased by the Discharger; indication what type of waste is applied (solid manure only, wastewater only, or both solid manure and wastewater); drainage flow direction in each field, nearby surface waters, and storm water discharge points; tailwater and storm water drainage controls; subsurface (tile) drainage systems (including discharge points and lateral extent); irrigation supply wells and groundwater monitoring wells; sampling locations for discharges of storm water and tailwater to surface water from the field; and

2. Process wastewater conveyance structures, discharge points and discharge mixing points with irrigation water supplies; pumping facilities; flow meter locations; drainage ditches and canals, culverts, drainage controls (berms, levees, etc.), and drainage easements.

B. Provide the following information for land application area identified in I.A above:

1. Field's common name (name used when keeping records of waste applications).

2. Assessor's Parcel Number.

3. Total acreage.

4. Crops grown and crop rotation.

5. Information on who owns and/or leases the field.

6. Proposed sampling locations for discharges of storm water and tailwater to surface water.

C. Provide copies of written agreements with third parties that receive process wastewater for their own use from the Discharger's dairy (Technical Standards V.A.1 and V.A.3 below).

D. Identify each field under the control of the Discharger and within five miles of the dairy where neither process wastewater nor manure is applied. Each field shall be identified on a single published base map at an appropriate scale by the following:

1. Assessor's Parcel Number.

2. Total acreage.

3. Information on who owns or leases the field.

Note: The NMP must be updated and the Central Valley Water Board notified in writing before waste is applied to the lands identified in Section D.

II. Sampling and Analysis (see Technical Standard I below)

Identify the sampling methods, sampling frequency, and analyses to be conducted for soil, manure, process wastewater, irrigation water, and plant tissue analysis (Technical Standard I below).

III. Nutrient Budget (see Technical Standard V below)

The Discharger shall develop a nutrient budget for each land application area. The nutrient budget shall establish planned rates of nutrient applications for each crop based on soil test results, manure and process wastewater analyses, irrigation water analyses, crop nutrient requirements and patterns, seasonal and climatic conditions, the use and timing of irrigation water, and the nutrient application restrictions listed in Technical Standards V.A through V.D below. The Nutrient Budget shall include the following:

A. The rate of application of manure and process wastewater for each crop in each land application area (also considering sources of nutrients other than manure or process wastewater) to meet each crop's needs without exceeding the application rates specified in Technical Standard V.B below. The basis for the application rates must be provided.

B. The timing of applications for each crop in each land application area and the basis for the timing (Technical Standard V.C below). The maximum period of time anticipated between land application events (storage period) based on proper timing and compliance with Technical Standard V.C. below. This will be used in the Waste Management Plan (item II.A of Attachment B) to determine the storage capacity needs.

C. The method of manure and process wastewater application for each crop in each land application area (Technical Standard V.D below).

D. If phosphorus and/or potassium applications exceed the amount of these elements removed from the land application area in the harvested portion of the crop, the soil and crop tissue analyses shall be reviewed by an agronomist at least every five years. If this review determines that the buildup of phosphorus or potassium threatens to reduce the long-term productivity of the soil or the yield, quality or use of the crops grown, application rates will be adjusted downward to prevent or correct the problem.

IV. Setbacks, Buffers, and Other Alternatives to Protect Surface Water (see Technical Standard VII below)

A. Identify all potential surface waters or conduits to surface water that are within 100 feet of any land application area.

B. For each land application area that is within 100 feet of a surface water or a conduit to surface water, identify the setback, vegetated buffer, or other alternative practice that will be implemented to protect surface water (Technical Standard VII below).

V. Field Risk Assessment (see Technical Standard VIII below)

Evaluate the effectiveness of management practices used to control the discharge of waste constituents from land application areas by assessing the water quality monitoring results of discharges of manure, process wastewater, tailwater, subsurface (tile) drainage, or storm water from the land application areas.

VI. Record-Keeping (see Technical Standard IX below)

Identify the records that will be maintained for each land application area identified in I.A above.

VII. Nutrient Management Plan Review (see Technical Standard X below)

A. Identify the schedule for review and revisions to the NMP.

B. Identify the person who will conduct the NMP review and revisions.

Technical Standards for Nutrient Management

The Discharger shall comply with the following Technical Standards for Nutrient Management in the development and implementation of the Nutrient Management Plan (NMP).

I. Sampling and Analysis

Soil, manure, process wastewater, irrigation water, and plant tissue shall be monitored, sampled, and analyzed as required in Monitoring and Reporting Program No. R5-2007-0035, and any future revisions thereto. The results of these analyses shall be used during the development and implementation of the NMP.

II. Crop Requirements

A. Realistic yield goals for each crop in each land application area shall be established. For new crops or varieties, industry yield recommendations may be used until documented yield information is available.

B. Each crop's nutrient requirements for nitrogen, phosphorus, and potassium shall be determined based on recommendations from the University of California, *Western Fertilizer Handbook* (9th Edition), or from historic crop nutrient removal.

III. Available Nutrients

A. All sources of nutrients (nitrogen, phosphorus, and potassium) available for each crop in each land application area shall be identified prior to land applications. Potential nutrient sources include, but are not limited to, manure, process wastewater, irrigation water, commercial fertilizers, soil, and previous crops.

B. Nutrient values of soil, manure, process wastewater, and irrigation water shall be determined based on laboratory analysis. "Book values" for manure and process wastewater may be used for planning of waste applications during the first two years during initial development of the NMP if necessary. Acceptable book values are those values recognized by American Society of Agricultural and Biological Engineers (ASABE), the Natural Resources Conservation Service (NRCS), and/or the University of California that accurately estimate the nutrient content of the material. The nutrient content of commercial fertilizers shall be derived from California Department of Food and Agriculture published values.

C. Nutrient credit from previous legume crops shall be determined by methods acceptable to the University of California Cooperative Extension, the NRCS, or a specialist certified in developing nutrient management plans.

IV. Overall Nutrient Balance

If the NMP shows that the nutrients generated by the dairy exceed the amount needed for crop production in the land application area, the Discharger must implement management practices (such as offsite removal of the excess nutrients, treatment, or storage) that will prevent impacts to surface water or groundwater quality due to excess nutrients.

V. Nutrient Budget

The NMP shall include a nutrient budget which includes planned rates of nutrient applications for each crop that do not exceed the crop's requirements for total nitrogen considering the stage of crop growth and that also considers all nutrient sources, climatic conditions, the irrigation schedule, and the application limitations in A through D below.

A. General Standards for Nutrient Applications

1. Prohibition A.8 of the Order: "*The application of waste to lands not owned, leased, or controlled by the Discharger without written permission from the landowner or in a manner not approved by the Executive Officer, is prohibited.*"

2. Prohibition A. 9 of the Order: "*The land application of manure or process wastewater to cropland for other than nutrient recycling is prohibited.*"

3. Land Application Specification C.2 of the Order: "*No later than 31 December 2007, The Discharger shall have a written agreement with each third party that receives process wastewater from the Discharger for its own use. Each written agreement shall be included in the Discharger's Existing Conditions Report, Nutrient Management Plan, and Annual Report. The written agreement(s) shall be effective until the third party is covered under waste discharge requirements or a waiver of waste discharge*

requirements that are adopted by the Central Valley Water Board. The written agreement shall:

a. *Clearly identify:*
   ii. *The Discharger and dairy facility from which the process wastewater originates;*

   iii. *The third party that will control the application of process wastewater to cropland;*

   iv. *The Assessor's Parcel Number(s) and the acreage(s) of the cropland where the process wastewater will be applied; and*

   v. *The types of crops to be fertilized with the process wastewater.*

b. *Include an agreement by the third party to:*
   ii. *Use the process wastewater at agronomic rates appropriate for the crops to be grown; and*

   iii. *Prevent the runoff to surface waters of wastewater, storm water or irrigation supply water that has come into contact with manure or is blended with wastewater.*

c. *Include a certification statement, as specified in General Reporting Requirements C.7 of the Standard Provision and Reporting Requirements (which is attached to and made part of this Order), which is signed by both the Discharger and third party."*

4. Land Application Specification C.4 of the Order: "*The application of animal waste and other materials containing nutrients to any cropland under control of the Discharger shall meet the following conditions:*

   a. *The application is in accordance with a certified Nutrient Management Plan developed and implemented in accordance with Required Reports and Notices H.1.c and Attachment C of this Order; and*

   b. *Records are prepared and maintained as specified in theRecord-Keeping Requirements of Monitoring and Reporting Program No. R5-2007-0035."*

5. Land Application Specification C.5 of the Order: "*The application of waste to cropland shall be at rates that preclude development of vectors or other nuisance conditions and meet the conditions of the certified Nutrient Management Plan.*"

6. Land Application Specification C.7 of the Order: "*All process wastewater applied to land application areas must infiltrate completely within 72 hours after application.*"

7. Land Application Specification C.8 of the Order: "*Process wastewater shall not be applied to land application areas during periods when the soil is at or above field moisture capacity unless consistent with a certified Nutrient Management Plan.*"

8. Provision E.6 of the Order: "*This Order does not apply to facilities where wastes such as, but not limited to, whey, cannery wastes, septage, municipal or industrial sludge, municipal or industrial biosolids, ash or similar types of waste are generated onsite or are proposed to be brought onto the dairy or associated cropland for the purpose of nutrient recycling or disposal. The Discharger shall submit a complete Report of Waste Discharge and receive WDRs or a waste-specific waiver of WDRs from the Central Valley Water Board prior to receiving such waste.*"

9. Plans for nutrient management shall specify the form, source, amount, timing, and method of application of nutrients on each land application area to minimize nitrogen and/or phosphorus movement to surface and/or ground waters to the extent necessary to meet the provisions of the Order.

10. Where crop material is not removed from the land application area, waste applications are not allowed. For example, if a pasture is not grazed or mowed (and cuttings removed from the land application area), waste shall not be applied to the pasture.

11. Manure and/or process wastewater will be applied to the land application area for use by the first crop covered by the NMP only to the extent that soil tests indicate a need for nitrogen application.

12. Supplementary commercial fertilizer(s) and/or soil amendments may be added when the application of nutrients contained in manure and/or process wastewater alone is not sufficient to meet

the crop needs, as long as these applications do not exceed provisions of the Order.

13. Nutrient applications to a crop shall not be made prior to the harvest of the previous crop except where the reason for such applications is provided in the NMP.

14. Water applications shall not exceed the amount needed for efficient crop production.

15. Nutrients shall be applied in such a manner as not to degrade the soil's structure, chemical properties, or biological condition.

B. Nutrient Application Rates

1. General

a. Planned rates of nutrient application shall be determined based on soil test results, crop tissue test results, nutrient credits, manure and process wastewater analysis, crop requirements and growth stage, seasonal and climatic conditions, and use and timing of irrigation water. Actual applications of nitrogen to any crop shall be limited to the amounts specified below.

b. Nutrient application rates shall not attempt to approach a site's maximum ability to contain one or more nutrients through soil adsorption. Excess applications or applications that cause soil imbalances should be avoided. Excess manure nutrients generated by the Discharger must be handled by export to a good steward of the manure, or the development of alternative uses.

2. Nitrogen

a. Total nitrogen applications to a land application area prior to and during the growing of a crop will be based on pre-plant or pre-side dress soil analysis to establish residual nitrogen remaining in the field from the preveious crop to establish early season nitrogen applications. Pre-plant or side dress nitrogen applications will not exceed the estimated total crop use as established by the nutrient management plan. Except as allowed below, application rates shall not result in total nitrogen applied to the land application areas exceeding

1.4 times the nitrogen that will be removed from the field in the harvested portion of the crop. Additional applications of nitrogen are allowable if the following conditions are met:

i. Plant tissue testing has been conducted and it indicates that additional nitrogen is required to obtain a crop yield typical for the soils and other local conditions;

ii. The amount of additional nitrogen applied is based on the plant tissue testing and is consistent with University of California Cooperative Extension written guidelines or written recommendations from a professional agronomist;

iii. The form, timing, and method of application facilitates timely nitrogen availability to the crop; and

iv. Records are maintained documenting the need for additional applications.

b. If, in calendar year 2012 or later years, application of total nitrogen to a land application area exceeds 1.65 times total nitrogen removed from the land application area through the harvest and removal of the previous crop, the Discharger shall either revise the NMP to immediately prevent such exceedance or submit a report demonstrating that the application rates have not and will not pollute surface or ground water.

3. Phosphorus and Potassium

a. Phosphorus and potassium may be applied in excess of crop uptake rates. If, however, monitoring indicates that levels of these elements are causing adverse impacts, corrective action must be taken. Cessation of applications may be necessary until crop uptake and harvest has reduced the concentration in the soil.

Important Note:
Use of animal manure as a primary source of nitrogen commonly results in applications of phosphorus and potassium at rates that exceed crop needs. Over time, these elements build up in the soils and can cause adverse impacts. For example, phosphorus will leave the land application area in surface runoff and

contribute to excessive algae growth in receiving waters and potassium can build up in crops to the point of limiting their use as animal feed. Application of these nutrients at agronomic levels, along with reasonable erosion control and runoff control measures, will normally prevent such problems.

Nutrients are being evaluated in several Central Valley surface waters. Where these studies show that nutrients are adversely impacting beneficial uses, the Regional Water Board will work with parties in the watershed, including dairies, to reduce discharges of phosphorus, nitrogen and possibly other constituents.

C. Nutrient Application Timing

1. Process wastewater application is not the same as irrigation. Process wastewater application scheduling should be based on the nutrient needs of the crop, the daily water use of the crop, the water holding capacity of the soil, and the lower limit of soil moisture for each crop and soil.

2. Wastewater shall not be applied when soils are saturated. During the rainy season rainfall can exceed crop water demand. However, the application of wastewater is allowable if tests show that there is an agronomic need and current conditions indicate that threat of nitrate leaching is minimal.

3. The timing of nutrient application must correspond as closely as possible with plant nutrient uptake characteristics, while considering cropping system limitations, weather and climatic conditions, and land application area accessibility.

4. Nutrient applications for spring-seeded crops shall be timed to avoid surface runoff and leaching by winter rainfall.

5. Except for orchards and vineyards, nutrients shall not be applied during periods when a crop is dormant.

D. Nutrient Application Methods

1. The Discharger shall apply nutrient materials uniformly to application areas or as prescribed by precision agricultural techniques.

2. Land Application Specification C.6 of the Order: "*Land application areas that receive dry manure shall be managed through implementation of erosion control measures to minimize erosion and must be consistent with a certified Nutrient Management Plan.*"

VI. Wastewater Management on Land Application Areas

Control of water and process wastewater applications and runoff is a part of proper nutrient management since water transports nutrients, salts, and other constituents from cropland to groundwater and surface water. The Discharger shall comply with the following provisions of the Order, which place requirements on applications of manure and process wastewater to, and runoff from, cropland:

A. Prohibition A.3 of the Order: "*The discharge of waste from existing milk cow dairies to surface waters which causes or contributes to an exceedance of any applicable water quality objective in the Basin Plans or any applicable state or federal water quality criteria, or a violation of any applicable state or federal policies or regulations is prohibited.*"

B. Prohibition A.4 of the Order: "*The collection, treatment, storage, discharge or disposal of wastes at an existing milk cow dairy that results in (1) discharge of waste constituents in a manner which could cause degradation of surface water or groundwater except as allowed by this Order, (2) contamination or pollution of surface water or groundwater, or (3) a condition of nuisance (as defined by the California Water Code Section 13050) is prohibited.*"

C. Prohibition A.10 of the Order: "*The discharge of wastewater to surface waters from cropland is prohibited. Irrigation supply water that comes into contact or is blended with waste or wastewater shall be considered wastewater under this Prohibition.*"

D. Prohibition A.11 of the Order: "*The application of process wastewater to a land application area before, during, or after a storm event that would result in runoff of the applied water is prohibited.*"

E. Prohibition A.12 of the Order: "*The discharge of storm water to surface water from a land application area where manure or process wastewater has been applied is prohibited unless the land application area has been managed consistent with a certified Nutrient Management Plan.*"

F. Land Application Specification C.3 of the Order: "*Land application of wastes for nutrient recycling from existing milk cow dairies shall not cause the underlying groundwater to contain any waste constituent, degradation product, or any constituent of soil mobilized by the interactions between applied wastes and soil or soil biota, to exceed the groundwater limitations set forth in this Order.*"

G. Land Application Specification C.7 of the Order: "*All process wastewater applied to land application areas must infiltrate completely within 72 hours after application*."

H. Land Application Specification C.8 of the Order: "*Process wastewater shall not be applied to land application areas during periods when the soil is at or above field moisture capacity unless consistent with a certified Nutrient Management Plan (see Attachment C)*."

VII. Setbacks and Vegetated Buffer

A. Land Application Specification C.9 of the Order: "*Manure and process wastewater shall not be applied closer than 100 feet to any down gradient surface waters, open tile line intake structures, sinkholes, agricultural or domestic well heads, or other conduits to surface waters, unless a 35-foot wide vegetated buffer or physical barrier is substituted for the 100-foot setback or alternative conservation practices or field-specific conditions will provide pollutant reductions equivalent or better than the reductions achieved by the 100-foot setback*."

B. A setback is a specified distance from surface waters or potential conduits to surface waters where manure and process wastewater may not be land applied, but where crops may continue to be grown.

C. A vegetated buffer is a narrow, permanent strip of dense perennial vegetation where no crops are grown and which is established parallel to the contours of and perpendicular to the dominant slope of the land application area for the purposes of slowing water runoff, enhancing water infiltration, trapping pollutants bound to sediment, and minimizing the risk of any potential nutrients or pollutants from leaving the land application area and reaching surface waters.

D. The minimum widths of setbacks and vegetated buffers must be doubled around the wellhead of a drinking water supply well constructed in a sole-source aquifer.

E. Practices and management activities for vegetated buffers include the following:

1. Removal of vegetation in vegetated buffers will be in accordance with site production limitations, rate of plant growth, and the physiological needs of the plants.

2. Do not mow below the recommended height for the plant species.

3. Maintain adequate ground cover and plant density to maintain or improve filtering capacity of the vegetation.

4. Maintain adequate ground cover, litter, and canopy to maintain or improve infiltration and soil condition.

5. Periodic rest from mechanical harvesting may be needed to maintain or restore the desired plant community following episodic events such as drought.

6. When weeds are a significant problem, implement pest management to protect the desired plant communities.

7. Prevent channels from forming.

VIII. Field Risk Assessment

The results of the water quality monitoring of discharges of manure, process wastewater, storm water, and tailwater to surface water from each land application area, as required by Monitoring and Reporting Program No. R5-2007-0035, shall be used by the Discharger to assess the movement of nitrogen and phosphorus from each land application area. The Discharger will follow guidelines provided by the Central Valley Water Board in conducting these assessments.

IX. Record-Keeping

The Discharger shall maintain records for each land application area as required in the Record-Keeping Requirements of Monitoring and Reporting Program No. R5-2007-0035.

X. Nutrient Management Plan Review

A. Provide the name and contact information (including address and phone number) of the person who created the NMP; the date that the NMP was drafted; the name, title, and contact information of the person who approved the final NMP; and the date of NMP implementation.

B. The NMP shall be updated when discharges from any land application area exceed water quality objectives, a nutrient source has changed, site-specific information has become available to replace defaults values used in the overall nutrient balance or the nutrient budget, nitrogen application rates in any land application area exceed the rates specified in Technical Standard V.B or the Field Risk Assessment finds that management practices are not effective in minimizing discharges.

C. The NMP shall be updated prior to any anticipated changes that would affect the overall nutrient balance or the nutrient budget such as, but not limited to, a crop rotation change, changes in the available cropland, or the changes in the volume of process wastewater generated.

D. The Discharger shall review the NMP at least once every five years and notify the Regional Board in the annual report of any proposed changes that would affect the NMP.

ATTACHMENT D

Manure/Process Wastewater Tracking Manifest
For
Existing Milk Cow Dairies

Instructions:

1) Complete one manifest for each hauling event, for each destination. A hauling event may last for several days, as long as the manure is being hauled to the same destination.
2) If there are multiple destinations, **complete a separate form for each destination**.
3) The operator must obtain the signature of the hauler upon completion of each manure-hauling event.
4) The operator shall submit copies of manure/process wastewater tracking manifest(s) with the Annual Monitoring Report for Existing Milk Cow Dairies.

Operator Information:

Name of Operator: ____

Name of Dairy Facility: ____

Facility Address: ____
Number and Street City Zip Code

Contact Person Name and Phone Number: ____
Name Phone Number

Manure/Process Wastewater Hauler Information:

Name of Hauling Company/Person: ____

Address of Hauling Company /Person: ____
Number and Street City Zip Code

Contact Person: ____
Name Phone Number

Destination Information:

Composting Facility / Broker / Farmer / Other (identify) ________________ (please circle one)

Contact information of Composting Facility, Broker, Farmer, or Other (as identified above):

____
Name Number and Street City Zip Code Phone Number

Manure/Process Wastewater Destination Address or Assessor's Parcel Number:

____
Number and Street City Zip Code Assessor's Parcel Number

Dates Hauled: ____

Amount Hauled:

Enter the amount of manure hauled in tons or cubic yards (indicate the units used), the manure solids content (if amount reported in tons) or manure density (if amount reported in cubic yards), and the method used to calculate the amount:

Manure: ___________Tons or Cubic Yards (indicate which units used)
Manure Solids Content (if amount reported in tons): ______________________
Manure Density (if amount reported in cubic yards): ______________________

Method used to determine amount of manure: ______________________________

____

Enter the amount of process wastewater hauled in gallons and the method used to determine the amount.

Process Wastewater: ______________ Gallons

Method used to determine volume of process wastewater: ______________________

____

Written Agreement:
Does the Operator have a written agreement (in compliance with Land Application Specification C.2 of Waste Discharge Requirements General Order No. R5-2007-0035) with any party that receives process wastewater from the Operator for its own use? (please check one)

____ Yes _______ No

If the answer is no, the Operator agrees to have such a written agreement with any such party for any process wastewater transferred after **31 December 2007** to such party.
_____________ (Operator shall provide initials here to acknowledge this requirement).

Certification:
I declare under the penalty of law that I personally examined and am familiar with the information submitted in this document, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of a fine and imprisonment for knowing violations.

Operator's Signature: ______________________________ Date: ______________

Hauler's Signature: ______________________________ Date: ______________

ATTACHMENT E

Definitions
For
Existing Milk Cow Dairies

1. "Agronomic rates" is defined as the land application of irrigation water and nutrients (which may include animal manure, bedding, or process wastewater) at rates of application in accordance with a plan for nutrient management that will enhance soil productivity and provide the crop or forage growth with needed nutrients for optimum health and growth.

2. "Anaerobic digester" is defined as a basin, pond, or tank designed, constructed, maintained, and operated for the anaerobic treatment of liquid or solid animal waste and which promotes the decomposition of manure or "digestion" of the organics in manure to simple organics and gaseous biogas products.

3. "Aquifer" is defined as ground water that occurs in a saturated geologic unit that contains sufficient permeability and thickness to yield significant quantities of water to wells or springs.

4. "Artificial recharge area" is defined as an area where the addition of water to an aquifer is by human activity, such as putting surface water into dug or constructed spreading basins or injecting water through wells.

5. "Central Valley Water Board" is defined as the California Regional Water Quality Control Board, Central Valley Region.

6. "Certified Nutrient Management Plan" is defined as a nutrient management plan that is prepared and signed by a specialist who is certified in developing nutrient management plans. A certified specialist is: a Professional Soil Scientist, Professional Agronomist, Professional Crop Scientist, or Crop Advisor certified by the American Society of Agronomy; a Technical Service Provider certified in nutrient management in California by the Natural Resources Conservation Service; or other specialist approved by the Executive Officer.

7. "Confined animal facility" is defined in Title 27 CCR Section 20164 as "*... any place where cattle, calves, sheep, swine, horses, mules, goats, fowl, or other domestic animals are corralled, penned, tethered, or otherwise enclosed or held and where feeding is by means other than grazing.*"

8. "Confined area" is defined as the area where cows are confined within the production area.

9. "Cropland" is defined as the land application area where dry or solid manure and/or process wastewater is recycled for the purpose of beneficially using the nutrient value of the manure and/or process wastewater for crop production.

10. "Degradation" is defined as any measurable adverse change in water quality.

11. "Discharge" is defined as the discharge or release of waste to land, surface water, or ground water.

12. "Discharger" is defined as the property owner and the operator of an existing milk cow dairy subject to Waste Discharge Requirements General Order No. R5-2007-0035.

13. "Existing facility" is defined, consistent with Title 14 CCR Section 15301, as a milk cow dairy subject to Waste Discharge Requirements General Order No. R5-2007-0035 that is fully constructed and operating as of 17 October 2005 and which has subsequently undergone no expansion in the size or scope of its herd, facilities, or operation.

14. "Existing herd size" is defined as the maximum number of mature dairy cows reported in the herd on 17 October 2005 plus or minus 15 percent of that reported number to account for the normal variation in herd sizes.

15. "Expansion" is defined as, but not limited to, any increase in the existing herd size (i.e., by more than 15 percent of the maximum number of mature dairy cows in the herd on 17 October 2005) or an increase in the storage capacity of the retention ponds or acquisition of more acreage for reuse of nutrients from manure or process wastewater in order to accommodate an expansion of the existing herd size. "Expansion" does not include installation or modification of facilities or equipment to achieve compliance with the requirements of Waste Discharge Requirements General Order No. R5-2007-0035 so long as the modification or installation is sized to accommodate only the existing herd size.

16. "Facility" is defined as the property identified as such in Waste Discharge Requirements General Order No. R5-2007-0035.

17. "Field moisture capacity" is defined as "the upper limit of storable water in the soil once free drainage has occurred after irrigation or precipitation."

18. "Freeboard" is defined as the elevation difference between the process wastewater (liquid) level in a pond and the lowest point of the pond embankment before it can overflow.

19. "Incorporation into soil" is defined as the complete infiltration of process wastewater into the soil, the disking or rotary tiller mixing of manure into the soil, shank injection of slurries into soil, or other equally effective methods

20. "Irrigation return flow" is defined as surface and subsurface water that leaves a field following application of irrigation water.

21. "Land application area" is defined as land under control of the milk cow dairy owner or operator, whether it is owned, rented, or leased, to which manure or process wastewater from the production area is or may be applied for nutrient recycling.

22. "Manure" is defined as the fecal and urinary excretion of livestock and other commingled materials. Manure may include bedding, compost, and waste feed.

23. "Manured solids" is defined as manure that has a sufficient solids content such that it will stack with little or no seepage.

24. "Mature dairy cow" is defined as a dairy cow that has produced milk at any time during her life.

25. "Normal precipitation" is defined as the long-term average precipitation based on monthly averages over the time that data has been collected at a particular weather station. Normal precipitation is usually taken from data averaged over a 30-year period (e.g. 1971 to 2000) if such data is available.

26. "Nuisance" is defined in the Porter-Cologne Water Quality Control Act as "*...anything which meets all of the following requirements:*
   (1) Is injurious to health, or is indecent or offensive to the senses, or an obstruction to the free use of property, so as to interfere with the comfortable enjoyment of life or property.
   (2) Affects at the same time an entire community or neighborhood, or any considerable number of persons, although the extent of the annoyance or damage inflicted upon individuals may be unequal.
   (3) Occur during, or as a result of, the treatment or disposal of wastes."

27. "Nutrient" is defined as any element taken in by a plant which is essential to its growth and which is used by the plant in elaboration of its food and tissue.

28. "Nutrient recycling" is defined as the application of nutrients at agronomic rates for crop production.

29. "Off-property discharge" is defined as the discharge or release of waste beyond the boundaries of the property of the dairy's production area or the land application area or to water bodies that run through the production area or land application area.

30. "Open tile line intake structure" is defined as an air vent for a subsurface (tile) drain system.

31. "Order" is defined as the Waste Discharge Requirements General Order.

32. "Overflow" is defined as the intentional or unintentional diversion of flow from the collection, treatment, land application, and conveyance systems, including pumping facilities.

33. "Pollutant" is defined in Title 40 Code of Federal Regulations Section 122.2 as "*...dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials (except those regulated under the Atomic Energy Act of 1954, as amended (42 U.S.C. 2011 et seq.)), heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water.*"

34. "Pollution" is defined in Section 13050(l)(1) of the Porter-Cologne Water Quality Control Act as *"...an alteration of the quality of the waters of the state by waste to a degree which unreasonably affects either of the following: (A) The waters for beneficial uses. (B) Facilities which serve these beneficial uses."*

35. "Pond" is defined as retention ponds, storage ponds, settling ponds, or any structures used for the treatment, storage, disposal, and recycling of process wastewater. Ponds are differentiated from sumps, which are structures in a conveyance system used for the installation and operation of a pump.

36. "Process wastewater" is defined as water directly or indirectly used in the operation of a milk cow dairy for any or all of the following: spillage or overflow from animal watering systems; washing, cleaning, or flushing pens, barns, manure pits, or other dairy facilities; washing or spray cooling of animals; or dust control...and includes any water or precipitation and precipitation runoff which comes into contact with any raw materials, products, or byproducts including manure, feed, milk, or bedding.

37. "Production area" is defined as that part of a milk cow dairy that includes the animal confinement area, the manure storage area, the raw materials storage area, and the waste containment areas.

38. "Regional Board" is defined as one of the nine California Regional Water Quality Control Boards.

39. "Salt" is defined as the products, other than water, of the reaction of an acid with a base. Salts commonly break up into cations (sodium, calcium, etc.) and anions (chloride, sulfate, etc.) when dissolved in water. Total dissolved solids is generally measured as an indication of the amount of salts in a water or wastewater.

40. "Salt in animal rations" is defined as the sodium chloride and any added minerals (such as calcium, phosphorus, potassium, sulfur, iron, selenium, copper, zinc, or manganese) in the animal ration.

41. "Significant quantity" is defined as the volume, concentrations, or mass of a pollutant that can cause or threaten to cause pollution, contamination, or nuisance; adversely impact human health or the environment; and/or cause or contribute to a violation of any applicable water quality standards for the receiving water.

42. "Sole-source aquifer" is defined as an aquifer that supplies 50 percent or more of the drinking water of an area.

43. "State" is defined as the State of California.

44. "State Water Board" is defined as the State Water Resources Control Board.

45. "Significant storm event" is defined as a precipitation event that results in continuous runoff of storm water for a minimum of one hour, or intermittent discharge of runoff for a minimum of three hours in a 12-hour period.

46. "Storm water" is defined as storm water runoff, snowmelt runoff, and surface runoff and drainage.

47. "Subsurface (tile) drainage" is defined as water generated by installing and operating drainage systems to lower the water table below irrigated lands. Subsurface drainage systems, deep open drainage ditches, or drainage wells can generate this drainage.

48. "Surface water" is defined as water that includes essentially all surface waters such as navigable waters and their tributaries, interstate waters and their tributaries, intrastate waters, all wetlands and all impoundments of these waters. Surface waters include irrigation and flood control channels.

49. "Tailwater" is defined as the runoff of irrigation water from an irrigated field.

50. "25-year, 24-hour rainfall event" is defined as a precipitation event with a probable recurrence interval of once in twenty five years as defined by the National Weather Service in Technical Paper No. 40, "Rainfall Frequency Atlas of the United States," May, 1961, or equivalent regional or State rainfall probability information developed from this source.

51. "Waste" is defined as set forth in Water Code Section 13050(d), and includes manure, leachate, process wastewater and any water, precipitation or rainfall

runoff that came into contact with raw materials, products, or byproducts such as manure, compost piles, feed, silage, milk, or bedding.

52. "Waters of the state" is defined in Section 13050 of the California Water Code as "*...any surface water or groundwater, including saline waters, within the boundaries of the state*."

53. "Wet season" is defined as the period of time between 1 October and 31 May of each year.

ATTACHMENT F

Acronyms And Abbreviations
For
Existing Milk Cow Dairies

ASABE	American Society of Agricultural and Biological Engineers
Basin Plans	Water Quality Control Plans
BMPs	best management practices
BOD_5	five-day biochemical oxygen demand
BPT	best practicable control technology currently available
BPTC	best practicable treatment or control
CCR	California Code of Regulations
CDQAP	California Dairy Quality Assurance Program
Central Valley Water Board	California Regional Water Quality Control Board, Central Valley Region
cm/sec	centimeters per second
CPS	Conservation Practice Standard
DWQ	Division of Water Quality
DWR	Department of Water Resources
EC	electrical conductivity
ESP	Environmental Stewardship Program
ETo	Evapotranspiration from a standardized grass surface
GWPA	Groundwater Protection Area
MCL	maximum contaminant level
mg N/L	milligrams nitrogen per liter
mg/L	milligrams per liter
ml	milliliter
MPN	most probable number
MRP	Monitoring and Reporting Program
MWICR	monitoring well installation completion report
MWISP	monitoring well installation and sampling plan
NAD83	North American Datum 1983
NAVD88	North American Vertical Datum 1988
NMP	nutrient management plan
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NTU	nephelometric turbidity unit
pH	Logarithm of the reciprocal of hydrogen ion concentration in gram atoms per liter
QA/QC	quality assurance/quality control
REC-1	water contact recreation
Region	Central Valley Region
Regional Board	California Regional Water Quality Control Board
ROWD	Report of Waste Discharge
SPRR	Standard Provisions and Reporting Requirements

State Water Board	State Water Resources Control Board
State Water Board Resolution 68-16	State Water Resources Control Board Resolution 68-16 (*Statement of Policy with Respect to Maintaining High Quality of Waters in California*)
State Water Board Resolution 88-63	State Water Resources Control Board Resolution 88-63 (*Sources of Drinking Water Policy*)
State Water Board Resolution 92-49	State Water Resources Control Board Resolution 92-49 (*Policies and Procedures for Investigation and Cleanup or Abatement of Discharges Under Water Code Section 13304* or *Cleanup and Abatement Policy*)
TDS	total dissolved solids
Title 3	Title 3 of the California Code of Regulations, Division 2, Chapter 1, Article 22
Title 27	Title 27 of the California Code of Regulations, Division 2, Subdivision 1, Chapter 7, Subchapter 2, Article 1
UCCE	University of California Committee of Experts
U.N.	United Nations
μmhos/cm	micromhos per centimeter (same as μS/cm)
μS/cm	microsiemens per centimeter (same as μmhos/cm)
USEPA	United States Environmental Protection Agency
WDRs	waste discharge requirements
WMP	waste management plan

Appendix E

Tentative Order

Waste Discharge Requirements for Bar 20 Partners, LTD

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER NO. R5-2008-XXXX

WASTE DISCHARGE REQUIREMENTS
FOR
BAR 20 PARTNERS, LTD., A LIMITED PARTNERSHIP BETWEEN
JOHN SHEHADEY AND RICHARD SHEHADEY,
AND MICROGY, INC.
BAR 20 DAIRY NO. 2
FRESNO COUNTY

The California Regional Water Quality Control Board, Central Valley Region, (hereafter Regional Water Board) finds that:

1. Bar Partners, LTD., a limited partnership between Richard Shehadey and John Shehadey submitted a Report of Waste Discharge (RWD) on 12 September 2007 for the completed expansion of the existing Bar 20 Dairy No. 2 (hereafter "facility") and the proposed addition of a thermophilic anaerobic digester. The digester will be owned and operated by Microgy Inc., a New Hampshire Corporation, and will digest a mixture of manure generated at the facility and an imported supplemental feedstock consisting of highly organic waste materials, to generate biogas. Bar 20 Partners, LTD, John Shehadey, Richard Shehadey, and Microgy, Inc. are hereafter collectively known as "Discharger."

2. The original portion of the facility has operated under Order No. R5-2007-0035, *Waste Discharge Requirements General Order for Existing Milk Cow Dairies* (hereafter "General Order") which prohibits the disposal of waste not generated by the on-site animal production activities except where a Report of Waste Discharge (RWD) for the disposal has been submitted to the Executive Officer and the Regional Water Board has issued or waived Waste Discharge Requirements (WDRs). The expanded portion of the facility, which initiated discharge in December 2005, operated in the absence of WDRs or a waiver thereof.

3. The facility includes developed milking, feed storage, waste storage, and confined animal areas within Sections 4, 5, 6, and 9, Township 14 South, Range 16 East, Mount Diablo Base and Meridian, and within Sections 31, 32, and 33, Township 13 South, Range 16 East, Mount Diablo Base and Meridian. The facility is approximately ten miles west of Kerman, in Fresno County, and is addressed 25500 and 24387 West Whitesbridge Road, as shown on Attachment A, attached hereto and made a part of this Order by reference.

Existing Dairy Facility

4. The portion of the facility north of Whitesbridge Road was constructed in 1972. Construction of the expanded portion of the facility south of Whitesbridge Road was completed in December 2005. The RWD submitted in September 2007, reported the facility houses 10,457 milk cows and dry cows.

5. The facility includes two milk barns, two confined animal areas, two wastewater retention systems with a total capacity of approximately 14.8 million cubic feet, and 2,792 acres of associated cropland. A site plan showing the layout of the facility is shown in Attachment B, Attachment C, and Attachment D which are attached hereto and made a part of this Order by reference.

6. Manure is washed from within the milk barns and wash pens using fresh water and recycled water from the milk cooling and cleaning operations. Manure which accumulates in the feed lanes is removed daily by flushing with recycled wastewater from the wastewater storage ponds. Stormwater runoff that contacts manure or waste feed in the corrals, and leachate from feed and manure storage areas are conveyed to the wastewater storage ponds. The manure which accumulates in the corrals is removed by periodic scraping and a portion of it is applied to the associated cropland and a portion is exported from the facility.

Proposed Digester Facility and Operation

7. The September 2007 RWD describes the proposed addition of a thermophilic anaerobic digester that will generate biogas for sale to the regional gas company. The digester installation will include a 546,000-gallon capacity steel above ground tank (AGT) to store the imported supplemental feedstock, a 775,000-gallon capacity steel AGT mix tank, and four 1.34-million-gallon AGT digester tanks with appurtenant pumps and piping. The digester has not yet been constructed. A diagram of the digester installation is shown on Attachment E, which is attached hereto and made a part of this Order by reference.

8. Digester operations will require some modification in dairy waste handling. Feed lanes will be vacuumed or scraped rather than flushed, and the manure gathered by vacuuming or scraping will be added to the mix tank and diluted with freshwater, recycled digester effluent, and the supplemental feedstock to about eight percent (8%) solids.

9. Approximately 154,500 gallons of the manure from the mix tank and 65,000 gallons of supplemental feedstock from the storage tank will be added to the four digester tanks daily. The digesters will function as complete-mix reactors

with a hydraulic retention time of approximately 21 days. Digester effluent will be removed from the digester tanks daily and pass through a screw press separator. The liquid fraction will be recycled to the manure mix tank or conveyed to the wastewater retention system for holding until it is applied to the cropland. The solids separated from the digester effluent will be stored on a concrete pad until they are used for animal bedding or exported from the facility.

10. Biogas produced during the digestion will be continuously extracted and conveyed to an on-site moisture removal system and then to an on-site gas treatment system (hereafter "biogas scrubber") where carbon dioxide and hydrogen sulfide will be removed prior to delivery to the natural gas pipeline. The biological reaction within the biogas scrubber will remove sulfur from the biogas. Periodically, the biogas scrubber will be flushed with fresh water to remove the accumulated effluent from the reaction surfaces. Approximately 2,440 gallons of effluent will be generated by the biogas scrubber daily. The Discharger proposes to discharge the biogas scrubber effluent into the on-site wastewater retention system. The anticipated character of the scrubber effluent is summarized below:

Characteristics of Biogas Scrubber Effluent

Constituent	Value	Constituent	Value
Calcium	ND	pH	1.4 pH units
Chloride	ND	Phosphorus (total)	33 ppm
Copper	1 ppm	Potassium (total)	ND
Iron	ND	Sodium	6 ppm
Magnesium	27 ppm	Sulfur	1,403 ppm
Manganese	2 ppm	Total Dissolved Solids	4,000 mg/L
Total Kjeldahl Nitrogen	159 mg/L	Zinc	1 ppm

mg/L – milligrams per liter ppm – parts per million

Source of data: Midwest Laboratories, Inc., Report of Analysis, Ref Lab # 212718, Report Number 07-297-5046 dated 10/30/07

11. Consistent with Title 22 of the California Code of Regulations (Title 22 CCR) §66261.20 the biogas scrubber effluent has the characteristics of a hazardous waste based on corrosivity (Title 22 CCR §66261.22) EPA Hazardous Waste Number (RCRA ID) of D002.

12. The biogas scrubber effluent is mostly sulfuric acid (H_2SO_4). Sulfuric acid is commonly used in the western United States to treat high pH soils. For many years, farmers have used sulfuric acid as a soil amendment to reclaim sodic soils and soils with high lime ($CaCO_3$) concentrations. The biogas scrubber effluent may have use as a soil amendment. Provision 14.b. of this Order requires the Discharger evaluate the biogas scrubber effluent and provide a description of its handling, disposition, or disposal.

13. To optimize biogas production, an organic supplemental feedstock material will be imported to the facility and combined with the manure for digester feedstock. The character of this supplemental feedstock is not known at this time, but reportedly, it may include a combination of materials such as non-saleable ice cream or salad dressing, used frying oil from fast- food restaurants, grape seed oil, cotton seed oil, protein powders, sugary flavorings, stillage from corn-based ethanol manufacturing, or fatty water skimmings. Cheese process wastewater, or whey will not be used.

14. Wastewater will be blended with irrigation water in the wastewater retention system prior to application to the associated cropland. The total dissolved solids (TDS) concentration of the wastewater in the retention system will vary over the storage period (November to February) with the input of stormwater runoff. The expected range of constituents concentration are: total nitrogen between 500 and 1,650 mg/L, total phosphorous between 150 and 510 mg/L, and TDS between 2,500 and 8,500 mg/L, depending upon the season.

15. For purposes of this Order, "waste" includes, but is not limited to, manure, leachate, process wastewater from the milk barns, digester effluent, scrubber effluent, and stormwater runoff which contacts the raw materials, products, or byproducts including manure, the supplemental feedstock, the digester effluent, the scrubber effluent, silage, milk, or bedding.

Wastewater Ponds and Volume of Liquid Waste

16. The wastewater retention system consists of two separator ponds and two holding ponds at the original portion of the dairy and two holding ponds at the expanded portion of the dairy. The total capacity of the system is approximately 14.8 million cubic feet while maintaining one foot of freeboard. The two holding ponds at the expanded portion of the dairy were constructed in 2004 and were certified as meeting the Confined Animal Regulations in Title 27 of the CCR, §22562(d) by Mr. Eric A. Abrahamsen, a California Registered Civil Engineer No. 52,000 in December 2004. Soils underlying the wastewater retention ponds at the original portion of the facility have not been assessed.

17. Section 22563(a) of Title 27 requires that application of manure and wastewater to cropland shall be at rates reasonable for the crop, soil, climate, special local situation, management system, and type of manure. The generally accepted best management practice for dairies is to provide for 120 days of wastewater storage during the winter months (December through March) when there is little, if any, irrigation demand. The existing retention capacity of the facility is sufficient to retain dairy wastewater through the winter months. However, operation of the planned digester could add more than 5.7 million cubic feet of effluent and dilution water during the 120-day storage period.

Waste Application to Associated Cropland

18. Best management practices for protection of water quality underlying the croplands include application of waste at rates which are reasonable for the crop, soil, climate, special local situations, management system, and type of manure consistent with Title 27 CCR §22563(a). Reasonable application is considered to be application of wastes at a rate that does not unreasonably degrade and does not pollute the waters of California or create a nuisance condition. The constituents of concern in the wastes are nutrients (primarily nitrogen compounds, but also potassium and phosphorus) and non-nutrient salts. Recent information published by the University of California (UC) indicates that an appropriate nutrient loading rate is between 1.4 to 1.65 times the nitrogen harvest rates[1]. Reasonable application requires careful timing and prudent monitoring of crop nutrient requirements, available nutrients in the soil, and water inputs. Reasonable application is achieved by the implementation of an appropriate Nutrient Management Plan (NMP) to maximize harvest and minimize leaching. Reasonable application of irrigation water (including leaching fraction) is no greater than 125 percent of the amount necessary for crop production (a 75 percent irrigation efficiency).

19. Based on a study conducted by J.L. Meyer in 1973[2], "reasonable" salt loading rates under normal situations were determined to help prevent the vertical migration of salts within the soil profile. Unless environmental conditions show differently, "reasonable" is accepted to be a maximum annual non-nitrate salt loading rate of 2,000 pounds per acre for single-cropped land and 3,000 pounds per acre for double-cropped land, in addition to the non-nutrient salts contained in the irrigation water.

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1 University of California, Division of Agriculture and Natural Resources, Committee of Experts on Dairy Manure Management, Managing Dairy Manure in the Central Valley of California, September 2003, Revised February 2004, July 2004, and June 2005.

2 Meyer, J. L., 1973, *Manure Waste Ponding and Field Application Rates,* U. C. Agricultural Extension, Stanislaus, San Joaquin, and Merced Counties.

20. The Discharger owns and farms 2,792 contiguous acres of associated cropland divided into 45 separate fields where dairy waste is applied. In 2007, crops grown on this acreage were winter forage, corn silage, and alfalfa. The current dairy operation is estimated to produce liquid and dry waste containing approximately 1,000 pounds of nitrogen and 3,500 pounds of inorganic salts annually per acre of cropland. Currently, sufficient dry waste is exported to avoid the unreasonable application of nitrogen and inorganic salts to the associated cropland.

Site Specific Conditions

21. The facility is in an arid climate characterized by hot dry summers and mild winters. The rainy season generally extends from November through March. Occasional rains occur during the spring and fall months, but summer months are dry. Average annual precipitation and evaporation in the discharge area are about 7 inches and 79 inches, respectively, according to information published by the California Department of Water Resources (DWR). The 25-year, 24-hour precipitation event for the area around the facility is approximately 2 inches, according to National Weather Service maps for the Fresno County area.

22. Area soils include Chino Series, a loam; Hesperia Series, a sandy loam; Pond Series, a loam; Pond Series, a fine sandy loam; and Traver Series, a sandy loam according to the USDA Natural Resources Conservation Service. Permeability of these soils is moderately slow to moderate.

23. Parts of the original and expanded portions of the dairy and its associated cropland are within the 100-year floodplain according to Federal Emergency Management Agency maps. The Discharger will provide documentation that measures adequate to protect the production areas at each portion from 100-year peak stream flows have been taken.

24. Land use in the facility vicinity is irrigated agriculture. The city of Kerman is approximately 10 miles east of the dairy. Crops grown in the within five miles of the facility include corn (silage), wheat (forage), alfalfa, plums, almonds, grapes and cotton according to DWR land use data published in 2003. Irrigation water is supplied primarily by groundwater wells.

25. Consistent with the United States Clean Water Act (CWA) §502(14) and 40 CFR §§122. 2 and 122.23, the facility is a "concentrated animal feeding operation" and a "point source" and subject to the National Pollutant Discharge Elimination System (NPDES) permit program for any discharge to waters of the United States, other than discharges of agricultural storm water as defined in 40 CFR § 122.23(e).

Groundwater Considerations

26. Perched groundwater is known to exist at and in the vicinity of the facility. In July 2004, during exploratory borings advanced in the vicinity of the expanded portion of the dairy (south of Whitesbridge Road), shallow groundwater was encountered between 18 feet and 41 feet below site grade.

27. A groundwater monitoring network was installed in June 2005 at the expanded portion of the dairy. The network includes three dedicated groundwater monitoring wells screened across perched groundwater. The network has been sampled/sounded eight times since its installation in June 2005. Since June 2005, shallow groundwater has existed between 25 and 43 feet below site grade and flowed consistently northwesterly. Since June 2005, the shallow groundwater samples have contained TDS at concentrations between 2,400 mg/L and 6,400 mg/L and nitrates as nitrogen at concentrations ranging from less than the detection limit to 10.5 mg/L.

28. Thirteen irrigation water supply wells exist on-site. Water in these wells was measured between 127 feet and 178 feet below grade during sampling conducted in April and May 2002. The analytical results revealed TDS at concentrations ranging from 185 mg/L to 1,428 mg/L (which exceeds the secondary maximum contaminant level of 500 mg/L) and nitrate at concentrations ranging from nondetectable to 0.1 mg/L. Construction details for the thirteen on-site irrigation water supply wells were not provided in the 2007 RWD.

Basin Plan, Beneficial Uses, and Water Quality Objectives

29. The *Water Quality Control Plan for the Tulare Lake Basin, Second Edition, 1995,* Revised 2004 (hereafter Basin Plan) designates beneficial uses, establishes water quality objectives, and contains implementation plans and policies for protecting waters of the basin.

30. The facility is in Detailed Analysis Unit (DAU) No. 235 within the Tulare Lake Basin. The beneficial uses of groundwater in the Tulare Lake Basin include: municipal and domestic supply, agricultural supply, industrial supply.

31. The facility is within the South Valley Floor surface water hydrologic unit, No. 551. The beneficial uses of surface waters in the South Valley Floor Hydrologic Unit include: agricultural supply, industrial supply, industrial process supply, water contact recreation, non-contact recreation, warm freshwater habitat, wildlife habitat, and groundwater recharge.

32. The Basin Plan includes a water quality objective for chemical constituents that, at a minimum, require water designated as domestic or municipal supply to meet the MCLs specified in Title 22, CCR. The Basin Plan recognizes that the Regional Water Quality Control Board may apply limits more stringent than MCLs to ensure that waters do not contain chemical constituents in concentrations that adversely effect beneficial uses.

33. The Basin Plan establishes narrative water quality objectives for Chemical Constituents, Tastes and Odors, and Toxicity. The Toxicity objective, in summary, requires that groundwater be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life associated with designated beneficial uses.

34. The Basin Plan identifies the greatest long-term problem facing the entire Tulare Lake Basin as the increase in salinity in groundwater, which has accelerated due to the intensive use of soil and water resources by irrigated agriculture. The Basin Plan recognizes that degradation is unavoidable until there is a long-term solution to the salt imbalance.

Anti-Degradation

35. State Water Resources Control Board Resolution 68-16 ("Policy with Respect to Maintaining High Quality Waters of the State") (hereafter "Resolution 68-16"), prohibits degradation of groundwater unless it has been shown that:

    a. The degradation is consistent with the maximum benefit to people of the State;

    b. The degradation will not unreasonably affect present and anticipated future beneficial uses;

    c. The degradation does not result in water quality less than that prescribed in State and Regional policies, including violation of one or more water quality objectives; and

    d. The discharger employs the best practicable treatment or control (BPTC) of the wastes to minimize degradation.

36. Constituents of concern that have the potential to degrade groundwater underlying the facility include salt (primarily sodium and chloride), nutrients (nitrogen), and boron. This Order requires the Discharger to implement BPTC of the wastes to minimize degradation. Degradation can occur from seepage to groundwater from the waste management areas on the facility; the corral area (including dry waste, and feed storage areas); the wastewater retention ponds; digester works, and the cropland. This Order, therefore, establishes schedules of tasks to evaluate BPTC for each waste management area of the facility and to characterize groundwater and all waste constituents. The evaluation of

BPTC is required in the Order as outlined in the Provisions section below. Completion of this evaluation and implementation of the approved strategies developed from that work, will ensure that BPTC and the highest water quality consistent with the maximum benefit to the people of the State will be achieved.

37. The Regional Water Board finds that some short-term degradation of groundwater beneath the facility is consistent with Resolution 68-16 provided that:

    a. The degradation is confined to a localized area and is temporally limited;

    b. The Discharger minimizes the degradation by fully implementing, regularly maintaining, and optimally operating BPTC measures;

    c. The degradation is limited to waste constituents typically encountered in confined animal operations as specified in the groundwater limitations of this Order; and

    d. The degradation does not result in water quality less than that prescribed by the Basin Plan.

38. Some degradation of groundwater by some of the typical waste constituents released with discharge from a confined animal facility (after effective source management, treatment, and control) is consistent with maximum benefit to the people of California. Global Warming Solutions Act (AB-32) signed by the Governor on 27 September 2006 requires the development of a market mechanism that will reduce green house gas emissions. The proposed project's reduction of green gas emissions from the dairy and the production of renewable energy are in keeping with the intent of AB-32. Secondary benefits include a reduction in ozone precursor compounds and hydrogen sulfide which will improve air quality. Therefore, sufficient reason exists to accommodate groundwater degradation around the facility, provided that the terms of the Water Quality Control Plan for the Tulare Lake Basin are met. Degradation of groundwater by constituents (e.g., toxic chemicals) other than those specified in the groundwater limitations of this Order is prohibited.

39. This Order establishes interim groundwater limitations for the facility that will not unreasonably threaten present and anticipated beneficial uses or result in groundwater quality that exceeds water quality objectives set forth in the Basin Plan. This Order contains tasks for assuring BPTC and the highest water quality consistent with the maximum benefit to the people of the State will be achieved. Accordingly, the discharge is consistent with the antidegradation provisions of Resolution 68-16. Based on the results of the scheduled tasks, the Regional Water Board may reopen this Order to consider groundwater and other limitations to comply with Resolution 68-16.

California Environmental Quality Act

40. A Mitigated Negative Declaration (MND) was prepared by the San Joaquin Valley Air Pollution Control District for the expanded portion of the dairy in September 2007. A revised version of the MND was put out for public review on 19 December 2007.

41. On 24 August 2007, the Fresno County Department of Public Works and Planning received an application for a Conditional Use Permit (CUP) and a CEQA Initial Study Application to accommodate the installation and operation of thermophilic digesters at the facility. Fresno County is the lead agency for purposes of the California Environmental Quality Act (CEQA) (Public Resources Code Section 21000, et seq.) and the CEQA guidelines (Title14, Division 6, California Code of Regulations, as amended). Between 21 December 2007 and 24 January 2008, Fresno County Department of Public Works and Planning circulated for public comment an Initial Study and a Notice of Intent to Adopt a Mitigated Negative Declaration for the digester project. Fresno County concludes in the Initial Study that impacts related to hydrology and water quality from the project will be considered "less than significant" with adherence to the rules, regulations, and permits under the jurisdiction of the Regional Water Board. In a 22 January 2008 letter, Regional Water Board staff commented on the Initial Study and the Notice of Intent by indicating that a tentative order had been drafted for the subject facility and that it contained protections for surface and groundwater quality necessary to mitigate impacts to water quality from the project. The protections outlined in the letter include: Prohibitions A.4. and A.9.; Discharge Specifications B.1.a., B.1.b., B.1.c., and B.1.d.; Waste Application to Cropland Specification C.1; and Interim Groundwater Limitations D.1., and D.2. On 24 January 2008, the Fresno County Planning Commission adopted a Mitigated Negative Declaration and Conditional Use Permit for the facility. The Regional Water Board, as a Responsible Agency, considered the Mitigated Negative Declaration and concurs that the identified mitigation measures reduce all impacts on water quality to a less-than-significant level.

General Findings

42. Pursuant to CWC §13263(g), discharge is a privilege, not a right, and adoption of this Order does not create a vested right to continue this discharge. Failure to prevent conditions that create or threaten to create pollution or nuisance or that may unreasonably degrade waters of the State, will be sufficient reason to modify, revoke, or enforce this Order, as well as prohibit further discharge.

43. This Order does not authorize violation of any federal, state, or local law or regulation. The requirements prescribed herein do not authorize the commission of any act causing injury to the property of another, nor protect the Discharger from his liabilities under federal, state, or local law.

44. CWC §13267(b) states that "In conducting an investigation specified in subdivision (a), the regional board may require that any person who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge waste within its region, or any citizen or domiciliary, or political agency or entity of this state who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge waste outside of its region that could affect the quality of waters within its region shall furnish, under penalty of perjury, technical or monitoring program reports which the regional board requires. The burden, including cost, of these reports shall bear a reasonable relationship to the need for the report and the benefits to be obtained from the reports. In requiring these reports, the regional board shall provide the person with a written explanation with regard to the need for the reports and shall identify the evidence that supports requiring that person to provide the reports."

45. The technical reports required by this Order and the attached Monitoring and Reporting Program No. R5-2008-____ are necessary to assure compliance with these waste discharge requirements. The Discharger operates the facility that discharges the wastes subject to this Order.

46. These requirements are consistent with Title 27, Division 2, Chapter 7, Subchapter 2, CCR, regulating confined animal facilities.

47. The California Department of Water Resources set standards for the construction and destruction of groundwater wells, as described in *California Well Standards Bulletin 74-90* (June 1991) and *Water Well Standards: State of California Bulletin 94-81* (December 1981). These standards, and any more stringent standards adopted by the State or county pursuant to CWC §13801, apply to all monitoring wells.

Public Notice

48. The Discharger and interested agencies and persons have been notified of the intent to prescribe waste discharge requirements for this discharge, and they have been provided an opportunity for a public hearing and an opportunity to submit their written views and recommendations.

49. All comments pertaining to the discharge were heard and considered in a public meeting.

IT IS HEREBY ORDERED that, Waste Discharge Requirements General Order No. R5-2007-0035 no longer applies to the Bar 20 Dairy No. 2 or Bar 20 Partners, LTD, including John Shehadey and Richard Shehadey, and that, pursuant to §§ 13263 and 13267 of the CWC, Bar 20 Dairy No. 2, Bar 20 Partners, LTD, including John Shehadey and Richard Shehadey., and Microgy, Inc., a New Hampshire Corporation, and their agents, successors, and assigns, in order to meet the provisions contained in Division 7 of the CWC and regulations adopted thereunder, shall comply with the following:

A. Prohibitions

1. The discharge of waste other than as defined in Finding 15 above, or of hazardous waste as defined in the California Water Code § 13150 (p) and Title 22 CCR §66261.3 et seq., respectively, is prohibited.
2. Bypass or overflow of undigested supplemental feedstock into the wastewater retention system or application cropland, is prohibited.
3. The direct or indirect discharge of waste and/or storm water from the production area of the facility to surface waters without and NPDES permit is prohibited. The production area is defined as the part of the facility that includes the animal confinement areas, manure storage area, raw material storage area, and waste containment area. It also includes the digester works, feedstock handling and storage area, digester effluent handling area, and the biogas scrubber area.
4. The discharge of wastewater to surface waters from the cropland without and NPDES permit is prohibited. Irrigation supply water that comes into contact or is blended with waste or wastewater shall be considered wastewater under this Prohibition.
5. Precipitation-related discharges of manure, litter, or process wastewater from cropland without an NPDES permit are prohibited, unless the discharges are agricultural storm water discharges as defined in 40 CFR § 122.23(e).
6. The disposal of dead animals in any liquid manure or wastewater system is prohibited. The disposal of dead animals at the facility is prohibited except when federal, state, or local officials declare a State of Emergency and where all other options for disposal have been pursued and failed and the onsite disposal complies with all state and local policies for disposal of dead animals.
7. All animals shall be prohibited from entering any surface water within the animal confinement area (Title 27 CCR §22561).
8. The application of waste to lands not owned, leased, or controlled by the Discharger as described in Finding 3 without written permission from the landowner or in a manner not approved by the Executive Officer, is prohibited.

9. The direct discharge of wastewater into groundwater via backflow through water supply or irrigation supply wells is prohibited.

10. Exceeding the mature herd size (milk and dry cows) as reported in Finding 4 by more than fifteen percent is prohibited.

B. Discharge Specifications

1. The collection, treatment, storage, or disposal of wastes at the facility shall not result in:

    a. Discharge of waste constituents in a manner or place, or at concentrations or in a mass, which could cause exceedance of water quality objectives of surface water or groundwater;

    b. Contamination or pollution of surface water or groundwater;

    c. A condition of nuisance; or

    d. Unreasonably affect beneficial uses (as defined by the CWC § 13050 and Chapter 2 of the Basin Plan).

2. The Discharger shall ensure that the maximum yearly average salinity concentration in the wastewater retention ponds will not exceed 4,129 milligrams per liter (mg/L) total dissolved solids (TDS) or 7,660 micromhos per centimeter (µmhos/cm) electrical conductivity. This interim specification will be reconsidered upon completion of the BPTC review.

3. The Discharger shall ensure that the biogas scrubber effluent is not discharged in a manner that will violate Title 22 CCR §66268.3

4. Wastes shall not be stored on site for more than 12 months. Any wastes not used within this time period must be removed from the property and disposed of properly.

C. Waste Application to Cropland Specifications

1. Title 27 CCR §22563(a) requires that application of manure and wastewater to cropland shall be at rates reasonable for the crop, soil, climate, special local situations, management system, and type of manure. This Order will require a review of BPTC, which will better define what are "reasonable" application rates. In the interim, reasonable application shall mean annual non-nutrient salt application rates shall not exceed 2,000 pounds per acre for fields that are single-cropped or 3,000 pounds per acre for fields that are double-cropped. For purposes of this Order, non-nutrient salts are defined as the mass of Total Dissolved Solids minus the mass of nitrogen, potassium, and phosphorus utilized by the crop(s) being grown in the field.

2. Land application of all waste from the facility shall be conducted in accordance with a NMP prepared by a specialist who is certified in developing NMPs. The NMP shall reflect actual crops grown at the facility, the actual form of nutrients and non-nutrient salts applied to each cropland field, and reasonable application rates. A certified specialist is a Professional Soil Scientist, Professional Agronomist, or Crop Advisor certified by the American Society of Agronomy or a Technical Service Provider certified in nutrient management in California by the Natural Resources Conservation Service. The Executive Officer may approve alternative proposed specialists. Only NMPs prepared and signed by these parties will be considered certified.

3. The application of waste to the cropland shall be at rates that preclude development of vectors or other nuisance conditions and meet the conditions of the certified NMP. All wastewater applied to cropland must infiltrate completely within 72 hours after application. Tailwater must be conveyed back to the wastewater retention system for storage and reuse.

4. Application of waste shall be timed to minimize nutrient movement below the root zone. Wastewater shall not be applied to cropland during periods when the soil is at or above field moisture capacity.

5. Cropland that receives dry manure shall be managed to minimize erosion. Crops must be planted within one month of waste solids application.

6. Waste solids and wastewater shall not be applied closer than 100-feet to any down gradient surface waters, open tile line structures, sinkholes, or other conduits to surface waters unless a 35-foot wide vegetated buffer (for surface waters) or physical barrier is substituted for the 100-foot setback or alternative conservation practices or field-specific conditions will provide pollutant reductions equivalent or better than the reductions achieved by the 100-foot setback.

7. Waste and cropland shall be managed to prevent contamination of crops grown for human consumption. The term "crops grown for human consumption" refers only to crops that will not undergo subsequent processing which adequately removes potential microbial danger to consumers.

D. Interim Groundwater Limitations

1. These interim groundwater limitations are to be applied at the upper aquifer beneath the facility. These limitations are based on either the maximum contaminant level (MCL) for the constituent as published in Title 22 CCR or other applicable Basin Plan objectives. Release of waste constituents from any treatment, storage, or disposal component associated with the facility shall not cause or contribute to groundwater:

a. Containing constituent concentrations in excess of the concentrations specified below or natural background quality (as determined in the Findings and updated as appropriate as a result of ongoing monitoring), whichever is greater:

   i. Nitrate as nitrogen of 10 mg/L (Title 22 CCR MCL);

   ii. Chloride of 250 mg/L (Title 22 CCR MCL);

   iii. Boron of 1.0 mg/L (crop sensitivity);

   iv. TDS of 500 mg/L (Title 22 CCR Secondary MCL);

   v. EC of 900 µmhos/cm (Title 22 CCR Secondary MCL);

   vi. Most probable number of total coliform (either *E. coli* or fecal coliform bacteria) not to exceed 2.2/100 milliliters (Title 22 CCR MCL);

   vii. For constituents identified in Title 22 CCR, the MCLs quantified therein; and

   viii. For salinity, a maximum average annual EC increase of no more than 3 µmhos/cm (Basin Plan Groundwater Quality Objective).

b. Containing taste or odor-producing constituents, toxic substances, or any other constituents, in concentrations that cause nuisance or adversely affect beneficial uses.

2. Final groundwater limitations will be developed based upon the results of the BPTC evaluations and monitoring conducted as directed by this Order and reported consistent with the Provisions below.

E. Provisions

1. The Discharger shall comply with all applicable provisions of the California Water Code; Title 27 CCR; and the Water Quality Control Plan for the Tulare Lake Basin, Second Edition, 1995, Revised 2004.

2. The Discharger shall comply with the attached Monitoring and Reporting Program No. ____which is part of this Order, and future revisions thereto as specified by the Board or the Executive Officer.

3. The Discharger shall submit a complete RWD in accordance with the CWC §13260 at least 140 days prior to any material change or proposed change in the character, location, or volume of the discharge, including any expansion of the facility, or development of any treatment technology.

4. In the event of any change in control or ownership of land or waste discharge facilities presently owned or controlled by the Discharger, the Discharger shall notify the succeeding owner or operator of the existence of this Order by

letter, a copy of which shall be forwarded to the Regional Water Board at least 60 days in advance of the change.

5. If site conditions threaten to violate Prohibition A.3. or A.4., or Specification B.1, the Discharger shall take immediate action to preclude the violation, documenting the condition and all corrective actions taken. Such actions shall be summarized in the annual monitoring report. Alterations for the production area to avoid a recurrence shall be submitted as a modification to the Waste Management Plan (WMP).

6. Any instance of noncompliance with this Order constitutes a violation of the California Water Code and its regulations. Such noncompliance is grounds for enforcement action, and/or termination of the authorization to discharge.

7. This Order shall become effective upon adoption by the Regional Water Board.

8. If during the performance of the inspections required by the MRP attached to this order, deficiencies, defects, and/or impending failures are observed in any of the wastewater conveyance, control, and/or retention structures, the Discharger shall take immediate action to correct and/or prevent unauthorized release. The corrective action(s) should be documented and these records attached to the pertinent inspection report.

9. Technical reports required by this Order must be certified by an appropriately licensed professional as required in this Order and its Attachments. If the Executive Officer provides comments on any technical report, the Discharger shall address those comments.

10. The Discharger will provide documentation that measures adequate to protect the production areas at the original and expanded portions of the facility from the 100-year peak stream flows have been taken.

11. **By 30 May 2008**, the Discharger shall submit a hydrogeologic report for the area affected or potentially affected by the facility to the Executive Officer. The technical report shall describe the underlying geology, existing production and monitoring wells (active or otherwise), well restrictions, and hydrogeology. The report shall include a Monitoring Well Installation Work Plan recommending the installation of additional groundwater monitoring wells appropriately located to provide data regarding first encountered groundwater up gradient and downgradient of the original portion of the facility. The new monitoring wells together with the existing three monitoring wells shall be sufficient to evaluate performance of BPTC measures at the facility, and shall provide sufficient data to determine compliance with the Order's Groundwater Limitations. The report including the work plan shall be reviewed and approved by the Executive Officer.

12. The Discharger shall comply with the following compliance schedule in implementing the groundwater monitoring approved by the Executive Officer in Provision 10:

Task	Compliance Date
a. Complete Monitoring Well Installation	120 days following Work Plan approval by Executive Officer
b. Commence Groundwater Monitoring	30 days following completion of Task 12. a.
c. Submit Monitoring Well Installation Report of Results	60 days following completion of Task 12. b.
d. Submit technical report that characterizes water quality in approved groundwater monitoring network for all monitored constituents	Two years following completion of Task 12. c.

13. By **1 October 2008**, the Discharger shall submit a written workplan for a BPTC technical evaluation that sets forth a schedule for a systematic and comprehensive technical evaluation for each component of the on-site waste treatment and control to determine for each waste constituent BPTC as used in Resolution 68-16. The work plan shall contain a time schedule for completing the comprehensive technical evaluation. The schedule to complete the BPTC Technical Evaluation shall be as short as practicable, and shall not exceed two years. Upon written determination of adequacy of the technical report by the Executive Officer, the Provision shall be considered satisfied.

14. By **1 October 2008**, the Discharger shall formulate and implement a Waste Management Plan (WMP) to demonstrate that waste management facilities, equipment, and practices in the production area meet the requirements of this Order. Additional requirement for preparing the WMP can be found in Attachment B of the Waste Discharge Requirements General Order R5-2007-0035 for Existing Milk Cow Dairies (Dairy General Order) at:

    http://www.waterboards.ca.gov/centralvalley/adopted_orders/GeneralOrders/R5-2007-0035.pdf.

    The Discharger shall comply with all requirements of Attachment B of the Dairy General Order except as otherwise explicitly stated in this Order. If the design, construction, operation, and/or maintenance of the facility does not comply with those requirements, the WMP must propose modifications and a schedule for modifications that will bring the dairy facility into compliance. The schedule must comply with the due dates in this Order. If the Executive Officer determines that any provisions of Attachment B of the Dairy General Order do not apply to this facility, the Executive Officer shall notify the Discharger that compliance with those provisions is not required. In addition to the elements outlined in Attachment B of the Dairy General Order, the elements of the WMP for this facility shall include:

a. a certification that the facility operations and maintenance (O&M) instructions for the dairy and digester operations that address each waste handling component of the facility (dairy and digester), and standard and emergency procedures. The O&M instructions should include the facility Emergency Response Plan. The O&M should contain instructions for the wastewater conveyance and storage features (including tailwater recovery), feed and waste storage areas, the digester area and handling of digester feed stock and effluent, and the handling and disposal/removal of cattle mortalities. The O&M instructions should be written to ensure that all specifications, limitations, and provisions of this Order are met and violations of prohibitions are prevented. A copy of these instructions should be available to employees at all times; and,

b. an evaluation of the biogas scrubber effluent and a description of its handling and disposition to demonstrate compliance with applicable laws and regulations.

15. By **1 October 2008**, the Discharger shall formulate and implement an NMP for application of the facility waste to the associated cropland. The NMP shall be submitted to the Executive Officer for review and approval. Failure to comply with the NMP is a violation of this Order. A copy of the NMP must be maintained at the dairy. The NMP must provide for protection of both surface water and groundwater. The purpose of the NMP is to control the recycling of waste generated on the facility to minimize their potential to degrade groundwater quality. The objective of the NMP is to manage the application of the waste to the cropland and disposal off-site to achieve a balance between nutrients and salts generated, crop requirements, and leaching to underlying groundwater. Additional requirements for preparing a typical NMP can be found in Attachment C of the Dairy General Order at:

    http://www.waterboards.ca.gov/centralvalley/adopted_orders/GeneralOrders/R5-2007-0035.pdf.

    The Discharger shall comply with all requirements of Attachment C of the Dairy General Order except as otherwise explicitly stated in this Order. If the Executive Officer determines that any provisions of Attachment C of the Dairy

General Order do not apply to this facility, the Executive Officer shall notify the Discharger that compliance with those provisions is not required.

In addition to the elements outlined in Attachment C of the Dairy General Order, the elements of the NMP for this facility shall include:

a. Formulating a water balance for the entire facility to estimate the amount of wastewater generated, the amount of irrigation water added to the wastewater retention system, and the amount of blended wastewater and irrigation water applied to the cropland. The NMP shall reflect a goal of 75 percent irrigation efficiency determined at each field.

b. Adoption of salt reduction actions as specified in the Salinity Evaluation and Minimization Plan (when approved).

c. Yearly evaluation of the results to modify the next year's NMP to maximize crop yield and minimize leaching potential and to be included in the annual report.

d. **By 1 January 2010**, total nitrogen applied to the cropland shall not exceed 1.4 times the nitrogen removed by the harvested portion of the crop. Additional application of nitrogen is allowable if plant tissue testing indicates it is necessary to obtain typical crop yield on written recommendations from a professional agronomist and records are maintained documenting the need.

16. **By two years from satisfaction of Provision 13**, the written BPTC Technical Evaluation report shall be submitted with the Discharger's written recommendations for any facility modifications (e.g., component upgrade and retrofit) and/or operations modifications that are necessary to ensure BPTC. The proposed schedule for modifications shall be identified. The schedule shall be as short as practicable but in no case shall completion of the necessary improvements exceed four years past the Executive Officer's determination of the adequacy of the comprehensive technical evaluation submitted pursuant to this provision unless the schedule is reviewed and specifically approved by the Regional Water Board. The adequacy of the component evaluation, recommended improvements, and schedule are subject to the Executive Officer's review and determination.

17. **By 1 July 2009**, the Discharger shall submit a Salinity Evaluation and Minimization Plan that identify sources of salt in waste generated at the facility both in the dairy and digester operations. This report must evaluate measures that can be taken to minimize salt in the facility waste, and commit to implement these measures identified to minimize salt in the waste within the NMP. The report must include a proposed implementation schedule. The adequacy of the salinity evaluation, recommended measures to minimize salt

in the wastes, and schedule are subject to the Executive Officer's review and determination.

18. The groundwater limitations set forth in this Order are not final and not an entitlement. **By 1 July 2012**, the Discharger shall submit a Groundwater Limitations Analysis report proposing specific numeric groundwater limitations for each waste constituent that reflects full implementation of BPTC and reflecting applicable water quality objectives for that waste constituent. The report shall describe in detail how these were determined considering actual data from monitoring wells comprising the approved groundwater monitoring program, impact reductions through full implementation of BPTC, the factors in CWC § 13241, Resolution 68-16, the Basin Plan, etc. The Discharger may submit results of a validated groundwater model or other hydrogeologic information to support its proposal.

19. Upon completion of tasks set forth in Provision 18, the Regional Water Board shall consider the evidence provide and make a determination regarding (a) whether the Discharger has justified BPTC and (b) the appropriate final numeric groundwater limitations that comply with Resolution 68-16.

20. Modification of any existing pond or construction of any new pond shall not begin until the Executive Officer notifies the Discharger in writing that the design report is acceptable.

21. Waste shall not be placed into any new or modified wastewater retention pond until the Executive Officer notifies the Discharger in writing that the post construction report is acceptable.

22. In the event the monitoring implemented under this Order detects evidence of a failure to meet Discharge Specification **B.1.**, the NMP shall be modified within 90 days. The modifications must be designed to bring the facility into compliance with this Order. The Discharger shall notify the Regional Water Board in writing with details of any proposed changes before the changes are made in the field. Any plan shall be updated as necessary or if the Executive Officer requests that additional information be included.

23. If the Regional Water Board or Executive Officer notifies the Discharger that the NMP is not consistent with this Order, revisions shall be made by a specialist who is certified in developing Nutrient Management Plans and submitted to the Regional Water Board in writing within 30 days of notification.

24. Settling basins and retention ponds at the facility shall be managed and maintained to prevent breeding of mosquitoes and other vectors. In particular:

    a. Small coves and irregularities shall not be allowed around the perimeter of the water surface;

    b. Weeds shall be minimized through control of water depth, harvesting, or other appropriate method;

    c. Dead algae, vegetation, and debris shall not accumulate on the water surface; and

    d. Management shall be in accordance with the requirements of the Mosquito Abatement District.

25. All precipitation and surface drainage from outside of the facility (i.e., "run on") shall be diverted away from any manured areas unless such drainage is fully contained (Title 27 §22562(b)).

26. All roofs, buildings, and non-manured areas located in the production area at the facility shall be constructed or otherwise designed so that clean rainwater, including roof drainage, is diverted away from manured areas, including corrals and waste containment facilities, unless such drainage is fully contained in the wastewater retention system (Title 27 § 22562(b)).

27. The milk parlor, animal confinement area (including corrals), manure and feed storage areas, and the digester equipment area shall be designed and maintained to convey all water that has contacted animal wastes or feed to the wastewater retention system and to minimize standing water and the infiltration of water into the underlying soils. The Discharger shall, at a minimum of once per year, backfill any slope loss with compacted, non-manured material to maintain pre-existing slopes.

28. Unlined ditches, swales, and/or earthen-berm channels may not be used for storage of wastewater, dry waste, or tailwater and may only be used for conveyance of wastewater from the retention lagoon to the land application area, irrigation return water management, or temporary control of accidental spills.

29. The Discharger shall comply with all of the terms of this Order including the Standard Provisions and Reporting Requirements for Milk Cow Dairies dated 25 January 2008, attached to and made part of this Order.

30. The Discharger shall maintain a copy of this Order and its attachments at the site to be available at all times to site-operating personnel. The Discharger, landowner and key operating personnel shall be familiar with the content of this Order.

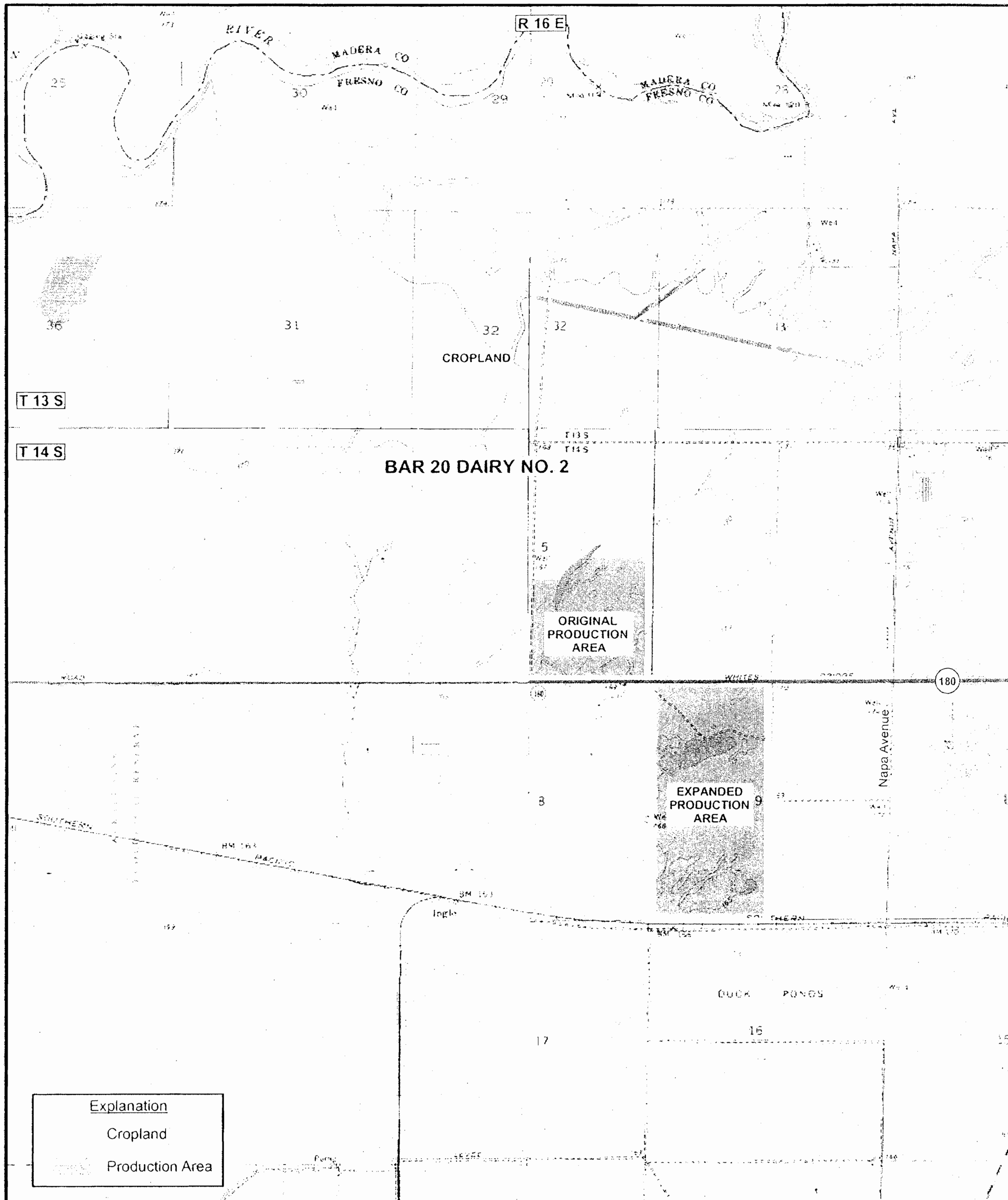
31. The Regional Water Board will review this Order periodically and may revise requirements when necessary. If upon completion of the BPTC Technical Evaluation Report, the Regional Water Board determines that waste constituents in the discharge have reasonable potential to cause or contribute to an exceedance of any Groundwater Limitation, this Order may be reopened for consideration of additional or revision of appropriate numerical effluent or groundwater limitations for the problem constituents.

I, PAMELA C. CREEDON, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Valley Region, on ______________.

____
PAMELA C. CREEDON, Executive Officer

<u>Order Attachments:</u>
Monitoring and Reporting Program
A. Location Map
B. Original Production Area Map
C. Expanded Production Area Map
D. Facility Map
E. Dairy Digester System Process Flow Diagram
Information Sheet
Standard Provisions

SMH: 2/5/08

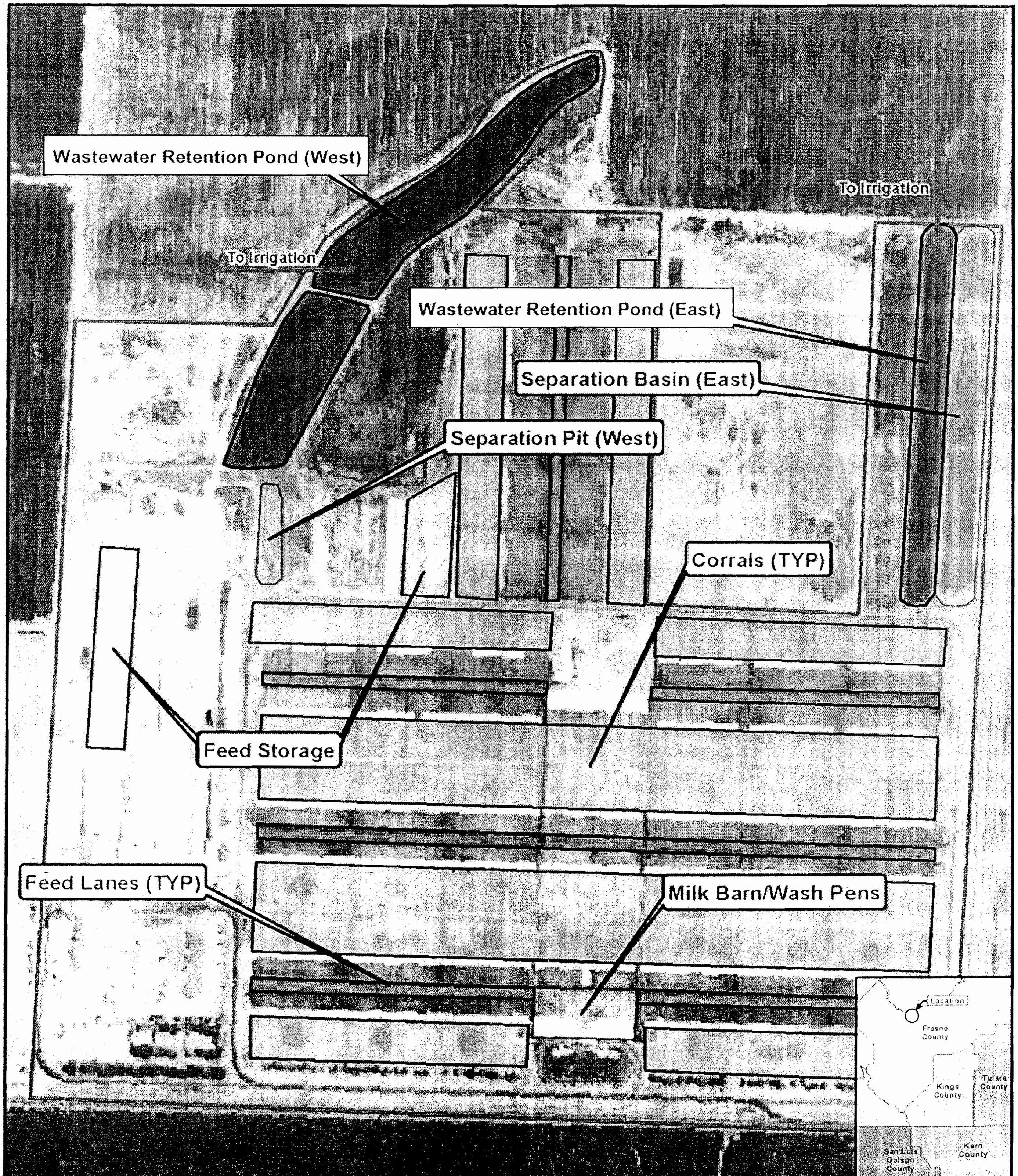


Map Source:
TRANQUILITY, MENDOTA DAM, GRAVELLY FORD, and JAMESAN 7.5 Minute USGS Quadrangles
Sections 31, 32, & 33, T13S, R16E, MDB&M
Sections 4, 5, 6, & 9, T14S, R16E, MDB&M

SCALE
1 INCH = 3,000 FEET

LOCATION MAP
ORDER NO. R5 - 2008 - XXXX
WASTE DISCHARGE REQUIREMENTS
FOR
BAR 20 PARTNERS, LTD., A LIMITED PARTNERSHIP BETWEEN
JOHN SHEHADEY AND RICHARD SHEHADEY, AND MICROGY INC.
BAR 20 DAIRY NO. 2
FRESNO COUNTY

ATTACHMENT A



Map Features:

Effluent

SCALE IN FEET

0 125 250 500

ORIGINAL PRODUCTION AREA MAP

ORDER NO. R5 - 2008 - XXXX

WASTE DISCHARGE REQUIREMENTS

FOR

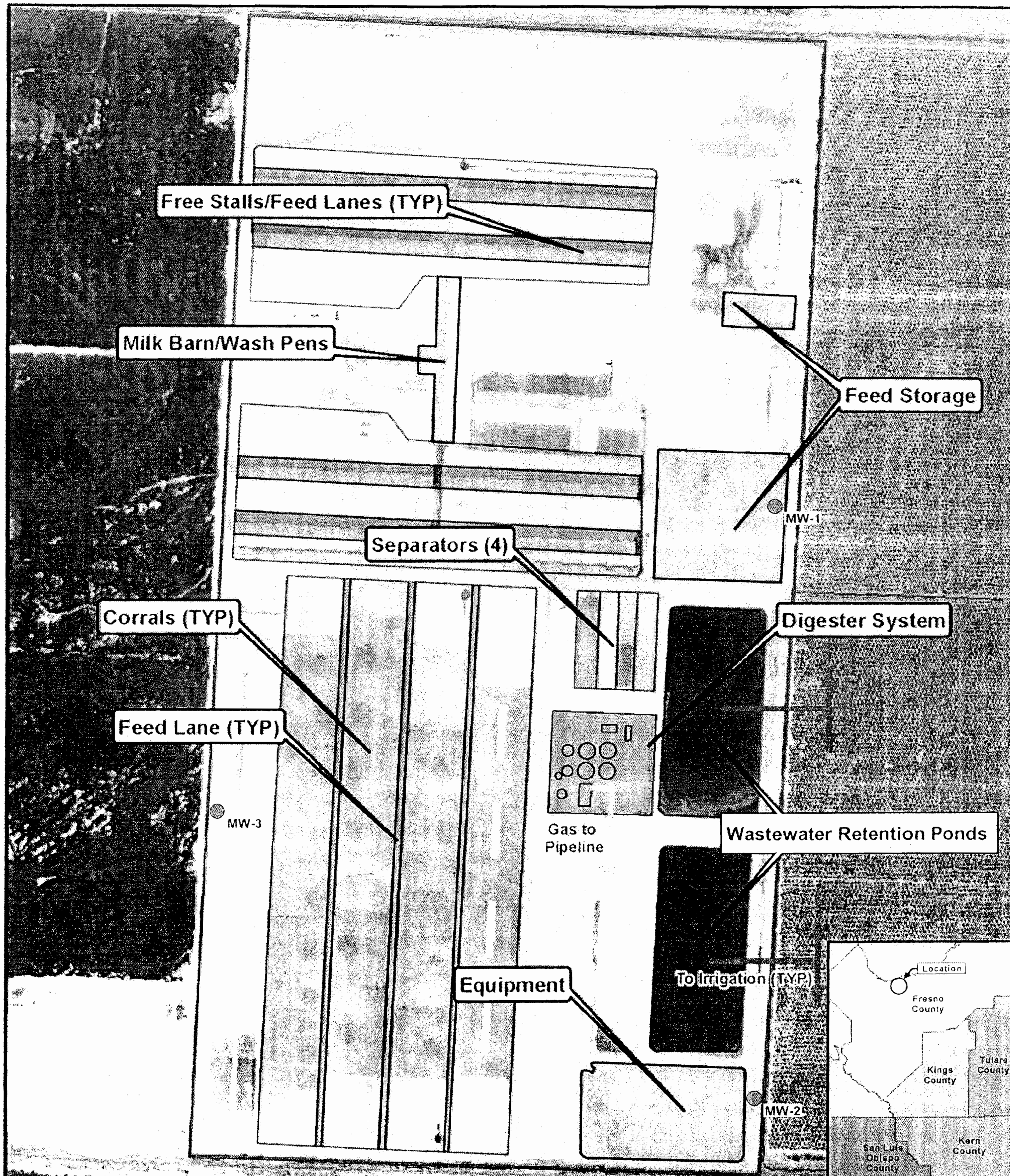
BAR 20 PARTNERS, LTD., A LIMITED PARTNERSHIP BETWEEN

JOHN SHEHADEY AND RICHARD SHEHADEY, AND MICROGY INC.

BAR 20 DAIRY NO. 2

FRESNO COUNTY

ATTACHMENT B



Map Features:

Effluent

Digester Gas

Monitoring Well

SCALE IN FEET
0 125 250 500

EXPANDED PRODUCTION AREA MAP

ORDER NO. R5 - 2008 - XXXX

WASTE DISCHARGE REQUIREMENTS

FOR

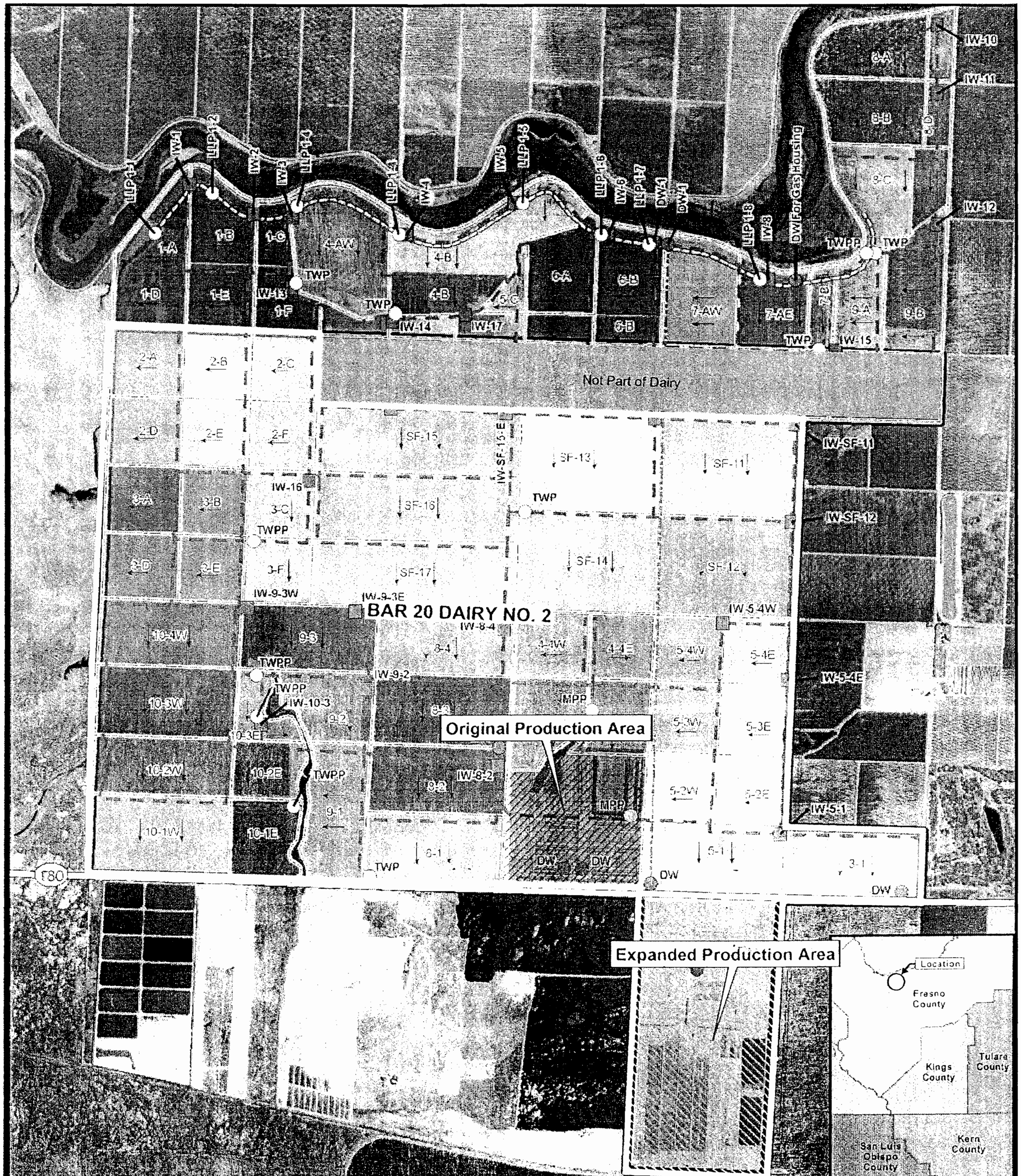
BAR 20 PARTNERS, LTD., A LIMITED PARTNERSHIP BETWEEN

JOHN SHEHADEY AND RICHARD SHEHADEY, AND MICROGY INC.

BAR 20 DAIRY NO. 2

FRESNO COUNTY

ATTACHMENT C



Map Features:

Land Application System
Irrigation System
Domestic Water Line
Lagoon Water to Irrigation
Domestic Well
Irrigation Direction
Leach Line
Irrigation Well
Pump

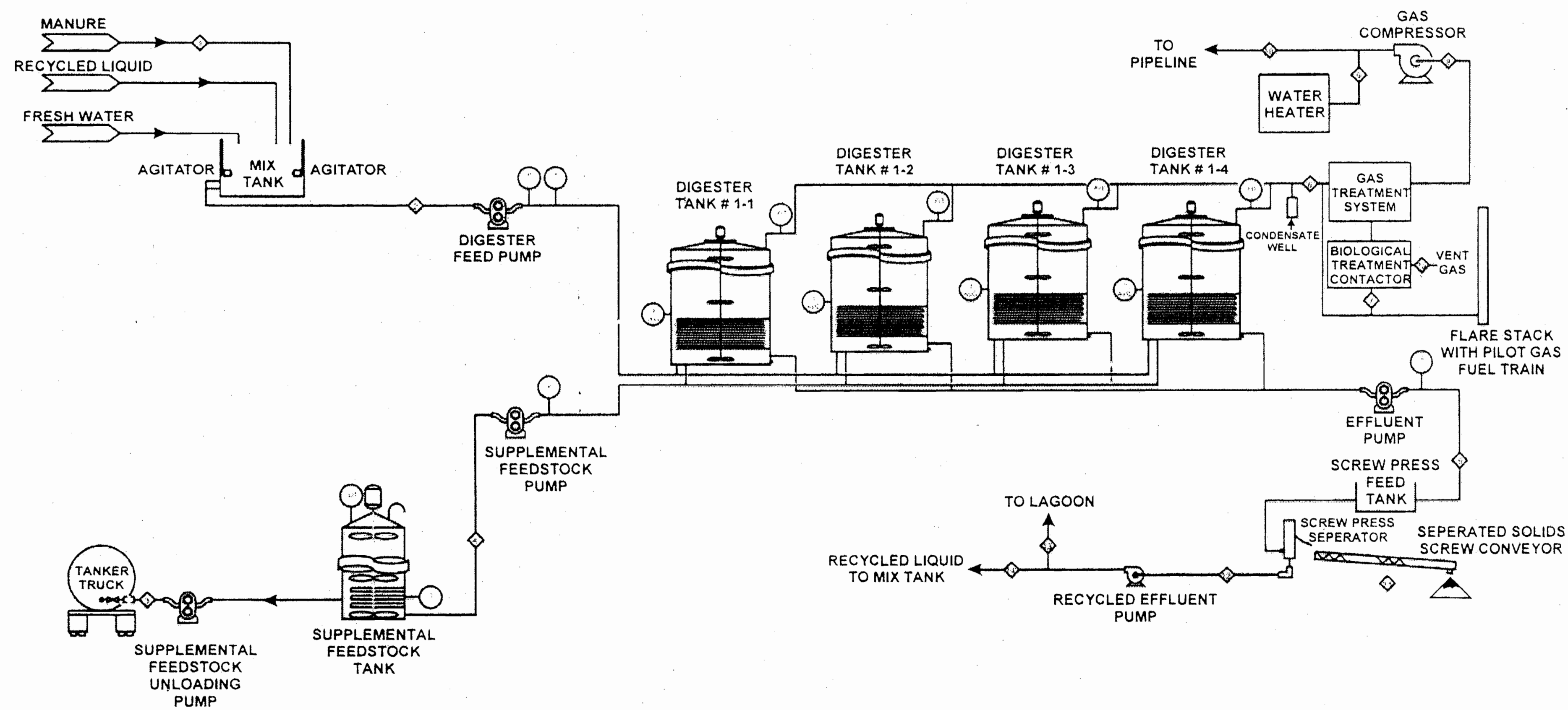
SCALE IN FEET
0 500 1,000 2,000

FACILITY MAP

ORDER NO. R5 - 2008 - XXXX

WASTE DISCHARGE REQUIREMENTS
FOR
BAR 20 PARTNERS, LTD., A LIMITED PARTNERSHIP BETWEEN
JOHN SHEHADEY AND RICHARD SHEHADEY, AND MICROGY INC.
BAR 20 DAIRY NO. 2
FRESNO COUNTY

ATTACHMENT D



DAIRY DIGESTER SYSTEM PROCESS FLOW DIAGRAM

ORDER NO. R5 - 2008 - XXXX
WASTE DISCHARGE REQUIREMENTS
FOR
BAR 20 PARTNERS, LTD., A LIMITED PARTNERSHIP BETWEEN
JOHN SHEHADEY AND RICHARD SHEHADEY, AND MICROGY INC.
BAR 20 DAIRY NO. 2
FRESNO COUNTY

ATTACHMENT E

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM NO. R5-2008-XXXX
FOR
BAR 20 PARTNERS, LTD., A LIMITED PARTNERSHIP BETWEEN
JOHN SHEHADEY AND RICHARD SHEHADEY, AND MICROGY, INC.
BAR 20 DAIRY NO. 2
FRESNO COUNTY

This Monitoring and Reporting Program (MRP) is issued pursuant to California Water Code (CWC) § 13267. The Discharger shall not implement any changes to this MRP unless and until the California Regional Water Quality Control Board, Central Valley Region, (hereafter "Regional Water Board") adopts or the Executive Officer issues a revised MRP.

This MRP includes Monitoring, Record-Keeping, and Reporting Requirements. Monitoring requirements include monitoring of discharges of manure and/or process wastewater, storm water, and tailwater from the production area and cropland, biogas scrubber effluent, and groundwater monitoring in order to determine if the Discharger's facility is in compliance with the discharge specifications of Waste Discharge Requirements Order No. R5-2008-____ (hereafter "Order").

Monitoring requirements also include monitoring of nutrients applied to, and removed from, cropland in order for the Discharger to demonstrate the facility's Nutrient Management Plan minimizes leaching of nutrients and salts to groundwater and the potential transport of these constituents to surface water.

In addition, monitoring requirements include periodic visual inspections of the dairy and digester to verify and document they are being operated and maintained to ensure continued compliance with the Order.

The Discharger shall keep and maintain records for five years of the monitoring activities for the production and cropland and to report the results of all monitoring. The Discharger shall conduct monitoring, record-keeping, and reporting as specified below.

If monitoring consistently shows no significant variation in the magnitude of a constituent concentration after at least two years of monitoring, the Discharger may request the MRP be revised to reduce monitoring frequency. The proposal must include adequate technical justification for reduction in monitoring frequency.

Monitoring Requirements

A. Visual Inspections

1. Production Area

   a. Daily

      (1) Inspect the digester equipment area (works) and note material conditions: plumbing, control equipment, feedstock storage, etc.; for evidence of leaks, corrosion, cracks, or other signs of equipment failure or malfunction.

(2) Inspect the cattle carcass holding area for security and evidence of scavenging.

b. Annually, no earlier than 1 September and no later than 1 November:

(1) Inspect all wastewater retention structures and note material conditions: berm integrity, cracking, slumping, erosion, excess vegetation, animal burrows, and/or seepage.

(2) Inspect the all storm water conveyance structures and equipment and note material conditions: integrity, proper functioning, and evidence of blockage and/or leaks.

(3) Inspect all dry waste storage and feed storage areas and note material conditions: appropriate drains, protection from rainfall and/or runoff, and measures to ensure leachate will drain to wastewater retention system.

c. Weekly during the wet season (December to March) and monthly between April and November:

(1) Inspect the wastewater retention system for freeboard and insure adequate capacity to retain the anticipated amount of wastewater and runoff that will be generated prior to the next opportunity to apply wastewater to the cropland. Freeboard shall be the vertical distance from the pond surface to the lowest elevation of the surrounding berm or the bottom of the spillway and shall be measured to the nearest 0.25 foot (3 inches). Monthly, photograph each lagoon showing the current freeboard on that date. All photographs shall be dated and maintained as part of the facility records.

(2) Inspect all dry waste and feed storage areas and note any conditions or changes that would result in discharges to surface water or off-site, and/or infiltration to underlying soil, and/or prevent drainage to the wastewater retention system.

(3) Inspect all corrals and note any occurrence of standing water, mud/manure slurry, and/or saturated manure stockpiles that could result in infiltration of wastewater to underlying soil.

d. During and after each significant storm event[1]:

(1) Visual inspect storm water conveyance and containment structures and wastewater retention system for discharge, freeboard, berm integrity, cracking, slumping, erosion, excess vegetation, animal burrows, and seepage or other evidence of uncontrolled discharge of wastewater.

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[1] A significant storm event is defined as a storm event that results in continuous runoff of storm water for a minimum of one hour, or intermittent runoff for a minimum of three hours in a 12-hour period.

2. Cropland

   a. Daily when process wastewater is being applied:

      (1) Inspect cropland area and note: the condition of cropland berms and surface water protection structures (banks, roadways, etc.). Observe for the occurrence of animal burrows, piping, and bank erosion.

      (2) Inspect the cropland fields being irrigated for the presence (or lack) of field saturation, excessive deposition of manure solids, tailwater standing at field ends or in conveyance ditches, erosion, runoff (including tailwater discharges from the end of fields, pipes, or other conveyances), and nuisance conditions.

      (3) Inspect all water supply wells within or adjacent to application cropland and note any application of wastewater within 100 feet of any well.

   b. Annually, prior to the beginning of the rainy season, inspect all surface water protection features and structures. These structures shall be inspected for berm integrity, cracking, slumping, erosion, animal burrows, and other evidence of failure or impending failure.

B. Discharge Monitoring

The discharge of manure/digester waste or wastewater and/or storm water runoff containing manure/digester waste or wastewater to surface water bodies is prohibited by the Order. In the event of such a discharge due to a failure of equipment, facilities, and/or management practices, the Discharger shall monitor discharges of manure and/or process wastewater, storm water, and tailwater from the production area and cropland for the constituents, and at the frequency specified in below.

1. Unauthorized Discharges (Including Off-Property Discharges) of manure/digester waste or wastewater from the production area; irrigation water mixed with wastewater or tailwater from cropland; or storm water runoff from either area which has come in contact with waste:

   a. <u>Daily during each discharge:</u>

      (1) Record date, time, approximate volume (gallons) or weight (tons), duration, location, source, and ultimate destination of the discharge.

      (2) Field measurements of the discharge for electrical conductivity and pH.

      (3) Laboratory analyses of the discharge for nitrate-nitrogen, total ammonia-nitrogen, ammonia-nitrogen, total Kjeldahl nitrogen, total phosphorus, potassium, total dissolved solids, five day biological oxygen demand (BOD_5), total suspended solids, and total and fecal coliform.

   b. <u>Daily during each discharge to surface water:</u>

(1) For surface water upstream[2] and downstream[3] of the discharge.

a. Field measurements for electrical conductivity, dissolved oxygen, temperature, and pH.

b. Laboratory analyses for nitrate-nitrogen, total ammonia-nitrogen, unionized ammonia-nitrogen, total Kjeldahl nitrogen, total phosphorus, potassium, total dissolved solids, BOD_5, total suspended solids, and total and fecal coliform.

If conditions are not safe for sampling, the Discharger must provide documentation of why samples could not be collected and analyzed. For example, the Discharger may be unable to collect samples during dangerous weather conditions (such as local flooding, high winds, tornados, electrical storms, etc.). Once the dangerous conditions have passed, the Discharger shall collect a sample of the discharge or, if the discharge has ceased, from the waste management unit from which the discharge occurred.

Discharge and surface water sample analyses shall be conducted by a laboratory certified for such analyses by the California Department of Health Services (i.e., California certified Environmental Laboratory Accreditation Program [ELAP] laboratory). These laboratory analyses shall be conducted in accordance with the Title 40 Code of Federal Regulations (CFR) Part 136 (Guidelines Establishing Test Procedures for the Analysis of Pollutants) or other test methods approved by the Executive Officer.

1. All discharges shall be reported as specified in the Noncompliance Reporting Requirements and Annual Reporting Requirements, as appropriate. The rationale for all discharge-sampling locations shall be included in the reports.

2. Biogas Scrubber Effluent Monitoring

   a. Daily

      (1) Measure and record the quantity of effluent generated by the biogas scrubber.

      (2) Measure and record the pH of the biogas scrubber effluent.

   b. Quarterly:

      (1) Collect and grab sample of biogas scrubber effluent.

      (2) Analyze for nitrate-nitrogen, ammonium-nitrogen, total Kjeldahl nitrogen, total phosphorus, potassium, pH, total dissolved solids, and electrical conductivity.

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2 Upstream samples shall be taken where the surface water body enters the facility.

3 Downstream samples shall be taken beyond where the discharge has blended with the receiving waters but not influenced by dilution flow from other discharges.

(3) Analyze for general minerals (bicarbonate, calcium, carbonate, chloride, magnesium, sodium, and sulfate), iron, and manganese.

3. Nutrient Monitoring – by 1 October 2008, the Discharger shall begin monitoring wastewater, digester effluent, dry waste, and plant tissue produced at the facility, soil in the cropland, and irrigation water used on each cropland field for the constituents and at the frequency specified below. This information is for use in conducting nutrient management on the individual cropland fields and the facility on the whole. The Discharger is encouraged to collect and use additional data, as appropriate, to refine nutrient management.

a. Wastewater

(1) Each application: Record the volume (gallons or acre-feet) and date of process wastewater application to each cropland field.

(2) Monthly, measure and record the electrical conductivity in each main wastewater retention pond.

(3) Quarterly (during each quarter when wastewater is applied to cropland), prior to blending for application to cropland:

a. Analyze for nitrate-nitrogen, ammonium-nitrogen, total Kjeldahl nitrogen, boron, total phosphorus, potassium, pH, total dissolved solids, and electrical conductivity.

b. Analyze for general minerals (bicarbonate, calcium, carbonate, chloride, magnesium, sodium, and sulfate), iron, and manganese.

b. Digester Effluent (liquid from the screw press separator)

(1) Daily, measure and record the volume discharged into the facility's wastewater retention system.

(2) Daily, measure and record the electrical conductivity.

(3) Quarterly

a. Analyze for nitrate-nitrogen, ammonium-nitrogen, total Kjeldahl nitrogen, boron, total phosphorus, potassium, pH, total dissolved solids, and electrical conductivity.

b. Analyze for general minerals (bicarbonate, calcium, carbonate, chloride, magnesium, sodium, and sulfate), iron, and manganese.

c. Dry Waste

(1) Each offsite export of dry waste: record the total volume (cubic yards) or total weight (tons), and analyze for either density (pounds per cubic foot) or percent moisture.

(2) Twice annually: analyze for ammonium-nitrogen, nitrate, total Kjeldahl nitrogen, chloride, total phosphorus, potassium, electrical conductivity (or total dissolved solids), and density (if volume manure applied is reported) or percent moisture (if weight manure applied is reported).

d. Plant Tissue

(1) At harvest: record the total weight (tons) and percent wet weight or volume (cubic yards) and density (grams per liter) of harvested material removed from each cropland field.

(2) At harvest: analyze for total nitrogen, phosphorus, and potassium (expressed on a dry weight basis), and percent wet weight (if weight of harvested material is reported) or density (if volume of harvested material is reported).

e. Soil

(1) Annually, prior to spring planting for each cropland field:

a. In the root zone for the crop to be planted: analyze for nitrate-nitrogen, total Kjeldahl nitrogen, soluble phosphorous, and electrical conductivity.

b. Below the root zone: analyze for nitrate-nitrogen, and electrical conductivity.

(2) Annually, prior to fall planting for each cropland field:

a. In the root zone of the crop to be planted: analyze for nitrate-nitrogen, phosphorus, potassium, total Kjeldahl nitrogen, soluble phosphorus, and electrical conductivity.

b. Below the root zone: analyzed for nitrate-nitrogen, total Kjeldahl nitrogen, and electrical conductivity.

f. Irrigation Water

(1) Each irrigation event for each cropland field, record volume (gallons or acre-feet) and source (well or canal) of irrigation water applied and date(s) applied.

(2) One irrigation event from each source of irrigation water during each irrigation season - analyze for: electrical conductivity and total nitrogen[4]

C. Groundwater Monitoring

The Discharger shall monitor groundwater conditions beneath the facility by sampling domestic wells, agricultural supply wells and monitoring wells present in the production and cropland. This monitoring shall be conducted at the frequency and for the parameters specified below.

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[4] In lieu of sampling the irrigation water, the Discharger may provide equivalent data from the local irrigation district.

1. Domestic and Agricultural Supply Wells

   a. Annually:

      (1) Field measurements for pH, temperature, and electrical conductivity.

      (2) Analyze for nitrate-nitrogen, ammonium-nitrogen, total Kjeldahl nitrogen, calcium, potassium, sodium, magnesium, bicarbonate, carbonate, sulfate, chloride, boron, iron, manganese, total phosphorus, total dissolved solids, and total coliform organisms.

2. Monitoring Wells

   a. Quarterly for two years and semi-annually thereafter:

      (1) The depth to groundwater from a surveyed reference point to the nearest 0.010 foot in each monitoring well.

      (2) Field measure pH, temperature, and electrical conductivity.

   b. Quarterly for two years and semi-annually thereafter: analyze for nitrate-nitrogen, ammonium-nitrogen, total Kjeldahl nitrogen, calcium, potassium, sodium, magnesium, bicarbonate, carbonate, sulfate, chloride, boron, iron, manganese, total phosphorus, and total dissolved solids.

3. Sampling Procedures

   Approved sampling procedures are listed on the Central Valley Water Board's web site at:

   http://www.waterboards.ca.gov/centralvalley/water_issues/dairies/sampling_procedures.pdf

   When special procedures appear to be necessary, the Discharger may request approval of alternative sampling procedures. The Executive Officer will review such requests and if adequate justification is provided, may approve the requested alternative sampling procedures.

D. General Monitoring Requirements

1. The Discharger shall comply with all the provisions and specifications of the Standard Provisions and Reporting Requirements.

2. All samples collected shall be representative of the volume and nature of the material being sampled.

3. Field activity reports should be created for each monitoring event, one record for each monitored location (monitoring well, water supply well, surface water body, cropland field). The field activity reports should identify the technician performing the fieldwork, the technician's affiliation, the entity commissioning the work (property owner, contractor, consultant, etc.), the location of the work, the identification of the sampled location, and

the date(s) of the work. The field activity record should be prepared and signed by the field technician in the field when the work is performed.

4. All samples containers shall be labeled and records maintained to show the time and date of collection as well as the person collecting the sample and the sample location.

5. All samples collected for laboratory analyses shall be preserved and submitted to the laboratory within the required holding time appropriate for the analytical method used and the constituents analyzed.

6. All samples submitted to a laboratory for analyses shall be identified in a properly completed and signed Chain-of-Custody form.

7. Testing instruments used for pH, and electrical conductivity may be used in the field provided: the operator is trained in the proper use and maintenance of the instruments; the instruments are field calibrated prior to each monitoring event; and instruments are serviced and/or calibrated by the manufacturer at the recommended frequency.

E. Record Keeping Requirements

1. Dischargers shall maintain on-site (for review by Regional Water Board inspectors) for a period of five years from the date they are created all information as follows:

   a. Records of the inspections including any and all subsequent corrective actions specified in Section **A. Visual Inspection** above.

   b. All records for the production area and digester including:

      (1) Records documenting actions taken to correct deficiencies noted during the inspections. Deficiencies not corrected in 30 days must be accompanied by an explanation of the factors preventing immediate correction.

      (2) Records of the date, time, and estimated volume of any digester bypass and/or overflow or leaks from any wastewater conveyance or storage structure.

      (3) Records documenting the daily wastewater electrical conductivity measurements in each main wastewater retention pond.

      (4) Records of all dry waste and/or wastewater exported from the facility which include information on the hauler, destination, dates hauled, and amount exported.

      (5) Action taken and date(s) to correct unauthorized releases as reported in accordance with Section **F.1. Noncompliance Reporting Requirements** below.

      (6) Records of monitoring activities, field activity records, and laboratory analyses conducted as required in Section **D. General Monitoring Requirements** above.

   c. All records for the cropland including:

(1) All information necessary to document implementation and management of the elements of the nutrient management plan (NMP).

(2) Identification of crop, acreage, dates of planting and harvest, and actual crop yields for each field.

(3) Dates, locations, and approximate weight and moisture content, or volume and density, of dry waste or artificial fertilizer applied to each field.

(4) Dates, locations, and volume of wastewater applied to each field.

(5) Weather conditions for 24 hours prior to and following application of dry waste and wastewater.

(6) Results (analytical laboratory reports) from dry waste, wastewater, digester effluent, irrigation water, soil, plant tissue, storm water and/or tailwater discharges, surface water, biogas scrubber effluent, and groundwater sampling.

(7) Records documenting any corrective actions taken to correct deficiencies noted during the inspections required in the Monitoring Provisions above. Deficiencies not corrected in 30 days must be accompanied by an explanation of the factors preventing immediate correction.

(8) Actions taken to correct unauthorized releases as reported in accordance with Section **F.1. Noncompliance Reporting** below.

(9) Records of monitoring activities, field activity records, and laboratory analyses conducted as required in Section **D General Monitoring Requirements** above.

d. A copy of the Discharger's current NMP.

e. The Manure/Process Wastewater Tracking Manifest forms documenting the export of waste from the facility. A copy of this form can be found on our web site in Attachment D of the Waste Discharge Requirement General Order R5-2007-0035 for Existing Milk Cow Dairies (Dairy General Order) at:

http://www.waterboards.ca.gov/centralvalley/adopted_orders/GeneralOrders/R5-2007-0035.pdf

F. Reporting Requirements

1. Noncompliance Reporting Requirements

a. The Discharger shall report any noncompliance that endangers human health or the environment or any noncompliance with Prohibitions in the Order, within 24 hours of becoming aware of its occurrence. The incident shall be reported to the Regional Water Board office, Fresno County Environmental Health Services (559-445-3357), and to the California Office of Emergency Services (OES) (800-852-7550). During non-business hours, the Discharger shall leave a message on the Regional Water Board's voice mail. The message shall include the time, date, place, and nature of the noncompliance, the name and number of the reporting person, and shall be recorded in writing by the Discharger. The OES phone number is operational 24 hours a day.

b. A written report shall be submitted to the Regional Water Board office within two weeks of the Discharger becoming aware of the non-compliance incident. The report shall contain a description of the noncompliance, its causes, duration, and the actual or anticipated time for achieving compliance. The report shall include complete details of the steps that the Discharger has taken or intends to take, in order to prevent recurrence. All intentional or accidental spills shall be reported as required by this provision. The written submission shall contain:

(1) The approximate date, time, and location of the noncompliance including a description of the ultimate destination of any unauthorized discharge and the flow path of such discharge to a receiving water body;

(2) A description of the noncompliance and its cause;

(3) The flow rate, volume, and duration of any discharge involved in the noncompliance;

(4) The amount of precipitation (in inches) the day of any discharge and for each of the seven days preceding the discharge;

(5) A description (location; date and time collected; field measurements of pH, temperature, dissolved oxygen and electrical conductivity; sample identification; date submitted to laboratory; analyses requested) of noncompliance discharge samples and/or surface water samples taken to comply with the **Monitoring Requirements** above for Unauthorized Discharges (Including Off-Property Discharges) of manure /digester waste or process wastewater from the production area or land application area and storm water discharges to surface water from the production area;

(6) The period of noncompliance, including dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue;

(7) A time schedule and a plan to implement corrective actions necessary to prevent the recurrence of such noncompliance; and

(8) The laboratory analyses of the noncompliance discharge sample and/or upstream and downstream surface water samples shall be submitted to the Regional Water Board office within 45 days of the discharge.

2. **Annual Reporting Requirements**

a. An annual Facility Report is due by **1 July** of each year for the previous year's monitoring, planting and harvesting.

b. The annual report shall include all the information as specified below:

(1) Summary of the crops gown in the facility cropland to include: field identification, type, date planted and harvested, and amount harvested.

(2) Number and type of animals, and number maintained in each type of confinement (free-stalls or open corrals). Statement reporting the type of manure removal practices in each type of confinement (i.e., flush lanes, dry scrape, vacuum pickup, etc.).

(3) Summary of all dry waste and/or wastewater discharges from the facility to surface water or to land areas (cropland or otherwise) when not in accordance with the facility's Nutrient Management Plan that occurred during the annual reporting period, including date, time, location, approximate volume, a map showing discharge and sample locations, rationale for sample locations, and method of measuring discharge flows.

(4) Summary of all storm water discharges from the production area to surface water during the annual reporting period, including the date, time, approximate volume, duration, location, and a map showing the discharge and sample locations, rationale for sample locations, and method of measuring discharge flows.

(5) Summary of all discharges from the cropland to surface water that have occurred during the annual reporting period, including the date, time, approximate volume, location, source of discharge (i.e., tailwater, process wastewater, or blended process wastewater), a map showing the discharge and sample locations, rationale for sample locations, and method of measuring discharge flows.

(6) Copies of records documenting the monthly wastewater electrical conductivity measurements in each main wastewater retention pond.

(7) Copies of laboratory analyses of all discharges (dry waste, wastewater, digester effluent, or tailwater), surface water (upstream and downstream of a discharge), and storm water, including chain-of-custody forms and laboratory quality assurance/quality control results.

(8) Tabulated field measurement and analytical data for samples of the dry waste, wastewater, digester effluent, irrigation water, soil, and plant tissue. The data shall be tabulated to clearly show sample dates, constituents analyzed, constituent concentrations, and detection limits.

(9) Tabulated irrigation and nutrient application data for each cropland field. The data shall be tabulated to show each field, area (acreage), crop(s) grown, amount and source of irrigation water, and the amount and source of nutrients and salt added (dry waste, wastewater, or fertilizer).

(10) Calculations showing the total nitrogen, phosphorus, potassium, and non-nutrient salts applied to each field, including from sources other than dry waste or wastewater.

(11) Calculations showing the nitrogen and salt balance for each field and the facility as a whole during the reporting period. The balance is determined by the amount of nitrogen and salt present in the cropland soil at the beginning of the reporting period, plus the amount added by dry waste, wastewater, and/or fertilizer, and minus the amount removed by harvest and/or export from the facility.

(12) If the amount of salt exceeded 2,000 pounds per acre for single crop fields or 3,000 pounds per acre for double crop fields; for any field, a statement indicating how the NMP will be modified to bring the facility back into compliance with the Order.

(13) Copies of all records and reports prepared for Section **F.1. Non-Compliance Reporting** above.

(14) Copies of all facility corrective action reports which resulted from inspections for the past year.

3. **Groundwater Reporting Requirements**

a. The Discharger shall report the results of all groundwater monitoring concurrently with the annual report.

b. Groundwater monitoring reports shall include:

(1) Copies of all field activity reports, chain-of-custody forms, and laboratory analyses (including laboratory quality assurance/quality control results) for each well sample (water supply wells and monitoring wells) collected.

(2) Tabulated groundwater elevation data showing date of measurement, depth to water, wellhead elevation and groundwater elevation in each on the monitoring wells.

(3) Tabulated analytical results for the well samples showing date of sampling, constituents analyzed, and detected concentrations.

(4) A potentiometric contour map showing the groundwater flow direction, gradient, and elevations for the most current groundwater sampling event.

(5) The tabulated data shall include both historical and current information.

4. **Hydrologic Report with Monitoring Well Installation and Sampling Plan (MWISP) – by 30 May 2008**, the Discharger shall submit a Hydrogelogic Report and MWISP. At a minimum the report must contain all of the information listed below:

   a. For Existing Monitoring Wells include the following:

      (1) General Information:

         a. Topographic map depicting the facility boundaries, and the major waste management areas (wastewater retention ponds, corrals, dry waste and feed storage areas, digester works, and cropland). The map should also show any existing on-site or nearby (within 2,000 feet) domestic, irrigation, and municipal supply wells and monitoring wells, utilities, surface water bodies, drainage courses and their tributaries/destinations, and other major physical and man-made features (roads, schools, parks, etc), as appropriate.

         b. A description of the underlying geology and hydrogeology of the facility. Historical groundwater depth and water quality data should be included. Copies of Department of Water Resources Well Completion Records or other well construction description for all on-site water supply wells (active or otherwise) should be attached.

         c. Site plan showing monitoring well locations, other existing wells, and major physical site features (corrals, freestall barns, milk parlors, feed storage areas, etc.) waste handling facilities (separator basins, retention ponds, manure storage areas, etc.), irrigated cropland and pasture, and on-site or adjacent water features.

         d. Monitoring Well Construction:

            (a) Number and depths of the monitoring well installed.

            (b) Monitoring well identification (i.e., numbers).

            (c) Date(s) of drilling and well installation.

            (d) Description of monitoring well locations including field-implemented changes (from proposed locations) due to physical obstacles or safety hazards.

      (2) As – builts for each monitoring well depicting the details outlined above

      (3) All depth to water measurements made during the field program.

      (4) Construction summary table of pertinent information such as date of installation, well depth, casing diameter, screen depth and interval, seal depth and interval, and well elevation.

      (5) Monitoring Well Survey:

         a. Identify coordinate system and/or reference points used.

b. Description of reference points.

c. Horizontal and vertical coordinates of north side of each well casing with cap removed.

d. Name, license number, affiliation, and signature of California licensed professional responsible for survey.

e. Surveyor's field notes.

f. Tabulated survey data, certified by the surveyor.

(6) Proposed monitoring event – schedule, depth to water measuring equipment and practices, well purging equipment, practices, and criteria for completion, sample collection equipment and practices, and analytical procedures.

5. If the Hydrogelogic Report determines that additional monitoring wells are needed, the Hydrologic report should include a **Monitoring Well Installation and Sampling Plan (MWISP)**, which should include the following:

a. Rational for the proposed number, construction, and location of the monitoring wells. Include anticipated depth to groundwater, groundwater flow direction (source of data), and identify the major waste management areas of the facility (corrals, wastewater retention ponds, digester work, and cropland). Provide for installation of a monitoring well up gradient from the influence of the facility (in as much as possible) and down gradient from each of the major waste management areas of the facility.

b. Local permitting information, as required by the Fresno County Environmental Health Services Department.

c. Drilling details; method, type of equipment, and logging practices/equipment.

d. Health and Safety Plan.

e. Proposed monitoring well design – a well construction schematic depicting: total depth, anticipated groundwater depth, borehole diameter, well construction materials, screen interval and perforations, seal intervals and materials, surface completion, and well protection.

f. Proposed well development – schedule (at least seven days after completion), method, equipment, measured parameters, and criteria used to determine that completion is complete.

g. Surveying – the method used to obtain horizontal and vertical positions, method accuracy, and the name and affiliation of the registered professional performing the survey.

h. Proposed monitoring event – schedule (at least twenty-four hours after development), depth to water measuring equipment and practices, well purging equipment, practices, and criteria for completion, sample collection equipment and practices, and analytical procedures.

6. Monitoring Well Installation Completion Report (MWICR) - within 60 days of installation of the monitoring wells, the Discharger shall submit MWICP. At a minimum the MWICP shall summarize the field activities as described below:

   a. General Information: same as required for the Hydrogelogic Report and MWISP in **Sections F.4. and F.5.** above with the necessary revisions and/or updated data gathered during the field work to install the monitoring wells.

   b. Monitoring Well Construction.

      (1) Number and depths of the monitoring well installed.

      (2) Monitoring well identification (i.e., numbers).

      (3) Date(s) of drilling and well installation.

      (4) Description of monitoring well locations including field-implemented changes (from proposed locations) due to physical obstacles or safety hazards.

      (5) Description of drilling and construction, including equipment, methods, and difficulties encountered (such as hole collapse, lost circulation, need for fishing).

      (6) Name and address of drilling company, driller, California License Number, and logger (name and affiliation of geologist).

      (7) Driller's Well Completion Report and lithologic log of borehole.

   c. As – builts for each monitoring well depicting the details outlined above

   d. All depth to water measurements made during the field program.

   e. Field notes from drilling, installation, and surveying activities (i.e. sub-contractor dailies as appropriate).

   f. Construction summary table of pertinent information such as date of installation, well depth (below site grade), casing diameter, screen depth and interval, seal depth and interval, and casing elevation (above site grade).

   g. Monitoring Well Development:

      (1) Date and time of development.

      (2) Name and affiliation of technician performing development.

      (3) Method of development.

      (4) Methods used to determine when development is complete.

(5) Development log: volume of water purged and measurements for temperature, pH, and electrical conductivity during and after development. Response notes – (bailing to dry, recovery time, number of development cycles).

(6) Disposal of development water.

h. Monitoring Well Survey:

(1) Identify coordinate system and/or reference points used.

(2) Description of reference points.

(3) Horizontal and vertical coordinates of north side of each well casing with cap removed.

(4) Name, license number, affiliation, and signature of California licensed professional responsible for survey.

(5) Surveyor's field notes.

(6) Tabulated survey data, certified by the surveyor.

7. **Groundwater Limitations Analysis Report.** The Discharger shall submit to the Executive officer a Groundwater Limitations Analysis Report consistent with the Order.

a. This report shall contain an evaluation of the groundwater quality and flow data to assess tends.

b. Data shall be presented and evaluated to address:

(1) The monitoring program's adequacy to assess compliance with the Order.

(2) Whether groundwater data provided is representative of conditions up gradient of the influence of the facility.

(3) Whether groundwater data provided is representative of conditions down gradient of the major waste management areas (wastewater retention system, corrals, digester works, and cropland) of the facility.

(4) Whether monitoring has been conducted in compliance with the Order and consistent with this MRP.

c. The report shall propose specific numeric groundwater limitations for each waste constituent that reflects full implementation of best practicable treatment or control (BPTC) and reflecting applicable water quality objectives for that waste constituent. The report shall describe in detail how these were determined considering actual data from monitoring wells comprising the approved groundwater monitoring program, impact reductions through full implementation of BPTC, the factors in CWC § 13241, Resolution 68-16, the Basin Plan, etc. The Discharger may, submit results of a validated groundwater model or other hydrogeologic information to support its proposal.

G. General Reporting Requirements

1. The results of any monitoring conducted more frequently than required at the locations specified herein shall be reported to the Regional Water Board.

2. Laboratory analyses for manure, process wastewater, and soil shall be submitted to the Regional Water Board upon request by the Executive Officer.

3. Each report shall be signed by the Discharger or a duly authorized representative as specified in the Standard Provisions and Reporting Requirements, Section C. 6.

4. All technical reports required by this MRP that involve planning, investigation, evaluation, or design, or other work requiring interpretation and proper application of engineering or geologic sciences, shall be prepared as specified in the Standard Provisions and Reporting Requirements, Section C. 8.

5. **Submit Reports to**:

   California Regional Water Quality Control Board

   Central Valley Region

   1685 E Street

   Fresno, CA 93706

   Attention: Confined Animal Regulatory Unit

ORDERED BY:______________________________
PAMELA C. CREEDON, Executive Officer

____
(Date)

SMH: 2/5/08

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

STANDARD PROVISIONS AND REPORTING REQUIREMENTS
FOR
MILK COW DAIRIES
25 January 2008

A. Introduction:

1. These Standard Provisions and Reporting Requirements (SPRR) are applicable to facilities that are regulated pursuant to the provisions of Title 27 California Code of Regulations (CCR) Division 2, Subdivision 1, Chapter 7, Subchapter 2, Sections 22560 et seq.

2. Any violation of the Order constitutes a violation of the California Water Code and, therefore, may result in enforcement action.

3. If there is any conflicting or contradictory language between the Order, the Monitoring and Reporting Program (MRP) associated with the Order, or the SPRR, then language in the Order shall govern over the MRP and the SPRR, and language in the MRP shall govern over the SPRR.

B. Standard Provisions:

1. The requirements prescribed in the Order do not authorize the commission of any act causing injury to the property of another, or protect the Discharger from liabilities under federal, state, or local laws.

2. The Discharger shall comply with all federal, state, county, and local laws and regulations pertaining to the discharge of wastes from the facility that are at least as stringent as the requirements of the Order.

3. All discharges from the facility must comply with the lawful requirements of municipalities, counties, drainage districts, and other local agencies regarding discharges of storm water to storm drain systems or to other courses under their jurisdiction that are at least as stringent as the requirements of the Order.

4. The Order does not convey any property rights or exclusive privileges.

5. The provisions of the Order are severable. If any provision of the Order is held invalid, the remainder of the Order shall not be affected.

6. The Discharger shall take all reasonable steps to minimize any adverse impact to the waters of the State resulting from noncompliance with the Order. Such steps shall include accelerated or additional monitoring as necessary to determine the nature and impact of the noncompliance.

7. The fact that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the Order shall not be a defense for violations of the Order by the Discharger.

8. The filing of a request by the Discharger for modification, revocation and reissuance, or termination of the Order, or notification of planned changes or anticipated noncompliance, does not stay any condition of the Order.

9. The Order is not transferable to any person except after notice to the California Regional Water Quality Control Board, Central Valley Region, (hereafter Regional Water Board). The Regional Water Board may modify or revoke and reissue the Order to change the name of the Discharger and incorporate such other requirements as may be necessary under the California Water Code.

10. The Discharger shall provide to the Executive Officer, within a reasonable time, any information which the Executive Officer may request to determine whether cause exists for modifying, revoking, and reissuing, or terminating the Discharger's coverage under the Order or to determine compliance with the Order. The Discharger shall also provide to the Executive Officer upon request, copies of records required by the Order to be kept.

11. After notice and opportunity for a hearing, the Order may be terminated or modified for cause, including but not limited to:

    a. Violation of any term or condition contained in the Order;

    b. Obtaining the Order by misrepresentation, or failure to disclose fully all relevant facts;

    c. A change in any condition that results in either a temporary or permanent need to reduce or eliminate the authorized discharge; or

    d. A material change in the character, location, or volume of discharge.

12. The Order may be modified if new state statutes or regulations are promulgated, and if more stringent applicable water quality standards are approved pursuant to Title 27 of the CCR, or as adopted into the Regional Water Board *Water Quality Control Plan* (Basin Plan) *for the Tulare Lake Basin (2nd Ed.).* The Order may also be modified for incorporation of land application plans, and/or changes in the waste application to cropland.

13. The Regional Water Board may review and revise the Order at any time upon application of any affected person or by motion of the Regional Water Board.

14. The Discharger shall ensure compliance with existing and/or future promulgated standards that apply to the discharge.

15. The Discharger shall permit representatives of the Regional Water Board and the State Water Resources Control Board (State Water Board), upon presentations of credentials at reasonable hours, to:

    a. Enter premises where wastes are treated, stored, or disposed and where any records required by the Order are kept;

    b. Copy any records required to be kept under terms and conditions of the Order;

    c. Inspect facilities, equipment (monitoring and control), practices, or operations regulated or required by the Order; and

    d. Sample, photograph, and/or video tape any discharge, waste, waste management unit, or monitoring device.

16. The Discharger shall properly operate and maintain in good working order any facility, unit, system, or monitoring device installed to achieve compliance with the Order. Proper operation and maintenance includes best practicable treatment and controls, and the appropriate quality assurance procedures.

17. Animal waste storage areas and containment structures shall be designed, constructed, and maintained to limit, to the greatest extent possible, infiltration, inundation, erosion, slope failure, washout, overtopping, by-pass, and overflow.

18. Setbacks or separation distances contained under Water Wells, Section 8, Part II, in the *California Well Standards, Supplemental Bulletin 74-90 (June 1991)*, and *Bulletin 94-81 (December 1981)*, California Department of Water Resources (DWR), shall be maintained for the installation of all monitoring wells and groundwater supply wells at existing dairies. A setback of 100 feet is required between supply wells and animal enclosures in the production area. A minimum setback of 100 feet, or other control structures (such as housing, berming, grading), shall be required for the protection of existing wells or new wells installed in the cropland. If a county or local agency adopts more stringent setback standards than that adopted by the DWR, then these local standards shall carry precedence over the Well Standards of DWR, and the Discharger shall comply with the more stringent standards.

19. Following any storm event that causes the freeboard of any wastewater holding pond to be less than one (1) foot for below-grade ponds, or two (2)

feet for above-grade ponds, the Discharger shall take action as soon as possible to provide the appropriate freeboard in the wastewater holding pond.

20. For any electrically operated equipment at the facility, the failure of which would cause loss of control or containment of waste materials, or violation of this Order, the Discharger shall employ safeguards to prevent loss of control over wastes or violation of this Order. Such safeguards may include alternate power sources, standby generators, standby pumps, additional storage capacity, modified operating procedures, or other means.

C. General Reporting Requirements:

1. The Discharger shall give at least 60 days advance notice to the Regional Water Board of any planned changes in the ownership or control of the facility.

2. In the event of any change in control or ownership of land or waste discharge facilities presently owned or controlled by the Discharger, the Discharger shall notify the succeeding owner or operator of the existence of the Order by letter at least 60 days in advance of such change, a copy of which shall be immediately forwarded to the appropriate Regional Water Board office listed below in the General Reporting Requirements C.11.

3. To assume operation under the Order, any succeeding owner or operator must request, in writing, that the Executive Officer transfer coverage under the Order. The Regional Water Board will provide a form for this request that will allow the succeeding owner or operator to provide their full legal name, address and telephone number of the persons responsible for contact with the Regional Water Board and a responsibility statement and a signed statement in compliance with General Reporting Requirement C.7 below. The form will also include a statement for signature that the new owner or operator assumes full responsibility for compliance with the Order and that the new owner or operator will implement the Waste Management Plan and the NMP prepared by the preceding owner or operator. Transfer of the Order shall be approved or disapproved in writing by the Executive Officer. The succeeding owner or operator is not authorized to discharge under the Order and is subject to enforcement until written approval of the coverage transfer from the Executive Officer.

4. The Discharger shall identify any information that may be considered to be confidential under state law and not subject to disclosure under the Public Records Act. The Discharger shall identify the basis for confidentiality. If the Executive Officer cannot identify a reasonable basis for treating the information as confidential, the Executive Officer will notify the Discharger that the information will be placed in the public file unless the Regional Water

Board receives, within 10 calendar days, a written request from the Discharger to keep the information confidential containing a satisfactory explanation supporting the information's confidentiality.

5. Except for data determined to be exempt from disclosure under the Public Records Act (California Government Code Sections 6275 to 6276), and data determined to be confidential under Section 13267(b)(2) of the California Water Code, all reports prepared in accordance with the Order and submitted to the Executive Officer shall be available for public inspection at the offices of the Regional Water Board. Data on waste discharges, water quality, meteorology, geology, and hydrogeology shall not be considered confidential.

6. All technical reports and monitoring program reports shall be accompanied by a cover letter with the certification specified in C.7 below and be signed by a person identified below:

   a. For a sole proprietorship: by the proprietor;

   b. For a partnership: by a general partner;

   c. For a corporation: by a principal executive officer of at least the level of senior vice-president; or

   d. A duly authorized representative if:

      (1) The authorization is made in writing by a person described in Subsection a, b, or c of this provision;

      (2) The authorization specifies either an individual or a position having responsibility for the overall operation of the facility, such as the position of manager. A duly authorized representative may thus be either a named individual or an individual occupying a named position; and

      (3) The written authorization is submitted to the Regional Water Board.

7. Each person, as specified in C.6 above, signing a report required by the Order or other information requested by the Regional Water Board shall make the following certification:

"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and

complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

8. In addition to Item C.7 above, all technical reports required in the Order that involve planning, investigation, evaluation, or design, or other work requiring interpretation and proper application of engineering or geologic sciences, shall be prepared by, or under the direction of, and signed by persons registered to practice in California pursuant to California Business and Professions Code, Sections 6735, 7835, and 7835.1 or federal officers and employees who are exempt from these Sections by California Business and Professions Code, Section 6739 or 7836. To demonstrate compliance with Title 16 CCR, Sections 415 and 3065, all technical reports must contain a statement of the qualifications of the responsible registered professional(s). As required by these laws, completed technical reports must bear the signature(s) and seal(s) of the registered professional(s) in a manner such that all work can be clearly attributed to the professional responsible for the work.

9. The Discharger shall file a Report of Waste Discharge with the Regional Water Board at least 140 days before making any material change in the character, location, or volume of the discharge. A material change includes, but is not limited to, the following:

   a. The addition of a new wastewater that results in a change in the character of the waste;

   b. Significantly changing the disposal or waste application method or location;

   c. Significantly changing the method of treatment;

   d. Increasing the discharge flow beyond that specified in the Order; and/or

   e. Expanding existing herd size beyond 15 percent.

10. All reports shall be submitted to the following address:

    California Regional Water Quality Control Board
    Central Valley Region
    1685 E Street
    Fresno, CA 93706
    Attention: Confined Animal Regulatory Unit

Requirements Specifically for Monitoring Programs and Monitoring Reports:

T E N T A T I V E O R D E R

1. The Discharger shall file self-monitoring reports and/or technical reports in accordance with the detailed specifications contained in the MRP attached to the Order.

2. The Discharger shall maintain a written monitoring program sufficient to assure compliance with the terms of the Order. Anyone performing monitoring on behalf of the Discharger shall be familiar with the written program.

3. The monitoring program shall include observation practices, sampling procedures, and analytical methods designed to ensure that monitoring results provide a reliable indication of water quality at all monitoring points.

4. All instruments and devices used by the Discharger for the monitoring program shall be properly maintained and shall be calibrated as recommended by the manufacturer and at least once annually to ensure their continued accuracy.

5. The Discharger shall retain records of all monitoring information, including all calibration and maintenance records, copies of all reports required by the Order, and records of all data used to complete the reports. Records shall be maintained for a minimum of five years from the date of sample, measurement, report, or application. Records shall also be maintained after facility operations cease if wastes that pose a threat to water quality remain at the site. This five-year period may be extended during the course of any unresolved litigation regarding the discharge or when requested in writing by the Regional Water Board Executive Officer.

   a. Records of on-site monitoring activities shall include the:

      (1) Date that observations were recorded, measurements were made, or samples were collected;

      (2) Name and signature of the individual(s) who made the observations, made and recorded the measurements, or conducted the sampling;

      (3) Location of measurements or sample collection;

      (4) Procedures used for measurements or sample collection;

      (5) Unique identifying number assigned to each sample; and

      (6) Method of sample preservation utilized.

b. Records of laboratory analyses shall include the:

(1) Results for the analyses performed on the samples that were submitted;

(2) Chain-of-custody forms used for sample transport and submission;

(3) Form that records the date that samples were received by the laboratory and specifies the analytical tests requested;

(4) Name, address, and phone number of the laboratory which performed the analysis;

(5) Analytical methods used;

(6) Date(s) analyses were performed;

(7) Identity of individual(s) who performed the analyses or the lab manager; and

(8) Results for the quality control/quality assurance (QA/QC) program for the analyses performed.

E. Enforcement

1. California Water Code Section 13350 provides that any person who violates WDRs or a provision of the California Water Code is subject to civil liability of up to $5,000 per day or $15,000 per day of violation, or when the violation involves the discharge of pollutants, is subject to civil liability of up to $10 per gallon, or $20 per gallon; or some combination thereof, depending on the violation, or upon the combination of violations. In addition, there are a number of other enforcement provisions that may apply to violation of the Order.

INFORMATION SHEET

WASTE DISCHARGE REQUIREMENTS ORDER NO. R5-2008-XXXX
BAR 20 PARTNERS, LTD., A LIMITED PARTNERSHIP BETWEEN
JOHN SHEHADEY AND RICHARD SHEHADEY
BAR 20 DAIRY NO. 2, AND MICROGY, INC.

Background

John Shehadey and Richard Shehadey, the general partners of Bar 20 Partners, LTD. own and operate the recently expanded Bar 20 Dairy No. 2 (hereafter "Facility"). The Facility is located approximately ten miles west of Kerman in Fresno County. The original portion of the dairy (that portion which exists north of Whitesbridge Road) is regulated by the Waste Discharge Requirement General Order R5-2007-0035 for Existing Milk Cow Dairies (Dairy General Order), which was adopted on 3 May 2007.

On 12 September 2007, Bar 20 Partners, LTD. submitted a Report of Waste Discharge (RWD) outlining the already completed expansion of the original dairy, and a plan to install a thermophilic anaerobic digester system within the boundaries of the expanded portion (that portion which exists south of Whitesbridge Road). The thermophilic digester would be owned and operated by Microgy, Inc., a New Hampshire Corporation to treat waste from the dairy operations and imported supplemental feedstock from various sources to produce biogas for sale to the regional gas utility company. Hereafter, Bar 20 Partners, LTD. and Microgy, Inc. are collectively referred to as "Discharger." Herd population data for the expanded dairy is summarized in Table 1.

TABLE 1
Herd Size and Composition

Animal	Head	AU Factor*	Animal Units
Milk Cow	9,400	1.40	13,160
Dry Cow	1,057	1.12	1,184
Large Heifer	2,125	1.02	2,168
Small Heifer	2,125	0.49	1,041
Calves	700	0.29	203
Total	**15,407**		**17,756**

* AU factor based on 1,000 pound animal

The digester system will include a 546,000-gallon capacity steel above ground tank (AGT) to store the imported supplemental feedstock, a 775,000-gallon capacity steel AGT mix tank, four 1.34-million gallon AGT digester tanks, a screw press separator, a gas treatment system (biogas scrubber), and appurtenant pumps and piping. Digester operations will require the feed lanes and free stalls to be vacuumed or scraped rather than routinely flushed. The vacuumed semi-liquid manure will be added to the mix tank and diluted with freshwater and/or recycled digester effluent to about eight percent (8%) solids.

The supplemental feedstock has been described as food processing waste that may include: non-saleable (off-spec or out-of-date) materials, used cooking oil, grape seed oil, cottonseed oil, floor sweepings from food processing, (protein powders and sugary flavorings), stillage from the manufacture of corn-based ethanol, and fatty water skimmings. The anticipated characteristics of the feedstock are summarized in Table 2.

TABLE 2
Selected Constituents and Estimated Concentrations for Supplemental Feedstock

Constituent	Estimated Concentration
Calcium	984 mg/L
Chloride	2,874 mg/L
Iron	320 mg/l
Sodium	2,062 mg/L
Sulfur	867 mg/L

mg/L – milligrams per liter

Approximately 154,500 gallons of manure from the mix tank and 65,000 gallons of the supplemental feedstock from the storage tank will be added to the digester daily. The digester will function as a complete-mix reactor with a hydraulic retention time of approximately 21 days. Digester effluent will be removed from the digester daily and pass through a screw press separator. Separated effluent liquid will be recycled to the manure mix tank or conveyed to the wastewater retention system for holding until it is applied to cropland. Separated digester solids will be stored on a concrete pad until they are used either onsite for animal bedding, or exported from the facility.

Biogas produced during the digestion will be continuously extracted and conveyed to a moisture removal system on site. The biogas will then be piped to an on-site central cleaning facility (biogas scrubber) where carbon dioxide and hydrogen sulfide will be removed from the biogas prior to its delivery to the natural gas pipeline. The digester project has not yet been constructed. A diagram of the digester installation is shown on Attachment E. The biological reaction with the biogas scrubber removes sulfur from the gas stream. Periodically, the biogas scrubber will be flushed with fresh water to remove the accumulated effluent from the reaction surfaces. The biogas scrubber effluent will consist mostly of sulfuric acid (H_2SO_4) and will be discharged into the facility's wastewater retention system. The anticipated characteristics of the dairy wastewater, the digester effluent, and the biogas scrubber effluent are summarized in Table 3.

TABLE 3
Waste Characteristics

Constituent	Dairy Wastewater[1]	Digester Effluent[2]	Biogas Scrubber Effluent[3]
Bicarbonate	2,206 mg/L	NR	NR
Calcium	175 mg/L	1,505 mg/L	ND
Carbonate	ND	NR	NR
Chloride	208 mg/L	1,185 mg/L	ND
Electrical Conductivity	4.230 µmhos/cm	NR	NR
Magnesium	85 mg/L	NR	27 ppm
Nitrate	3 mg/L	NR	NR
Nitrogen (Total)	320 mg/L	3,014 mg/L	159 mg/L
pH	7.4	8.3	1.4
Potassium	361 mg/L	1,928 mg/L	ND
Sodium	178 mg/L	1,092 mg/L	6 ppm
Sulfur	30 mg/L	362 mg/L	1,403 ppm
Total Dissolved Solids	2,283 mg/L	12,841 mg/L	4,000 mg/L

[1] Based on average of 200 samples collected from 22 dairies in southern San Joaquin Valley

[2] Reported by Larry Walker Associates email of 24 October 2007

[3] Midwest Laboratories, Inc., Report of Analysis, Ref Lab # 212718, Report Number 07-297-5046 dated 10/30/07

mg/L – milligram per liter µmhos/cm – micromhos per centimeter ppm – parts per million

ND - not detected NR – not reported

There will be four waste streams entering the wastewater retention ponds: process wastewater from the milk parlor, digester effluent, biogas scrubber effluent, and stormwater runoff from the production area. Dilution water (fresh water) will be added to the wastewater retention ponds to reduce the salt concentration. The Discharger reports that it will dilute the wastewater in the retention ponds. Given the operational parameters described in the RWD, the annual average salinity concentration in the wastewater retention ponds should not exceed 4,100 milligrams per liter (mg/L) total dissolved solids (TDS) or 7,700 micromhos per centimeter (µmhos/cm) electrical conductivity (EC).

The anticipated dairy and digester operations are estimated to generate approximately 109 million gallons or 14.5 million cubic feet of wastewater during a typical rainy season. The currently existing wastewater retention system appears to have adequate capacity (approximately 14.8 million cubic feet) to meet the Title 27 CCR §22562 and §22563 requirements. However, no water use study has been conducted to determine actual water use. This Order requires the submission of a Waste Management Plan (WMP) to demonstrate that waste management facilities, equipment, and practices in the production area meet the requirement of the Order.

Groundwater Conditions and Existing Land Use

In early-2005, a groundwater monitoring network was installed at the expanded portion of the dairy. The monitoring network includes three dedicated groundwater monitoring wells which are depicted in the map of that portion of the Facility (Attachment C). The monitoring network has been sampled eight times since its installation in June 2005, five times prior to the Facility initiating discharge in December 2005 and three times since. The groundwater elevation data collected during the eight sampling events are summarized in Table 4, below.

TABLE 4
GROUNDWATER DEPTH MEASUREMENTS
(June 2005 through August 2007)

MONITORING WELL ID	DATE OF SAMPLING EVENT	DEPTH TO GROUNDWATER (feet below ground surface)
MW-1	6/30/2005	34.83
	7/7/2005	34.85
	7/19/2005	34.92
	8/17/2005	35.14
	11/11/2005	35.38
	8/17/2006	35.02
	12/13/2006	37.85
	8/12/2007	37.86
MW-2	6/30/2005	22.98
	7/7/2005	23.33
	7/19/2005	23.05
	8/17/2005	22.97
	11/11/2005	22.71
	8/17/2006	23.85
	12/13/2006	27.67
	8/12/2007	27.25
MW-3	6/30/2005	38.90
	7/7/2005	38.93
	7/19/2005	38.97
	8/17/2005	39.23
	11/11/2005	39.32
	8/17/2006	38.63
	12/13/2006	41.57
	8/12/2007	41.77

The groundwater analytical data is summarized in Table 5, below.

TABLE 5
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS

WELL ID	SAMPLING DATE	NO_3-N mg/L	HCO_3 mg/L	Cl mg/L	TKN mg/L	NH_3-N mg/L	TDS mg/L	EC µmhos/cm	pH std
MW-1	6/30/2005	<0.05	389	1,010	0.76	0.100	3,910	5,910	7.72
	7/7/2005	0.234	392	1,100	<0.5	<0.1	4,230	6,070	7.53
	7/19/2005	<0.05	374	1,000	1.7	<0.1	4,200	6,030	7.50
	8/17/2005	<2.0	410	1,100	<1.0	<1	3,000	4,800	7.8
	11/11/2005	<4.0	430	1,100	<1.0	<0.1	2,800	4,800	8.0
	8/17/2006	10.5	414	1,220	ND	ND	3,100	5,110	6.64
	12/13/2006	ND	461	1,090	0.65	0.200	3,270	4,660	7.04
	8/12/2007	<5.0	420	1,200	<1.0	<1.0	2,500	4,800	8.0
MW-2	6/30/2005	<0.05	557	1,030	1.5	0.141	4,370	6,210	7.76
	7/7/2005	0.087	455	1,170	<0.5	<0.1	4,200	6,010	7.55
	7/19/2005	<0.05	529	1,020	2.3	<0.1	4,460	6,190	7.4
	8/17/2005	<2.0	540	1,100	1.2	<1	3,400	5,200	7.7
	11/11/2005	<5.0	500	1,200	<1	<1	3,700	6,000	7.9
	8/17/2006	ND	454	1,020	6.53	ND	2,740	5,220	7.27
	12/13/2006	ND	485	2,290	ND	0.151	2,980	4,830	7.38
	8/12/2007	<4.0	390	770	<1.0	<1.0	2,400	4,200	7.8
MW-3	6/30/2005	<0.05	515	1,670	0.99	0.218	6,400	9,020	7.94
	7/7/2005	0.086	560	1,830	5.0	0.260	5,990	8,810	7.82
	7/19/2005	<0.05	553	1,860	2.3	0.161	6,250	9,190	7.60
	8/17/2005	<2.4	550	1,800	<1.0	<1	4,900	7,600	7.9
	11/11/2005	<1.6	540	1,800	<1.0	<1.0	4,900	7,800	8.0
	8/17/2006	0.058	464	1,700	2.18	0.310	5,580	7,330	7.33
	12/13/2006	ND	515	1,600	0.50	0.200	4,610	7,190	7.59
	8/12/2007	<6.0	520	1,500	<1.0	<1.0	3,500	6,600	8.1
Primary MCL		**10**	**1**	**NE**	**NE**	**NE**	**NE**	**NE**	
Secondary MCL		**NE**	**NE**	**250**	**NE**	**NE**	**500**	**900**	

Cl chloride
HCO_3 bicarbonate
NH_3-H disassociated ammonia
NO_3-N nitrate as nitrogen
EC electrical conductivity
TDS total dissolved solids
TKN total Kjeldahl nitrogen
µmhos/cm micromhos per centimeter
Primary MCL Primary Maximum Contaminant Levels
Secondary MCL Recommended Secondary Maximum Contaminant Levels

On the Site Map attachment to the 2007 RWD, twenty irrigation and domestic water supply wells are depicted at the Facility and within the boundaries of the associated cropland. Thirteen of the wells were sampled in April and May 2002, and the analytical results are summarized in Table 6, below. The same thirteen wells were sounded in July, August, and September 2006. Groundwater intercepted by these wells during the 2006 events measured between 127 and 178 feet below site grade.

TABLE 6
Summary of Selected Analytical Results from Water Supply Wells

Well Identification	Total Dissolved Solids (mg/L)	Nitrate – Nitrogen (mg/L)
14	185	<0.1
15	289	<0.1
16	444	<0.1
5-1	1,428	<0.1
5-4E	1,103	<0.1
5-4W	743	<0.1
SF-12	465	<0.1
SF-11	454	<0.1
SF-13	413	<0.1
SF-15	424	<0.1
9-3E	481	<0.1
10-4	564	<0.1
SF-15-4	312	<0.1

mg/L - milligrams per liter

Land use surrounding the facility is predominantly agricultural with scattered farmsteads according land use data published in 2003 by DWR. Nearby crops include corn, cotton, almonds, grapes, wheat, alfalfa, and plums. The most prevalent soils on the facility are classified as: Chino loam, Hesperia sandy loam, Pond loam and Pond fine sandy loam, and Traver sandy loam.

Basin Plan, Beneficial Uses, and Regulatory Considerations

The Basin Plan indicates the greatest long-term problem facing the entire Tulare Lake Basin is increasing salinity in groundwater, a process accelerated by man's activities and particularly affected by intensive irrigated agriculture. Although a valley-wide salt drain is a desired future alternative for concentrated salt sources, Basin Plan policies and programs focus on controlling the rate of increase of salt in the Basin from all controllable sources, and particularly point sources of waste.

The procedure for the Regional Water Board to follow in establishing numerical limitations in waste discharge that will implement Basin Plan narrative objectives is described in pages IV-21 through IV-23 of the Basin Plan. The Regional Water Board must consider, among other things, information submitted by a Discharger and other interested parties and relevant numerical criteria and guidelines developed or published by other agencies and organizations on harmful concentrations of constituents.

The constituent concentrations to be included in the proposed Order and summarized in Table 7 are what the Basin Plan and referenced documents of recognized authorities indicate cannot be exceeded without causing some adverse impact on the listed beneficial use. For agricultural use and the waste constituents listed, crop application is consistently more sensitive than animal uses, but there may be several concentration thresholds that apply dependent upon the crop and how irrigation takes place.

The combined dairy digester discharge has not been initiated. Regional Water Board staff cannot yet determine what impact the discharge may have on beneficial uses of groundwater. Insufficient data has been reported to establish background groundwater conditions but it appears that the groundwater in the regional produciton aqufer beneath the facility is suitable for all beneficial uses. This Order requires the installation of a groundwater monitoring network to monitor the impact of the discharge and help develop long-term groundwater limits, the development of which is discussed further in the Antidegradation section below.

The Order uses the constituent concentrations summarized in Table 7 as interim groundwater limitations while a Groundwater Limitations Analysis is performed to determined if more stringent groundwater limitations are needed to protect water quality. These interim groundwater limitations are based on either the maximum contaminant level (MCL) for the constituent as published in Title 22 CCR or other designated Basin Plan objectives.

TABLE 7
Summary of Interim Receiving Water Numerical Limitations

Constituent	Units	Value	Beneficial Use	Criteria or Justification
Boron	mg/L	1.0	AGR[2]	Boron sensitive crops[3]
Chloride	mg/L	250	MUN[1]	Recommended Secondary MCL[5]
Conductivity (EC)	µmhos/cm	900	MUN[1]	Recommended Secondary MCL[5]
Nitrate as N	mg/L	10	MUN[1]	Primary MCL[4]
Total Coliform Organisms	MPN/100 mL	2.2	MUN[1]	Basin Plan
Total Dissolved Solids	mg/L	500	MUN[1]	Recommended Secondary MCL[4]

Notes:
1 - Municipal and domestic supply
2 - Agricultural supply
3 - Ayers, R. S. and D. W. Westcot, Water Quality for Agriculture, Food and Agriculture Organization of the United Nations – Irrigation and Drainage Paper No. 29, Rev. 1, Rome, (1985)
4 - Title 22, CCR, § 64431, Table 64431-A
5 – Title 22, CCR, § 64449, Table 64449-B

Antidegradation

The antidegradation directives of State Water Board Resolution No. 68-16, "Statement of Policy With Respect to Maintaining High Quality Waters in California," or "Resolution 68-16" require that waters of the State that are better in quality than established water quality objectives be maintained "consistent with the maximum benefit to the people of the State." Policy and procedures for complying with this directive are set forth in the Basin Plan.

Certain dairy and digester wastewater constituents are not fully amenable to waste treatment and control and it is reasonable to expect some impact on groundwater. Degradation is likely to occur from waste handling and storage and application of wastes to cropland. However, there is some uncertainty over the degree of that degradation given that the combined dairy discharge has not been initiated.

Digester effluent quality data used to develop this Order comes from one of Microgy's digesters in Wisconsin and while it is sufficient to provide a general understanding of the character of the discharge it is insufficiently detailed to perform a best practicable treatment or control (BPTC) analysis or set consistent long-term groundwater limits that reflect full implementation of BPTC. Given the limited information, this Order takes a phased approach. Interim groundwater limitations assure protection of the existing beneficial uses of groundwater while this process takes place.

The Order first requires technical reports in the form of a BPTC technical evaluation for each component of the facility's waste treatment and control to determine for each waste constituent BPTC as used in Resolution 68-16, a Nutrient Management Plan (NMP) for the cropland, and Salinity Evaluation and Minimization Plan for salinity control of facility waste. The results of these technical evaluations and water quality data from required groundwater monitoring will be used to develop numeric groundwater limitations for each waste constituent that reflects full implementation of BPTC and compliance with the most stringent applicable water quality objectives for each constituent. Lastly, the Order may be reopened to incorporate changes to the interim groundwater water limitations, or waste handling and treatment technologies, deemed necessary to implement BPTC.

Proposed Order Terms and Conditions

The recently adopted Waste Discharge Requirement General Order R5-2007-0035 for Existing Milk Cow Dairies (Dairy General Order) has set new standards for waste management on dairy facilities. The requirements specified in the propose Order largely reflect those of the Dairy General Order expect where specific circumstances require different or more stringent discharge specifications or provisons.

California Environmental Quality Act (CEQA)

This Order rescinds the original portion of the dairy's coverage under the Waste Discharge Requirement General Order R5-2007-0035 for Existing Milk Cow Dairies (Dairy General Order). The Dairy General Order was found to be exempt from CEQA provided that the original portion of the dairy did not expand its cow numbers beyond those that existed as of 17 October 2005. Prohibition A.10. of this Order prohibits the Discharger from exceeding their October 2005 herd numbers, with a 15 percent increase allowance to accommodate normal fluctuations in herd size.

- For the digester project at this facility, Fresno County is the lead agency pursuant to CEQA and has prepared an Initial Study and a Mitigated Negative Declaration. Between 21 December 2007 and 24 January 2008, Fresno County Department of Public Works and Planning circulated for public comment an Initial Study and a Notice of Intent to Adopt a Mitigated Negative Declaration for the digester project. Fresno County concluded in the Initial Study that impacts related to hydrology and water quality from the project will be considered "less than significant" with adherence to the rules, regulations, and permits under the jurisdiction of the Regional Water Board, and required compliance with waste discharge requirements and a comprehensive nutrient management plan as mitigation measures. The relevant protections required by this Order include: Prohibitions A.4. and A.9.; Discharge Specifications B.1.a., B.1.b., B.1.c., and B.1.d., Waste Application to Cropland Specification C.1; and Interim Groundwater Limitations D.1., and D.2. On

24 January 2008, the Fresno County Planning Commission adopted a Mitigated Negative Declaration and Conditional Use Permit for the facility. The Regional Water Board, as a Responsible Agency, considered the Mitigated Negative Declaration and concurs that the identified mitigation measures reduce all impacts on water quality to a less-than-significant level.

- For the expansion of the facility, the San Joaquin Valley Air Pollution Control District is the lead agency pursuant to the California Environmental Quality Act (CEQA). A Mitigated Negative Declaration (MND) was prepared by the District in September 2007. A revised version of the MND was circulated for public review between 24 December 2007 and 24 January 2008. The revised MND indicated that there would be no potentially significant impacts to water quality at the expanded facility which would be regulated by the Regional Water Board through this Order. The MND was certified and the project approved by the District on 24 January 2008. [This may change on 25 January 2008]

Discharge Prohibitions, Specifications and Provisions

The proposed Order prohibits the discharge of wastes to surface water. This includes natural and man-made water bodies and conveyances whether surface water is present or not at the time of discharge. In the event such a discharge occurs due to a failure of proper waste management, the proposed Order specifies monitoring and mitigation of the surface water body affected. The actions required by the proposed Order include:

- Immediate termination of the discharge.
- Notification of regulatory agencies (Regional Water Board, County Health Department, Fish & Game, etc.) within 24 hours of discovery.
- Investigation to determine the extent and magnitude of the discharge impact.
- Mitigation of the degradation caused by the discharge.
- A plan to prevent recurrence of the discharge.

This proposed Order prohibits discharge of waste to groundwater that causes or contributes to exceedances of water quality objectives. This proposed Order reduces the threat of degradation of groundwater by requiring the Discharger to:

- Submit a hydrogeologic report for the area affected or potential affected by the facility to the Executive Officer. The technical report shall describe the underlying geology, existing wells (active or otherwise), well restrictions, and hydrogeology. The report shall include a Monitoring Well Installation Work Plan that recommends a monitoring well network to collect data from the unconfined to semi-confined, regional production aquifer up gradient from the influence of the facility and down gradient from each of the waste management areas (e.g., corrals, wastewater retention ponds, digester works, and cropland). The network shall be sufficient to evaluate performance of BPTC measures and to determine compliance with the Order's Groundwater Limitations. The recommendations shall be reviewed and approved by the Executive Officer..

- Conduct a performance evaluation of existing waste handling equipment, facilities, and an evalution of BPTC for the waste handling and disposal activity. A critical waste management element to be evaluated is the existing wastewater retention system. The wastewater retention ponds must be evaluated for their effectiveness to control seepage of wastewater to the upper regional aquifer below the shallow water zone. The report must include a review of treatment and control technologies, and propose BPTC measure for retention ponds.
- Develop and implement a Waste Management Plan (WMP) to document waste handling and management measures. If the existing conditions do not comply with Title 27 confined animal facility regulations, interim modifications would be proposed to mitigate the problems. The WMP will be include a schedule of milestones and completion dates for any necessary construction and/or retrofitting of the existing physical plant.
- Develop and implement and a Nutrient Management Plan (NMP) to implement waste applicaton practices in the cropland. The NMP will provide a schedule of waste and irrigation water application formulated to meet the crop needs in each field. The NMP will provide for sampling plan for wastewater, soil, crop tissue, and irrigation water, to collect the data needed to manage waste applications.
- Develop a Salinity Evaluation and Minimization Plan that identifies sources of salt in waste generated at the facility both in the dairy and digester operations. The report should evaluate measures that can be taken to minimize salt in the facility waste, and provide a schedule to implement these measures identified to minimize salt in the waste with the NMP.
- Develop and implement groundwater monitoring to assess the performance of the facility in meeting this proposed Order's specfications and limitations.
- Prepare a final Groundwater Limitations Analysis to propose specific numeric groundwater limitations for each waste constituent that reflects full implementation of BPTC and compliance with the most stringent applicable water quality objectives for each constituent. The data from the groundwater monitoring program and the monitoring provisions of the NMP will be used to measure the facilitiy's performance This data will be used in the the Groundwater Limitations Analysis to formulate the subsequent final groundwater limitations.

Initial Compliance Monitoring

This Order prescribes monitoring of digester effluent, wastewater in the retention ponds, the biogas scrubber effluent, and fresh irrigation water. Monthly (and weekly during the rainy season) monitoring of wastewater retention ponds' freeboard to ensure the wastewater retention systems has sufficient capacity to meet the requirements of Title 27 §22562 (a) (i.e., sufficient to retain facility wastewater generated and stormwater runoff from the 25-year, 24-hour storm). Monitoring of the wastewater application amount(s) to cropland by field and monthly monitoring of the mineral and nitrogen character of the digester effluent, wastewater in the retention ponds, and fresh irrigation water are necessary to determine: 1) the amount and basic quality characteristics of the discharge, 2) if the contents of the wastewater retention system are complying with discharge limits for TDS or EC, 3) if the application to cropland is meeting crop needs and not exceeding the salt application limitations, and 4) if there is a material charge in the discharge.

The Discharger must monitoring groundwater for waste constituents expected to be present in the discharge, capable of reaching groundwater, and exceeding the groundwater limitations if treatment, control, and environmental attenuation, proves inadequate. For each constituent listed in Section D Interim Groundwater Limitations, of the Order, the Discharger must, as part of each monitoring event compare concentrations of constituents found in each monitoring well (or water supply well) to the background concentration or to prescribe numerical limitations to determine compliance.

Reopener

The conditions of discharge in the proposed Order were developed based on currently available technical information and applicable water quality laws, regulations, policies, and plans, and are intended to assure conformance with them. However, information is presently insufficient to develop final groundwater limitations, so the proposed Order sets limitations for the interim while site-specific, constituent-specific limits are developed in conjunction with a BPTC evaluation. Additional information must be developed and documented by the Discharger as required by schedules set forth in the proposed Order. As this additional information is obtained, decisions will be made concerning the best means of assuring the highest water quality possible that could involve substantial cost. It may be appropriate to reopen the Order if applicable laws, regulations, or site conditions change.

Appendix F

Proposed Significance Threshold for Greenhouse Gases

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 than 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.

<u>Implementing a GHG Non-zero Significance Threshold:</u>

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.

<u>Establishing a Non-zero GHG Significance Threshold:</u>

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 NOx 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 NOx 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 NOx/ROG analogy ("Regulated Emissions Inventory Capture" methodology) are as follows:

- Define regional NOx/ROG CEQA thresholds
- Define the regional NOx/ROG emission inventory the agency is trying to regulate with its NOx/ROG thresholds
- Calculate the percentage of the total emissions inventory for NOx 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 CO_2 equivalent (MMT CO_2e). 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.

<u>Establishing a GHG Significance Threshold:</u>

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:

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

Calculation:

GHG California wide EI (2004): 499 million metric tons/year (CO_2e)

CARB Statewide NOx EI (2005): 3,555.8 ton/day

EPA NOx Significance Threshold (major source level): 100 tons NOx/year

GHG Significance Threshold = (499,000,000 metric t/y x 100 t/y) / (3,555.8 t/d x 365d/y)
= 38,447 metric tons/year (CO_2e)

GHG Significance Threshold = 42,370 ton (US)/year (CO_2e)

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.

Appendix G

Rule 4570 (Confined Animal Facilities)
Final Staff Report

SAN JOAQUIN VALLEY UNIFIED AIR POLLUTION CONTROL DISTRICT

FINAL STAFF REPORT

RULE 4570 (CONFINED ANIMAL FACILITIES)

June 15, 2006

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I. SUMMARY

A. Reasons for Rule Development and Implementation

In terms of state and federal standards, the California Air Resources Board (ARB) and United States Environmental Protection Agency (EPA) classified the San Joaquin Valley Air Basin (SJVAB) as a non-attainment area for ozone. The District is classified as a serious non-attainment area for the federal 8-hour ozone National Ambient Air Quality Standards (NAAQS). It is anticipated that attainment of the eight-hour standard will require the control measures cited in the one-hour Extreme Ozone Attainment Plan (Ozone Plan), which include control measure 4570 (Confined Animal Facilities). Since Proposed Rule 4570 is a control measure in the District's Ozone Plan, it is subject to Federal Register, Clean Air Act (CAA), and California Health and Safety Code (CH&SC) requirements. Additionally, anti-backsliding provisions commit the District to develop all control measures listed in the Ozone Plan (Federal Register Volumes 69 and 70). These requirements are summarized in Table 1.

Table 1
Anti-backsliding and Ozone Plan Commitments

Subject	Reference	Requirement
Anti-backsliding	69 Federal Register 23955	Districts shall develop all control measures listed in the one-hour Ozone Plan until the District is designated as attainment for the 8-hr NAAQS.
BACM	Federal Register 8/18/94	Provisions in attainment plans should include the application of best available control measures (BACM) to existing major stationary sources.
BARCT	CH&SC 40919(a)(3) Ozone Plan	Ozone attainment plans should provide for best available retrofit technology (BARCT) for existing permitted sources. BARCT is specifically required for "large" Confined Animal Facilities (CAF).
Deadlines	Ozone Plan	Rule adoption by the 2nd quarter of 2006.
Feasible Controls	CH&SC 40914(a)(2)	Ozone attainment plans should include "all feasible control measures."
RACT	CAA 182(b)(2) and 182(f)	Ozone attainment plans shall assure that reasonable available control technology (RACT) for volatile organic compounds (VOC) is in use at sources and on source categories at or above the RACT threshold.
RACT Threshold	70 Federal Register 30592-30596	The applicable RACT threshold for control measures shall be the threshold in effect on June 15, 2004. The Districts threshold on June 15, 2004 was 10 tons per year (tpy) for VOC. Therefore, 10 tpy is the RACT threshold for Proposed Rule 4570.
Reductions	Ozone Plan	The rule shall reduce VOC emissions by at least 25% from the baseline by 2010. Twenty-five percent of the baseline used for the Ozone Plan (63.1 tpd) is 15.8 tpd.
Timeline	CAA Section 172(c)(1)	Ozone attainment plans shall implement control measures as expeditiously as practicable, and provide for attainment.

Proposed Rule 4570 is also intended to fulfill the following CH&SC requirements created by the passage of California's Senate Bill 700 (SB 700):

Table 2
SB700/California Health and Safety Code Requirements

Subject	CH&SC Sections	SB700 / CH&SC Requirements
Large Confined Animal Facility Definition (large CAF)	40724.6(a)	The District shall use the "large CAF" definition developed by the California Air Resources Board (ARB).
Deadline	40724.6(b)	By **July 1, 2006** the District shall adopt, implement, and submit for inclusion in the state implementation plan a rule requiring owners of "large" CAF to obtain a permit.
Degree of Mitigation Required	40724.6(d)(1)(B)	Best Available Retrofit Control Technology (BARCT) is the degree of mitigation required of large CAF.
Compliance Schedule	40724.6(d)(4)	Owner/operators shall implement control measures within **one year** of the permit issuance date.
Permit Requirements to be Included in the Rule	40724.6(d)	1. The permit shall include an emission mitigation plan that demonstrates use of BARCT, (Rule 4570 Section 5.0) 2. The District shall provide for a 30-day public noticing and commenting period for proposed permits, (Rule 4570 Section 6.1.6) 3. The District shall review and update permits at least once every three (3) years, (Rule 4570 Section 6.2) 4. The District shall act on completed permit applications within six (6) months of receipt, (Rule 4570 Section 6.3) 5. The permit shall include sufficient information to prepare an emission inventory of all regulated air pollutants emitted from the facility, and (Rule 4570 Sections 6.0 and 7.0) 6. The owner/operators of large CAF shall submit a permit application within six (6) months of Rule 4570 adoption. (Rule 4570 Section 8.1)
Impact Assessment	40724.6(d)	Prior to adopting a rule, the District shall analyze the following: 1. Category, number, and size of facilities affected, (Section II of the Staff Report) 2. Nature, quantity, and significance of emissions in adversely affecting public health, the environment, and attainment of air quality standards, (Section IB and Section II of the Staff Report) 3. Emission reduction potential, (Appendix B) 4. Costs, (Appendix C and D) 5. Impact on employment and the economy, (Appendix D) 6. Alternative controls, and (Section III of the Staff Report) 7. Technical and Practical Feasibility. (Section III of the Staff Report)

B. Scope of Proposed Rule 4570

Rule 4570 is properly limited to VOC regulation. Proposed Rule 4570 was developed pursuant to California Health and Safety Code (CH&SC) 40724.6, which applies only to the regulation of ozone and ozone precursors. This is confirmed by CH&SC 40724.6(d)(1)(B), which requires, amongst other things, the implementation of reasonably available control technology (RACT) in "moderate" and "serious" nonattainment areas, and best available retrofit control technology (BARCT) in "severe" and "extreme" nonattainment areas. "Severe" and "extreme", as used in these sections of the CH&SC, are legal terms that pertain only to ozone attainment status. Please see CH&SC 40724.6(d)(1)(B) for additional information. Due to the fact that the aforementioned sections only apply to ozone and ozone precursors, controlling emissions of other non-ozone related pollutants, such as ammonia, is not mandated or permitted.

Pursuant to CH&SC 40724.6(d)(4)(d)(2), the District analyzed the significance of emissions from CAFs and determined that the rule should focus on the control of volatile organic compounds ("VOCs") as ozone precursors.

Ammonia is not being targeted by this rule because ammonia is a particulate matter precursor and not an ozone precursor. Some commenters inaccurately stated that Proposed Rule 4570 must regulate ammonia because CH&SC 40724(a) requires BARCT controls for particulate matter (PM) precursors, and ammonia is a precursor for both PM10 and PM2.5. The District disagrees with this comment for several reasons. First, as discussed above, Rule 4570 is being adopted pursuant to CH&SC 40724.6, which authorizes the regulation of ozone, not particulate matter. The District complied with CH&SC 40724(a) when it adopted its Rule 4550 (Conservation Management Practices) in May and August 2004. To the extent that the commenters believe that ammonia should have been regulated under that rule, their comments are misplaced in this rule development process, as this is a separate district rulemaking activity. However, in an effort to respond to these comments, the District offers the following:

Ammonia was not targeted by Rule 4550 because, based on the District's PM-10 Plan; the preliminary results from the California Regional PM10/PM2.5 Air Quality Study (CRPAQS); and the Ninth Circuit decision in *Association of Irritated Residents vs. U.S. Environmental Protection Agency*, 423 F.3d 989 (9th Circuit 2005), reducing ammonia is not an effective method of achieving attainment for particulate matter. Oxides of nitrogen (NOx), not ammonia, are the limiting reagents in the formation of PM in the San Joaquin Valley. The District could reduce over half of the ammonia from CAFs and not affect particulate matter formation. Furthermore, CH&SC 40724(a) requires the District to regulate PM precursors "in a manner commensurate to other source categories." Since current District rules do not require any other source category to control ammonia, this rule cannot do so for confined animal facilities. In addition, the District did not regulate PM2.5 in Rule 4550 because CH&SC 40724(a) applies only to the regulation of PM in federal nonattainment areas designated as nonattainment for PM2.5 as of January 1, 2004. The San Joaquin Valley was not designated as nonattainment for PM2.5 until April 5, 2005, well after the January 2004 applicability date. Thus, CH&SC 40724(a) does not require regulation of PM2.5 precursors in the San Joaquin Valley.

Returning to the rule at issue here, Proposed Rule 4570, even if the District agreed that CH&SC 40724.6 applied to all "air contaminants" as commenters suggest, CH&SC 40724.6(b) requires that emissions from a facility be reduced "to the extent feasible." In order to be "feasible" emission reductions must have some relationship to the pollution problem being addressed. Since Proposed Rule 4570 seeks to reduce ozone pollution, it would be nonsensical to attempt to control ammonia, soot, odor, or other "air contaminants" that have no effect on ozone levels in the San Joaquin Valley. Such a regulation would not survive the required socioeconomic analysis because the money spent on controls would not result in an improvement in ozone levels in the San Joaquin Valley. Therefore, such controls would not be considered "feasible."

In addition, the District is prohibited from requiring controls in Proposed Rule 4570 that would duplicate controls required for particulate matter in Rule 4550. CH&SC 40724.6(h) states that "nothing in this section authorizes a district to adopt a rule or regulation that is duplicative of a rule or regulation adopted pursuant to CH&SC 40724 and 40724.5." As discussed above, Rule 4550 (Conservation Management Practices) was adopted pursuant to CH&SC 40724. Rule 4550 contains the required PM controls for agricultural sources, including confined animal facilities. As a result, the present ozone rule, Proposed Rule 4570, could not similarly regulate particulate matter pollution as that would be "duplicative" and thus in violation of CH&SC 40724.6(h).

Finally, CH&SC 40724.6(d)(4)(d) states that the District must consider the impacts of a rule adopted under the aforementioned section and assess, amongst other things, "the nature and quantity of emissions from the category and the significance of those emissions in ... causing or contributing to the violation of a state or federal ambient air quality standard." As discussed above, the District performed this analysis for ammonia when it adopted it PM10 Plan in 2003 and again when it adopted an update to that Plan in 2006. This analysis determined that controlling ammonia is not an effective strategy for reducing particulate matter in the Valley. This analysis was affirmed by the Ninth Circuit in *Association of Irritated Residents vs. U.S. Environmental Protection Agency.* However, even though the District is not required to regulate ammonia with this rule, it is important to note that many of the mitigation measures required by the rule to reduce VOCs also reduce ammonia. As a result, this rule is expected to reduce ammonia from large CAFs by over 30%, as demonstrated in Appendix F.

The District also analyzed NOx pursuant to CH&SC 40724.6(d)(4)(d). Although NOx is an ozone and particulate matter precursor, Rule 4570 does not require NOx controls at CAFs. This is because animals and manure emit minimal quantities of NOx. Furthermore, the scope of this rule is limited to animal husbandry including manure disposal, not engines on these facilities. However, the District implemented BARCT for NOx emissions on CAFs from engines, boilers, and other sources in other District Rules including, but not limited to, District Rules 4301, 4304 through 4308, and 4701 through 4703.

Accordingly, because Rule 4570 as a measure for the District's Ozone Plan pursuant the authority set forth in H&SC section 40724.6, which authorizes the regulation of ozone and ozone precursors, this rule focuses on the regulation of VOCs, which are the pollutants that contribute to the District's non-attainment status for ozone.

C. Large CAF Definition

A CAF is defined in CH&SC 39011.5(a) and 39011.5(a)(1). Based on these sections of the CH&SC, a CAF is "a source of air pollution or a group of sources used in the...raising of fowl or animals located on contiguous property under common ownership or control...including, but not limited to, any structure, building, installation, barn, corral, coop, feed storage area, milking parlor, or system for the collection, storage, treatment, and distribution of liquid and solid manure, if domesticated animals are corralled, penned, or otherwise caused to remain in restricted areas for commercial purposes and feeding is by means other than grazing."

The California Air Resources Board (ARB) was required by CH&SC 40724.6 to "review all available scientific information, including, but not limited to, emission factors for confined animal facilities; the effect of those facilities on air quality in the basin; and other relevant scientific information and to develop a definition for a "large" confined animal facility. ARB's board adopted the following thresholds for a large CAF, based on air emissions from CAFs:

Table 3: ARB Large CAF Thresholds	
Livestock Category	**Number of Animals**
Dairy	*1,000 lactating cows*
Beef Feedlots	*3,500 beef cattle*
Other Cattle Operations	*7,500 calves, heifers, and other cattle*
Chickens-Broilers & Egg Layers	*650,000 head*
Turkeys	*100,000 head*
Swine	*3,000 head*
Sheep and Goats	*15,000 head*
Horses	*2,500 head*
Ducks	*650,000 head*
Other Livestock Not Previously Mentioned	*30,000 head*

Source: http://www.arb.ca.gov/regact/lcaf05/lcaf05.htm accessed 2/24/06

D. Permits Requirements

CH&SC 40724.6(c) provides the District with the authority to require permits on facilities with less than one half of any applicable emissions threshold, if they make certain findings, as quoted below:

> "A district may require a permit for a large confined animal facility with actual emissions that are less than one-half of any applicable emissions threshold for a major source in the district for any air contaminant, including, but not limited to, fugitive emissions in a manner similar to other source categories if, prior to imposing that requirement, the district makes both of the following determinations in a public hearing:
>
> (1) A permit is necessary to impose or enforce reductions in emissions of air pollutants that the district show cause or contribute to a violation of a state or federal ambient air quality standard and
>
> (2) The requirement for a source or category of sources to obtain a permit would not impose a burden on those sources that is significantly more burdensome than permits required for other similar sources of air pollution." (CH&SC 40724.6)

Staff believes that without a permit, determining compliance with Proposed Rule 4570 and ensuring compliance would not be feasible. A permit is the legal document through which we enforce the rule for permitted sources. Furthermore, since many of the affected sources already have permits and this rule would only require a modification to their existing permits, staff does not believe the permit requirement in Proposed Rule 4570 would impose a burden. The District will make these findings at a public hearing on June 15, 2006.

E. RACT Requirements

Reasonably Available Control Technology (RACT) is required by CAA 182(b)(2) and 182(f) for any facility with at least ten (10) tons per year (tpy) of VOC emissions. The emissions factors for confined animal facilities are being revised; therefore, it is not possible to conclusively identify the number of animals of any species that would trigger RACT requirements. The development of this rule cannot be postponed until finalization of the emission factor due to the CH&SC 40724.6 requirements for rule adoption by July 1, 2006. Preliminary discussion with EPA staff suggest that, due to the current uncertainty of the emission factors, at this time EPA will consider the RACT and large CAF thresholds to be equivalent. Therefore, staff will address those facilities defined as "large CAF" by the ARB in Proposed Rule 4570 to be adopted on or before July 1, 2006. Later, after emission factors are more refined, staff may amend this rule to address CAFs below the large CAF definition, but at or above the ten (10) tpy emission threshold for RACT, if it is determined that such sources exist.

F. Scientific Background Review/Revision

Due to the relatively new status of CAFs as a regulated stationary source, the body of scientific knowledge that is useful in understanding its impact on air pollution is not as well established compared to other traditional stationary sources under the jurisdiction of the District. New scientific findings characterizing and quantifying dairy, poultry, and other animal emissions and possible control measures are being developed and completed. The District developed Proposed Rule 4570 using relevant findings from previous research efforts as they were finalized, published, and peer-reviewed. These include, but are not limited to:

- A study at UC Davis, led by Dr. Frank Mitloehner, which focused on emissions from cows housed in environmental chambers to evaluate the emissions produced directly from cows and their fresh manure.
- A study at two operating dairies in the San Joaquin Valley, led by Dr. Chuck Schmidt, in which measurements were made at various locations at the dairies, including the corrals and turnouts, bedding areas, lagoons, feed storage areas, flush lanes, and bunker feed.
- A study by Dr. Schmidt to validate the effectiveness and capture efficiency of using flux chambers that were used to quantify emissions in the dairy studies.

These studies have provided significant findings that provide an understanding of the emissions at CAFs. Due to the rule adoption date mandated by CH&SC 40724.6 and the presence of peer-reviewed and preliminary research data, staff will propose rule adoption no later than July 1, 2006.

Since control efficiencies for technologies and emission factors may change based on new research, staff structured the rule such that facilities may comply with rule requirements utilizing management practices and machinery that owners/operators already have access to onsite. This is intended to implement BARCT, while preventing owners/operators from being required to invest significant capital in a technology that is later found to control only a small portion of the emissions. Staff may amend this rule after July 1, 2006 when additional research is completed, which may require owners/operators to make capital investment beyond the mitigation measures currently being proposed in Rule 4570. At that time, the emissions from each area would be better quantified, and staff would be able to determine which VOC emission mitigation measures have the highest cost effectiveness values.

Since testing methods are being developed, staff left the testing requirements flexible to prevent owners/operators from being required to invest significant capital in testing that is later found to be ineffective or not the most cost effective method. Furthermore, the rule provides the flexibility for the APCO, ARB, and EPA to add additional test method options that they believe are appropriate. This concept acknowledges that, as research continues, new, more effective, and less expensive test methods may be developed and, if so, owner/operators should be allowed to use such methods.

While the studies by Dr. Schmidt and Dr. Mitloehner have provided valuable new information, they do not fully address air emissions from CAF. Additional work is needed to allow a comprehensive update to the emission factors currently being used for CAF. As additional research, such as that being undertaken by the California Air Resources Board, becomes finalized, this rule may be adjusted to incorporate that new information. Please see Appendix H for additional information on ongoing studies.

II. BACKGROUND

CAF are used for the raising of animals including, but not limited to, cattle, calves, chickens, ducks, goats, horses, sheep, swine, rabbits, and turkeys, which are corralled, penned, or otherwise caused to remain in restricted areas for commercial agricultural purposes and fed by a means other than grazing. (CH&SC 39011.5 (a)(1))

Due to the different methods of confinement and associated manure management, there is no typical CAF. The design and operation of a CAF varies depending on animal type, regional climatic conditions, business practices, and preferences of the owners/operators. This is why Proposed Rule 4570 provides a menu of options for the owners/operators. This acknowledges that not all facilities can implement the same options due to infrastructure, conditional use permits, water board permits, soil types, production contracts, and other limitations. It also enables the people that understand the particular operation best, the owners/operators, to choose the mitigation measures that make the best environmental and economic sense for the facility.

A. General Description of Poultry Operations

Poultry facilities operate either as layer ranches for egg production or as broiler ranches where birds are grown for the fresh meat market. Poultry facilities, called ranches in reference to their specialized operation, may consist of one or more farms on properties that may be several miles apart. Several barn-like houses may make up a farm. A chicken layer house may have over 100,000 layers; a typical chicken broiler house contains approximately 20,000-25,000 birds; and a typical turkey broiler house contains approximately 10,000 birds at any one time.

This typical practice of having no more than 650,000 birds on a single property or contiguous properties is for biosecurity purposes. Although the farms that make up a ranch may be operated as a single facility all using the same equipment, personnel, and operators and having a single owner, if the farms are not on contiguous properties they will each be considered a separate agricultural source based on the definition of a single agricultural source in CH&SC Sections 39011.5(a) and 39011.5(a)(1). Therefore, the majority of the existing poultry operations are expected to be below the thresholds established for control requirements.

In the United States, approximately 61% of the chicken layer houses and a majority of the breeder and broiler houses use power ventilation instead of natural ventilation. The most common type of power ventilation is tunnel ventilation. In tunnel-ventilated houses, all the fans are clustered at one end of the house and the fans push the air to the other end of the house. Curtains on the houses may be used on a non-routine basis for ventilation, particularly during colder weather.

Studies indicate that most chicken layer houses produce approximately two cubic yards of waste per week per five hundred chickens. Although a small amount of liquid waste may occur from egg washing operations located on the facility and a small amount of bedding may be collected as waste, poultry excretions account for a majority of the waste. Typically, hens are confined in a layer house that consists of many layer boxes positioned above the ground. On average, every seven (7) to nine (9) days workers remove waste from under the layer boxes, and every fourteen (14) to eighteen (18) weeks workers remove waste from the floor of the layer houses. However, many facilities list less frequent waste removal, ranging from one (1) to three (3) times per year (every 17-52 weeks) as a control technique used to comply with District Rule 4550 Conservation Management Plan (CMP). Several mitigation measures in Proposed Rule 4570 and Rule 4550 that the owners/operators could choose do not affect waste removal frequency. Therefore, owners/operators can comply with both Rule 4550 and 4570.

In broiler facilities, complete litter removal from the house occurs one (1) to four (4) times per year. Litter removal frequencies vary from every two (2) to seven (7) flocks (approximately 90-315 days); more commonly, it is removed every third flock. Before introducing a new flock, the house is left empty, typically for five (5) days. During this interlude, the operator adjusts the temperature and other ambient conditions in the house. In the broiler industry, the new flocks of birds are brought into the houses as chicks and are raised for approximately 45 days, until they reach the desired weight. Shortly thereafter, the grown birds are removed and the house is again left empty for approximately five (5) days to sanitize. This approximately 55-day cycle is the production period for one flock. Depending on management practices, litter production ranges from 0.5 to 0.7 pounds per pound of live bird weight. On average, for each pound of live weight gained, meat birds produced 0.52 pounds of litter during the production period.

Poultry excretions and bedding materials, such as rice hulls, are removed either by scraping or by flushing. In a scrape system, the litter is either swept or scraped from the house into a pile or piles outside the house. Typically, concerns about transmitting diseases among birds and flocks necessitate trucking the scraped litter offsite shortly after removal. The liquid handling system is similar to dairy flush systems, explained later in this report. However, less than 15% of the poultry operations in the San Joaquin Valley use liquid manure handling systems.

Based on current preliminary research data, litter and feed are the major sources of VOC emissions. These emission points are also sources of ammonia emissions. Since ammonia forms a significant health risk to the animals and decreases productivity, many facilities implement controls for ammonia. The humidity, litter additive, moisture, and ventilation controls widely used to control ammonia also constitute BARCT for VOC emissions. Based on industry comments, staff believes that the majority of poultry facilities in the SJVAB already implement BARCT for VOC emissions. Furthermore, the studies conducted to determine emissions factors for poultry were on poultry houses that had implemented BARCT, thus the baseline for poultry emissions includes BARCT.

B. Dairy Operations

For this description, dairy operations are defined as those operations producing milk or animals for facilities that produce milk. In order to produce milk, the cows must be bred and give birth. Typically, the gestation period for dairy cattle is nine (9) months and dairy cows are bred again approximately four (4) months after calving. Milk production typically peaks shortly after calving and then declines. Commonly a cow will produce milk for ten (10) to twelve (12) months and then be dry approximately two (2) months. Thus, a dairy operation may have several types of animal groups present including heifers, lactating cows, dry cows, calves, and bulls (for breeding purposes). Approximately 25% of a milking herd is replaced each year, but replacement levels can be as high as 40% for intensively managed herds (EPA 2001).

Calves are typically housed in individual pens or hutches. Older animals are typically housed in freestall barns, dry lots, tie stalls/stanchions, or any combination of the aforementioned. The freestall barn is the predominate type of housing system used on dairy farms for lactating cows. In a freestall barn, cows are housed in large pens with free access to feed bunks, waterers, and stalls for resting. Standard freestall barns have a feed alley in the center of the barn separating two feed bunks on each side. Animals stand on the corral side of the feed lane to eat; this is where the majority of the animal excretion occurs. In some cases, cows may be confined in or have access to drylots. Drylots are typically fenced in areas that may have shade. Drylot confinements are similar to beef feedlots described later in this report. Tie stalls/stanchions are not uncommon on smaller dairy farms and older facilities. In this type of housing system, cows are confined in a stall for feeding, but have access to a dry lot or pasture for exercise. A mechanically or manually cleaned gutter is located behind each row of stalls for manure collection and removal.

Feeding and watering practices vary for each animal type. In general, calves are nursed for four (4) to five (5) days after birth. Calves are then fed a milk replacement until weaning, which generally occurs at about eight (8) weeks of age. During this period, a feed grain based starter diet is introduced. This starter diet is fed to calves until they are approximately three (3) months old. At approximately three (3) months, calf rumen development allows a shift to a roughage-based diet.

Older cattle and calves being raised for milk production are commonly fed a roughage-based diet. The principal constituents of these diets are corn or grain sorghum silage and legume or grass and legume hays with feed grains and byproduct foodstuff added in varying amounts to satisfy energy, protein, and other nutrient requirements. The manure tends to be generated in a semi-solid state.

Manure with a total solid content of 10% or less can be handled as a liquid. In slurry or liquid systems, the manure is flushed from alleys or pits to a storage facility. Typically, effluent from the solid separation system or supernatant from a pond or an anaerobic lagoon is used as flush water in animal housing. The supernatant is the clear liquid in the lagoon that is overlying the solids that settle below. Dairy manure that is handled and stored as a slurry or liquid may be mixed with dry manure. Liquid systems are common in large dairies due to their lower labor costs and ease of use with automatic flushing systems. Manure handled as solids can be removed by mechanized scraping systems, a tractor, or a chain scraper. Typically, the solid manure scraped is stock piled and dried for disposal through land application.

C. General Description for Beef Cattle Feeding Operations

This animal sector includes adult beef cattle (heifers and steers). Beef may spend all, part, or none of their lives on a CAF. There are three types of operations in the beef industry: cow-calf operations, backgrounding operations, and finishing operations. These operations are typically conducted at separate locations that specialize in each phase of production, but may occur at a single location.

Cow-calf operations are a source of heifers and steers fed for slaughter. These animals are fed primarily hay with some grain and other foodstuff. Backgrounding or stocker operations prepare weaned calves for finishing. The backgrounding process is highly dependent on feed prices. Typically the animals are fed the lowest priced feed at the time, which may be forages or crop residues, with the objective of building muscle and bone mass at a low cost. The duration of the backgrounding process may be from thirty

(30) days to six (6) months old. Typically, high grain prices favor longer periods of backgrounding by reducing feed costs for finishing or fattening. After approximately 150 to180 days, animals in finishing operations will reach slaughter weights of 1,050 to 1,250 pounds. Although, some feedlots start with younger or older cattle and the finishing cycle may be less than 100 days or over 270 days. Accordingly, feedlots typically have between 1.5 to 3.5 cattle turnovers per year.

In any case, animals are typically segregated by production stage in pens with feed truck access. The animals are typically fed two (2) to three (3) times per day using feed bunks located along feed alleys that separate the individual pens.

For these types of operations, the manure is commonly handled as a solid. Solid manure is typically scraped or moved by tractors to stockpiles. Manure accumulates in areas around feed bunks and water troughs most rapidly, thus these areas may need to be cleaned during the finisher cycle. However, there is significant concern and risks associated with entering areas where beef cattle are housed.

D. General Description for Swine Operations

The production cycle for hogs has three (3) phases: farrowing, nursing, and finishing. The first phase begins with breeding and gestation over a 114-day period followed by farrowing (giving birth). After farrowing, the newly born pigs or piglets normally are nursed for a period of three (3) to four (4) weeks until they reach a weight of approximately ten (10) to fifteen (15) pounds. Typically, there are from nine (9) to eleven (11) pigs per litter. Sows can be bred again within a week after a litter is weaned. Sows normally produce five (5) to six (6) litters before they are sold for slaughter at a weight of 400 to 460 pounds.

Weaned pigs are fed a starter ration until they reach a weight of approximately fifty (50) to sixty (60) pounds. At this point, they are typically eight (8) to ten (10) weeks of age. Then the animals are fed a growing and finally a finishing ration until they are approximately 240 to 280 pounds at which point they are approximately 26 weeks of age and ready for slaughter. The diet varies, but it typically includes small grains such as wheat and barley, corn and soybean meal.

The animals are typically housed in confinement buildings that are either totally enclosed or open-sided with curtains. Totally enclosed facilities are mechanically ventilated throughout the year. Open-sided buildings are naturally ventilated the majority of the year, but may be mechanically ventilated when the curtains are closed due to weather conditions. Manure may be flushed from the floor of the housing or fall through slats in the floor to a pit underneath the floor. Manure in the pit may be flushed or scraped.

E. Land Application of Animal Waste

Liquid manure from flush systems stored in lagoons or solid manure scraped from facilities eventually may be land applied with or without prior treatment such as composting or anaerobic digestion. Typically, animal waste is applied to cropland at rates adequate to supply crop nutrient needs. Historically the determination of application rates has been based on crop nitrogen requirements due to concern about the impact of excess nitrogen on surface and ground water. In cases where treatment methods, such as aerobic digestion, increase the nitrogen content in the waste stream, the waste may need to be applied over a greater number of acres in order to comply with the Regional Water Quality Board's regulations.

Surface application of manure waste may be done with a spreading device known as a box manure spreader. This is simply a rectangular box that is either tractor drawn or truck mounted with a spreading device at the rear end. During spreading, the manure moves to the rear of the box by either a belt or chain-and flight conveyor. Box type spreaders are typically loaded with tractor mounted front-end loaders. Manure handled as slurry or liquid may be spread with a tractor drawn or truck mounted tank known as a liquid manure spreader. The manure may be forced out of the tank under pressure against a distribution plate to create a spray pattern. Another option is to force the manure from the tank under pressure through a manifold with a series of hanging or trailing pipes to create parallel strips of manure on the soil surface. A second type of spreader for manure slurries is a flail spreader. This is a partially open tank with chains attached to a rotating shaft positioned parallel to the direction of travel. Manure is discharged perpendicular to the direction of travel by the momentum transferred from rotating chains.

Manure may be land applied and land incorporated through the use of a manure injection device, typically attached to a tractor; tilling surface applied manure under the soil; applying liquid manure at such a rate that is rapidly absorbed into the soil; or another method in which the manure is covered with soil.

Facilities choosing to use conservation tillage options will likely apply any liquid manure at a rate such that it is rapidly absorbed into the soil and apply any solid manure only after it has been treated with an anaerobic digestion process, treated with an aerobic digestion process, or dried to a moisture content of less than 50%. In any of these cases the animal waste land applied would not need to be tilled under the soil in order to comply with rule requirements. Similarly, such methods may be used when crop height prevents the owner/operator from tilling the land-applied waste.

F. Emission Characterization

Current research suggests that general sources of VOC on CAF may include: enteric (i.e. eructation and respiration), bedding, excreta, and feed. (Schmidt, 2004) In excreta, the majority of the non-methane volatile organic compounds (NMVOC) originate from the decomposition of undigested protein (Hobbs 2004). Sources of VOC from excreta include animal housing, yards, manure storage areas, land spreading, solid separator piles, and lagoons.

The District extensively reviewed current research in the APCO reports available at: http://www.valleyair.org/busind/pto/dpag/dpag_idx.htm

The District identified the following emission categories:

- Category 1- Feed and Enteric from an Environmental Chamber: Several VOC including aromatics and ethanol were not measured. Ethanol was the main VOC found in feed in Dr. Chuck Schmidt's study;

- Category 2- Ethylamines from Specific Dairy Processes: Does not include emissions from several processes, including feed storage, land application, and composting;

- Category 3- VOC from Miscellaneous Dairy Processes: Several VOC including methanol were not measured and several important processes including feed storage, land application, and composting were not included;

- Category 4- VOC from Lagoons and Storage Ponds: Several VOC including aromatics and ethanol were not measured;

- Category 5- Volatile Fatty Acids: Used low range estimates and minimums for several VFA calculations so it may underestimate the VFAs at dairies;

- Category 6- Phenols from Dairy Processes: Not included because no information regarding the relationship between phenol formation and diet and process conditions was provided to the APCO; and

- Category 7- Land Application, Feed Storage, Settling Basins, Composting, and Manure Disturbance: Not included due to limited data on the VOC emissions at these sources.

The emission categories listed above contribute to emissions in the following emission sources (locations) on a CAF are:

- Feed,
- Housing,
- Land Application (if applicable),
- Milking Center (if applicable),
- Liquid Waste Handling Systems (if applicable), and
- Solid Waste Handling Systems (if applicable).

Not every facility has all of the above emission sources due to differences in operating and farming practices.

G. Emission Factors

To calculate source emissions, reductions, and cost effectiveness of control measures, staff required emission factors. The emission reduction calculations are performed using the most recent emission factors accepted by the District at the time of the calculation.

Emission factors come from a variety of sources:

- The emission factor for swine, rabbits, horses, sheep, and goats are based on a metabolism study conducted in 1938 by Benedict and Ritzman. This study measured methane in animals including an elephant, a horse, seven (7) Holsteins, four (4) Jerseys, and a Hereford cow. This study and the subsequent research papers based on it remain the most currently published and reviewed source of emission factors for several species. Several most recent articles have reported different emissions from these operations and emission sources. However, those emission factors tend to be inconsistent, possibly due to variation between facilities, and are not complete. Staff was unable to locate comparable emission factor data that addressed all emission sources on these facilities. Therefore, the Ritzman study and Ritzman-based studies are currently considered the most complete, published, and peer reviewed source of emission factors for these facilities. Additionally they are the factors listed in the ARB October 2003 interim proposed report on emission factors.

- The remaining emission factors are those currently used by the District's Permit Services for permitting purposes. Those factors are based on the 2005 California Department of Food and Agriculture and Foster Farms source test of a chicken broiler facility; information from the Dairy Permitting Advisory Group (DPAG) (see www.valleyair.org/busind/pto/dpag/dpag_idx.htm for details); and ASAE manure production equivalents.

Table 4 details the emission factors, based on these sources, which will be used for calculation purposes. As noted previously, the emission factors may be revised in the permitting process to reflect the latest approved research information.

Table 4: Emission Factors (as of 4-26-06)	
Animal Type	**VOC Emission Factor** (lb/hd-yr)
Milking Cow	19.3 to 21.7*
Dry Cow	11.9
Heifer (15-24 months)	8.3
Heifer (7-14 months)	7.2
Heifer (4-6 months)	6.6
Calf (under 4 months)	6.2
Feedlot Cattle	11.1
Laying Hens and Associated Birds	0.05
Broiler Chickens and Associated Birds	0.025
Turkeys and Associated Birds	0.10
Swine	4.6
Rabbits	0.19
Horses	6.7
Goats and Sheep	0.96

* The emission factor for lactating cows varies based on the type of housing. Cows in a complete flush dairy with no freestalls have an emission factor of 19.3 lb/hd-yr and cows in a complete flush dairy with freestalls have an emission factor of 21.7 lb/hd-yr. On the website the 21.0 lb/hd-yr value is listed because it is the weighted average of the number of animals in facilities with freestalls (71%) and the number of animals in facilities without freestalls (29%). Specifically, the calculation is: 21.7 x 71% + 19.3 x 29% = weighted emission factor = 21.0 lb/hd-yr.

H. Animal Inventory and Emissions

Staff utilized the 2002 USDA census, industry data, and California Air Resources Board documents to estimate the VOC's emitted by CAFs in the SJVAB. The methodology is further explained below; Table 5 summarizes the results.

Table 5: Total 2005 VOC Emissions from CAFs in the SJVAB				
	Total VOC Emitted by CAFs (lb/yr)	Total VOC Emitted by CAFs (tons/day)	Total VOC Emitted by Large CAFs (lb/yr)	Total VOC Emitted by Large CAFs (tons/day)
Milk Cows	37,432,525	51.28	26,951,418	36.92
Beef Cattle	2,042,955	2.80	1,940,807	2.66
Other Cattle	11,355,375	15.56	10,795,230	14.79
Poultry	2,583,221	3.54	1,574,625	2.16
Swine	729,266	1.00	414,000	0.57
Other Animals	296,383	0.00	0.00	0.00
Total Animals	54,439,725	74.57	41,676,080	57.09

Dairy

Staff utilized the California Department of Food and Ag (CDFA) report entitled "*California Agricultural Statistics 2004*." The numbers are shown in Table 6. These numbers only include milking and dry cows, not heifers that have not calved or calves.

Table 6: Number of Milk and Dry Cows (CDFA Data 2004)				
County	2002	2003	2004	Projected 2005*
Fresno	86,115	90,345	95,577	99,878
Kern	85,830	98,478	121,147	126,599
Kings	146,545	153,475	162,656	169,976
Madera	49,899	57,099	63,934	66,811
Merced	224,895	224,734	237,854	248,557
San Joaquin	99,828	106,162	103,619	108,282
Stanislaus	164,558	177,432	178,420	186,449
Tulare	424,643	437,476	442,853	462,781
Total	1,282,313	1,345,201	1,406,060	1,469,333

*The growth from 2002 to 2003 was approximately 4.9% and the growth from 2003 to 2004 was 4.5%. In order to be conservative, staff assumed a growth of 4.5% for 2004 to 2005.

In order to estimate the number of support stock at a dairy, ratios were developed using 216 dairy applications submitted to the District. Based on those applications the following ratios, listed in Table 7, were developed. These ratios represent the number of each type of animal.

Table 7: Ratio of Each Type of Dairy Cow to Milkers					
Support Animals to Milkers	Dry Cows to Milkers	Heifers (15-24 mo) to Milkers	Heifers (7-14 mo) to Milkers	Heifers (4-6 mo) to Milkers	Calf (<4 mo) to Milkers
107%	16%	34%	29%	16%	11%

Before the above ratios can be applied to the CDFA milk and dry cow numbers to estimate a total number of head, the number of dry cows needs to be subtracted from the milk and dry cow numbers. Based on the ratios above, 16% of cows are dry cows when compared to milk cows, therefore the calculations would be as shown in the example below:

1,469,333/1.16 = 1,266,666 milk cows
1,266,666 x 0.16= 202,667 dry cows
1,266,666 x 0.11 = 139,333 calves

Now we can use the ratios in Table 7 to estimate all the other types of cows at a dairy.

Staff assumed, based on the ARB's June 23, 2005 Staff Report for Confined Animal Facilities page iii, that 72% of the dairy cows would be included in this regulation.

Furthermore, since the APCO Report noted that the 19.3 lb/hd-yr factor did not consider all emission sources and that the majority of facilities have freestalls, in order to be conservative, Staff utilized the weighted emission factor of 21.0 lb/hd-yr listed on the District's web page for dairies.

Table 8: Total 2005 Dairy Animals in SJVAB						
	Total Animals	VOC Factor (lb/hd/yr) from Table 4	Total VOC Emissions (lb/yr)	Animal Included In Rule	VOC Factor (lb/hd/yr)	Total VOC from Animals Included in Rule (lb/yr)
Milk Cows	1,266,666	21.00	26,599,994	912,000	21.00	19,151,996
Dry Cows	202,667	11.90	2,411,733	145,920	11.90	1,736,448
Heifers (15-24)	430,667	8.30	3,574,533	310,080	8.30	2,573,663
Heifers (7-14)	367,333	7.20	2,644,799	264,480	7.20	1,904,256
Heifers (3-6)	202,667	6.60	1,337,600	145,920	6.60	963,072
Calves	139,333	6.20	863,866	100,320	6.20	621,984
Total Cows	2,609,333		37,432,525	1,878,720		26,951,418

Beef and Other Cattle

The following table includes other cattle facilities in the San Joaquin Valley, from a USDA California Agricultural Statistics 2004 Report and beef on feedlots from the California Farm Bureau Federation. Staff assumed, based on the ARB's June 23, 2005

Staff Report for Confined Animal Facilities page 8, that 95% of the beef cattle and other cattle would be included in this regulation. This is based on the assumption that a similar number of beef and other cattle would be included in this rule as feedlot cattle listed in the ARB Staff Report.

Furthermore, staff assumed that there were equal numbers of each type of heifers and calves at the other cattle facilities therefore, averaged the emission factors for heifers and calves in order to obtain the emission factor for other cattle. This was used to develop Table 9.

Table 9: Total 2005 Beef and Other Cattle

	Total Animals	VOC Factor (lb/hd/yr) from Table 4	Total VOC Emissions (lb/yr)	Animal Included In Rule	VOC Factor (lb/hd/yr)	Total VOC from Animals Included in Rule (lb/yr)
Total Beef	184,050	11.10	2,042,955	174,848	11.10	1,940,807
Total Other Cattle	1,605,000	7.08	11,355,375	1,524,750	7.08	10,795,230
Total	1,789,050		13,398,330	1,699,598		12,736,037

Poultry and Other Animals

Staff obtained an estimate of the number of layers in the SJVAB from the USDA census data. Since the ARB Proposed Emission Methodology assumed no significant growth for layers, staff assumed that the layer population has been relatively constant since 2002. Based on ARB June 23, 2005 Public Hearing to Consider the Adoption of a Regulation Establishing a Definition of BACT, staff assumed that 62% of the layers are housed in large CAFs.

Staff obtained estimates of the number of broilers and turkeys in the SJVAB from the California Poultry Federation. Based on this information, staff determined the number of turkeys and broilers housed in large CAFs.

Table 10: Total 2005 Poultry Animals

	Total Animals	VOC Factor (lb/hd/yr) from Table 4	Total VOC Emissions (lb/yr)	Animal Included In Rule	VOC Factor (lb/hd/yr)	Total VOC from Animals Included in Rule (lb/yr)
Layers	11,717,799	0.050	585,890	7,265,035	0.050	363,252
Broilers	47,608,059	0.025	1,190,201	29,540,054	0.025	738,501
Turkeys	8,071,297	0.100	807,130	4,728,720	0.100	472,872
Total	67,397,155		2,583,221	41,533,809		1,574,625

Staff obtained an estimate of the number of rabbits, goats, sheet, and swine in the SJVAB from the USDA census data. Since ARB Proposed Emission Methodology assumed no significant growth for non-cattle, staff assumed that the non-cattle population has been relatively constant since 2002. Based on the District's permit database, staff found that approximately 90,000 swine are housed in large CAFs and no rabbits, goats, or sheep in the SJVAB are housed in large CAFs. This is illustrated in Table 11.

Table 11: Total 2005 Other Animals

	Total Animals	VOC Factor (lb/hd/yr) from Table 4	Total VOC Emissions (lb/yr)	Animal Included In Rule	VOC Factor (lb/hd/yr)	Total VOC from Animals Included in Rule (lb/yr)
Rabbits	3,903	0.190	742	-	0.190	-
Goats	34,160	0.960	32,794	-	0.960	-
Sheep	273,800	0.960	262,848	-	0.960	-
Swine	158,536	4.600	729,266	90,000	4.600	414,000
Total	470,399		1,025,649	90,000		414,000

I. Industry Description

The SCAQMD's dairy rule includes all facilities with 50 cows of any type, but the average dairy in SJVAB is over twice the size of dairies in the SCAQMD. Furthermore, the majority of the dairies in the SCAQMD are scrape dairies, many of which transport their manure off the dairy and into the SJVAB. In 2003, according to the Santa Anna Regional Water Quality Board, over 157,400 tons of manure was shipped from the Chino Basin to the SJVAB. Many of the SJVAB dairies use a flush waste control system instead of scrape waste removal system. Furthermore, dairies in the SJVAB do not typically ship manure out of the Valley but efficiently reuse their manure and flush water on adjacent or nearby crops. Therefore, staff does not believe the SCAQMD dairy operations are comparable to the SJVAB dairy operations.

In terms of size of facilities, a significant number of CAFs would be below the proposed Rule 4570 applicability thresholds. Information from the California Poultry Federation, District's permit database, and CDFA estimates and surveys was used to identify all other facilities that would likely be required to implement practices that they do not already utilize. Please note that a significant number of CAF already utilize enough mitigation options listed in the rule to comply with the rule requirements. Staff estimated the number of swine facilities affected by using 2002 USDA census data. By subtracting the maximum and minimum number of swine in facilities with fewer than 1,000 head from the total number of swine in each county, staff estimated the number of swine facilities that would be affected. This is summarized in Table 12.

Table 12
Estimated Number of Facilities Affected by the Rule

Animal Type	Number of Large CAFs	Number of Facilities That Will Likely Be Implementing New Practices
Dairy	430	233
Beef Feedlots	<16	6
Other Cattle Operations	<16	5
Swine	1 to 3	1 to 3
Poultry	<61	0

J. Source Growth

Overall, the livestock inventory in the SJVAB increased between 2 and 6% per year over the last 12 years. A significant portion of this growth is due to increases in the number of milk cattle. According to the USDA 2002 Census data and California Department of Food and Agriculture (CDFA) Statistics Annual from 1998 and 2002, the inventory of milk cattle in the SJVAB increased over 30% from 1997 to 2002. Local county agricultural reports show that the inventory of milk cows increased 2 to 4% between 2002 and 2003. In contrast, USDA census data indicate relatively stable or decreasing populations of beef cattle, hog, layer and broiler chicken, turkey, ducks, and geese from 1997 to 2002. Based on CEQA projects submitted to the District, the inventory of dairy cattle in the SJVAB would increase over 25% in the next three years, if all the proposed projects were completed. Although it should be noted that some of the CEQA projects may not be completed. Therefore, staff assumed a conservative 4.5% growth for the dairy industry based on historical data from CDFA.

III. EMISSION CONTROL TECHNOLOGY

This section summarizes the requirements for control and the possible control techniques for reducing air emissions from CAFs. The information assembled was obtained through a review of available literature and research. The goal of the literature review was to identify possible controls. Some of these controls do not appear in the rule as mitigation measures or on any list due to a lack of scientific data regarding VOC reductions. However, they are identified in this report to provide owners/operators with ideas of some mitigation measures that have been proposed as potential mitigation measures and, with further information, may be approved as alternative mitigation measures.

A. Technology Requirements

Best Available Control Technology (BACT) as a New Source Review Requirement

With the changes to the CH&SC and the resulting loss of exemption from permitting of agricultural sources of air pollution (CH&SC 39011.5 (b)), **new or expanded** CAFs may now be required to undergo the BACT process as a requirement under New Source Review (NSR). District Rule 2201 (New and Modified Stationary Source Review Rule) implements state and federal requirements under Title I, Part D and requires BACT for new sources or sources undergoing modification with emission increases that are above the de minimis value (two (2) pounds per day of VOC). BACT provisions would apply to sources which are subject to District permitting requirements and that emit or may emit one or more affected pollutant, either as a "major" source subject to Title V permitting or as a source with actual emissions which are 50% or more of any major source thresholds.

Beginning July 1, 2004, large CAFs, as defined by the ARB, and CAFs with emissions that reach or exceed 50% of the major source threshold were required to obtain permits. The existing sources that apply and receive permits are not reviewed as "new" sources, but rather as sources with a "loss of exemption." This means that BACT is not required, but the source may be subject to emission reduction requirements under other local prohibitory rules, which are local rules other than permitting rules.

Best Available Retrofit Control Technology (BARCT) Requirement for Large CAF

As mentioned previously, CAFs defined as "large" by the ARB will be required by Proposed Rule 4570 to submit emission mitigation plans. The level of mitigation required by the CH&SC is BARCT. This term characterizes a standard of emissions control for **existing**, traditional sources. Under federal air pollution programs for traditional sources, different levels of control are expected of new sources (best available) and existing sources (reasonably available), with the understanding that there are more options available at a more reasonable cost when a source is being designed, than there are after it is built, especially if it was built a long time ago. California law established an intermediate level of control that is the "best available" for "retrofit" to existing sources, recognizing that the state's air pollution problems may demand more effective pollution control than what is usually considered "reasonably available." Local air districts have adopted many rules to implement BARCT, including particulate control efficiency standards and limitations on exhaust pollutants and technology-based requirements that dictate the use of a particular control device or something that is equally effective.

BACT vs. BARCT

As discussed above, the purposes of BACT and BARCT are different. BACT is designed to **minimize the growth** in future stationary source emissions; BARCT is designed to **reduce** current stationary source emissions. BACT is utilized in the permitting process on a case-by-case basis. BARCT is considered for application on an industry-wide basis in the rule development process.

B. Feed and Silage Mitigation Measures

Feed According to National Research Council Guidelines

Dietary manipulation of feed formulations, a practice commonly used to improve animal health and productivity, has been shown to reduce VOC emissions from cow flatulence (enteric) and manure. Emission reductions of at least 10% for ammonia, hydrogen sulfide, and VOC were found (Klaunser, 1998 J Prod Agric). However, studies regarding efficiency of dietary manipulation to reduce VOC conflict. This may be due to variations in feed formulations. Staff is considering the National Research Council's (NRC) recommendations regarding the nutrient requirement for different animals as an appropriate feed formulation to minimize VOC emissions from cow flatulence (enteric) and manure, while ensuring that animal health is not jeopardized. The National Research Council considered environmental, animal productivity, animal health, and energy concerns in developing their guidance for nutrient requirements for animals. The guidance is located in the following publications:

- *Nutrient Requirements of Beef Cattle, 2000;*
- *Nutrient Requirements of Dairy Cattle, 2001;*
- *Nutrient Requirements of Goats: Angora, Dairy, and Meat Goats in Temperate & Tropical Countries, 1991*;
- *Nutrient Requirements of Horses, 1989;*
- *Nutrient Requirements of Poultry, 1994;*
- *Nutrient Requirements of Rabbits, 1977;*
- *Nutrient Requirements of Sheep, 1985;* and
- *Nutrient Requirements of Swine, 1998.*

As of May 19, 2005 these documents were available for purchase through links at: http://www.nap.edu/category.html?id=ag

Feeding Corn

In the Proceeding of the Symposium on the State of the Science: Animal and Waste Management Jan. 2005 S.L. Archibeque et al presented a presentation titled "Feeding High Moisture Corn Instead of Dry Rolled Corn Reduces Odor Production in Finishing Beef Cattle Manure Without Sacrificing Performance". This study found that cattle fed high moisture corn instead of dry rolled corn excreted less starch in their manure (starch ferments to form volatile fatty acids which are a volatile organic compound) and less volatile fatty acids in their manure. Additionally, in the Journal of Dairy Science 87:2546-2553 article "The Effect of Steam Flaked or Dry Ground Corn and Supplemental Phytic Acid on Nitrogen Partitioning in Lactating Cows and Ammonia

Emissions from Manure" by Burkholder et al found less starch in the manure of cattle fed steam flaked corn than dry ground corn.

Feed Removal

Research conducted by Dr. Chuck Schmidt at dairies within the SJVAB suggested significant emissions from feed in the feed lane. Therefore, regular cleaning of feed from all areas of the facility are considered control measures. This is because by limiting the quantity of time that the feed is onsite, one limits the quantity of time that the feed may emit VOC. Additionally, it minimizes the amount of moisture that comes in contact with the feed. Since the microorganisms that breakdown feed in a manner that releases VOC require moisture, by minimizing the moisture one can minimize the microorganism's activity and thus VOC emissions.

Weatherproof Storage and Covers for Silage and Grain

Covering silage and grain may minimize the amount of area exposed to the environment, thus the amount of area from which VOC in the silage can enter the atmosphere. There are various options for covering silage and grain. These include, but are not limited to, silos, tarps, and bags. There are several benefits of utilizing bags to store silage. Because of the low storage height, there is less danger of falls from elevations. Additionally, there is reduced spoiling of silage. However, some of the disadvantages include added cost of approximately $10 per ton of silage based on information found at the following website: http://bse.wisc.edu/hfht/tipsheets_html/silagebag.htm accessed 2/16/06. Covering silage and venting it to a VOC control device is considered beyond BARCT because it has not been achieved in practice at facilities in the United States, although some venders and researchers contend it is feasible. It would be a transfer of technology from the composting industry and require significant capital investment (over $100,000 for materials and installation at a facility with 1,000 cows).

Leachate Management

Leachate from the silage contains water-soluble VOC. By collecting this and sending it to a treatment system, such as an anaerobic digestion lagoon, the owner/operator minimizes the opportunity for the water in the leachate to evaporate and the VOC to be emitted into the atmosphere.

Eliminate Silage

Since fermenting processes, such as the process used to produce silage, emit VOC, substituting fermented feed (silage) for unfermented feed (grain) would reduce VOC emissions. However, due to feed availability and cost, this is considered extremely difficult for facilities to implement. This is primarily due to the Regional Water Quality Board requirements for land application of animal waste in a manner that minimizes or prevents nitrates and nitrites from entering ground water. One common method to do this is planting silage crops, which take in significant quantities of nitrogen, such as corn. Therefore, staff believes that implementing this measure would result in significant increase in waste treatment costs (over $100,000 for a facility with 1,000 cows), such as installation of a denitrification system for animal waste; purchase of additional land; or transport of animal waste offsite.

Swine and Poultry Options

Research at the University of Mississippi State University and the International Journal of Poultry Science 2(5):313-317, 2003 article titled "Reduction of Broiler House Malodor by Direct Feeding of a Lactobacilli Containing Probiotic" by Chang et al suggested that feeding broilers lactobacilli containing probiotic reduced VOC emissions from the broiler house. The District's most recent BACT analysis for broiler facilities noted that feeding the poultry lactobacilli containing probiotics likely reduces VOC emissions from poultry. Addition of enzymes, such as those from yucca and soybeans also may reduce VOC emissions by increasing the animal's absorption or digestion of nutrients thereby reducing the quantity of protein and volatile fatty acids excreted in the manure and litter.

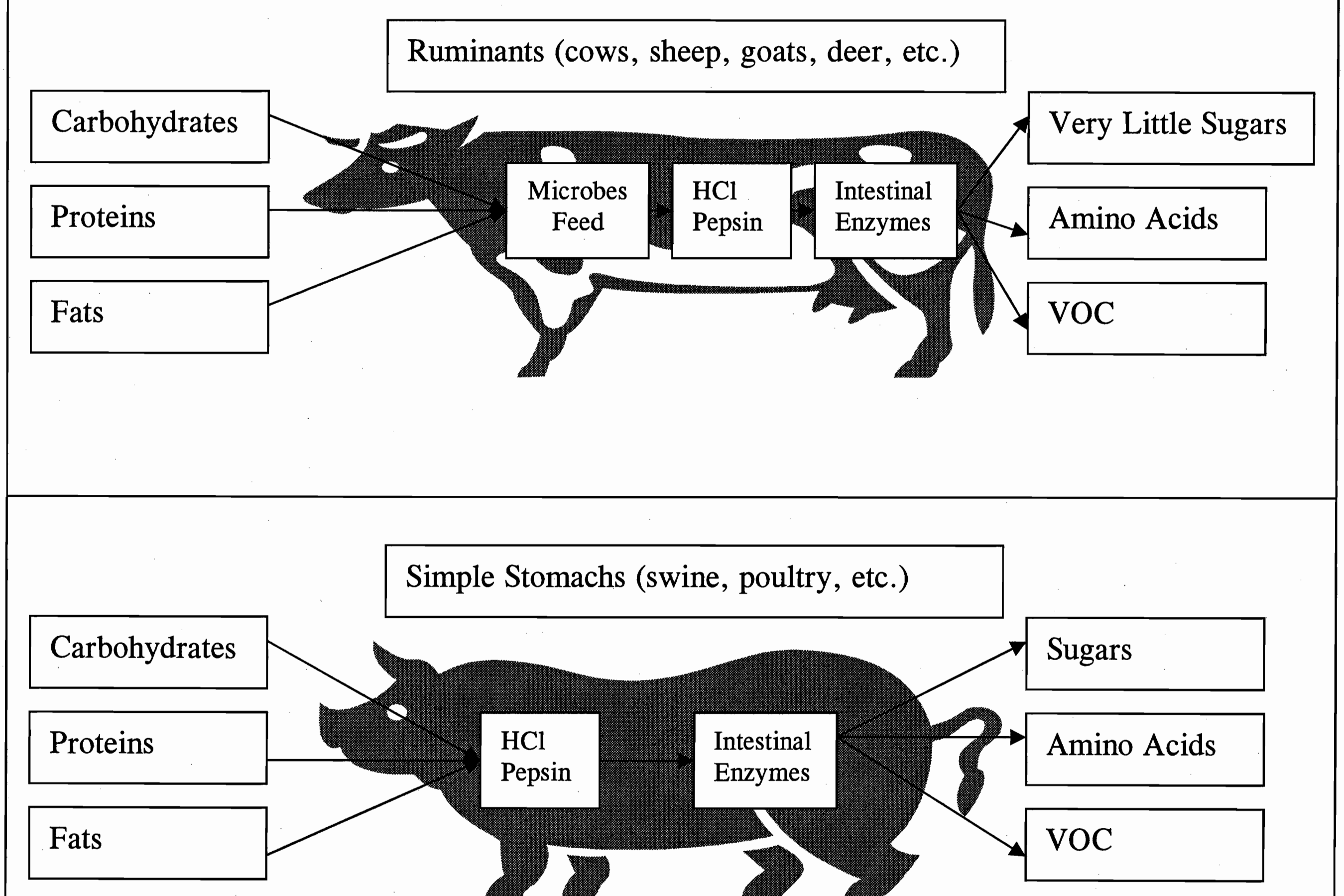
Information notes that poultry feed additives may be used to reduce the feed decomposition or oxidation in poultry feed, thus rate of VOC emissions.

Feed additives that improve digestion efficiency have been studied on swine and poultry already being fed according to NRC guidelines for protein and nitrogen. In swine, research at the University of Purdue demonstrated that the addition of 5% cellulose in feed formulation reduced VOC emissions by 11%. The study reported no adverse health effects from the addition of this quantity of cellulose (Sutton 1998). The study also noted reduction in VOC emissions with the addition of 10-ppm anthraquinone, and use of reduced protein diets with supplemented amino acids. In swine, the Journal of Animal Science 2003 Volume 81:1754-1763 article "Ammonia, volatile fatty acids, phenolics, and odor offensiveness in manure from growing pigs fed diets reduced in protein by Otto et. al; Purdue 1998 Swine Day Report titled "Addition of Carbohydrates to Low Crude Protein Pig Diets to Reduce Manure Nitrogen Excretion and Odors" by Sutton et al; and Purdue 2000 Swine Day Report titled "Reduction of Odorous Sulfide and Phenolic Compounds in Pig Manure Through Diet Modification" by Hankins et al found the following feed measures reduced volatile fatty acids in swine manure:

- Feeding probiotics;
- Feeding at least 5% cellulose in the diet;
- Feeding a casein based diet;
- Feeding an amino acid supplemented diet with 2% sucrose thermal oligosaccharide caramel;
- Feeding a diet with no more than 10% crude protein with supplemented lysine, threonine, tryptophan, and methionine; and
- Feeling animals 10 ppm anthraquinone.

Since swine and chickens have a different digestive system and nutrient requirements from cattle, poultry and other animals, staff was unable to determine whether or not these feeding strategies would reduce VOC emissions from other types of animals. See Figure 1 for a brief explanation of the difference between a ruminant (e.g. cow) stomach and a simple stomach (e.g. swine and chickens).

Figure 1: Ruminants versus Simple Stomach Animals



Source: Rumen Microbiology and Its Role in Ruminant Nutrition by Dr. James Russell.

However, owners/operators of non-swine operations may utilize these options for their operation if they satisfy the requirements for utilizing these as alternative mitigation measures.

Alternative Mitigation Measures

The following mitigation measures have been proposed and many are being researched as potential VOC mitigation measures. However, at the time of this report, there was insufficient data for staff to determine that the measures would result in volatile organic compound (VOC) emission reductions and not cause harm to animals. Stakeholders may utilize these methods to comply with rule requirements if they could demonstrate, to the satisfaction of the ARB, APCO, and EPA that the measure achieves VOC reductions that are equal to or exceed the reductions that would be achieved by other mitigation measures listed in the rule that the owner/operator could have chosen.

1. Manage silage piles in a manner that minimizes exposed surface area (this was removed from the list because staff was unable to locate appropriate standards for these practices);
2. Feeding high moisture or steam flaked corn instead of dry corn to swine;
3. Feeding high moisture feeds other than corn, instead of dry feed;
4. Feeding a diet containing probiotics to animals other than swine and poultry;
5. Feeding a diet supplemented with amino acids to animals other than swine and poultry;
6. Feeding a diet containing at least 5% cellulose to animals other than swine;
7. Feeding a casein based diet to animals other than swine;
8. Feeding an amino acid diet supplemented with sucrose thermal oligosaccharide caramel to animals other than swine;
9. Feeding a diet with no more than 10% crude protein to animals other than swine;
10. Feeding a diet containing 10 ppm anthraquinone to animals other than swine;
11. Feeding feed additives that reduce feed decomposition for animals other than poultry;
11. Feeding a diet containing liquid instead of solid feed;
12. Feeding a manure acidifier;
13. Feeding high moisture or steam flaked corn to swine;
14. Only feeding silage that has a particle size of 10 to 20 mm;
15. Feeding high moisture grain;
16. Feeding animals elephant grass (also known as Napier grass and Pennisetum) instead of alfalfa hay;
17. Feeding animals bicarbonate;
18. Feeding animals forage instead of grain;
19. Supplementing animal diet with ruminally undegradable fiber;
20. Feeding a diet containing canola meal;
21. Feeding a diet containing sunflower seed;
22. Using silage additives such as sodium diacetate;
23. Using AIV silage;
24. Feeding a non-fiber carbohydrate supply to animals; and
25. Feeding a diet containing supplemental fats.

C. Housing/Animal Waste Mitigation Measures

Rapid Drying, Rapid Removal of Manure, and Moisture Minimization

In housing (including freestalls, pens, corrals, milk parlors, etc) moist conditions lead to anaerobic decomposition of manure. Suppression of emissions of reduced gaseous compounds can be achieved by faster drying of animal waste, minimization of moisture, and increased removal frequency. Increased removal frequency reduces anaerobic decomposition by reducing the amount of manure not exposed to the surface and oxygen; minimizing the moisture in the manure and feed thus minimizes the moisture needed by the microbes that decompose the manure to form VOC; and moving manure and feed from areas with minimal controls to areas with significant controls (such as a treatment lagoon) reduces the quantity of uncontrolled manure and feed emissions.

Elimination of Liquid Manure Handling

Poultry excrete a white solid called uric acid. Ammonia and VOC are emitted as the uric acid breaks down. The microbes needed to degrade the protein in the uric acid require moisture; therefore, moisture reduction is a significant means of reducing uric acid breakdown and thus ammonia and VOC emissions. Hatfield noted that VOC emissions are negligible at poultry scrape facilities, but significant at facilities with liquid handling systems. Therefore, using a solid litter handling system exclusively is considered a control measure.

In most other animals, significant VOC are emitted when the urease in urine mixes with solid excretion. Moisture facilitates this mixing process. The microbes that break down the waste require moisture, thus drying the waste and employing moisture minimization processes minimize the activity of these microbes. Several studies have found that volatile fatty acid emissions from manure increase with moisture. Koziel et al stated in their paper, "Measurements of Volatile Fatty Acids Flux from Cattle Pens in Texas, "[m]easured flux was proportional to manure pH and moisture content" (Texas A&M University Paper #04-A-646-AWMAA). In the paper titled "Strategies to Reduce Manure Emissions," McGinn stated that "[a]dding more than 20 mm of water to manure increased volatile fatty acids emissions over a four-day period. Therefore, solely utilizing a solid manure handling method for housing would reduce VOC.

Non-manure Based Bedding

As mentioned previously, manure breaks down in the presence of moisture to emit VOC. Housing tends to have high humidity and moisture due to misters, animal urination, and animal respiration. By using non-manure based bedding you are minimizing the amount of manure products present in the housing that have the potential to emit VOC. Some types of non-manure based bedding are rice straw, almond hulls, cow waterbeds, and cow mats. Furthermore, you limit the size of separated solid stockpiles, which emit VOC, on the facilities since in non-manure based bedding only a minimal quantity of separated solids is necessary.

Housing Animals in Buildings

One alternative would be to enclose the animal housing and vent the exhausted air to a secondary control device such as a biofilter. Plastic "curtains" similar to those used in poultry houses, in addition to traditional wall material, have been used for enclosures vented to biofilters. Since all the animal waste and enteric emissions in the house would be controlled by venting the exhaust air through a biofilter, management practices requirements including, but not limited to, dietary manipulation, animal waste removal frequency, and animal waste additives may not be necessary to ensure VOC reductions. It may allow owner/operator more flexibility in managing their animals and their manure/litter. It may also result in fewer monitoring, recording, and testing requirements, since management practices inside the building may not be regulated. This option alone may achieve highest VOC reductions of all the management practices proposed combined.

Furthermore, enclosing animals in buildings and venting the buildings to a biofilter may have benefits beyond air emissions. Depending on the ventilation rate through the house animals may breathe fresher and cleaner air since air may be cycled through the enclosure at a faster rate than it would be in a free stall or other housing with minimal or no mechanical ventilation. Dr. Terry Smith at Mississippi State University housed lactating Holsteins in a tunnel ventilated barn with misters and evaporative coolers and found an 1.8-2.7 kg/hd/day increase in milk production and 81% decrease in heat stress occurrences compared to animals housed in free stalls with fans and misters. Additionally, Hauls Dairy in Montana, a 1,100 head facility, found that, by enclosing their milkers, they increased their milk production; decreased their calving interval by over a month; reduced the number of cattle with symptoms of heat stress; and reduced odor at the facility. However, Hauls did note that adequate ventilation is crucial to protecting animal health in the building.

Operations, such as poultry and swine, already typically house animals in enclosures with mechanical ventilation. Therefore, to utilize this control, such facilities would only need to install a VOC control system and increase ventilation rates. Nicolai Pork in Hector, Minnesota; University of Minnesota swine facility and University of North Carolina swine facilities used barn(s) vented to biofilters, which achieve capture and control efficiencies of approximately 80% (this is why an 80% capture and control efficiency was used in the VOC control options). SRC in Urbana-Champaign, Illinois vent their swine-finishing house to a wet scrubber to reduce dust and VOC.

The University of Minnesota Extension publication number BAEU-18 dated March 2004 provides guidance for ventilation rates for dairy cows, chickens, turkeys, and swine housed in buildings. Additionally, it provides guidance for venting the building to a biofilter and configuring the biofilter. Cornell University Dairy Facilities Engineering

Program has an interactive program to assist in designing and estimating the cost of a tunnel ventilated dairy barn. Please refer to the following website for further information: www.prodairyfacilities.cornell.edu/TunnelVent/Final_Report.aspx

However, this would be considered beyond BARCT due to the high cost and the fact that it has not been achieve in practices at facilities similar in size to those defined as large CAFs by the ARB.

Thymol

Thymol is plant oil derived from thyme. This compound was tested by Vincent Varel of the United States Department of Agriculture, Agricultural Research Service. This was applied to the ground at cattle feedlots and swine housing. In multiple studies, thymol showed a reduction in volatile fatty acid (VFA) emissions from manure. Thymol causes the pH of the manure to drop more rapidly, further inhibiting microbial activity and air emissions. In addition to reducing VFA emissions over 50%, it also reduced fecal coliform content in the waste. However, these results were from studies conducted for short period (less than a month) therefore additional data is required to determine the long-term effects of these oils.

Due to the fact it has not been used at facilities similar in size to that defined as large CAFs by the ARB and is very expensive, staff considered this mitigation measure beyond BARCT.

Lime

Lime has been used by several facilities to minimize moisture. However, it is extremely costly and in many cases not feasible due to soil quality and water quality issues. Therefore, it is considered beyond BARCT.

Vacuum Animal Waste and Apply Directly to the Land

While this would minimize emissions by minimizing the moisture in manure and the time that it is stored in an uncontrolled manner, it is considered beyond BARCT due to the high capital costs of vacuum trucks.

Use Shade Structures Designed to NRCS Standards

This would minimize moisture, thus anaerobic decomposition of manure under the shade structures. It would also minimize animal movement, thus the surface area over which manure is excreted and VOC emitted. However, this option is extremely costly, thus considered beyond BARCT.

Alternative Mitigation Measures

The following mitigation measures have been proposed and many are being researched as potential VOC mitigation measures. However, at the time of this report, there was insufficient data for staff to determine that the measures would result in volatile organic compound (VOC) emission reductions and not cause harm to animals. Stakeholders may utilize these methods to comply with rule requirements if they demonstrate, to the satisfaction of the ARB, APCO, and EPA, that the measure achieves VOC reductions that are equal to or exceed the reductions that would be achieved by other mitigation measures listed in the rule that the owner/operator could have chosen.

1. Acidification of manure;
2. Use of manure additives not listed in Proposed Rule 4570;
3. Use of potassium permanganate in manure piles or corral;
4. Use fresh water to clean the freestalls;
5. Use low biochemical oxygen demand water to clean the freestalls;
6. Use environmentally safe cleaning on degreasing products on dairy manure;
7. Pave feedlanes at least 8 feet on the corral side of the fence; and
8. Use of eugenol (may have water quality issues).

D. Solid Manure Handling

Cover or Eliminate Solid Manure Piles During the Wet Season

As noted above, wet manure promotes anaerobic decomposition, which emits significant VOC. Therefore, practices, such as covering piles that minimize exposure to moisture also minimize VOC emissions.

Compost

Current research suggests that aerated static piles (ASPs), in-vessel technology, and within vessel technology (i.e. Ag Bag) with the captured air vented to a secondary control may reduce VOC emissions from the pile by 23-95%. Preliminary data from Schmidt/Card's 2004 ARB Research Symposium presentation suggests that solid storage may account for approximately three (3) percent on the emissions at a facility. Based on this estimate ASPs, in-vessel, and within vessel technologies may reduce emission on a facility by approximately 0.69%-2.85%.

In ASP composting, manure is mixed with other material and formed into piles that are mechanically aerated. There are two common methods of aeration- either the compost pile is formed over a concrete floor with built-in vents to force air through the compost or the pile is formed around pipes attached to a blower that forces air through the pile. Both in-vessel and within vessel systems enclose the compost mix in a bag, vessel, or structure and mechanically aerates the mixture. In all the systems, the captured air is vented to a secondary control device, a device to further reduce VOC emissions, such as a biofilter.

It should be noted that the California Integrated Waste Management Board regulations, including but not limited to California Code of Regulations (CCR) Title 14, Division 7, Chapter 3.1, Articles 1-4, may limit the materials that may be use for composting and/or place additional requirements on the facility depending on the type of material used in composting; origin of material used in composting, quantity of material used; and quantity of compost given away or sold annually.

This is extremely costly and not achieved in practice at large CAFs, thus considered beyond BARCT.

Solid Waste Digesters

Anaerobic digestion has been used on swine and dairy operations for solid and liquid waste handling. Limited preliminary research suggests that when the gas is captured and vented to a secondary control, up to 90% control efficiency of VOC emissions from the waste can be achieved from these technologies. However, these are extremely costly and producers note that they require significant technical skill to operate, thus considered beyond BARCT.

Alternative Mitigation Measures

The following mitigation measures have been proposed and many are being researched as potential VOC mitigation measures. However, at the time of this report, there was insufficient data for staff to determine that the measures would result in volatile organic compound (VOC) emission reductions and not cause harm to animals. Stakeholders may utilize these methods to comply with rule requirements if they demonstrate, to the satisfaction of the ARB, APCO, and EPA, that the measure achieves VOC reductions that are equal to or exceed the reductions that would be achieved by other mitigation measures listed in the rule that the owner/operator could have chosen.

1. Thermal Conversion (Including Combustion and Gasification
   Technologies that burn waste to produce energy or treat waste to produce fuels are classified as "thermal conversion": and include direct combustion (burning with excess air to produce heat), pyrolysis (thermal treatment in the absence of air, resulting in the production of pyrolysis oil and low BTU gas), gasification (thermal treatment at higher temperatures in an oxygen-restricted environment to produce a low to medium BTU gas), and hydrothermal liquefaction (thermal conversion of solids in a liquid stream to oils and char for separation and use as fuel). Many existing thermal conversion technologies are not suitable for raw dairy manure due to the high-energy costs to dry the manure to an acceptable moisture level. Additionally thermal conversion has the potential to create air

emissions, although there are methods of controlling these air emissions. The University of Southern Illinois is testing this potential control option.

2. Windrow Composting with Management Practices
Some stakeholders have suggesting management practices such as controlling the moisture content, carbon to nitrogen content, and porosity of compost piles to minimize VOC emissions from compost piles. As of the date of this report staff was not able to find significant information specifying the appropriate parameters for these measures and demonstrating that these measures would result in VOC emission reductions

E. Solid Separators

Solid separators may be used to reduce loading of the lagoon, extract separated solids for composting and/or bedding, and serve other purposes on the facility. There are two categories of solid separation systems-- source separation systems and delayed separation systems. While solid separation can occur at any point during manure handling and treatment processes, the separation methods used closest to the point of origin (source separation systems) are significantly different than the methods used after the manure has been diluted or stored.

Belt separation is one the most common types of source separation. Conveyor belts are placed beneath the animals, typically under a slatted floor. The belt is concave or positioned at an angle allowing the urine to flow into a gutter and away from the solids dropping onto the belt. The liquids flow down the gutter by gravity and into a collection tank. The manure solids are scraped off the belt and into a separation collection area. Belt systems have been used in poultry operations for about 30 years (van Kempen, 2003), have a life expectancy of eight to ten years, and require minimal maintenance. They have also been used routinely in swine facilities.

The alternative to source separation is delayed separation, separation after the urine and fecal matter have been mixed or diluted with flush water. Gravity, mechanical, and chemical are the main types of solid separation.

Gravity separation, also called passive separation, uses the natural downward force of gravity to separate the liquid from the solids. Solids denser than the liquid settle to the bottom and solids lighter than the liquid form a crust on the top. Liquid is removed by pipes between these two regions or by overflow where the liquid, when it reaches a certain height, simply flows over a small dam into another basin. Gravity systems can be settling channels, settling basins, or settling ponds. All of these systems require additional storage for the separated liquid, as well as periodic removal of the settled solids. Current research suggests a solid removal efficiency of 7% to 65% depending on factors such as the initial quantity of solids in the waste and the retention time.

An alternative to gravity separation is mechanical separation. This relies on a combination of moving parts and gravity to separate manure solids from the waste stream, mostly utilizing the size of the solid particles to achieve separation. While mechanical processes can achieve separation faster than gravity processes, there are tradeoffs, for example, the expense of the power to drive the machinery and the maintenance required of moving gears.

Mechanical systems include sloping stationary screens, vibrating screens, screw presses, drag chain separators, roller presses, and centrifuges. A sloping stationary screen is the most common method of mechanical solid separation. The slurry is deposited at the top edge of the sloping fabric screen where the screen is virtually vertical. As the slurry moves down the slope, free liquid flows through the perforations. The relationship between efficiency and mesh size is inverse. Vibrating screen systems are the second most common mechanical method for solid separation. They are similar to the sloping screen, except they vibrate to keep the perforations clear and shake solids off the edge of the screen. A different mechanical system is the screw press. The slurry enters a hopper, and then the screw press, which consists of a screw auger rotating inside of a cylindrical perforated screen. The slurry is put under pressure by the auger as it moves toward the discharge end. Adjusting a counterweight at the discharge end of the system can alter the efficiency of solid separation. Another system is the drag chain system. The slurry is applied to a perforated screen. Free liquid flows through the perforations and into a collection basin. Chains equipped with paddles pass over the surface of the screen. Variations in solid content affect the efficiency of this method. The roller press system consists of a roller press containing a rotating perforated drum and one or more rollers. First, the slurry enters the drum where free liquids pass through the perforations, and the slurry moves to the end of the drum. As the slurry moves under the rollers, more liquid is squeezed out. Solids are scrapped off the drum and roller apparatus and into a storage container. Another method is a centrifuge where the centrifuge rapidly spins the slurry, pulling the liquids to the outside through perforations. The solids remain on the inside wall of the perforated drum.

There are varying opinions regarding the typical percent solid removal from different types of solid separators as shown in Table 13.

Table 13
Estimates of Solid Removal with Mechanical Separation Methods

Percent Removal	Source
10%-98%	Separating Fact from Fiction, Alan Newport, Hay and Forage Grower, Sept. 2004.
15%-65%	Iowa State University, Selection and Performance of mechanical Solid-Liquid Separators, Robert T. Burns, rburns@iastate.edu.
17%-60%	University of Tenn., Performance Testing of Screw-Press Solid Separators, Robert Burns and Lara Moody, P.O Box 1071, Knoxville, TN 37901-1071.
30%-40%	University of Ill. at Urbana-Champaign, Swine Odor Waste Management Paper 4, 2005.
50%-70%	Miner 2002.

Several factors including the size of the separation screen (which typically range from 0.010-0.150 inch and may be as small as 0.007 inches or as large as 0.025 inches); and initial solid concentration of the manure can affect the solid removal efficiency

F. Liquid Manure Mitigation Measures

Volatile organic compounds (VOC) are formed as intermediate metabolites in the degradation of organic material in manure and litter. Under aerobic conditions, any VOC formed are rapidly oxidized to carbon dioxide and water. Under anaerobic conditions, complex organic compounds are degraded microbially to volatile organic acids and other volatile organic compounds, which in turn are converted to methane and carbon dioxide by methanogenic bacteria. When the activity of the methanogenic bacteria is not inhibited, virtually all of the VOC are metabolized to simpler compounds and the potential for VOC emissions is nominal. However, inhibition of methane formation results in a buildup of VOC in the manure and ultimate volatilization to the air. Loading more solids in the liquid storage system than the system can handle causes this. VOC emissions will be minimal from a properly designed and operated stabilization process such as anaerobic lagoons. However, VOC emissions will be higher from storage tanks, ponds, overloaded anaerobic lagoons, and land application sites. (EPA 2001)

Minimize Animal Excretions in Lagoons (only stormwater, boiler blowdown, etc.)

By limiting the lagoon to wastewater not from freestall flushing, the organic loading and thus VOC emissions from the lagoon will be less.

Phototrophic Lagoon

In Zahn et al's 2001 study, lagoons with Bacteriochlorophyll A concentrations above 40 nmol mL^{-1}, phototrophic lagoons, showed lower emissions of VOC than other swine management systems. Overall, a lagoon with a phototrophic lagoon had 80% to 90% less VOC emissions per head on the average than a lagoon that was not phototrophic (Zahn 2001). Reductions of 80% to 93% of VOC were also observed in phototrophic swine lagoons following a photosynthetic bloom according Do 2003.

Lagoons Designed In Accordance with USDA/NRCS Recommendations

The USDA NRCS Agricultural Waste Management Field Handbook offers guidance on building and designing anaerobic and aerobic lagoons. In general, lagoons that meet the guidance parameters are expected to have lower VOC emissions than lagoons with smaller dimensions, lower dissolved oxygen content, or higher loading. In general, aerobic lagoons are shallow, 2-5 feet deep and loaded so that the dissolved oxygen concentration is approximately double the biological oxygen demand. Anaerobic lagoons tend to be sized so that there is sufficient water to dilute the animal waste entering the lagoon such that there is no more than 11 pounds of volatile solids per 1,000 feet^3 per day entering the lagoon. If the lagoon does not have sufficient volume to accept all the waste sent to the lagoon and not exceed 11 pounds of volatile solids per 1,000 ft^3 per day limit, pretreatment of liquids entering the lagoon may be used. This pretreatment may be solid separation. The solids separated from the liquid would be handled similar to other solids on the facility and the liquid, with less volatile solids, would be sent to the lagoon.

Lagoon pH

The solubility of VOC is pH dependant, thus measures to maintain the pH within the range that maximizes VOC solubility would minimize VOC emissions.

Complete Aeration/Aerobic Lagoons

In this system, sufficient concentration of dissolved oxygen is maintained to enable aerobic digestion to occur. Aerobic digestion is the decomposition of organic compounds by microbes in an oxygen-rich environment. The microbes reduce the organic compounds in the waste to carbon dioxide, water, nitrates, sulfates, and biomass (sludge). According to Dr. Ruihong Zhang of UC Davis, complete aeration can be achieved with dissolved oxygen concentrations of greater than 2.0 mg/L. However, this has not been achieved in practice at CAFs in the SJVAB and consumes significant energy, thus is considered beyond BARCT.

Lagoon Loading

This measure would minimize VOC by promoting phototrophic conditions, however is considered beyond BARCT due to the fact CAFs typically do not measure these parameters, thus may need extensive training to understand and maintain these parameters.

Use Non-standard Equipment or Chemical Additives with the Solid Separator

This method requires extensive capital expense and is typically beyond what is utilized at CAFs, therefore considered beyond BARCT.

Covered Lagoon with Gas Vented to a Control Device

Covers may be used to capture the gas produced by reactions in the lagoon and send the gas to a secondary VOC control device, which includes, but is not limited to an anaerobic digester generating electricity. Storage covers need to be acceptable by local mosquito abatement district regulations. These vary from district to district, but in general, districts require that the cover not be liquid permeable and completely cover the lagoon with no gaps that would allow mosquito access to the liquid or be removable so that mosquito abatement personnel can treat the lagoon if needed. There are two main storage cover designs: bank-to-bank and balloon.

Bank-to-bank covers extend across the entire span of the storage facility. The edges are buried in trenches around the perimeter of the pond, pit, basin, channel, or lagoon. Bank-to-bank covers are continuous with the ground surface or extend only slightly above the ground. The design should include floatation devices to keep the cover from sinking into the manure. Water pumping equipment may be required to keep the cover free of standing water. This design can create an anaerobic environment, depending on the specific design and materials used.

A variation of the bank-to-bank cover design is the balloon cover. These are essentially fabric pulled over the surface of the storage facility and kept aloft with fans and blowers. The fans and blowers create air pressure to inflate the cover. Pre-cast concrete posts or stainless steel poles may be used as supports for the cover. A matrix of ropes placed on the manure may also be used to keep the cover from sinking into the manure in case of a power loss. These covers are typically not appropriate for creating anaerobic conditions since air is pumped into the headspace above the manure. Once again, the edges of the cover are buried in trenches around the perimeter of the lagoon. There are various materials that may be used for covers including, but not limited to hypalon 45, polyvinyl chloride (PVC), PVC coated with acrylic or hypalon, estane polyurethane, polyethylene, and others.

However, this requires capital expenses beyond what is considered BARCT.

Alternative Mitigation Measures:

The following mitigation measures have been proposed and many are being researched as potential VOC mitigation measures. However, at the time of this report, there was insufficient data for staff to determine that the measures would result in volatile organic compound (VOC) emission reductions and not cause harm to animals. Stakeholders may utilize these methods to comply with rule requirements if they demonstrate, to the satisfaction of the ARB, APCO, and EPA, that the measure achieves VOC reductions that are equal to or exceed the reductions that would be achieved by other mitigation measures listed in the rule that the owner/operator could choose.

1. Chemical Oxidation
   Chemical oxidants can be applied in liquid form to liquid manure systems to oxidize VOC. Agents such as potassium permanganate and hydrogen peroxide may be applied to the system, at the surface, to reduce emissions. However, a large amount of these types of additives is typically required due to the high organic matter content of animal manure. The emission reductions achieved by these additives also appears to be short term, requiring frequent applications to consistently reduce gaseous emissions. There are several venders of these chemical oxidants and these chemicals have been utilized on swine and dairy facilities, however, due to the cost and other concerns, their use is not widespread.

2. Ozonation
   Ozone has been used to reduce gaseous emissions from manure slurries by bubbling or diffusing it through dairy slurry. However, ozone must be produced on-site, which requires costly generation and application systems.

3. Microaerobic Biological Nutrient Management Practice
   In this system, waste products are collected and mixed with water. The mixture is pumped through a contact chamber and then a coarse solid separator. The clarified liquid fraction containing dissolved solids, suspended solids, and a suspension of microbial cells flows to the next unit process in the treatment systems, the bioreactor. The liquid then passes through anaerobic and anoxic zones. According to technology venders, the majority of the VOC and VOC precursors are metabolized and incorporated into microbial biomass. Based on the Final Dairy Permitting Advisory Groups (DPAG) Report this has a control efficiency of approximately 79% for the emissions from liquid manure handling and approximately 52% for emissions from land application. The District has reviewed the provided information about this technology and it appears that it has the potential of reducing VOC emissions. Additional information, such as that specified in the Final DPAG Report, will be required to fully evaluate such a system. CAF owners/operators would include the additional information should they wish to propose such systems as alternative mitigation measures under Section 5.0 of Rule 4570.

4. Microbial Lagoon Additives
   In this method a mixture of microbes and, in some cases, nutrients and/or media are added to the lagoons on a routine basis. Venders suggest that this technology reduces VOC emissions, manure sludge buildup, odors, preserves nutrients, reduces nitrates, reduces ammonia emissions, reduces flies, and many other things. It has been used at numerous dairy and poultry facilities, however

there is not sufficient data available to determine the effect of this technology on VOC emissions.

5. Aquatic Cropping
In this option alga is grown in engineered ponds, raceways, or lagoons. Some suggest that the algae incorporate nitrogen, phosphorus, and VOC precursors into their biomass. The algae could then be harvested and used as a slow release fertilize; protein feed; component in make-up production; or other use.

6. Natural Crust Manure Storage Cover
A manure crust typically forms if large amounts of solids are added to a liquid manure storage unit. Some believe that the crust serves as a biological cover that would reduce VOC emissions. Others believe that by increasing solid loading to form this crust one would increase VOC emissions.

7. Elimination of Processing Pit
Some believe that the processing pit is an additional emission unit that causes increase VOC emissions. They note that the manure in this pit is not treated; the pit has solids levels above 1%; in some cases the pit is stirred; and the solids have a potential of settling and forming anaerobic conditions—all of which could lead to increased VOC emissions. Others believe that the processing pit is not an additional emission unit and explain it as simply an expanded use of the pump pit for the solid separator.

8. Wet Combustion System
This process involves adding oxygen and bacteria. The technology introduces oxygen into pond systems with the intent of raising the oxygen levels. Bacterial is introduced on a daily basis.

9. Reciprocating Water Technology
In this process, organic matter is oxidized and nitrogen is removed via biological nitrification and denitrification.

10. Rotating Biological Contactor
In this process, a fixed film of microorganisms rotates, much like a water wheel, in and out of an effluent stream thereby exposing the attached biofilm to alternating aerobic and anaerobic conditions. Organic compounds are oxidized.

G. Crop Application

Land Application

Current research suggests that the majority of emissions emitted during land application of manure are emitted during the first 24 hours. Therefore, rapid land incorporation, whenever feasible is considered a control measure. This includes rapid incorporation of waste into the soil by tilling, injection, and other methods. This type control method, based on SCAQMD PR1127 Staff Report has a control efficiency of approximately 23%. Furthermore, by only applying waste with minimal biological activity, either waste that has already by treated or with low moisture content, VOC emitted by biological degradation of manure is minimized.

Land application at an agronomic rate can be a cost-effective and sustainable practice that can build soil tilth, increase the water holding capacity of the soil, and provide essential nutrients for plant growth. The land application options are designed to provide and ensure maximum rule flexibility and allow land application of animal waste. Nothing in the rule places minimal or maximum limits on the quantity of manure applied to the land. Furthermore, the owners/operators have the opportunity to choose when to land apply waste, either by timing of animal housing removal or only applying waste that has been treated or with dried.

It is understood that a balance between manure incorporation and conservation tilling must be struck-- incorporation disturbs the soil surface and reduces plant residue cover, which can lead to erosion. Therefore, tilling options may not be feasible for all facilities. It is further understood that these measures are not always feasible, for example once crops grow a certain height the use of injection equipment may cause crop damage-- therefore injection methods are not to be used at these times. Additionally, in wet weather the vehicles used to transport the manure could become stuck in the fields, thus at some times weather may cause this option to be infeasible. In such cases, farmers would likely choose the following mitigation measures:

- Only apply liquid manure at a rate that it is absorbed into the soil, thus no tilling would be required;
- Not apply liquid manure;
- Only apply solid manure with moisture content less than 50%, thus no tilling would be required; or
- Not apply solid manure.

Surface applied solid and slurry type manure may be incorporated into the soil by either disking or plowing. Liquid manure may also be injected using a mobile injection device attached to a tank. Incorporation is expected to reduce VOC emissions because the soil is expected to trap the VOC below the surface and act a biofilter scrubbing and absorbing a significant portion of the VOC before they are able to escape into the atmosphere.

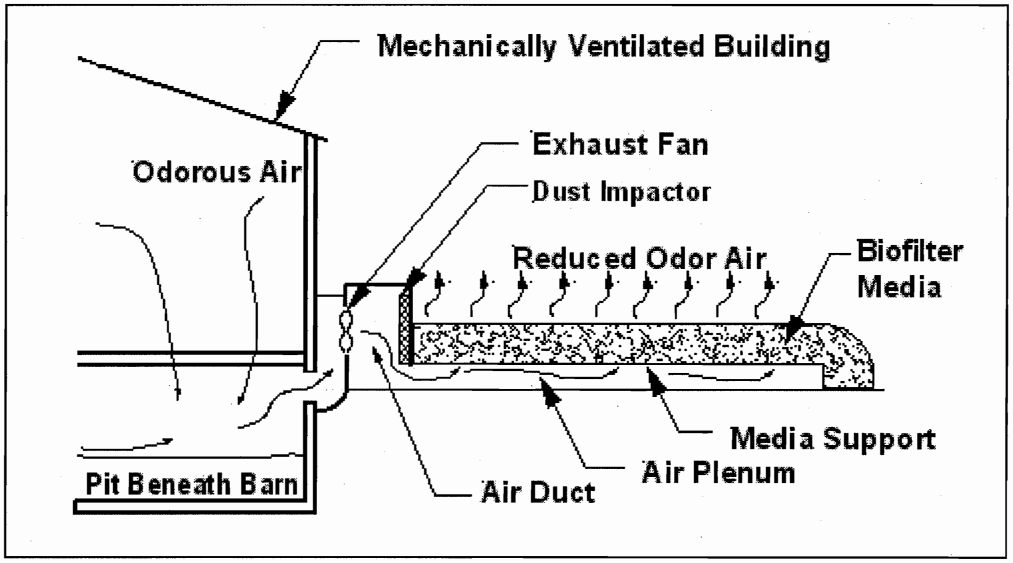
H. Secondary Controls

A secondary control is a device where air is exhausted to a control to further remove VOC from the air stream. Air from composting, digesters, enclosures, and covered lagoons, as discussed previously in this staff report, may be vented to a secondary control device including, but not limited to, biofilters and wet scrubbers. These systems have routinely been used in the swine industry and as well as some poultry and dairy facilities. Most of these biofilters were designed for ammonia or odor control rather than for VOC control.

Biofilter

A biofilter is a control technology that uses microorganisms to treat air emissions. They have been used at poultry, swine, and dairies (mostly in colder regions where the cows are housed in barns), to control air contaminants, however there may be negative animal health issues related to the use of biofilters. A biofilter is simply a layer of organic material, referred to as biofilter media, that supports a microbial population. Mechanical and/or natural ventilation pushes air through ducts into the air plenum; empty space underneath the biofilter. A fan then pushes the air up through the biofilter material. In the media, microbes convert VOC to carbon dioxide and water. Figure 2 below depicts an open-faced biofilter system for a swine house.

Figure 2 Biofilter



Biofilter designs are based on the volumetric flow rate of the air to be treated, air contaminants to be treated and the concentrations, media characteristics, biofilter size (area) constraints, moisture control, maintenance, and cost. These parameters all play a role in either the efficient cleaning of airstreams or in the economic operation of the biofilter. The ventilation rate required is dependent on temperature and the type, size, and number of animals in the building. Ventilation design procedures can be found in the University of Minnesota Extension Publication MWPS-32, Ventilation Systems for Livestock House. Some building ventilation rates are shown in Table 14.

Table 14
Typical Building Airflow Requirements

Facility Type	Airflow Requirements (cubic feet per minute per animal space for warm weather)
Swine Nursery	35
Swine Finishing	120
Swine Gestation	150
Swine Farrowing	500
Broiler or Layer (5 lb live weight)	5
Turkey (40 lb)	32
Dairy Cow (1,400 lb)	470
Covered Manure Storage (per square foot of surface area)	0.1

(Source: Schmidt 2004)

Biofilters treating air from a manure storage unit may treat a smaller volume of air than animal housing, but the air will have a higher concentration of odorous gases. Typical airflow rates from a covered manure storage unit are 0.01 cfm per square foot of surface area.

Media selection is another critical element because, for a biofilter to operate efficiently, the media must provide a suitable environment for microbial growth (including appropriate pH and temperature) and maintain a high porosity to allow air to flow easy. A proven organic media mixture for animal agriculture biofilters ranges from approximately 30:70 to 50:50 ratio by weight of compost and wood chips or wood shreds. The wood provides the porosity and structure while the compost provides microorganisms, nutrients, and moisture holding capacity.

The life of the media is typically at least three years and likely five years or longer. During this time, the media decomposes and becomes denser, which reduces the porosity (air space in the media) and increases the pressure or force needed to move the air through the biofilter media. This force is measured as the static pressure drop. A static pressure drop of over 50% of the design pressure, the pressure upon initial start-up, across the biofilter indicates the need to replace the media. (Schmidt 2004)

Ductwork and plenum construction are another critical component of a biofilter. Ducting must be constructed to move the air from the fans to the plenum of the biofilter. The ducts and plenum should be designed to keep the air velocity between 600 and 1,000 feet per minute. (Schmidt 2004)

Moisture control is also essential. Inadequate moisture can allow the media to dry out, deactivating the microbes and creating cracks and channeling of air, which results in a reduction of filter efficiency. Too much moisture can plug some of the pore in the media, causing channeling and limiting oxygen flow in saturated areas of the filter, thereby creating anaerobic zones in the biofilm. Recommended moisture content for biofilters range from 40-65% wet basis with optimum moisture content of 50% (Schmidt 2004.)

Finally, good weed prevention and rodent control are essential. Weed growth on the biofilter surface can reduce the treatment efficiency by causing air channeling and limiting oxygen exchange. Roots also contribute to plugging of biofilter pores inhibiting the flow of air through the media. Rodents, such as mice, rats, rabbits, woodchucks, and badgers, burrow through the warm media during the cold winter months causing channeling problems. Channeling, as previously mentioned, reduces the biofilter efficiency by providing a means of air escaping the biofilter without completely filtering through the media and being completely treated by the microbes.

Gas Absorption

In a gas absorber, building air is collected and passed though an enclosed (typically packed) tower with the absorption media flowing counter-current to the incoming air stream. Gases in the air stream diffuse into and are absorbed by the media. Although water is used as the scrubbing media in many applications, the absorption of gases can be enhanced using chemical reactions between target gases and the absorbing media, such as using caustic solution to remove acidic gases. Some negative impacts associated with this option are the emissions from the generation of the electricity needed to convey air to the scrubber and disposal of the absorbing media. It has been used in a study at the University of Minnesota, however staff was unable to find commercial CAFs utilizing this technology to reduce VOC.

Bioscrubber

The concept behind a bioscrubber is similar to that of biofiltration with the exception of the microorganisms, which are housed in an enclosed packed tower with water circulated counter-current to the incoming building air, instead of in a filter bed. As contaminated air is passed through the scrubber, water-soluble compounds are absorbed by the water and oxidized microbially. Some scrubber designs contain a vessel that is used as a biological reactor. Effluent from the scrubber is routed to the vessel where additional retention time is provided for microbial oxidation. No information was found in the literature review regarding the ultimate disposal of the effluent from bioscrubbers. However, it is likely that this effluent could be land applied. Periodically the filter media must be replaced due to decomposition and compaction. These have been utilized at swine operations with a reduction of over 80%, however they are not common at commercial operations.

IV. MONITORING AND MEASUREMENT REQUIREMENTS (MMR)

The monitoring and measurement requirements, which include minimum testing frequency, are designed to minimize the costs of testing for owners/operators while ensuring that adequate testing is conducted to demonstrate compliance with the appropriate mitigation measures and such measures are operating in a manner that optimizes the VOC reductions.

Monitoring Requirements

The CH&SC 40724.6 requires that the District obtain sufficient information to develop an emission inventory for all pollutants. Since the emission inventory is dependent on the number of animals in the SJVAB and typically other agencies do not collect and publish data in sufficient detail (e.g. number of animals of each type in each county) to accomplish this, staff is requiring producers to provide this information to the District, upon request. Please note that owners may use documents, such as Regional Water Quality Board Waste Nutrient Management Plans that list the numbers of animals in each production group (e.g. calves, heifers, milkers, and dry cows) to comply with this monitoring requirement. The rule will not require owners/operators to maintain a set of records exclusively for the use of the San Joaquin Valley Air District.

Other monitoring and testing requirements only apply to facilities that choose mitigation measures where such monitoring or testing would assist in demonstrating compliance. This is to acknowledge that, based on currently available information, these parameters are not necessary to determine an emission inventory, unless the mitigation measures chosen are affected by these parameters. An example is monitoring feed content. Table 15 below lists the feed mitigation measures for dairies.

Table 15 Feed Mitigation Measures for Dairies	
A.	Owners/operators shall incorporate at least four (4) of the following feed mitigation measures:
	Class One Mitigation Measures
1.	a. Feed according to National Research Council (NRC) guidelines.
2.	a. Feed animals high moisture corn or steam-flaked corn and not feed animals dry rolled corn.
3.	a. At least once every fourteen (14) days remove feed from the area where animals stand to eat feed.
4.	a. At least once every fourteen (14) days remove spilled feed from the area where equipment travels to place feed in the feed bunk.
5.	a. Remove uneaten wet feed from feed bunks within twenty-four (24) hours of a rain event.
6.	a. Feed or dispose of rations within forty-eight (48) hours of grinding and mixing rations.
7.	a. Store grain in a weatherproof storage structure from October through May.
8.	a. Implement an alternative mitigation measure(s), not listed above.

Facilities only choosing options A3, A4, A5, and A6 would not need to maintain records of feed content, formulation, or quantity of feed additives used in order to demonstrate rule compliance since these measures are not affected by this. However, a facility choosing option A1 may need to maintain the aforementioned records in order to demonstrate compliance.

Traditionally, the District has required testing of VOC control devices every twelve months to ensure that the device has not been damaged, degraded, or otherwise changed to the degree that it no longer achieved the desired reductions. More frequent testing is not required because it is a mechanical device with clearly defined operating parameters which are not expect to change significantly in time periods of less than a year. An example would be a biofilter. If the blowers are operating at a specific pressure, unless the biofilter media has been saturated, it has been well documented that specific VOC control efficiencies will be achieved. On the average, biofilter media becomes saturated to the point it is not effective for VOC control in one (1) to ten (10) years, depending on design. Therefore, testing more than once a year is not considered vital to ensure VOC control. Please note that a VOC control device, as defined in Proposed Rule 4570, are devices that capture air; reduce the VOC content in the air; and release the air into the environment. This would be a system such as an enclosure vented to a biofilter. It would not include control measures, such an increased cleaning, lagoon aerators, etc. where air is not captured by the control measure.

Staff acknowledges that, at this time, there is not substantial information to determine what constitute minimum testing frequency to ensure compliance with the mitigation measures specified in the rule. However, staff believes that the minimum testing frequency for control devices, as was done for control devices in other District prohibitory rules is twelve (12) months. Also, as noted in the rule, more frequent testing may initially be necessary to confirm rule compliance. The need for more frequent testing would be determined by the APCO, ARB, and EPA and may only be temporary until the owner/operators has demonstrated that system tested (e.g. lagoon with a ph between 6.5 and 7.0) is stable.

V. POTENTIAL FUNDING SOURCES

As noted in the cost-effectiveness and socioeconomic analysis, some of these controls have significant costs. However, farms are eligible for numerous grants, which could pay for some or all of the costs of implementing mitigation measures. Some of these are listed below.

A. National Programs

Environmental Quality Incentive Program (EQIP)

This program provides financial and technical assistance to install or implement structural and management conservation practices. EQIP can be used for manure transport, composters, solid separators, land application of nutrients, and many other things. Approximately 60% of the total EQUIP funds are target to projects involving animal agriculture and air quality is one of the four national priorities for this program.

This funding can be used for up to approximately 75% of the cost of the project and has a maximum funding per project of approximately $450,000. For more information please contact your local or state Natural Resource Conservation (NRCS) office or check their website at http://www.nrcs.usda.gov/programs/eqip/index.html.

EQIP Conservation Innovation Grants Program

This program is intended to accelerate technology transfer and adoption of promising technologies and approaches to address some of the nation's most pressing natural resource concerns.

This funding can be used for up to approximately 50% of the cost of the project. For more information look for the announcement, which is usually released in early spring of each year, and the website at http://www.nrcs.usda.gov/programs/cig/.

Renewable Energy Systems and Energy Efficiency Improvement Program

This program establishes grant, loan, and loan guarantee programs to assist farmers, ranchers, and rural small businesses in purchasing renewable energy systems for making energy efficiency improvements.

The funding can be used for up to approximately 25% of the cost of the project. For more information look for the announcement or check their website at http://www.rurdev.usda.gov/rbs/farmbill/index.html.

Sustainable Agriculture Research and Education Grants Program

The purpose of this program is to advance farming systems that are profitable, environmentally sound, and good for communities.

For more information look for the announcement or check their website at http://www.sare.org/grants/index.htm.

B. State Programs

Please note some of these programs are only available to persons living in certain areas of the state.

Section 319 Grants

These may fund anaerobic digesters, manure vacuum devices, solid separators, compost devices and feed management practices. For more information please check their website at http://www.swrc.ca.gov/funding/319h.html

Self Generation Incentive Program

This may fund up anaerobic digesters. For more information check their website at http://www.sdenergy.org/ContentPage.asp?ContentID=35&SectionID=24.

Energy Efficiency Improvement Loan Fund

This may fund anaerobic digesters. For more information check their website at http://www.safe-bidco.com

VI. PROPOSED RULE 4570 (CONFINED ANIMAL FACILITIES)

The purpose of Proposed Rule 4570 is to limit VOC emissions from confined animal facilities (CAF). Preliminary analysis of the industries indicate that the cost and feasibility of control options will be highly variable due to existing infrastructure and current management practices at the facilities. To provide owner/operators flexibility in complying with the rule's control requirements, the rule includes several options for compliance and the option for owner/operators to develop their own control measures as appropriate.

A. Summary of Proposed Rule

Section 1.0 Purpose

The purpose is to limit volatile organic compound (VOC) emissions from confined animal facilities (CAF).

Section 2.0 Applicability

Indicates that the rule applies to any CAF located within the District.

Section 3.0 Definitions

Lists general definitions that pertain to the rule.

Section 4.0 Exemptions

The rule exempts facilities not exceeding any of the thresholds listed in Table 16 from all requirements except those requiring records be kept demonstrating that they qualify for the exemption.

Table 16: Exemption Thresholds

Livestock Category	Number of Animals
Dairy	1,000 lactating cows
Beef Feedlots	3,500 beef cattle
Other Cattle Operations	7,500 cows
Chickens	650,000
Ducks	650,000
Turkeys	100,000
Swine	3,000
Horses	2,500
Sheep, Goats, or any combination of the two	15,000
Any other livestock not listed above	30,000

Section 5.0 Requirements

- Operators of a CAF are to choose a specified number of VOC mitigation measures from the measures listed in the rule for each emission area on their facility. This cafeteria plan provides flexibility to facilities considering that CAF facilities vary from one another and not all controls are feasible for all facilities. Facilities that are unable to use the control options listed to meet the minimum required number of measures have the option of developing VOC mitigation measures that are more applicable to their facilities by demonstrating the efficiency of the measures.

Additionally, facilities have the option of submitting an emission mitigation plan that demonstrates a facility wide VOC reductions of at least 30% in lieu of implementing the minimum required number of measures in the applicable Tables 1 through 6 of the rule. The mitigation measures specified in Tables 1 through 6 of the rule are considered to have been approved by the APCO, ARB, and EPA through the rulemaking process, which provided avenues for such approving authorities to accept the appropriateness of the listed measures. Owners/operators would demonstrate, as part of the emission mitigation plan submission, the required facility wide emissions reduction by calculating the control efficiencies of their selected mitigation measures in accordance with the procedures/methods shown in Appendix B of the Final Draft Staff Report for Rule 4570. Any mitigation measure in the emission mitigation plan that is not specifically listed in the rule is considered an alternative mitigation measure. As such, it is subject to the requirements for alternative mitigation measures, as defined in Section 3.0 of the rule, including the requirement that the mitigation measure be approved by the ARB, APCO, and EPA. It is important to note that alternate mitigation measures are evaluated on a case-by-case basis and will only be approved by the APCO, ARB, and EPA if such alternate measures have been determined to achieve reductions that are equal to or greater than the reductions that would be achieved by those specific measures listed in the Tables 1 through 6 of the rule.

Additionally, Section 6.1.6 of the rule specifies that the permit application, including any emission mitigation plan, be publicly noticed with a commenting period of no less than thirty (30) days. During this time the ARB, EPA, and stakeholder will have the opportunity to view the emission mitigation plan, approve or disapprove of the plan, and recommend changes, as appropriate.

Table 17
Summary of the Minimum Number of VOC Mitigation Measures Per Animal Type and Area Compared to Total Number of Options

Area	Dairy	Beef	Other Cattle	Swine	Poultry
Feed	4 of 8	5 of 8	5 of 8	5 of 12	5 of 10
Silage	1 of 6	1 of 6	1 of 6	0 of 0	0 of 0
Milk Parlor	1of 3	0 of 0	0 of 0	0 of 0	0 of 0
Housing	8 of 26	7 of 15	7 of 23	5 of 10	4 of 17
Solid Manure	2 of 8	1 of 8	1 of 8	1 of 8	1 of 8
Liquid Manure	1 of 11	1 of 11	1 of 11	1 of 11	1 of 11
Land Application	2 of 7	2 of 7	2 of 7	2 of 7	0 of 0
TOTAL	**19 of 69**	**17 of 55**	**17 of 63**	**14 of 48**	**11 of 46**

- Suspension of Mitigation Measures
  This section allows mitigation measures to be suspended in order to promote molting; protect animal health; and address quarantine situations. In some limited cases all measures may need to be suspended, such as a case where

a quarantine prevents equipment, animal waste, nonessential personnel, etc. from entering or leaving the facility. However, the decision to suspend any or all mitigation measures must be approved on a case by case basis by the APCO, ARB, and EPA with input from the appropriate experts, such as licensed veterinarians, nutritionists, and government employees. Except for poultry molting, the exemption is designed to address atypical, non-periodic, and rare occurrences, not routine situations.

Furthermore, to minimize uncontrolled emissions, facility will have no more than 30 days to address the issue requiring the measures to be suspended or implement new mitigation measures to comply with rule requirements. This is designed to minimize the time that any VOC emissions occur in an uncontrolled manner.

Section 6.0 Permit Requirements

- Owner/operators would need to submit a permit application for each CAF within six (6) months of rule adoption.
- Permit application has to include:
  - Contact and legal information;
  - List of mitigation measures to be implemented;
  - Animal inventory; and
  - All information necessary for the District to prepare an emission inventory of all regulated air pollutants emitted from the facility.
- Owner/operators would need to submit an update to the permit application at least once every three (3) years.
- The District would need to act on the permit application within six (6) months of receipt.

Section 7.0 Administrative Requirements

- Recordkeeping
  - Indicates recordkeeping requirements
- Compliance testing
  - Control devices would need to be initially source tested upon start-up or modification, and thereafter at least once every 12 months
  - Facilities would need to conduct all laboratory testing required to determine compliance
- Test Methods
  - Indicates the applicable test methods to be used in determining compliance with the rule requirements.

Section 8.0 Compliance Schedule

- Owners/operators would need to comply with all requirements on and after one year from the permit issuance date.

VII. EMISSION REDUCTIONS

Emissions Reduction Analysis

The VOC reductions required by the Extreme Ozone Plan for Proposed Rule 4570 is 5,767 tons per year (15.8 tons per day) or 25% from the planning baseline of 23,031 tons of VOC per year (63.1 tons per day). District staff estimated that the VOC reduction from Proposed Rule 4570 is about 7,563 tons per year (21 tons per day) or 28 percent of the total CAF baseline emission of 27,000 tons per year. The VOC emission reduction analysis is included in Appendix B of the Final Draft Staff Report.

A concern was expressed as why the proposed rule targets VOC reductions but not ammonia emissions from CAFs. Ammonia is not a precursor to ozone formation and therefore not the pollutant targeted by the District's Ozone Plan. Although ammonia is not specifically regulated by Proposed Rule 4570, the VOC mitigation measures of the proposed rule actually have the added air quality benefit of reducing ammonia emissions. Staff estimated at least 100 tons per day of ammonia reductions could be achieved from the implementation the proposed VOC mitigation measures. The ammonia reduction analysis is included in Appendix F of the Final Draft Staff Report.

VIII. HEALTH EFFECTS

Respiratory diseases associated with agriculture were one of the first-recognized occupational hazards. According to the Institute for Agriculture and Trade Policy (Wallinga 2004), studies at beef, swine, and poultry facilities show increased occurrences of asthma, sinusitis, bronchitis, decreased lung function, and depression among workers at concentrated animal feeding operations. Of the 331 VOC and gaseous compounds found in odorous samples from North Carolina swine facilities, 157 are known airway irritants; chronic irritation can permanently scar lungs and lead to respiratory problems. (Wallinga 2004)

IX. RULE DEVELOPMENT PROCESS

As part of the rule development process, District staff conducted public scoping meetings in April 2005, public workshops and Socioeconomic Focus Group meeting in March 2006 in order to present, discuss, and solicit comments on Proposed Rule 4570. In addition to the workshops, staff met with representatives of the beef, dairy, poultry, swine industries, and control technology vendors to receive comments on the technical aspects and compliance costs of the proposed rule. The comments received from the public, affected sources, California Air Resources Board, and United States Environmental Protection Agency during the public workshop process and technical consultation meetings were incorporated into the proposed rule as appropriate.

Comments received and District responses are discussed in Appendix A of the Final Draft Staff Report.

Proposed Rule 4570 and the Final Draft Staff Report including the analyses mandated by CH&SC will be published prior to a public hearing on June 15, 2006 for the District Governing Board to consider the adoption of the proposed rule. The notice of the public hearing for this rule project was published in a general circulation newspaper in each of the eight San Joaquin Valley counties, and will be mailed to affected sources and interested parties. The public notice solicited written comments to be submitted by mail, and will identify the name and telephone numbers of the District staff that can answer questions and respond to comments. The June 15, 2006 adoption schedule will satisfy the requirement of the CH&SC for the District to adopt a regulation by July 1, 2006.

X. COST EFFECTIVENESS ANALYSIS

Pursuant to CH&SC 40920.6(a) a cost effectiveness analysis is required to be performed for rules that implement BARCT. For the purpose of calculating the compliance cost and associated cost-effectiveness of the proposed rule, staff took into consideration those mitigation measures already being implemented at facilities and assumed that owners/operators will likely choose the lowest cost mitigation measures. This was done to minimize overestimation of compliance costs. A detailed discussion of the analysis is shown in Appendix C of the Final Draft Staff Report. The estimated cost effectiveness is as follows:

- Dairies = $4,815 or less per ton of VOC reduced,
- Beef feedlots = $4,505 or less per ton of VOC reduced
- Other cattle facilities= $10,088 or less per ton of VOC reduced, and
- Swine = $3 or less per ton of VOC reduced.

A cost effective analysis was not done for poultry because, based on comments from industry and information in the District's permit database, staff has determined that existing poultry facilities are already required to implement best available retrofit control technology. Therefore, the added cost would only be recordkeeping costs, which are considered minimal and typically not included in the cost effectiveness analysis.

XI. SOCIOECONOMIC ANALYSIS

Pursuant to CH&SC 40728.5, the District is required to perform a socioeconomic impact analysis prior to the adoption, amendment, or repeal of a rule that significantly affects air quality or strengthens an emission limitation. The socioeconomic analysis is presented in Appendix D of the Final Draft Staff Report.

XII. ENVIRONMENTAL IMPACTS

Proposed Rule 4570 underwent an environmental review in accordance with the requirements of the California Environmental Quality Act (CEQA). A proposed negative declaration has been issued by the District and made available for public review. The public commenting period ended on May 29, 2006. Staff received comments on the proposed negative declaration from the State Water Resources Control Board and addressed these comments in Appendix A. The initial study and proposed negative declaration are presented in Appendix G of the Final Draft Staff Report. District staff recommends that the District Governing Board approve the negative declaration.

XIII. RULE CONSISTENCY ANALYSIS

Pursuant to California Health & Safety Code Section 40727.2, District staff prepared a rule consistency analysis that compares the elements of Proposed Rule 4570 with the corresponding elements of other District rules, federal regulations and guidelines that apply to the same source category or type of equipment. The analysis is attached as Appendix E of the Final Draft Staff Report.

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Appendix H

Mitigation of Greenhouse Gas Emissions in European Conventional and Organic Dairy Farming

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Agriculture, Ecosystems and Environment 112 (2006) 221–232

Agriculture Ecosystems & Environment

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Mitigation of greenhouse gas emissions in European conventional and organic dairy farming

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Abstract

Dairy farming is the largest agricultural source of the greenhouse gases methane (CH_4) and nitrous oxide (N_2O) in Europe. A whole-farm modeling approach was used to investigate promising mitigation measures. The effects of potential mitigation measures were modeled to obtain estimates of net greenhouse gas (GHG) emissions from representative dairy model farms in five European regions. The potential to reduce farm GHG emissions was calculated per kg milk to compare organic and conventional production systems and to investigate region and system specific differences. An optimized lifetime efficiency of dairy cows reduced GHG emissions by up to 13% compared to baseline model farms. The evaluation of frequent removal of manure from animal housing into outside covered storage reduced farm GHG emissions by up to 7.1%. Scraping of fouled surfaces per se was not an effective option since the reduction in GHG emissions from animal housing was more than out-weighed by increased emissions from the storage and after field application. Manure application by trail hose and injection, respectively, was found to reduce farm GHG emissions on average by 0.7 and 3.2% compared to broadcasting. The calculated model scenarios for anaerobic digestion demonstrated that biogas production could be a very efficient and cost-effective option to reduce GHG emissions. The efficiency of this mitigation measure depends on the amount and quality of organic matter used for co-digestion, and how much of the thermal energy produced is exploited. A reduction of GHG emissions by up to 96% was observed when all thermal energy produced was used to substitute fossil fuels. Potential measures and strategies were scaled up to the level of European regions to estimate their overall mitigation potential. The mitigation potential of different strategies based on a combination of measures ranged from −25 up to −105% compared to baseline model farms. A full implementation of the most effective strategy could result in a total GHG emission reduction of about 50 Mt of carbon dioxide (CO_2) equivalents per year for conventional dairy farms of EU(15) comparable to the defined model farms.

Keywords: Model farms; Dairy farming; N_2O; CH_4; Manure application techniques; Anaerobic digestion

1. Introduction

Agricultural activities contribute substantially to anthropogenic greenhouse gas (GHG) emissions. Thus, methane (CH_4) and nitrous oxide (N_2O) emissions from agriculture in EU(15) amounted to 383 Mt carbon dioxide (CO_2) equivalents in the year 2000, which corresponds to approximately 10% of total EU(15) GHG emissions (Gugele et al., 2002). About 49% of CH_4 and 63% of N_2O emissions can be attributed to agricultural production. Within the agricultural sector, dairy production systems represent the largest source of CH_4 and N_2O emissions and may therefore have a large potential for GHG mitigation.

A large number of technical and management-related measures for mitigating N_2O, CH_4 and CO_2 emissions from agricultural systems have been suggested in the literature (Mosier et al., 1996; Smith et al., 1997; Döhler et al., 2002;

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doi:10.1016/j.agee.2005.08.023

reduces the number of calves born from 1.13 to 1.08 per annual cow (Håndbog i Kvæghold, 2003). The milk yield of a 320 days lactation is in the 2nd lactation 1.104 times and in the 3rd and later lactations 1.166 times the yield in the first lactation, based on standard lactations for Holstein Friesian cows with a herd yield of 7000 kg cow^{-1} a^{-1} (Håndbog i Kvæghold, 2003). This results in an increase in annual cow yield of 1.5% when the cow herd is changed from 40:25:35 to 30:25:45.

To test the mitigation potential of the cow lifetime efficiency, four different variations of the replacement rate were analyzed by the FarmGHG model:

(1) Replacement rate 40%, surplus heifers are kept until mature (40%/keep = baseline),
(2) Replacement rate 40%, surplus heifers are sold as newborn (40%/sell; RR1),
(3) Replacement rate 30%, surplus heifers are kept until mature (30%/keep; RR2),
(4) Replacement rate 30%, surplus heifers are sold as newborn (30%/sell; RR3).

2.2.2. Frequent removal of manure and scraping systems

On average only about one third of feed N is transformed into the protein of animal products, while the rest is excreted in urine and feces (Kirchgessner et al., 1994). About one fourth of this N may be emitted as ammonia (NH_3) directly after excretion from the animal and during manure storage. In animal houses the volatilization of NH_3 is related to the ammonium (NH_4^+) concentration, pH and surface area of the manure stored in the house, to the area contaminated by the animals, and to the temperature and ventilation of the housing system. Hence, decreasing the surface area fouled by manure has a potential to reduce NH_3 emissions. Ammonia and CH_4 emissions from cattle housing can be reduced through a more frequent removal of manure to a closed storage system, and through the regular scraping of the floor.

Methane emissions from slurry-based manure management systems increase with the temperature of the stored slurry. The slurry is typically stored at higher temperatures in the house pit than in the outside manure store, depending on seasonal and climatic conditions. The effect of reducing slurry temperature was demonstrated by Hilhorst et al. (2001), who found a reduction in CH_4 emissions of 30–50% when changing storage temperature from 20 to 10 °C. A more frequent removal out of animal houses to an outside storage of lower temperature can therefore be expected to reduce the CH_4 emissions. A daily removal was applied to slurry-based model farms with an in-house retention time in the baseline case of more than one day, i.e. the Atlantic 1, 2, 3, 4 (instead of 90 days) and Pre-Alpine 2 (instead of 7 days) model farms.

A number of scraping systems for regular removal of the slurry from the floor have been tested experimentally (UNECE, 1999; Döhler et al., 2002). The most promising and practical system to date involves the use of a scraper running over a solid floor, which can reduce NH_3 emissions by approximately 50% (Swierstra et al., 2001). The FarmGHG model thus assumes a reduction in NH_3 emissions of 50% for slurry-based cattle housing systems. In addition, there is an electricity demand for operating the scrapers, which was set to 40 kWh cow^{-1} a^{-1}. In the model calculations, the effect of using scrapers to reduce NH_3 volatilization can only be applied to the Atlantic farms 1–4, which all have slurry-based systems and animal houses with grooved floors.

2.2.3. Biogas production by anaerobic digestion

For biogas production, manure can be digested alone or together with on-farm produced or imported co-digestates to increase CH_4 yields. The rate of anaerobic digestion depends on temperature, pH, carbon-to-nitrogen and water-to-solids ratios, nutrient composition, particle size, retention time, and quality of manure and co-digestible material. The CH_4 produced can be used in combustion engines to produce electricity and heat, which farm owners may utilize or sell. Therefore, the CH_4 capture and use for energy production achieves both a reduction in CH_4 emissions and a substitution of fossil fuels, which reduces CO_2 emissions.

For the biogas production as mitigation option the effects of the following scenarios were modeled:

(1) Digestion of manure (and straw if farmyard manure) (scenario m = BG1),
(2) Digestion of manure (and straw if farmyard manure) and imported potatoes (scenario m + p = BG2),
(3) Reduction of livestock density by 30% and digestion of manure and crops with residues (scenario m + c = BG3),
(4) Reduction of livestock density by 30% and digestion of manure, crops with residues and imported potatoes (scenario m + c + p = BG4).

In scenario BG3 and BG4 with a reduction of the livestock density of model farms by 30%, the permanent grassland (*Lolium perenne*) area was reduced, and surplus cropland was used for co-digestate production. For the calculation of the digestion scenarios, the manure collected from the animal houses plus additional on-farm or imported substrates were used for co-digestion. Potatoes (*Solanum tuberosum*) were chosen to represent carbohydrate-rich co-substrates as this crop can be grown all over Europe. Imported potato biomass for anaerobic digestion, such as potato pieces and peelings, are residues from the food industry and thus a waste product which has to be disposed of. Therefore, the GHG emissions and costs for the production of potatoes were neglected, whereas emissions and costs of transports were included. The imported potatoes were estimated to be 50% of the manure mass produced in the baseline scenarios; these amounts were maintained on farms with reduced livestock density. The calculations of must be aggregated to the European level. Data from the Farm Accountancy Data Network (FADN) were used to estimate the proportion of existing dairy farms that are represented by the congruent defined model farms, below denoted as "specialized" dairy farms (FADN, 2000). For this purpose, FADN data were classified according to the following characteristics:

- Climatic region (Atlantic, Continental, Boreal, Pre-Alpine, Mediterranean),
- Farming system (organic or conventional),
- Milk as share of total farm output (specialized dairy production),
- Average milk yield per hectare (production intensity).

This arrangement in groups of European milk production and the selection of specialized dairy farm types had the consequence that only a minor part of the total number of dairy farms were considered for the upscaling approach. The FADN survey for the year 2000, for example, represented 0.6 million EU(15) dairy farms (125 Mt milk produced), but only 0.2 million farms (48 Mt milk produced) fitted the requirements of specialized dairy farms, which assumed that the milk production on these farms have a share of more than 60% of total farm output and an average milk yield of more than 8 t per hectare. The mitigation potential was first calculated for the different groups of specialized dairy farms and then scaled up to the total EU(15) dairy production by multiplying with the ratio of the specialized farms to that of total EU(15) milk production.

The calculations with the FarmGHG model provided the amount of CO_2-equivalents per kg milk produced by each farm type in the different dairy production regions (Atlantic, Continental, Boreal, Pre-Alpine, Mediterranean), and it provided the mitigation potential of the selected mitigation options. Relating this information (kg CO_2-eq. kg^{-1} milk) to the FADN data on milk production in each region (Mt of milk) offers the amount of GHG emissions mitigated by the different farm types and regions:

$$(\text{kg}\,CO_2\text{-eq.}\ \text{kg}^{-1}\,\text{milk})_{\text{farm type}} \times (\text{Mt of milk})_{\text{region}} = (\text{Mt}\,CO_2\text{-eq.})_{\text{farm type, region}} \qquad (1)$$

There is no information available on the number of organic dairy farms and the amount of organic milk produced, and thus a simplified approach was needed for organic farming. Consequently, an estimation of the amount of organic milk was made by considering the proportion of organic farming to total agriculture in each country using data provided by SOEL/FiBL (2003).

3. Results and discussion

The simulated GHG emissions ranged from 1.3 to 1.7 kg CO_2-eq. kg^{-1} milk for conventional, and from 1.2 to 2.0 kg CO_2-eq. kg^{-1} milk for organic dairy farms (Table 1). This was slightly higher compared to the GHG emissions of 1.09 kg CO_2-eq. kg^{-1} milk estimated for livestock systems in the USA (Phetteplace et al., 2001). On average for all European dairy regions, the emissions from organic production systems were approximately 1.6 kg CO_2-eq. kg^{-1} milk and thus 10% higher compared to the conventional model farms (1.4 kg CO_2-eq. kg^{-1} milk). It is not a general conclusion that organic farms give higher emissions than conventional farms, since organic farms showed the highest (Medit. 2), but also the lowest GHG emissions (Boreal 2) of all European model farms. Especially the Atlantic region with three different conventional model farms showed that farm type and crop rotations (mixed, grass and maize) also influence GHG emissions significantly (1.3–1.6 kg CO_2-eq. kg^{-1} milk). Details of model calculation results for the different farm types and regions are presented by Olesen et al. (2006).

Table 1
Characteristics of organic and conventional dairy model farms, and GHG emissions in kg CO_2-eq. per kg milk with different replacement rate combinations

	Farm type	Livestock density (LU ha^{-1})	Crop rotation	Manure	Baseline (kg CO_2-eq. kg^{-1} milk)		RR1 40%/sell (kg CO_2-eq. kg^{-1} milk)		RR2 30%/keep (kg CO_2-eq. kg^{-1} milk)		RR3 30%/sell (kg CO_2-eq. kg^{-1} milk)	
Atlantic 1	Convent.	2.7	Mixed	Slurry	1.33	(11/41/48)	1.27	(11/42/47)	1.30	(11/41/48)	1.19	(11/42/47)
Atlantic 2	Organic	1.5	Mixed	Slurry	1.45	(4/56/40)	1.38	(5/56/40)	1.41	(4/56/40)	1.30	(5/56/39)
Atlantic 3	Convent.	2.7	Grass	Slurry	1.55	(12/34/54)	1.47	(12/34/54)	1.51	(12/34/54)	1.39	(12/34/54)
Atlantic 4	Convent.	2.7	Maize	Slurry	1.25	(10/41/49)	1.19	(10/41/49)	1.22	(10/41/49)	1.12	(10/41/49)
Cont. 1	Convent.	2.2	Mixed	Slurry	1.33	(10/40/50)	1.25	(10/40/50)	1.29	(10/40/50)	1.17	(10/40/50)
Cont. 2	Organic	1.2	Mixed	Slurry	1.43	(5/45/49)	1.34	(6/46/49)	1.38	(6/46/49)	1.25	(6/46/48)
Pre-Alp. 1	Convent.	2.1	Mixed	FYM	1.48	(12/37/51)	1.39	(12/37/51)	1.43	(12/37/51)	1.31	(12/37/50)
Pre-Alp. 2	Organic	1.2	Mixed	Slurry	1.59	(5/45/50)	1.48	(6/46/49)	1.53	(5/45/49)	1.39	(6/46/49)
Boreal 1	Convent.	1.1	Mixed	Slurry	1.28	(13/36/51)	1.22	(13/36/51)	1.25	(13/36/51)	1.15	(13/36/51)
Boreal 2	Organic	0.7	Mixed	Slurry	1.18	(11/36/53)	1.11	(11/37/52)	1.15	(11/37/52)	1.05	(11/37/52)
Medit. 1	Convent.	2.5	Mixed	Slurry	1.70	(9/43/48)	1.61	(9/43/48)	1.66	(9/43/48)	1.51	(9/44/47)
Medit. 2	Organic	1.4	Mixed	Slurry	2.03	(5/52/44)	1.92	(5/52/43)	1.97	(5/52/44)	1.79	(5/52/43)

The share of CO_2, CH_4 and N_2O emissions as a percentage of CO_2-eq. is given in brackets.

animal house increases animal health and welfare and therefore the production performance (Hartung and Wathes, 2000). Odors may be reduced and nutrients and organic matter conserved. However, it has to be taken into account that preventing losses of NH_3 from housing and storage results in a higher nutrient concentration in the manure. Hence, the emissions during application will increase if no preventative measures are introduced (Klaassen, 1994). The more frequent removal of manure requires neither technical expenditures nor additional energy, as the amount of manure pumped out remains constant. However, the higher frequency of the pumping process is associated with a higher expenditure of human labor and increased capacity demands for outdoor storage facilities, which have to be considered in cost calculations.

On an aggregated European level, the emission reduction by means of this measure ranged from 1.7 to 2.5 Mt CO_2-eq. a^{-1} for the conventional farm types, and was 0.1 Mt CO_2-eq. a^{-1} for the organic farm Atlantic 2 (Table 3). For the Pre-Alpine farm type, the more frequent removal of manure affected a reduction of only 0.01 Mt CO_2-eq. a^{-1} for the region and had therefore only a small mitigation potential. There are no European statistics available on manure management practices in dairy farming, but probably the frequency of manure removal from the house to an outside manure store will vary considerably, and there is thus a large uncertainty associated with the evaluation of the regional efficiency of this mitigation measure.

The use of scrapers for reducing NH_3 emissions increased GHG emissions at the farm level (Table 4). Although scraping reduced indirect N_2O emissions derived from NH_3 volatilization, the additional GHG emissions predicted during prolonged outside storage and after field application were much higher. The increase in emissions from agricultural soils is a consequence of a higher emission factor for nitrate leaching (2.5%) than for NH_3 volatilization (1.0%). Using scrapers increases the manure N content and thus may reduce the need of mineral fertilizers. For conventional farms, decreasing the import of mineral fertilizers is an option to reduce GHG emissions due to lower prechain emissions. However, the GHG emissions associated with the electricity needed to operate the scrapers exceeded the reduction from reduced import of N fertilizers, and the net result was an increase in prechain emissions with use of scrapers. The organic farms do not have the option to import mineral fertilizer and therefore the use of scraper resulted in a higher increase in emissions compared with the conventional farms.

Even though the use of scraping systems did not reduce total GHG emissions, this option also gives more hygienic production conditions and thus improved animal health and welfare. But in contrast to the higher frequency of manure removal, scraping systems are connected with significantly higher costs of ca 33.2 € cow^{-1} a^{-1} (Eurich-Menden et al.,

Table 4
Percentage effect of using scrapers in animal houses on GHG emissions from Atlantic dairy farms in comparison to a baseline scenario without scrapers

Farm type	Increase in emissions for using scraper (%)				
	House	Manure store	Fields	Prechains	Farm
Atlantic 1	−0.3	0.1	0.9	0.7	0.45
Atlantic 2	−0.2	0.1	1.3	6.4	0.76
Atlantic 3	−0.4	0.1	0.6	0.6	0.38
Atlantic 4	−0.4	0.1	0.6	1.1	0.43

Table 5
GHG emissions in kg CO_2-eq. kg^{-1} milk for biogas production scenarios

	Baseline	BG1[a] (m) (kg CO_2-eq. kg^{-1} milk)		BG2[a] (m + p) (kg CO_2-eq. kg^{-1} milk)		BG3[a] (m + c) (kg CO_2-eq. kg^{-1} milk)		BG4[a] (m + c + p) (kg CO_2-eq. kg^{-1} milk)	
		e_{40}	e_{total}	e_{40}	e_{total}	e_{40}	e_{total}	e_{40}	e_{total}
Atlantic 1	1.33	1.13	1.12	0.97	0.77	1.18	1.01	0.95	0.50
Atlantic 2	1.45	1.20	1.20	1.00	0.81	1.20	0.96	0.94	0.42
Atlantic 3	1.55	1.42	1.41	1.26	1.07	1.60	1.49	1.38	0.99
Atlantic 4	1.25	1.13	1.12	0.96	0.78	1.11	0.87	0.88	0.37
Cont. 1	1.33	1.14	1.14	0.92	0.68	1.18	0.88	0.88	0.21
Cont. 2	1.43	1.07	1.07	0.70	0.48	1.09	0.89	0.61	0.05
Pre-Alp. 1	1.48	1.44	1.38	1.09	0.71	1.50	1.25	0.97	0.24
Pre-Alp. 2	1.59	1.42	1.42	1.06	0.83	1.65	1.52	1.11	0.62
Pre-Alp. 3	1.50	1.41	1.40	1.07	0.80	1.64	1.46	1.11	0.58
Boreal 1	1.28	1.13	1.13	0.84	0.60	1.34	1.11	0.94	0.33
Boreal 2	1.18	1.03	1.03	0.66	0.47	1.17	0.97	0.73	0.16
Medit. 1	1.70	1.51	1.30	1.50	0.97	1.74	1.35	1.71	0.85
Medit. 2	2.03	1.79	1.79	1.72	1.39	2.24	1.95	2.14	1.39
Medit. 3	1.82	1.80	1.76	1.73	1.36	2.25	1.95	2.16	1.38

[a] BG1 (m): manure, BG2 (m + p): manure + imported potatoes, BG3 (m + c): manure + crops, BG4 (m + c + p): manure, crops + imported potatoes with thermal use of energy of 40 MWh a^{-1} (e_{40}) and total use of energy produced (e_{total}).

Table 7
Electricity generation costs in ct kWh^{-1} by biogas production for 50 and 100 ha scenarios if all thermal energy was utilized

Farm type[a]	50 ha farm (ct kWh^{-1})				100 ha farm (ct kWh^{-1})			
	m	m + p	m + c	m + c + p	m	m + p	m + c	m + c + p
Atlantic 1	26.7	11.5	17.9	11.3	18.3	8.5	14.1	9.0
Atlantic 2	37.0	15.0	20.4	14.0	24.5	10.7	16.2	11.0
Atlantic 3	26.7	11.5	21.4	12.0	18.3	9.4	17.4	10.0
Atlantic 4	26.7	11.5	15.6	10.7	18.3	8.6	12.4	8.7
Continental 1	28.3	12.0	14.3	10.3	19.3	8.9	10.9	8.0
Continental 2	39.1	15.9	24.3	14.3	26.3	11.4	16.7	10.8
Pre-Alpine 1	18.2	10.6	15.2	9.9	12.9	7.6	11.9	8.0
Pre-Alpine 2	41.6	16.6	24.5	14.9	27.4	11.7	17.5	11.1
Pre-Alpine 3	32.1	15.4	23.0	14.6	21.4	11.0	16.8	10.9
Boreal 1	37.0	14.9	18.3	12.6	24.5	10.7	13.5	9.5
Boreal 2	54.4	20.0	22.8	15.7	33.6	13.9	16.0	11.3
Mediterranean 1	23.1	10.3	17.8	10.3	16.2	7.8	13.9	8.3
Mediterranean 2	32.0	13.2	19.2	12.4	21.4	9.6	14.6	9.6
Mediterranean 3	26.1	12.5	18.8	12.2	17.7	9.2	14.3	9.5

[a] BG1 (m): manure, BG2 (m + p): manure + imported potatoes, BG3 (m + c): manure + crops, BG4 (m + c + p): manure, crops + imported potatoes.

For the Atlantic region the implementation of anaerobic digestion on conventional farms could reduce GHG emissions between 2.5 (BG3) and 9.9 Mt CO_2-eq. a^{-1} (BG2), when thermal energy was only partly used (e_{40}) (Table 8). By implementing this measure on organic farms, an average mitigation potential for the Atlantic region of 0.4 Mt CO_2-eq. a^{-1} for all scenarios was achievable. Considering total use of thermal energy (e_{total}), the highest mitigation potential was available for conventional farms in the Atlantic region. Total amounts of 5 (BG1), 8 (BG3), 16 (BG2) and 24 Mt CO_2-eq. a^{-1} (BG4) were calculated after scaling the farm level results up to the region. The mitigation potential of organic farming in this region was smaller: only from 0.3 (BG1) to 1.2 Mt CO_2-eq. a^{-1} (BG4) for the whole region was achievable according to these calculations.

3.4. Improved manure application techniques

Trail hose application (AT1) reduced emissions from all conventional model farms by an average 0.7%, whereas the reduction by injection (AT2) was on average 3.2% compared to broadcasting (Table 9). This is in contrast to organic production systems, where changes in GHG emissions were negligible. On organic farms, there is no reduction of imported fertilizers, and the net increase in N applied to the field may increase N leaching, which in some cases leads to greater N_2O emissions and to higher total GHG emissions per kg milk produced, even if the impact on yield associated with manure use was considered. Controlling GHG emissions from manure application is particularly important because, without an improved application at the end-of-pipe

Table 8
Total GHG emissions for specialized dairy farms in EU(15) regions with different mitigation options related to biogas production on 50 ha farms (Mt CO_2-eq. a^{-1})

Farm type	Baseline GHG emissions (Mt CO_2-eq. a^{-1})	BG1 (m) (Mt CO_2-eq. a^{-1})		BG2 (m + p) (Mt CO_2-eq. a^{-1})		BG3 (m + c) (Mt CO_2-eq. a^{-1})		BG4 (m + c + p) (Mt CO_2-eq. a^{-1})	
		e_{40}	e_{total}	e_{40}	e_{total}	e_{40}	e_{total}	e_{40}	e_{total}
Atlantic 1	41.9	35.6	35.4	40.3	24.4	37.2	31.7	44.0	15.7
Atlantic 2	1.6	1.3	1.3	1.5	0.9	1.3	1.1	1.6	0.5
Atlantic 3	48.9	44.6	44.5	49.3	33.6	50.3	46.9	57.3	31.1
Atlantic 4	39.4	35.5	35.3	40.1	24.4	34.9	27.5	41.7	11.5
Continental 1	12.6	10.8	10.8	12.5	6.5	11.3	8.4	13.7	2.0
Continental 2	1.3	1.0	1.0	1.0	0.4	1.0	0.8	1.1	0.1
Pre-Alpine 1	2.0	2.0	1.9	2.3	1.0	2.1	1.7	2.4	0.3
Pre-Alpine 2	0.5	0.5	0.5	0.5	0.3	0.5	0.5	0.6	0.2
Pre-Alpine 3	0.5	0.5	0.5	0.5	0.3	0.5	0.5	0.6	0.2
Boreal 1	2.5	2.3	2.3	2.5	1.2	2.7	2.2	3.1	0.7
Boreal 2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.3	0.1
Mediterranean 1	5.6	5.5	4.9	6.8	3.9	5.8	5.1	8.2	3.5
Mediterranean 2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1
Mediterranean 3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1

that reduce the total mitigation effect in comparison to the sum of individual options. This is mainly caused by compensating effects between the different measures.

The aggregated mitigation potentials for the different strategies ranged from 0.03 (Medit. 2, S1) up to 13.2 Mt CO_2-eq. a^{-1} (Cont. 1, S2) for the whole region compared to the baseline (Table 10). The high mitigation potential of S2, in particular for the Continental region, was due to the fact that fossil fuel substitution by the production of biogas was taken into account. The effectiveness of the strategies analyzed was higher both for conventional and organic farming systems when the total produced thermal energy was used.

The implementation of the options 'lifetime efficiency', 'biogas production' and 'improved application techniques' is recommendable for all organic and conventional dairy farms in Europe. The combination of measures influenced all aspects of dairy production and clearly increased the GHG mitigation effect compared to a single option.

4. Conclusions

The model calculations presented in this study show that many of the mitigation measures suggested in the literature, such as scraping systems and a frequent removal of manure from animal housing into a covered storage, do not always have the expected reduction potential when evaluated at the farm level. Therefore, it is recommended for future research projects that evaluation of mitigation measures considers effects on both NH_3, N_2O, CH_4 and CO_2 emissions of the whole production process, as shown by the model calculations presented in this study. In addition, the evaluation of mitigation measures of model farms within the five European dairy production regions, comprising a wide range of production intensities and crop rotations, clarified the dependencies between farm types and region-specific conditions.

In general, the most cost-effective mitigation measures were those that simultaneously reduced emissions of several greenhouse gases from the whole production chain. This was exemplified by biogas production, which has the ability to reduce on-farm emissions of CH_4 and N_2O, and to substitute at the same time the use of fossil fuels. Biogas production will often need to be subsidized through support for investments and/or through guaranteed prices for the electricity produced. Many of the other mitigation options analyzed will only be cost-effective if they are linked to a general increase in effectiveness of the nutrient cycling on the farm (Velthof et al., 1998). An increasing efficiency in the cycling of nitrogen is desirable also for other reasons, including the need to reduce NH_3 volatilization and nitrate leaching, and such reasons may in many cases be the primary driving forces for improved efficiencies.

The Atlantic region is the most important and intensive European dairy region and thus has the largest mitigation potential. According to the calculations, strategy S2 had the most effective set of measures to reduce GHG emissions in this region. A total reduction of 30 Mt of CO_2-eq. a^{-1} is achievable by means of this strategy for all conventional specialized dairy farms in the Atlantic region. Regarding the EU(15), a mitigation potential of 50 Mt CO_2-eq. a^{-1} for conventional and 3.2 Mt CO_2-eq. a^{-1} for organic specialized dairy farms was calculated. When the total EU(15) milk production was considered, the potential GHG emission reduction in the dairy farming industry was estimated at 138 Mt CO_2-eq. a^{-1} by the full implementation of strategy S2, corresponding to 3.5% of total anthropogenic GHG emissions within EU(15). It can be concluded that considerable possibilities for emission reduction regarding the agricultural sector were identified.

Acknowledgement

The study was part of the MIDAIR project funded by EC contract EVK2-CT-2000–00096.

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Appendix I

Comments Received on Proposed Mitigated Negative Declaration

STATE OF CALIFORNIA Arnold Schwarzenegger, Governor

NATIVE AMERICAN HERITAGE COMMISSION
915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-6251
Fax (916) 657-5390
Web Site www.nahc.ca.gov
e-mail: ds_nahc@pacbell.net

Received
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SJVAPCD

April 7, 2008

Mr. Chris Kalashian
SAN JOAQUIN VALLEY UNIFIED AIR POLLUTION CONTROL DISTRICT
1990 E. Gettysburg Avenue
FRESNO, CA 93726

Re: SCH#2007091073; CEQA Notice of Completion; Proposed Mitigated Negative Declaration for the Bar 20 Dairy Project, including Pipeline Construction; Kerman; Fresno County, California

Dear Mr. Kalashian:

The Native American Heritage Commission is the state agency designated to protect California's Native American Cultural Resources. The California Environmental Quality Act (CEQA) requires that any project that causes a substantial adverse change in the significance of an historical resource, that includes archaeological resources, is a 'significant effect' requiring the preparation of an Environmental Impact Report (EIR) per the California Code of Regulations §15064.5(b)(c (CEQA guidelines). Section 15382 of the 2007 CEQA Guidelines defines a significant impact on the environment as "a substantial, or potentially substantial, adverse change in any of physical conditions within an area affected by the proposed project, including ... objects of historic or aesthetic significance." In order to comply with this provision, the lead agency is required to assess whether the project will have an adverse impact on these resources within the 'area of potential effect (APE)', and if so, to mitigate that effect. To adequately assess the project-related impacts on historical resources, the Commission recommends the following action:

√ Contact the appropriate California Historic Resources Information Center (CHRIS) for possible 'recorded sites' in locations where the development will or might occur.. Contact information for the Information Center nearest you is available from the State Office of Historic Preservation (916/653-7278)/ http://www.ohp.parks.ca.gov. The record search will determine:

- If a part or the entire APE has been previously surveyed for cultural resources.
- If any known cultural resources have already been recorded in or adjacent to the APE.
- If the probability is low, moderate, or high that cultural resources are located in the APE.
- If a survey is required to determine whether previously unrecorded cultural resources are present.

√ If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.

- The final report containing site forms, site significance, and mitigation measurers should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum, and not be made available for pubic disclosure.
- The final written report should be submitted within 3 months after work has been completed to the appropriate regional archaeological Information Center.

√ Contact the Native American Heritage Commission (NAHC) for:

  * A Sacred Lands File (SLF) search of the project area and information on tribal contacts in the project vicinity that may have additional cultural resource information. Please provide this office with the following citation format to assist with the Sacred Lands File search request: USGS 7.5-minute quadrangle citation with name, township, range and section; .

- The NAHC advises the use of Native American Monitors to ensure proper identification and care given cultural resources that may be discovered. The NAHC recommends that contact be made with Native American Contacts on the attached list to get their input on potential project impact (APE). In some cases, the existence of a Native American cultural resources may be known only to a local tribe(s).

√ Lack of surface evidence of archeological resources does not preclude their subsurface existence.

- Lead agencies should include in their mitigation plan provisions for the identification and evaluation of accidentally discovered archeological resources, per California Environmental Quality Act (CEQA) §15064.5 (f). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American, with knowledge in cultural resources, should monitor all ground-disturbing activities.
- A culturally-affiliated Native American tribe may be the only source of information about a Sacred Site/Native American cultural resource.
- Lead agencies should include in their mitigation plan provisions for the disposition of recovered artifacts, in consultation with culturally affiliated Native Americans.

√ Lead agencies should include provisions for discovery of Native American human remains or unmarked cemeteries in their mitigation plans.

* CEQA Guidelines, Section 15064.5(d) requires the lead agency to work with the Native Americans identified by this Commission if the initial Study identifies the presence or likely presence of Native American human remains within the APE. CEQA Guidelines provide for agreements with Native American, identified by the NAHC, to assure the appropriate and dignified treatment of Native American human remains and any associated grave liens.

√ Health and Safety Code §7050.5, Public Resources Code §5097.98 and Sec. §15064.5 (d) of the California Code of Regulations (CEQA Guidelines) mandate procedures to be followed, including that construction or excavation be stopped in the event of an accidental discovery of any human remains in a location other than a dedicated cemetery until the county coroner or medical examiner can determine whether the remains are those of a Native American. . Note that §7052 of the Health & Safety Code states that disturbance of Native American cemeteries is a felony.

<u>√ Lead agencies should consider avoidance, as defined in §15370 of the California Code of Regulations (CEQA Guidelines), when significant cultural resources are discovered during the course of project planning and implementation</u>

Please feel free to contact me at (916) 653-6251 if you have any questions.

Sincerely,

Dave Singleton
Program Analyst

Attachment: List of Native American Contacts

Cc: State Clearinghouse

Native American Contacts
Fresno County
April 7, 2008

North Fork Mono Tribe
Ron Goode, Chairperson
13396 Tollhouse Road — Mono
Clovis , CA 93619
eagleye@cuip.net
(559) 299-3729 Home

Kings River Choinumni Farm Tribe
John Davis, Chairman
1051 Brookside Drive — Foothill Yokuts, Choinumni
Clovis , CA 93611
559-324-9908

Santa Rosa Rancheria
Clarence Atwell, Chairperson
P.O. Box 8 — Tache, Tachi, Yokut
Lemoore , CA 93245
(559) 924-1278
(559) 924-3583 Fax

Kenneth Woodrow
1179 Rock Haven Ct. — Foothill Yokuts, Mono
Salinas , CA 93906
831-443-9702

Table Mountain Rancheria
Lee Ann Walker Grant, Chairperson
P.O. Box 410 — Yokuts
Friant , CA 93626-0177
(559) 822-2587
(559) 822-2693 FAX

Dumna Tribal Government
Jim Redmoon - Cultural Resources Representative
535 W. Dayton — Dumna/Foothill, Choinumni
Fresno , CA 93705
559-241-0226

Dumna Wo-Wah Tribal Goverment
Keith F. Turner, Tribal Contact
P.O. Box 306 — Dumna/Foothill, Mono
Auberry , CA 93602
(559) 855-3128 Home
(559) 696-0191 (Cell)

Chaushiha Tribe
Jerry Brown
10553 N. Rice Road — North Valley Yokuts
Fresno , CA 93720
559-434-3160

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native American with regard to cultural resources for the proposed, SCH#2007091073; CEQA Notice of Completion; Initial Study and Proposed Migiated Negative Declaration for the Bar 20 Dairy, including Pipeline Construction; Kerman Community; Fresno County, California.

California Regional Water Quality Control Board

Central Valley Region

Linda Adams
Secretary for Environmental Protection

Fresno Office
1685 E Street, Fresno, California 93706
Phone (559) 445-5116 • FAX (559) 445-5910
Internet Address: http://www.waterboards.ca.gov/centralvalley

Arnold Schwarzenegger
Governor

9 April 2008

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SJVAPCD

Mr. Chris Kalashian
San Joaquin Valley Air Pollution Control District
1990 East Gettysburg Avenue
Fresno, CA 93726

REVIEW OF REVISED MITIGATED NEGATIVE DECLARATION FOR THE EXPANDED PORTION OF BAR 20 DAIRY NO. 2, FRESNO COUNTY, SCH #2007091073

On 21 March 2008, we received a copy of the revised Proposed Mitigated Negative Declaration and Initial Study for the expanded portion of the Bar 20 Dairy prepared by your agency as the lead agency with respect to the California Environmental Quality Act (CEQA). The Regional Water Board is a responsible agency with respect to water quality. Regional Water Board staff commented on the original and revised versions of the environmental document in letters dated 12 October 2007 and 22 January 2008, respectively.

Section 2.6.8 (entitled Hydrology/Water Quality) of this most recent version of the Mitigated Negative Declaration, includes a discussion of the Regional Board's current regulation of the original portion of the dairy through a General Order, and the tentative Individual Order, which, when adopted by the Regional Board will be used to regulate the entire expanded dairy. We have no additional comments beyond those provided in our previous letters.

If you have any questions regarding this matter, please call Steve Hulbert at (559) 444-2502.

STEVEN M. HULBERT
Environmental Scientist

DAVID A. SHOLES
Senior Engineering Geologist
CEG No. 1687

cc: State Clearinghouse
Steve Shehadey, Bar 20 Partners, LTD. P.O. Box 1231, Fresno, CA 93715
Jeffrey Dasovich, Microgy, Inc., PO Box 2324, Mill Valley, CA 94942
Quad Knopf, P. O. Box 3699, Visalia, CA 93278

EDMUND G. BROWN JR.
Attorney General

State of California
DEPARTMENT OF JUSTICE

1515 CLAY STREET, 20TH FLOOR
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OAKLAND, CA 94612-0550

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April 10, 2008

David Warner
Director of Permit Services
San Joaquin Valley Air Pollution Control District
1990 East Gettysberg Ave.
Fresno, CA 93726-0244

RE: Proposed Mitigated Negative Declaration and Initial Study for Bar 20 Dairy

Dear Mr. Warner:

I am writing to memorialize our telephone conversation of April 8 regarding the Bar 20 Dairy expansion project. Thank you for continuing to discuss this project with me.

You stated that the Air District would place enforceable conditions on permits issued to the Bar 20 Dairy in order to ensure that the mitigation measures identified in the March 2008 Proposed Mitigated Negative Declaration and Initial Study are implemented. Some of these conditions are described on pages 1-3 to 1-8 and 2-33 to 2-34 of the document. Specifically, the permits will require Bar 20 to permanently close down other diaries within the District and to provide proof that these closures represent a GHG emission reduction equivalent to 10,401.3 tons of CO_2 per year. Bar 20 will not be allowed to expand to its maximum permitted herd size until the other dairies have been closed. You said that in addition to requiring Bar 20 to provide the written evidence described in the document, the Air District would conduct site inspections at Bar 20 and the closed dairies to confirm that the mitigation measures have been implemented. The Air District will also condition Bar 20's permits on the feeding and other mitigation measures and will conduct site inspections to ensure compliance. Further, you confirmed that because the methane digester is now part of the project that the Air District has analyzed under CEQA, it is the Air District's position that Bar 20 is obligated to build and operate the methane digester and does not have the option to not do so.

As I have discussed with you by telephone and in our two previous comment letters, the Initial Study substantially underestimates the increase in greenhouse gasses (GHG) from the expansion of the Bar 20 Dairy because it considers a large GHG emission source at the expanded dairy – the liquid manure lagoon – to be an existing source. The Initial Study states the net methane emissions from the project will be a *reduction* equivalent to 13,868 tons of CO_2 per year. It does not make sense that almost tripling the number of cows at the dairy could have the effect of reducing GHG emissions. We believe that even if all of the mitigation measures are implemented, the Bar 20 Diary expansion will lead to a net methane *increase* equivalent to 8,121 tons of CO_2 per year.

Finally, this letter should not be construed as support for the Air District's draft proposed significance threshold for GHG, which is included as Appendix F to the March 2008 Proposed Mitigated Negative Declaration and Initial Study. As you are aware, the Attorney General's Office and the Air District will have further discussions about this issue in the near future.

The Attorney General urges the Air District to use its enforcement authority to ensure that Bar 20 implements all of the mitigation measures identified in the March 2008 Proposed Mitigated Negative Declaration and Initial Study in a timely manner. We appreciate the Air District's consideration of our comments on the Bar 20 Dairy expansion project and we look forward to working with the Air District in the future.

Sincerely,

TIMOTHY E. SULLIVAN
Deputy Attorney General

For EDMUND G. BROWN JR.
Attorney General

cc: Chris Kalashian, San Joaquin Valley Air Pollution Control District
Arnaud Marjollet, San Joaquin Valley Air Pollution Control District

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Via Email and Overnight Delivery

April 15, 2008

Chris Kalashian
Air Quality Specialist
San Joaquin Valley Unified Air Pollution Control District
ISR/CEQA Department
1990 East Gettysburg Avenue
Fresno, CA 93726-0244
Email: Chris.kalashian@valleyair.org
Phone: (559) 230-6000

Re: Comments on Revised Mitigated Negative Declaration for the Bar 20 Dairy, State Clearinghouse No. 2007091073

Dear Mr. Kalashian:

The Center for Biological Diversity (the "Center"), Earthjustice, Sierra Club, the Association of Irritated Residents ("AIR"), and the Center on Race, Poverty & the Environment ("CRPE") submit these comments on the Revised Mitigated Negative Declaration ("MND") for the Bar 20 Dairy, Project No. C-1060791 ("Project"). While the revised MND responds to some of our earlier comments on the Project,[1] we continue to have significant concerns that the environmental impacts of the Project have not been properly analyzed and mitigated. Specifically, the revised MND fails to accurately inventory the Project's greenhouse gas ("GHG" emissions), does not sufficiently document the emissions reductions from its proposed mitigations, and fails to implement all feasible mitigation measures and offset remaining emissions. Accordingly, there continues to be a fair argument that the proposed Project may have significant air quality impacts and impacts from the Project's GHG emissions. Unless the MND remedies these deficiencies, an Environmental Impact Report ("EIR") must be prepared

[1] Joint comments submitted on the Project on January 22, 2008 by the Center, Earthjustice, the Sierra Club, AIR, and CRPE are herein incorporated by reference.

for the Project. *See, e.g., Architectural Heritage Assn. v. County of Monterey*, 122 Cal.App.4th 1095, 1109 (2004) (where a fair argument can be made that a proposed project may have a significant impact on the environment, the lead agency must prepare an EIR).

AIR is an unincorporated association of Valley-based residents from five counties, including Fresno, whose organizational purpose is to advocate for air quality in the Valley. CRPE is a national environmental justice legal organization with offices in San Francisco and Delano, California. CRPE provides legal and technical assistance to grassroots groups in low-income communities and communities of color fighting environmental hazards.

The Center is a non-profit conservation organization dedicated to the protection of native species and their habitats through science, policy, and environmental law. The Center's Climate, Air, and Energy Program works to reduce greenhouse gas emissions to protect biological diversity, our environment, and public health. We educate the public about the impacts of climate change on our world, including the animals and plants that live in it, and to build the political will to enact solutions. The Center has over 40,000 members throughout California and the western United States, including in the County of Fresno and within the San Joaquin Valley Air Pollution Control District. Center members will be directly impacted by the Project.

Earthjustice is a non-profit public interest law firm that works on behalf of its community, public-health, and environmental clients to defend their right to a healthy environment.

The Sierra Club is a non-profit conservation organization that works to protect the basic right of clean air and a healthy environment for all Americans and to ensure that polluters and the government agencies that regulate them adhere to environmental laws. The Tehipite chapter of the Sierra Club, which includes Fresno County, has long fought to improve air quality in the San Joaquin Valley, where its members are exposed to some of the worst air pollution in the country.

I. AIR QUALITY

A. Project Emissions May Be Grossly Understated

Insofar as the proposed Authority to Construct Application Review has not been amended, the following issues continue to concern us and suggest that the revised MND still does not adequately address the air quality impacts from this Project.

The District's analysis may significantly underestimate the emissions that will occur due to this Project. First, the analysis ignores "potentially significant emissions" from the feed handling and storage operation, stating that because an emission factor has not yet been established, the emissions are assumed to be zero (MND at A-5). However, the District cannot simply ignore potentially significant emissions and must provide a reasonably supported best estimate of these emissions together with appropriate mitigation measures. Likewise, the District ignores emissions from the solid manure handling system. Solid manure represents 52 percent of all manure generated by the existing Bar 20 dairy and is estimated to account for between 40 and

52 percent of the manure generated by the Project (id. at A-36, A-38), and yet "all affected pollutants" generated by solid manure are ignored and assumed to be zero due to a lack of emissions factor for the solid manure management system (*id.* at A-10, A-20). The lack of an established emissions factor for solid manure systems is not an excuse to ignore known emissions sources. The MND does, in fact, establish a fairly substantial emission factor for methane from the solid manure system (id. at A-36, A-38) and must not ignore the generation of other air emissions that may impact the environment.

Further, the so-called "control-efficiencies" assumed by the District to determine the "controlled emission factors" for PM-10 are arbitrary and cannot be supported. The District must analyze what reductions will actually be gained by the specific mitigation measures that will be required in the operating permits for the Bar 20 Dairy and should not rely on a poorly supported draft memorandum (*see* SJVUAPCD Draft Memorandum – Dairy and Feedlot PM-10 Mitigation Practices and their Control Efficiencies, cited at ATC Application Review at 16) in which control efficiencies are determined generally over the industry as a whole. For example, Saudi style barns are being proposed for use at the expanding dairy and are being credited with a 25 percent control efficiency. This 25 percent control efficiency is not justified anywhere in the cited memo nor in the District's analysis.

Thirdly, while the analysis claims credit for PM-10 offsets that were purchased in accordance with a settlement agreement between the District and the Bar 20 Dairy, this claim is inaccurate. In fact, the Bar 20 Dairy has purchased SOx emission reduction credits at a 2.25-to-1 ratio of SOx to PM-10. The District claims the purchase of these offsets is equivalent to reducing PM-10. While the District has tried to maintain this double standard for many years, EPA has rejected SOx-for-PM-10 trading in permitting situations just like this one. This is because the District determined in its EPA-approved PM-10 State implementation plan that controlling SOx emissions made "insignificant contributions toward attainment" (SJVAPCD 2003 at 7-3). Further, in the attached letter from EPA Region IX's Air Division Permit Office to the District regarding a source seeking to purchase SOx offsets to meet PM-10 offset requirements (EPA Region IX 2006), EPA states that, having approved the District's plan in which SOx control is discounted as having no impact on achieving the PM-10 NAAQS, "EPA can not now allow the use of SOx offsets to meet PM10 offset requirements under NSR. In essence, the District has stated and EPA has concurred that controlling SOx does not provide an equivalent environmental benefit as providing the required PM10 offsets."

Lastly, the reductions that result from feeding according to NRC guidelines are already factored into the emission factors (SJVAPCO 2005 at 3-4). Therefore, the District's analysis double-counts VOC reductions from this control measure, which in turn means that the post-project estimate for VOC emissions is underestimated and the assumption that the mitigation measures bring the source down to 9.9 tons of VOC (just below the CEQA significance threshold of 10 tons VOC) is in error.

B. Bar 20 Dairy is a Major Source of Methanol and Thus the District Must Require MACT

The Bar 20 Dairy emits methanol (also known as wood alcohol) from cows' enteric emissions, freshly excreted manure, and decomposing feed stored at the dairy. Methanol is on the Clean Air Act § 112(b) list of hazardous air pollutants ("HAP"). The human health risks from methanol exposure include a decrease in gestation time, an increase in the number of required Caesarian-section births, and, in prenatally exposed children, instances of a severe wasting syndrome, concentration-related delay in sensorimotor development and lower performance on an infant intelligence test. *American Forest and Paper Association v. EPA*, 294 F.3d 113, 118 (D.C. Cir. 2002) (upholding EPA decision not to delist methanol as a hazardous air pollutant), *citing* 66 Fed. Reg. 21929, 21932-21935 (May 2, 2001). Methanol is also a state-listed Toxic Air Contaminant and a VOC, which forms low-level ozone.

Section 112(g)(2)(B) of the Clean Air Act states:

> After the effective date of a permit program under subchapter V of this chapter in any State, no person may construct or reconstruct a major source of hazardous air pollutants in such State unless the Administrator (or the State) determines that the maximum achievable control technology emissions limitation under this section for new sources will be met. Such determination shall be made on a case-by-case basis where no applicable emissions limitations have been established by the Administrator.

CAA § 112(g)(2)(B).

The construction of the Bar 20 Dairy constituted the construction of a major source within the meaning of Clean Air Act § 112(g)(2)(B) and 40 C.F.R. § 63.41, because the Bar 20 Dairy is a stationary source located on contiguous property and under common control that emits more than 10 tons per year of methanol. The Bar 20 Dairy will include a total of 9,400 milk cows, 1,500 dry cows, and 6,900 heifers between the ages of 3-24 months (for a total of 8,400 dry cows). While the District cites a 2005 study claiming that the emission factor for methanol is 1.35 lbs/milk cow-yr, a more recent 2006 study shows that a lactating cow and its waste emit 11.12 lbs/milk cow-yr of methanol (Mitloehner 2006 at 32). A dry cow and its waste emit 3.09 lbs/milk cow-yr of methanol (*id.* at 31)(*see also* Card and Schmidt 2006). The District must consider this recent updated research and not continue to depend on an outdated emission factor to keep methanol emission numbers low. As *Association of Irritated Residents v. Fred Schakel Dairy*, 2008 U.S. Dist. LEXIS 25257 (E.D. Cal. March 28, 2008) suggests, an unwillingness to acknowledge more recent research does not insulate the District or the Bar 20 Dairy from a citizen suit under the Clean Air Act to enforce section 112(g)(2)(B).

Using the more recent emission factors, the total methanol emissions for the Bar 20 Dairy are calculated as follows:

9,400 milk cows * 11.12 lbs methanol/milk cow-yr = 104,528 lbs methanol/yr (52.26 tons/yr)
8,400 dry cows * 3.09 lbs methanol/dry cow-yr = 25,956 lbs methanol/yr (12.98 tons/yr)

Total = 130,484 lbs methanol/yr (65.24 tons/yr)

Because the total methanol emissions from the proposed expansion will be well over 10 tons/yr, the District must require the Bar 20 Dairy to comply with MACT pursuant to Clean Air Act section 112(g)(2)(B).

EPA has adopted regulations implementing this provision of the Act. 40 C.F.R. §§ 63.40 through 63.44. These rules provide:

> Prohibition. After the effective date of section 112(g)(2)(B) (as defined in § 63.41) in a State or local jurisdiction and the effective date of the title V permit program applicable to that State or local jurisdiction, no person may begin actual construction or reconstruction of a major source of HAP in such State or local jurisdiction unless:
>
> (1) The major source [is regulated by a standard issued under subsections 112(d), (h) or (j) of the Act and complies with such standard]; or
> (2) The permitting authority has made a final and effective case-by-case determination pursuant to the provisions of § 63.43 such that emissions from the constructed or reconstructed major source will be controlled to a level no less stringent than the maximum achievable control technology emission limitation for new sources.

40 C.F.R. § 63.42(c). The latest possible effective date of Section 112(g)(2)(B) is June 29, 1998. *See* 40 C.F.R. § 63.41. EPA gave final approval to California's Title V permit programs on December 7, 2001. *See* 66 Fed. Reg. 63503 (Dec. 7, 2001). After settling a lawsuit with San Joaquin Valley air quality advocates including AIR, EPA partially withdrew approval of California's Title V permit programs because Cal. Health & Safety Code § 42310(e) (2003) exempted "equipment used in agricultural operations used in the growing of crops or the raising of fowl or animals" from the duty to obtain a permit. 67 Fed. Reg. 63551 (Oct. 15, 2002). Effective January 1, 2004 and once California passed Senate Bill 700, which deleted the exemption, EPA granted full approval to California's Title V permit programs. 68 Fed. Reg. 65637 (Nov. 21, 2003). Because EPA approved California's Title V programs after June 29, 1998, the effective date of section 112(g)(2)(B) is June 29, 1998.

The federal regulations define the term "construct a major source" as:

> To fabricate, erect, or install at any greenfield site a stationary source or group of stationary sources which is located within a contiguous area and under common control and which emits or has the potential to emit 10 tons per year of any HAP's or 25 tons per year of any combination of HAP[.]

40 C.F.R. § 63.41. Because EPA has not established an applicable emission limitation for emissions of methanol from dairies under Sections 112(d), (h), or (j), section 112(g)(2)(B) of the Act requires the District to issue a source-specific determination that the Bar 20 Dairy would meet MACT for new major sources of methanol. The District failed to analyze methanol

emissions and failed to issue a determination that the Bar 20 Dairy would meet the MACT standard for new major sources. The construction of the Bar 20 Dairy violated section 112(g)(2)(B), and 40 C.F.R. § 63.42(c) on the day construction began. Every day after the date construction began represents a separate, on-going violation of these requirements until Bar 20 Dairy obtains a MACT determination from the District.

Finally, we note that the MND fails to analyze the impact of methanol on nearby receptors. Thus, even setting aside the specific control technology required, there is not dispute that this source emits toxic air contaminants that pose potentially serious health risks to surrounding communities. CEQA, at a minimum, requires these potentially significant adverse impacts to be assessed. The MND contains no such assessment.

C. The Bar 20 Dairy Is a Major Source Under the Clean Air Act

The District inappropriately concludes that the Project is not a major source of air pollution in the San Joaquin Valley as defined in section 3.25 of District rule 2201 and thereby allows the source to avoid certain requirements (such as BACT/LAER and offsets) that would further reduce air emissions in the Valley. The District's conclusion is based on its improper decision to categorize the emissions from the dairy's milking center, cow housing, manure storage, and feed storage and handling operations as fugitive. This decision artificially lowered the post-project stationary source potential to emit values in order to avoid a major source determination for the dairy. The District offers as its rationale CAPCOA guidance from 2005 that states: "No collection technologies currently exist for VOC emissions from these emissions units. Therefore, the VOC emissions from these sources are considered fugitive" (ATC Application Review at 46). This guidance, however, is both legally and factually flawed.

First, the CAPCOA guidance, does not apply the correct test for determining if emissions are legally considered "fugitive." EPA defines "fugitive emissions" as "those emissions which could not reasonably pass through a stack, chimney, vent, or other functionally-equivalent opening." 40 C.F.R. §§ 70.2, 71.2. Thus, the test is not whether emissions <u>are</u> collected, but whether they <u>could be</u> collected. EPA has interpreted this definition to mean whether emissions can be reasonably collected or captured (US EPA 2006c).[2] When determining whether emissions can be reasonably collected, EPA construes "reasonableness" broadly (US EPA 1999b).[3]

Emissions can be classified non-fugitive for a number of reasons. If emissions actually pass through a stack, chimney, vent or other functionally equivalent opening, they are non-fugitive *(id.)*. When emissions do not actually pass through one of the listed openings, it is presumed that they can be reasonably collected if they are actually being collected by other analogous sources *(id.)*. This means that if there is currently technology in use by other dairies to capture emissions, these emissions are presumed non-fugitive. Moreover, even if other dairies are not currently using technology, the "collection of specific pollutant-emitting activity can create a

[2] Letter from William Wehrum, U.S. EPA Acting Assistant Secretary, to Terry Stokes, National Cattlemen's Beef Association, Nov. 2, 2006.

[3] U.S. EPA, "Interpretation of the Definition of Fugitive Emissions in Part 70 and 71," 2 (Feb. 10, 1999) *available at* <u>http://www.epa.gov/region07/programs/artd/air/title5/t5memos/fug-def.pdf</u>.

presumption that collection is reasonable for a similar pollutant-emitting activity" *(id.)*. Therefore, if similar activities, such as CAFOs containing different animals, are currently capturing these supposedly "fugitive" emissions, there is a presumption that those emissions are non-fugitive. It is important to understand that this is not a best available control technology ("BACT")-type analysis of whether the emissions at the specific source being permitted should be required to be captured and controlled, but only whether or not those emissions are fugitive and should be included in the BACT analysis. The test for fugitive emissions is not a source-by-source test. If these emissions are, or can be, captured at similar sources, that is the end of the analysis.

The following sections demonstrate that emissions from the identified sources *are* reasonably capable of being captured, notwithstanding CAPCOA's outdated, conclusory claims.

Milking Parlors

The draft ATC permit claims that emissions from milking parlors are fugitive because they cannot be reasonably captured. The District acknowledges that the mechanical system for the milking parlors can capture emissions but argues that this would require the holding area to be entirely enclosed. BACT Analysis at 3. The District's conclusion that these emissions are fugitive is undercut by its own rule 4570, which demonstrates that these emissions are reasonably capable of being captured by these sources. That rule includes, among other requirements, the option of enclosing the milk parlor and venting to a VOC device in the list of class two mitigation measures (*see* Rule 4570, § 5.6B). In the District's staff report for rule 4570, the District cited studies showing that enclosing parlors and venting to a biofilter "might achieve the highest VOC reductions of all the management practices . . . combined" (SJVUAPCD 2006 at 28).[4] Therefore, since the District includes enclosed milking parlors in its CAFO rule, the District has already concluded that this technology is capable of capturing these emissions.

Furthermore, contrary to the District's assertion that "no facility currently encloses the holding area" *(id.)*, the staff report for rule 4570 describes the Hauls Dairy, an 1,100 head[5] dairy in Montana that encloses its animals in buildings and then vents the buildings to a biofilter *(id. at 28)*. The Hauls Dairy example shows both that enclosing milking parlors is possible and that there is a facility in use that encloses the holding area. Since there are already dairies using this control technology, the presumption is that emissions at milking parlors are not fugitive. Because the Bar 20 Dairy does not have any unusual circumstances that might rebut such a presumption, emissions from its milking parlors may not be ignored as fugitive and must be counted toward its major source determination.

Cow Housing

The District claims that only smaller dairies have enclosed freestall barns and that these dairies do not vent the exhaust through a collection device (ATC Application Review at 47). In

[4] SJVUAPCD Final Draft Staff Report: Proposed Rule 4570 (Confined Animal Facilities) (May 18, 2006).
[5] Since CARB's threshold for dairy Large Confined Animal Facilities is 1,000 head, Hauls would be considered a Large CAF if located in CA.

addition to this assertion, the District claims that the high airflows needed to protect herd health could not be achieved. Both of these assertions are again disproved by the District's rule 4570 analysis and quick research on other similar operations.

In its section entitled "Housing Animals in Buildings," the staff report notes that the Hauls Dairy, an 1,100 head dairy in Montana, encloses its animals in buildings and then vents the buildings to a biofilter (SJVUAPCD 2006 at 28). The staff report adds that by enclosing its dairy facilities, Hauls Dairy "increased milk production, decreased calving interval by over a month, reduced the number of cattle with symptoms of heat stress, and reduced odor at the facility" (*id.*). In addition, the North Florida Holsteins Dairy in Bell, Florida houses its entire herd of 6,400 dairy cows, with 3,700 milking cows, in tunnel ventilation barns (*see* http://www.northfloridaholsteins.com/info.html). Furthermore, with regard to biofilters, the District's Dairy Permitting Advisory Group states that "today there are more than 500 biofilters in Germany and in the Netherlands. In agriculture, biofiltration is widely used to control emissions from enclosed swine facilities and have been reported to be used in *dairy situations* from enclosed, mechanically ventilated *housing* and manure storage areas" (DPAG 2006 at 20, *emphasis added*).

Since there are already dairies enclosing cow housing areas and capturing these emissions, the presumption is that emissions at cow housing areas are not fugitive. Because the Bar 20 Dairy does not have any unusual circumstances that might rebut such a presumption, emissions from its cow housing areas should count toward its major source determination.

Manure Storage Areas

The District claims that it was "not able to find any facility, which currently captures the emissions from the storage or handling of manure piles" (ATC Application Review at 47). Yet the dairy has two obvious options for controlling solid manure emissions: either enclose the entire facility and process all manure through the digester, or enclose and vent solid manure storage areas. The District's own Rule 4570 notes that emissions from manure storage areas can be captured with technologies such as aerated static piles, enclosures, or digesters that are vented to a biofilter and includes these technologies as class two mitigation measures (Rule 4570, § 5.6E; SJVUAPCD 2006 at 27-31). In the staff report to the rule, the District notes that anaerobic digestion via methane digesters has been used on swine and dairy operations for solid waste handling and has achieved up to 90% control efficiency when vented to a secondary control (SJVUAPCD 2006 at 31). In addition to the operations mentioned in the staff report, other dairies like that of Dennis Haubenschild in Minnesota have successfully installed methane digesters (*see, e.g.,* http://www.wapa.gov/es/pubs/esb/2003/03Feb/esb029.htm and BACT discussion below).

Since there are already dairies using this control technology, the presumption again is that emissions from manure storage areas are not fugitive. Because the Bar 20 Dairy does not have any unusual circumstances that might rebut such a presumption, emissions from its manure storage areas must be counted toward its major source determination.

Feed Handling and Storage

The District claims that while there are significant emissions from feed handling and storage, "no system has been designed to successfully extract gases from the face of the [feed] pile to capture them" (ATC Application Review at 47). The District's claims, however, run counter to its analysis in rule 4570, which identified technologies such as enclosing silage in a bag and venting to a VOC control device, enclosing silage in a weatherproof structure and venting to a VOC control device, and eliminating silage from the animal diet altogether as options for capturing and/or controlling these emissions (*see* Rule 4570, § 5.6B).

Since the District has concluded that it is feasible and reasonable to capture emissions from feed handling and storage areas, emissions from these areas must be counted toward its major source determination. It is unclear how much of an increase in emissions this would cause because the District failed to even quantify emissions for feed handling and storage areas. However, the District concedes that emissions from feed handling and storage are "potentially significant" (ATC Application Review at 5). Therefore, the District should establish an emission factor for the Bar 20 Dairy's feed handling and storage areas and include these emissions in its major source determination.

Project Design Elements

In the revised MND, the District has added into its analysis the emissions from and emission reduction benefits of the use of a methane digester. The elements of this technology are themselves sources of certain criteria air pollutants and therefore must be included in the District's major source determination. Pages A-28 and A-29 of the MND provide emissions estimates for the thermophilic, mixed tank digester system, flare, and the natural gas-fired boiler associated with this technology. According to the District's estimates, this new design element adds at least[6] 9.82 tons per year of NOx, 1.54 tons of PM-10 per year, and 0.65 tons per year of VOC.

When all of these emissions are included, as required, the Bar 20 Dairy's emissions total at least 209,865 lbs per year of VOC. This emission level exceeds the major source threshold[7] of 50,000 lbs of VOC per year. Therefore, the project will make the Bar 20 Dairy a major source of VOC, and the District must regulate it accordingly.

D. The September 21, 2006 Version of District Rule 2201 Requires the Purchase of Offsets for Criteria Pollutants

[6] We say at least because the District calculates daily emission totals for the digester flare using a worst-case day but does not use the same number for calculating annual emissions from the flare. Therefore, the ATC permit for this device must ensure that the maximum gas flared annually does not exceed 453.21 MMscf/yr (MND at A-28).
[7] The District's analysis improperly uses the major source threshold of 25 tons per year that applies to severe ozone nonattainment areas even though the District was reclassified as an extreme ozone nonattainment area effective May 17, 2004, *see* 69 Fed. Reg. 20550 (April 16, 2004), and is required to have NOx and VOC thresholds of 10 tons per year.

District Rule 2201 states that, "[u]nless exempted pursuant to Section 4.6, offsets shall be required if the post-project Stationary Source Potential to Emit ("SSPE2") equals or exceeds the...offset threshold levels." The thresholds relevant to this Project are 20,000 lbs/year of VOC and 29,200 lbs/year of PM-10. The SSPE2 emission levels for VOC and PM-10 at the Bar 20 Dairy are 208,562 lbs/year of VOC and 47,902 lbs/year of PM-10 (MND at A-31). Thus, even if the emissions erroneously claimed as "fugitive" are excluded from SSPE2, emissions from the Project are well above the threshold levels and should trigger requirements for the source to purchase offsets.

The District erroneously claims that agricultural sources are exempt from the requirement to purchase offsets under Section 4.6.9 of Rule 2201 and therefore does not require the Project to fully offset the net increases of PM-10 and VOC emissions pursuant to that rule. However, contrary to the District's belief, no blanket exemption from offset requirements exists for agricultural sources in Rule 2201. The District points to an exemption in its rule pursuant to California Health & Safety Code Section 42301.18(c), which says:

> A district may not require an agricultural source to obtain emissions offsets for criteria pollutants for that source if emissions reductions from that source would not meet the criteria for real, permanent, quantifiable, and enforceable emission reductions.

The District claims that because it has not yet established protocols for verifying that offsets meet the above criteria, that state law prohibits it from requiring offsets from agricultural sources (SJVUAPCD Draft Staff Report: Rules 2020 and 2201, Attachment A, at 2 (Aug. 17, 2006)).[8] However, 42301.18(c) does not require the District to come up with these protocols, as they are already well-established and understood. What the District must do is make a determination of whether emissions from agricultural sources satisfy the criteria in order to be creditable—something the District has already done in the affirmative by seeking state implementation plan ("SIP") approval for its Agricultural Conservation Management Practices Program (Rule 4550) and its Confined Animal Facilities Rule (Rule 4570). The California Air Resources Board has confirmed this interpretation of state law:

> We believe that section 42301.18(c) does not ask whether or not the District has a regulatory protocol to verify whether ERC's offered by agricultural source [sic] are creditable, but rather sets forth the objective, generic criteria that must be satisfied by an agricultural source seeking credits for its emission reductions. If the proffered reductions are real...the District may, therefore, require the source to provide offsets....The existence of a District rule allowing such offsets to be generated is not germane to determining whether emission reductions from a given agricultural source "would" meet the criteria for real, permanent, quantifiable, and enforceable.

[8] Not attached but available upon request.

(CARB 2007 at 8-9).[9] The applicant should, therefore, be required to offset all net increases in VOC and PM-10 emissions from the project and the failure to do so has a detrimental effect on air quality.

E. The December 19, 2002 SIP-Approved Version of District Rule 2201 Does Not Exempt Agriculture from Offset Requirements

We note further that the above-noted "exemption" to the offset requirement by the District has not been approved into the SIP. Neither the version of District Rule 2201 that EPA approved as part of the SIP on February 13, 2003 (68 Fed Reg. 7330) nor the Clean Air Act provide an exemption for agricultural sources from the duty to obtain offsets. As such, the District's interpretation of California Health & Safety Code section 42301.18(c) conflicts with the federally-approved SIP and the Act itself and is preempted. *See Safe Air for Everyone v. EPA*, 475 F.3d 1096, 1105 (9th Cir. 2007); *Sierra Club v. TVA*, 430 F.3d 1337, 1346-47 (11th Cir. 2005) (A state may not unilaterally modify a requirement in a SIP without submitting the proposed change to the EPA for approval).

That agricultural sources must obtain offsets pursuant to the federally-approved District rule 2201 was recently upheld in *Association of Irritated Residents v. C & R Vanderham Dairy*, No. 1:05-CV-01593 (OWW), 2007 WL 2815038 (E.D. Cal. Sept. 25, 2007).

F. The District's Best Available Control Technology Analysis Is Flawed

Rule 2201 §3.9 defines best available control technology ("BACT") as the most stringent of four options, including technologies "achieved in practice for such category and class of source." There are two BACT technologies that are achieved in practice and particularly promising for this project. Dairy emissions are controllable using (1) enclosed and connected milk parlors and cow housing units vented to biofilters, and (2) anaerobic digester systems. Because these technologies are achieved in practice, the District must require them as BACT.

A significant number of anaerobic digesters are in use in California and in other parts of the United States, primarily at dairies, and they are in widespread use in Europe (US EPA 2007c, US EPA 2006b). The EPA described biogas recovery systems using anaerobic digesters as a "proven technology" as far back as 2002 (US EPA 2002). Thus, digesters are an "achieved in practice" technology and are required pursuant to the EPA-approved SIP rules.

We commend the Project applicant for committing to install a methane digester at the Project. The District, however, must amend the ATC Application Review to reflect this commitment and make the methane digester a condition of permit approval.

The District's BACT analysis for Bar 20 Dairy identifies enclosed milking parlors and cow housing units vented to biofilters as technologically feasible but eliminates these controls from consideration on the basis of cost-effectiveness (MND Appendix E, BACT Analysis at 4, 8, 17, 24). This conclusion, however, conflicts with previous District analysis of this technology. First, District Rule 4570 identifies vented enclosures as Class 2 Mitigation Measures equivalent

[9] Letter from W. Thomas Jennings, ARB Chief Counsel, to Brent Newell, CRPE, May 30, 2007.

to BACT (*see* 4570-2 – 4570-3) for cow housing structures (4570-10), milk parlors (4570-9), feed storage (4570-8), and manure storage (4570-11) (Rule 4570, § 5.6B-F). Furthermore, the Application Review for the Bar 20 Dairy Expansion notes that "[t]he District has found that the mitigation measures required by District Rule 4570 are cost effective and technologically feasible for confined animal facilities" (Bar 20 Dairy Expansion Application Review at 59).

In addition, the District's own analyses for other, similar projects show that enclosed barns are commonly in use in other parts of the country, including the South, where temperatures tend to be high (SJVAPCD 2007a, South Lakes Dairy Application Review Appendix D at 13). Regarding biofilters, the Dairy Permitting Advisory Group, convened by the District, states that:

> "today there are more than 500 biofilters in Germany and in the Netherlands. In agriculture, biofiltration is widely used to control emissions from enclosed swine facilities and have been reported to be used in dairy situations from enclosed, mechanically ventilated housing and manure storage areas"

(DPAG 2006 at 20). These technologies have been used at dairies and swine facilities. Thus, there can be no dispute that these technologies are achieved in practice.

However, contrary to the definition of BACT in section 3.9 of Rule 2201, the District did not even carry out an achieved in practice determination for the technologies. The District cannot legally eliminate these technologies on the basis of cost-effectiveness alone. If a control technology is achieved in practice, that control is required <u>regardless of cost</u>. A cost effectiveness analysis is only performed when technologically feasible control technologies are not achieved in practice for a category and class of source and must therefore be evaluated on a case-by-case basis to determine whether they can be used at the applicant source. Though the District claims that a settlement agreement with the dairy industry prevents it from making a determination that *any* control technology is achieved in practice for San Joaquin Valley dairies (ATC Application Review at Appendix E), a settlement agreement does not trump the requirements of the District's federally-enforceable Rule 2201.

Lastly, the District must analyze BACT for CO_2. Under Clean Air Act section 165, no major emitting facility may be constructed or modified unless it is subject to best available control technology for pollutants subject to regulation under the Act. A major emitting facility is any source with the potential to emit 250 tons per year or more of any air pollutant. *See* CAA §169(1). CO_2 is a regulated pollutant under Clean Air Act section 821. EPA has adopted regulations requiring the monitoring of CO_2 emissions at 40 CFR part 75. *See also Massachusetts v. EPA*, 147 S.Ct. 1438,1460 (2007) (concluding CO_2 is an "air pollutant"). Because the Bar 20 Dairy emits more than 250 tons per year of CO_2, it is a major source of this pollutant. The construction or modification of this source is therefore subject to BACT. *See, e.g.*, 40 CFR 52.21(b)(23)(ii)(defining "significant" for purposes of a modification as "any" increase in the emissions of an unlisted pollutant).

II. GHG IMPACTS, MITIGATIONS, AND SIGNIFICANCE THRESHOLD

Climate change poses enormous risks to California. Scientific literature on the impact of greenhouse gas emissions on California (and the world) is well developed and was discussed at length in our January 22, 2008 comments on this project, which we hereby incorporate by reference. The environmental analysis for this Project must make a good faith effort at full disclosure and avoid minimizing or discounting the severity of global warming's impacts. *See* Guidelines § 15151; *San Joaquin Raptor/Wildlife Rescue Center v. County of Stanislaus*, 27 Cal.App.4th 713 (1994). By failing to fully analyze and mitigate the Project's harmful greenhouse gas emissions and by arbitrarily establishing a significance threshold that would continue to allow unacceptably huge amounts of greenhouse gas emissions into the environment, the District has failed to meet its obligations under CEQA.

Although the Project contemplates the addition of thousands of new cows to the Bar 20 dairy, the MND's creative accounting concludes that the Project would actually *reduce* greenhouse gas emissions. As set forth below, the MND's misleading analysis is based on flawed emissions factors, pre-project assumptions that are contrary to existing environmental conditions, unverified and deferred mitigation, and credit for cows taken from dairies that would appear to have closed with or without the Project. As the Project would clearly result in a net emissions increase, in addition to misleading the public and decision makers, there is a fair argument that the Project would have a cumulatively significant impact on global warming.

A. The MND Fails to Accurately Inventory Pre-Mitigation Project Emissions

The GHG emissions inventory provided in the MND remains incomplete. As stated in our previous comments on the proposed MND, the first step in determining a project's GHG pollution impact is to complete a full inventory of all emissions sources. In conducting such an inventory, all phases of the proposed project must be considered. *See* 14 Cal. Code Regs. §15126. The greenhouse gas inventory for a project must include a complete analysis of all of the sources of a project's greenhouse gas emissions, from building materials and construction emissions, to operational energy use, vehicle trips, water supply, and waste disposal. Environmental review of the Project must therefore include a full and adequate inventory of the Project's greenhouse gas emissions.

A greenhouse gas inventory for the project must include the project's direct and indirect greenhouse gas emissions. *See* 14 Cal. Code Regs § 15358(a)(1) ("Indirect or secondary effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density, or growth rate, and related effects on air and water and other natural systems, including ecosystems."). Consequently, a complete inventory of a project's emissions should include, at minimum, an estimate of emissions from the following:

- Digestive processes of dairy animals;
- Waste products generated by the animals and dairy operations, including waste collection, storage, processing, and disposal;
- Cultivation, processing, transport, and storage of feed consumed by dairy animals;
- Site preparation, construction, and dairy operation using vehicles and machinery;

- Manufacturing and transport of building materials;
- Electricity generation and transmission for the heating, cooling, lighting, cleaning, and other energy demands of project;
- Water supply and transportation to the project;
- Fossil fuel combustion required for live animal and animal product transport; and
- Any outsourced activities and contracting.

Methodologies are readily available to inventory the emissions from the proposed project, including, but certainly not limited to, the California Air Resources Board ("CARB") emissions factors for direct GHG dairy emissions cited in the MND. The Intergovernmental Panel on Climate Change (IPCC) has produced guidelines for calculating greenhouse gas emissions inventories for livestock facilities, including enteric fermentation and manure management (IPCC 2006); these guidelines are used by the U.S. Environmental Protection Agency ("EPA") in their 2007 Inventory of U.S. Greenhouse Gas Emissions and Sinks (US EPA 2007a). The California Climate Action Registry General Reporting Protocol provides guidance on reporting other types of emissions, such as mobile emissions generated by increased vehicle trips, stationary combustion sources, and refrigeration systems (particularly relevant for dairies) (CCAR 2007a). Livestock-specific reporting and certification protocols are also available from the CCAR (CCAR 2007b, CCAR 2007c). Finally, Dr. Frank Mitloehner has calculated methane and carbon dioxide emissions factors from dairy cows, which can be found in a 2006 CARB report and a subsequent presentation delivered to the International Symposium on Near-Term Solutions for Climate Change in California (Mitloehner et al. 2006; Mitloehner 2007).

The greenhouse gas emissions analysis in the MND dramatically understates total Project GHG emissions by excluding or underestimating a number of important sources of GHG. The cumulative tally of greenhouse gas emissions for the Project includes only direct methane and nitrous oxide emissions from dairy animals (MND at 2-40, Table 2.6.3.5), ignoring numerous direct and indirect sources of GHGs. For example, the MND here excludes significant sources of carbon dioxide from the alleged total GHG emissions for the Project, including emissions from Project-related transportation, facility construction and operation, and direct emissions from animals. While the revised MND now acknowledges some of the GHG emissions for the unauthorized construction of the facilities that will support the expanded herd (MND at 2-28), there is no attempt to mitigate those emissions, despite the fact that the proposed ATC permit is intended to retroactively remedy the earlier, illegal actions of Bar 20 Dairy (ATC Application Review at 2). As it does not appear that CEQA review was conducted for facility construction, the GHG emissions from this phase of the Project should be included and mitigated in the instant MND. Construction of the dairy facilities without CEQA review followed by CEQA review of project operation not only contravenes CEQA review requirements, but is improper piecemealing of the project.

1. The MND Cannot Legitimately Include Emissions from Liquid Manure from New Cows As Part of the Environmental Baseline for the Project

In calculating the amount of methane and nitrous oxide that will be generated by the Project, the District has included the liquid manure from the 13,510 cows that will be added by the Project in both the pre-project emissions calculations and in the post-project calculations on the grounds that the construction of the structure that would hold this manure was begun prior to the requirement that the dairy obtain an Authority to Construct permit from the District. The result is that pre-project GHG emissions are overstated by 774.61 tons of methane per year (16,266.81 tons/year carbon dioxide equivalent, or 40.5 percent of the total pre-project emissions of 40,166.94 tons per year, carbon dioxide equivalent).

The MND's incorporation of unrealized emissions from an unfilled manure pit improperly inflates the project baseline and segments the project. Under CEQA, the MND must compare the proposed Project to the state of the environment without the Project. *Environmental Planning & Information Council v. County of El Dorado* (1982) 131 Cal.App.3d 350, 358-59. Here, while a lagoon pit may have been constructed prior to the onset of environmental review, it was not filled with the manure that are the actual source of the emissions. Thus, in direct contravention of CEQA, the MND improperly attempts to take credit for a hypothetical condition, rather than the actual, existing environmental conditions. *See, e.g., Communities for a Better Env't v. SCAQMD,* 158 Cal.App.4th 1336 (2008); *Woodward Park Homeowners Association, Inc. v. City of Fresno*, 150 Cal.App.4th 683, 693 (2007) (EIR for a new commercial development and shopping center on vacant land improperly compared the impacts of the proposed project against the impacts of a nonexistent office park that could be built at the site under existing zoning and plan designations). Because the cows under review by this Project are what result in emissions, and not an empty lagoon, the MND cannot take credit for these reductions. Even if the lagoon did generate emissions – which is does not – taking credit for these emissions when the lagoon is clearly part of the larger project under review here unlawfully segments the environmental review of the project. *City of Santee v. County of San Diego*, 214 Cal.App.3d 1438, 1452 (1989).

2. Substantial Evidence Does Not Support the MND's Use of Emission Factors

The MND's use of low emissions factors for dairy cows are not supported by substantial evidence and minimize Project emissions. Appendix A of the MND lists uncontrolled emission factors for methane and nitrous oxides, two powerful greenhouse gases, as reproduced on the table below:

TABLE 1: Emission Factors Used in the Revised MND (Appendix A).

	Manure Methane (lbs/hd/yr)	**Pre-Project Manure Methane (lbs/hd/yr)**	**Enteric Methane (lbs/hd/yr)**	**Nitrous Oxide from Manure (lbs/hd/yr)**
Milk and Dry Cow	377.2	226.3	283.2	0.534
Heifers (15-24 mths)	5.4	3.2	139.4	3.2
Heifers (4-14 mths) and calves	5.4	3.2	88.7	3.2
Bulls	6.2	3.7	116.8	0.0

To support the use of these factors, the MND purportedly relies on the CARB Draft Documentation for California's Greenhouse Gas Inventory from 2005 (http://www.arb.ca.gov/cc/inventory/doc/doc_index.php). The rationale for the MND's use of these numbers as emission factors was not properly documented or explained. In fact, CARB staff would not validate the use of the state GHG inventory formulas to calculate emissions for individual dairies on an annual basis, indicating that this sort of application of the data is inappropriate.[10] Indeed, the emission factors used in the MND may dramatically underestimate enteric emissions of methane from the Project's lactating cows. In a 2006 study produced for CARB, Dr. Frank Mitloehner, an Air Quality Extension Specialist in the Department of Animal Science at the University of California at Davis, found that the enteric fermentation process in cows is a very significant source of methane emissions. In that study, lactating dairy cows were found to produce higher levels of methane than their dry cow counterparts. Methane emissions from lactating cows averaged 365 pounds per cow per year and from non-lactating dry cows approximately 275 pounds per cow per year (Mitloehner et al. 2006 at 17). In a subsequent presentation at the International Symposium on Near-Term Solutions for Climate Change in California, Dr. Mitloehner suggests that the methane emission factor for a lactating dairy cow is 412 pounds per cow per year and 268 pounds per cow per year for a dry cow (Mitloehner 2007 at slide 12). The use of these empirically generated, California-specific emissions factors significantly increase the enteric emissions from dairy cows, thereby underestimating the GHG inventory for this portion of the Project by as much as 430.3 tons per year of methane (9,036.3 tons per year CO_2-equivalent). Since the MND relies almost entirely on reducing GHGs from the manure-management portion of the Project to mitigate its GHG impacts, and because it does very little to reduce the impact of enteric emissions, this is a serious flaw in the CEQA analysis. The Mitloenher study constitutes the best available information on California-specific emissions factors. Accordingly, the MND should recalculate Project emissions using these factors in order to more accurately state Project emissions.

In addition to methane, nitrous oxide emissions should be recalculated and included in the total GHG emissions for the Project. N_2O has a global warming potential of 310 times that of CO_2. Therefore, it is very important that sources of this potent GHG be accurately quantified and mitigated. While the revised MND offers emission factors for nitrous oxide, including 0.534 pounds per head per year for lactating and dry dairy cows and 3.2 pounds per head per year for heifers, nitrous oxide emissions from the Project are not consistently included total GHG inventory for the Project (*see* MND, Appendix A), which results in conflicting and misleading emissions calculations.

Moreover, the latest science suggests that the nitrous oxide emission factors used in the MND may be too low. In the 2007 presentation cited above, Dr. Mitloehner discusses emissions of N_2O from dairy sources (Mitloehner 2007). He suggests an emissions factor of 8.7 pounds per year per cow for lactating cows and 6.9 pounds per year per cow for dry cows, much higher than the numbers used by the District. Using Dr. Mitloehner's emission factors for dry and lactating cows, we find that the post-project emissions of N_2O post mitigation (excepting reductions from the to-be-closed dairies) are approximately 16.77 tons per year of N_2O or 5,198.7 tons per year of CO_2-equivalent.

[10] Personal communication with Webster Tasat, Manager, Emission Inventory Analysis Section, April 2008.

3. Carbon dioxide emissions must be included in total GHG emissions for the Project

Though in one part of the MND carbon dioxide ("CO_2") emissions are calculated for construction equipment that was used during the Project's construction prior to obtaining a permit or performing a CEQA review (MND at 2-28), the MND does not acknowledge these emissions in its assessment of total GHG emissions from the proposed dairy expansion. Furthermore, except for emissions from the Project's methane digester boiler (MND at 2-40), the MND fails to calculate the actual CO_2 emissions that will result from the Project's daily operations.

Like other GHGs, CO_2 is a byproduct of manure decomposition and enteric fermentation in ruminants. Emission factors for CO_2 emissions from dry and lactating cows are established in the same presentation by Dr. Frank Mitloehner mentioned above (Mitloehner 2007). Dr. Mitloehner suggests an emission factor of 18,325 pounds per cow per year for lactating cows and 13,637 pounds per cow per year for dry cows. Even if the MND calculated CO_2 emission from just these two types of cows (which equal about 57 percent of the animals proposed for the Bar 20 Dairy), the un-mitigated CO_2 impact from the Project would be approximately 96,355.25 tons per year of CO_2.

B. Proposed Measures to Mitigate the Project's GHG Emissions Are Inadequate

By failing to conduct a complete greenhouse gas inventory and determine the significance of Project emissions, there is simply no way that the District can adequately analyze alternatives and mitigation measures to reduce those impacts. In any event, because the Project's greenhouse gas emissions may have a potentially significant effect on the environment, the District's use of an MND is improper as even the conditions imposed by the District do not "mitigate the effect to a point where clearly no significant effect on the environment would occur." Pub. Res. Code § 21064.5. Not only is proposed mitigation inadequate and unverified, but other feasible measures which would result in significant emissions reductions are not made conditions of project approval.

CEQA requires that agencies "mitigate or avoid the significant effects on the environment of projects that it carries out or approves whenever it is feasible to do so." Pub. Res. Code § 21002.1(b). Mitigation of a project's significant impacts is one of the "most important" functions of CEQA. *Sierra Club v. Gilroy City Council*, 222 Cal.App.3d 30, 41 (1990). Therefore, it is the "policy of the state that public agencies should not approve projects as proposed if there are feasible alternatives or feasible mitigation measures which will avoid or substantially lessen the significant environmental effects of such projects." Pub. Res. Code § 21002; *see also Laurel Heights I*, 47 Cal.3d at 400-401.

In designing a project under CEQA, "the preferred practice is first to avoid, then to minimize, and finally to compensate for impacts." (CAPCOA 2008 at 79.) Thus, a project must first avoid and reduce on-site greenhouse gas emissions. Any remaining emissions must then be offset through the purchase of credits from a verifiable and transparent source. *See, e.g.*, *Anderson First Coalition v. City of Anderson*, 130 Cal.App.4th 1173 (2005) (fair-share contributions to defined fee-based mitigation program is adequate mitigation if "part of reasonable plan of actual mitigation that the relevant agency commits itself to implementing.").

1. GHG emission reductions claimed from mitigation measures are not adequately documented

The MND's GHG emissions analysis relies on inadequate and unverified mitigation measures to reduce total post-project emissions. The MND claims that the following three mitigation measures will produce a cumulative "quantifiable" GHG emissions reduction of 272.49 tons per year of methane: (1) feeding dietary oils (e.g., cottonseed); (2) manure removal at least daily; and (3) incorporating manure into fields within two hours of application. (MND at 2-22). Except for the feeding of cottonseed oil, none of the emission reductions claimed are supported with documented evidence. The manure removal control efficiency is apparently based on a news alert from *Science for Environment Policy*, which is not provided. The MND likewise provides no direct support for the significant GHG reductions it attributes to direct application and incorporation of manure into soil, citing only to a VOC efficiency control factor provided by the Dairy Permitting Advisory Group and baselessly assuming the same benefits for manure methane control.[11]

Additionally, the MND claims significant reductions from a proposed design element of the Project: an anaerobic digester. CEQA requires that mitigation measures are "fully enforceable through permit conditions, agreements, or other measures" so "that feasible mitigation measures *will actually be implemented as a condition of development.*" *Federation of Hillside & Canyon Ass'ns v. City of Los Angeles*, 83 Cal.App.4th 1252, 1261 (2000). It is unclear whether the District is proceeding with the permit for the Bar 20 Dairy Expansion without making the anaerobic digester a condition of the permit and a required mitigation measure; if this is the case, there is no guarantee that this measure will be implemented. If the District wishes to use the anaerobic digester application to address concerns about this project's GHG emissions, it must include this mitigation measure as part of this project and assure its implementation as a condition of the permit. *Sundstrom v. County of Mendocino*, 202 Cal.App.3d 296, 307 (1988) (certain and enforceable mitigation requirements cannot be deferred until after project approval). Accordingly, the District must clarify whether the digester is now fully incorporated into the Project or is still being analyzed as a separate project. If the digester is in fact part of the Project, the ATC for the Project must be revised to make the digester an enforceable element of the Project.

Assuming that the anaerobic digester is now an "integral part of this project," as the MND suggests (MND at 2-1), we applaud Bar 20 Dairy's commitment to implement this

[11] Solid manure management systems, including application of untreated manure to soil, are a potentially major source of nitrous oxide emissions that can be significantly reduced if the manure is first processed in an anaerobic digester or composted (US EPA 2006a, Li et al. 2005, Pattey et al. 2005, AgStar Handbook). Unfortunately, the MND appears to treat nitrous oxide emissions from manure as an afterthought, failing to provide any basis for the calculations that are found only in tables and never discussed (MND at 2-21 and 2-40).

meaningful mitigation measure, which has the potential to dramatically reduce methane and other air contaminants from the manure management portion of the Project. We caution the District, however, about overestimating the capabilities of such technology without adequate explanation and documentation. Though the MND claims that a "conservative" 95 percent control efficiency will be applied for the digester, this is, in fact, higher than 85 percent capture rate the EPA assumes in its policy book on methane emissions reduction (US EPA 2006a). The MND must provide a valid explanation for using a higher control efficiency.

2. Benefits from closing existing dairies must be equivalent, certain, and enforceable

The MND is claiming substantial GHG reductions from the Bar 20 Dairy's proposal to purchase and shut down several smaller San Joaquin Valley dairies. There are a number of problems with this as mitigation for the proposed Project.

First, the District claims that the existing lagoons at Bar 20 are actually designed as storage ponds, which do not convert volatile solids to methane as readily, and therefore reduce the emissions for these sources by 40 percent. However, in its calculations for the dairies to be closed by Bar 20, the District uses the higher emission factor it assigned to the post-project, properly-designed treatment lagoons. Unless the District can document that the dairies being shut down by Bar 20 utilized these proper treatment lagoons, the MND should not claim excess reductions from the shut-down dairies by assuming the higher emission factor is appropriate.

Second, the MND gives no details at all about the dairies Bar 20 is proposing to shut down (aside from how many milk cows the Project will take from each). The MND should discuss why these dairies were chosen, what the practices and/or mitigation measures already employed on these dairies are/were, whether the dairies would have closed anyway even without the Project, and by what date they will be shut down. If the dairies closed or would have closed regardless of whether the Project is approved, the closing of those dairies is not truly done in mitigation of this project.

It has come to our attention that the JMC dairy, which Bar 20 proposes to purchase and shut down, ceased to operate at some time before August 22, 2006 (CAFO Order 2007)[12]. Because this dairy closed long before this Project will be approved, it can be assumed that the offsets claimed by Bar 20 are not valid and should not be included in the MND as mitigation.

Lastly, the vague and unenforceable commitment made in the MND that Bar 20 will, at some unspecified future date, purchase and close down enough dairies to accumulate 10,401.3 tons of CO_2 emission reductions to offset its impacts on the environment (MND at A-33) is unacceptable under CEQA. Without thorough documentation of which dairies will be shut down, when, what emissions will be eliminated, and an analysis of whether they would have shut down in spite of the proposed Project, this commitment cannot stand as a mitigation measure for the purposes of avoiding an EIR.

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[12] *See* In re: Consent Agreements and Proposed Final Orders for Animal Feeding Operations, Consent Agreement and Final Order CAA-HQ-2005-xx, CERCLA-HQ-2005-xx, EPCRA-HQ-2005-xx, Vacating Consent Agreements and Final Orders, before the Environmental Appeals Board, U.S. EPA, Order, January 17, 2007.

3. The MND inappropriately dismisses feasible enteric emissions mitigations.

Under CEQA, all feasible measures must be adopted. Guidelines § 15065(c)(3). Measures to reduce impacts may not be deferred until some future time or so vague that it is impossible to evaluate their effectiveness. *See* Guidelines § 15126.4(a)(1)(B); *San Franciscans for Reasonable Growth v. City & County of San Francisco,* 151 Cal.App.3d 61, 79 (1984). In the revised MND, the District characterizes enclosures vented to biofilters as "a technologically feasible BACT option," yet dismisses this feasible mitigation measure because it is "not cost-effective at this time" (MND at 2-25 – 2-26).

The MND's bare assertion that biofilters are "not cost effective" violates CEQA. A finding of infeasibility may only be made if there is evidence that "additional costs or lost profitability are sufficiently severe to render it impractical to proceed with the project." *Citizens of Goleta Valley v. Board of Supervisors of Santa Barbara County*, 197 Cal.App.3d 1167, 1181 (1988). No such evidence is presented here. Vented enclosures, which have been identified as best available control technology for cow housing structures, milk parlors, feed storage, and manure storage (SJVUAPCD Rule 4570, § 5.6B-F), are effective in controlling enteric and manure methane as well as nitrous oxide emissions. Enclosed barns are commonly in use in other parts of the country where temperatures tend to be high, and have been shown to decrease odor and significantly increase milk production by relieving heat stress in cows. (*See, e.g.,* http://www.northfloridaholsteins.com/info.html; SJVUAPCD 2007a-b; SJVUAPCD 2006). Regarding biofilters, the San Joaquin Valley Air Pollution Control District's Dairy Permitting Advisory Group states that "today there are more than 500 biofilters in Germany and in the Netherlands. In agriculture, biofiltration is widely used to control emissions from enclosed swine facilities and have been reported to be used in dairy situations from enclosed, mechanically ventilated housing and manure storage areas" (DPAG 2006 at 20). These technologies have been used at dairies (*e.g.,* Hauls Dairy in Montana, *see* SJVUAPCD 2006) and are widely used at swine facilities, which are of the same category or class as dairies (*id.).* Thus, these technologies are achieved in practice and should be considered feasible under CEQA.

C. Remaining GHG Emissions Should Be Offset

Once all feasible on-site mitigation has been implemented, the District must use offsets to fully mitigate any remaining greenhouse gas emissions generated by the Project. Care should be taken to ensure that offsets purchased are real (additional), permanent, and verified, and all aspects of the offsets should be discussed in the MND. As proposed by CAPCOA, a potential cost-effective offset and verifiable offset could include an energy-efficient retrofit of existing building stock in the Project area to offset the remainder of the Project's emissions. (CAPCOA 2008 at 80.) The District is uniquely positioned to implement an offset program. Indeed, in a recent settlement with the Attorney General regarding the mitigation of greenhouse gas emissions from a proposed Great Valley Ethanol Project, the SJVAPCD agreed to administer a greenhouse gas emissions fund to achieve real, permanent, verifiable, and additional off-site emissions reductions. (GVE and AG Settlement Agreement 2008), Future projects under the purview of SJVAPCD like Bar 20 could contribute to this fund to offset greenhouse gas emission that could not be feasibly reduced on site. Because the MND does not offset the remainder of the Project's greenhouse gas emissions, the Project's impacts have not been fully mitigated. Absent full mitigation, the District must prepare an EIR to evaluate Project greenhouse gas emissions.

D. The Proposed Significance Threshold of 42,000 Tons for Greenhouse Gases Cannot be Relied on Because There Is A Fair Argument That Environmental Effects May Still Be Significant at Levels Below this Threshold

To determine the significance of the Project's greenhouse gas impacts, the District proposes a greenhouse gas emissions threshold of 42,000 tons based on a conceptual approach set forth by CAPCOA referred to as the Regulated Emissions Inventory Capture methodology. The Regulated Emissions Inventory Capture methodology is fundamentally flawed because it is essentially ineffective at reducing greenhouse gas emissions, is inconsistent with the emissions reduction mandates of AB 32 and Executive Order S-3-05, and is premised on a meaningless comparison with criteria pollutant thresholds under the Clean Air Act. As there is a fair argument that environmental effects would occur at emission levels below this threshold, it cannot be legitimately relied on to support the District's determination that impacts from the Project's greenhouse gas pollution are less than significant.

The 42,000 ton greenhouse gas threshold proposed by the District would capture far less than half of new residential and commercial development. As CAPCOA notes, a 39,000 to 46,000 metric ton threshold would correspond to the GHG emissions of approximately 2,200 to 2,600 residential units, 1.5 to 1.8 million square feet of office space, 470,000 to 560,000 square feet of retail, and 275,000 to 320,000 square feet of supermarket space. (CAPCOA 2008 at 46.) Failing to capture well over half of all residential and commercial development means that a substantial amount of new growth would not be required to adopt all feasible mitigation measures to reduce greenhouse gas emissions. Moreover, larger projects that are above the 42,000-ton threshold would only be required to mitigate to 42,000 tons, thereby avoiding additional critical opportunities for further mitigation were a lower threshold established.

Under CEQA, "[t]he determination of whether a project may have a significant effect on the environment calls for careful judgment on the part of the public agency involved, based to the extent possible *on scientific and factual data*." CEQA Guidelines § 15064(b) (emphasis added). Accordingly, a significance threshold for greenhouse gases must reflect the grave threats posed by the cumulative impact of additional new sources of emissions into an environment where deep reductions from existing emission levels are necessary to avert the worst consequences of global warming. *See Communities for Better Env't v. California Resources Agency,* 103 Cal. App. 4th 98, 120 (2002) ("the greater the existing environmental problems are, the lower the threshold for treating a project's contribution to cumulative impacts as significant."); *see also Center for Biological Diversity v. National Highway Traffic Safety Administration*, 508 F.3d 508, 550 (9th Cir. 2007) ("we cannot afford to ignore even modest contributions to global warming."). Unsurprisingly, in reviewing the effectiveness of the Regulated Emissions Inventory Capture methodology, CAPCOA concluded this approach had a *low* effectiveness in reducing greenhouse gas emissions and a *low* consistency with AB 32 and Executive Order S-03-05. (CAPCOA 2008 at 55.)

Under CAPCOA's own analysis, the only two thresholds that are highly effective at reducing emissions and highly consistent with AB 32 and Executive Order S-3-05 are a threshold of zero [Threshold 2.1] and a quantitative threshold designed to capture 90 percent or more of likely future discretionary projects (a 900-ton CO_2 Eq threshold) [Threshold 2.2]. (CAPCOA 2008 at 56-57). All other proposed thresholds are simply inadequate in light of the severe environmental threats posed by global warming and California's emissions reduction mandate. Indeed, CEQA requires that a lead agency must "still consider any fair argument that a certain environmental effect may be significant" even where a project complies with a regulatory threshold. *Protect the Historic Amador Waterways v. Amador Water Agency*, 116 Cal. App. 4th 1099, 1109 (2004). Because there is a fair argument that application of a threshold with limited effectiveness at reducing emissions would still result in environmental effects, reliance on a threshold that is not highly effective at reducing greenhouse gas emissions and/or fails to achieve mandated reductions leaves projects open to legal challenges under the fair argument standard. Accordingly, these thresholds, including the threshold proposed by the District, should not be adopted.

According to CAPCOA, 900 tons is roughly the equivalent of the emissions generated by 50 homes or 30,000 square feet of commercial space. (CAPCOA 2008 at 43). While this size of these projects ordinarily may seem minor enough to ignore, the challenges posed by climate change are far from ordinary. Given the recent extreme losses in arctic sea ice, scientists at the National Snow and Ice Data Center have concluded that "the observed changes in the arctic indicate that this feedback loop is now starting to take hold."[13] Even the ambitious emissions reduction targets set by Executive Order S-3-05 in 2005, consistent with contemporaneous science indicating that reductions of 80% below 1990 levels by developed countries were sufficient to stabilize the climate (CA EPA 2006 at 18),[14] are now believed to be insufficient to stabilize the climate. Based on the alarming and unpredicted rate of loss of Arctic sea ice and other recent climate change observations, scientists now state that "humanity must aim for an even lower level of GHGs" (Hansen et al. 2008)[15] As our current scientific understanding now calls for even greater reductions and indicates that we already may have passed a climactic tipping point, a threshold of zero would appear to be necessary to ensure that new projects do not have a cumulatively significant impact on global warming.

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[13] National Snow & Ice Data Center, *Arctic Sea Shrinks as Temperatures Rise*, Oct. 3, 2006 available at http://nsidc.org/news/press/2006_seaiceminimum/20061003_pressrelease.html Loss of sea ice is subject to a tipping point because, as sea ice melts in response to rising temperatures, it creates a positive feedback loop: melting ice means more of the dark ocean is exposed, allowing it to absorb more of the sun's energy, further increasing air temperatures, ocean temperatures, and ice melt.

[14] Cal. EPA, Climate Action Team Report to Governor Schwarzenegger and the Legislature (Mar. 2006).

[15] In *Target Atmospheric CO2: Where Should Humanity Aim?*, James Hansen, the premier NASA climatologist, now concludes that "[i]f humanity wishes to preserve a planet similar to that on which civilization developed, paleoclimate evidence and ongoing climate change suggest that CO_2 will need to be reduced from its current 385 ppm to at most 350 ppm." An emissions pathway whereby developed countries would reduced emissions to 80% below 1990 levels as envisioned under Executive Order S-03-05 would cap atmospheric concentrations of CO_2 at approximately 450 ppm. *See, e.g.*, UNDP, Human Development Report 2007/2008, Fighting climate change: Human solidarity in a divided world (2007) at 46-50 available at http://hdr.undp.org/en/reports/global/hdr2007-2008/chapters/

The District's concerns that a zero significance threshold would require preparation of EIRs even for the smallest projects can be addressed were the District to develop and implement a mitigation fee and offset program for greenhouse gases in conjunction with the promulgation of a threshold of significance. With the implementation of a mitigation fee program, a project proponent would have a straightforward means of mitigating emissions to zero once all on-site mitigation measures were adopted. Indeed, as the District will already begin a mitigation program for greenhouse gases pursuant to a recent Attorney General settlement, additional projects in the District could easily be incorporated into this framework.

Not only is the threshold used by the District ineffective and noncompliant with AB 32 and Executive Order S-3-05, but the Regulated Emissions Inventory Capture method has absolutely no relationship to the greenhouse gas emission reduction targets set by the State of California. Rather, the proposed approach suggested by CAPCOA and selected by the District is utterly arbitrary. It suggests that the threshold for GHG emissions might be set by comparing the NOx or ROG thresholds to the emissions inventory of those pollutants. What makes this approach absurd is there is simply no relationship between the major source threshold and the emissions inventory. The major source thresholds used by the District as the "surrogate" for a NOx significance threshold under CEQA were established by Congress in the Clean Air Act and have no connection whatsoever to the emissions inventory of an area. This ratio of the significance threshold to the emissions inventory is as meaningless as the ratio of the threshold to the number of cars on the road or the number of pigeons in the park – it is an arbitrary comparison of two numbers that have no connection.

The fact that these numbers have no connection should be obvious from the fact that the significance thresholds in the Clean Air Act do not vary from area to area, or state to state depending on the local emissions inventory. Nor do the thresholds change proportionately as inventories increase or decrease over time. To the contrary, the Clean Air Act provides for the tightening (i.e., lowering) of major source thresholds in areas that may be experiencing either increasing or decreasing inventories.

For example, major source thresholds in nonattainment ozone areas are tied to the classification of the area. *See e.g.*, CAA § 182a(c), (d), and (e). The initial classification is tied to the ambient ozone concentrations of an area. *Id.* at § 181(a)(1). The result is that, at least initially, the most polluted areas are subject to the lowest major source thresholds (*i.e.*, the major source threshold is *inversely* related to the level of pollution). These initial classifications, however, change if an area fails to achieve the national ozone standard by the statutory deadlines. *See id.* at § 182(b)(2). The failure to meet these deadlines, again, is not tied to whether inventories are increasing or decreasing. Thus, the major source threshold tightens in areas that miss the statutory deadlines for attainment because they have done nothing to control pollution and consequently have inventories that are increasing. But some areas, such as the San Joaquin Valley, may be "bumped up" to higher classifications even when the inventory of emissions is allegedly declining because the reductions were not achieved in time or to the degree necessary to result in clean air by the statutory deadline. For these areas the major source threshold gets smaller even while the inventories decline.

The arbitrariness of the comparison between major source thresholds and inventories is reflected in the way the District has applied it. First, the District offers no explanation as to why 2005 is the appropriate year for the NOx inventory. The inventory has declined significantly since Congress first adopted the Clean Air Act and the associated major source thresholds. In particular, state and federal mobile source controls have achieved upwards of 90 percent reductions in emissions from cars and trucks. Why then, even if one assumed that the NOx threshold has some connection to the emissions inventory, would the District choose an inventory that is much lower than the inventory as it existed when Congress established the major source thresholds for NOx? Second, why does the District use the statewide inventory of NOx when the thresholds are established according to the ozone classification area by area? Even if the District decided to use the local threshold and the local inventory, whose threshold and inventory should be used? The resulting GHG threshold would be different in every air district, an outcome that demonstrates there is no rational basis for this approach. A related question is why the District would use 100 tons per year as the appropriate threshold when the currently applicable NOx threshold for the San Joaquin Valley is 10 tons per year. There are no rational answers to these questions because the exercise is irrational at its core. CAPCOA was wrong to have included this conceptual approach in its White Paper and the District was wrong to have selected it as its preferred option.

CONCLUSION

For all of the reasons discussed above, we continue to object to the revised Mitigated Negative Declaration for the Bar 20 Dairy Expansion. We request that the District prepare an EIR for this Project as required by CEQA; require verified and fully enforceable mitigation measures, including appropriate BACT; categorize and treat Bar 20 Dairy as a major source of emissions; require that the dairy purchase sufficient credits to fully offset all remaining air and greenhouse gas emission; and make a MACT determination as part of the ATC permit process. Thank you for your consideration of these comments. Cited references are found on a CD, which will be mailed with a hard copy of this letter. These important references should be considered carefully and included in the administrative record for the project approval process.

If you have any questions regarding these comments, please do not hesitate to contact Matthew Vespa at (415) 436-9682 x 309 or mvespa@biologicaldiversity.org, Emily Brown at (415) 436-9682 x 312 or ebrown@biologicaldiversity.org, or Sarah Jackson at (510) 550-6725 or sjackson@earthjustice.org.

The above signatories to this letter wish to be placed on the mailing/notification list for all future environmental decisions regarding this Project (email preferred).

Sincerely,

Emily R. Brown
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Center for Biological Diversity

/s/

Tom Frantz
President
Association of Irritated Residents

Matthew Vespa
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/s/

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(Attorney for AIR)

Sarah E. Jackson
Research Associate
Earthjustice

Kevin Hall
Air Quality Chair
Sierra Club-Tehipite Chapter

Enclosures: The following references are included in the accompanying CD for your review and inclusion in the administrative record.

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County of Fresno
Department of Public Health
Edward L. Moreno, M.D., M.P.H., Director-Health Officer

FA0168673
LU0014114
PE 2600

April 16, 2008

San Joaquin Valley Air Pollution Control District
ISR/CEQA Department
Attn: Chris Kalashian
1990 East Gettysburg Avenue
Fresno, CA 93726-0244

Dear Mr. Kalashian:

SUBJECT: Bar 20 Dairy Revised Proposed Mitigated Negative Declaration and Initial Study

LOCATION: 24387 Whitesbridge Road, Kerman.

The Fresno County Department of Public Health, Environmental Health Division has reviewed the above noted revised document and offers no new comments at this time.

If I can be of further assistance, please contact me at (559) 445-3357.

Sincerely,

Glenn Allen, R.E.H.S.
Environmental Health Specialist III
Environmental Health Division

ga

SJVAPCD Bar 20 Dairy Revised MND

LINDA S. ADAMS
SECRETARY FOR
ENVIRONMENTAL PROTECTION

CALIFORNIA INTEGRATED WASTE MANAGEMENT BOARD

ARNOLD SCHWARZENEGGER
GOVERNOR

1001 I STREET, SACRAMENTO, CALIFORNIA 95814 • P.O. BOX 4025, SACRAMENTO, CALIFORNIA 95812-4025
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April 16, 2008

Mr. Chris Kalashian
San Joaquin Valley APCD
ISR/CEQA Department
1990 East Gettysburg Avenue
Fresno, CA 93726-0244

Subject: **SCH # 2007091073** - Initial Study and Proposed Mitigated Negative Declaration - Bar 20 Dairy Expansion Project No. C-1060791.

Dear Mr. Kalashian:

Thank you for allowing the California Integrated Waste Management Board (CIWMB or Board) staff to provide comments for this proposed project and for your agency's consideration of these comments as part of the California Environmental Quality Act (CEQA) process.

Board staff has reviewed the Initial Study Checklist and Evaluation of Environmental Impacts for the proposed expansion and installation of an anaerobic digester project at the Bar 20 Dairy.

As per the project description, the Board might regulate the proposed anaerobic digester if an exemption to 14 CCR cannot be met. Anaerobic digestion (which is sometimes labeled as a conversion technology) fits within the definition of composting. See, PRC Section 40200(b)(3). Sites using anaerobic digestion could potentially be regulated under the CIWMB compostable material handling regulations depending upon the nature of their feedstock and how it is handled (14 CCR 17850 et seq.).

Please contact your Local Enforcement Agency (LEA), The Fresno County Department of Community Health (Department), to determine how this operation is to be regulated. Steve Crump is the current contact person and can be reached at (559) 445-3271. Please include him (or the Department), and the Board in any future planning and environmental documentation for this proposed project.

If you have any questions regarding these comments, please contact me at (916) 341-6772 or email me at jluther@ciwmb.ca.gov.

Sincerely,

Joy Luther

Joy Luther
California Integrated Waste Management Board
Waste Compliance and Mitigation Program
Permitting and LEA Support Division – South Branch

cc: David Otsubo, Supervisor
California Integrated Waste Management Board
Waste Compliance and Mitigation Program
Permitting and LEA Support Division – South Branch

Steve Crump, LEA
County of Fresno Department of Community Health
1221 Fulton Mall, Brix Building
P.O. Box 11867
Fresno, CA 93775

Appendix J

Responses to Comments Received on Proposed Mitigated Negative Declaration

The following parties provided written comments on the proposed Initial Study/Mitigated Negative Declaration:

- State of California, Native American Heritage Commission
- California Regional Water Quality Control Board, Central Valley Region
- State of California, Department of Justice
- The Center for Biological Diversity (Center), Earthjustice, Sierra Club, The Association of Irritated Residents (AIR), and the Center on Race, Poverty, and the Environment (CRPE)
- The County of Fresno, Department of Community Health
- California Integrated Waste Management Board

Copies of the respective comment letters are incorporated into this document as attachments in Appendix I. A summary of salient comments and associated responses follow.

<u>Native American Heritage Commission</u>

1. **Comment:** *The Native American Heritage Commission is the state's Trustee Agency for Native American Cultural Resources. The California Environmental Quality Act (CEQA) requires that any project that causes a substantial adverse change in the significance of an historical resource, that includes archaeological resources, is a 'significant effect ' requiring the preparation of an Environmental Impact Report (EIR) per CEQA guidelines $15064.5(b)(c). In order to comply with this provision, the lead agency is required to assess whether the project will have an adverse impact on these resources within the 'area of potential effect (ape), and if so, to mitigate that effect. To adequately assess the project-related impacts on historical resources, the Commission recommends the following action:*

    Contact the appropriate California Historic Resources Information Center (CHRIS). Contact information for the Information Center nearest you is available for the State Office of Historic Preservation (81 6/653 7278/http://www.ohp.psrks.ca.gov/l068/Jiles/lC%20Roster.pd. The record search will determine:
    - *If a part or the entire APE has been previously surveyed for cultural resources.*
    - *If any known cultural resources have already been recorded in or adjacent to the APE.*
    - *If the probability is low, moderate, or high that cultural resources are located in the APE.*
    - *If a survey is required to determine whether previously unrecorded cultural resources are present.*

    If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.
    - *The final report containing site forms, site significance, and mitigation measures should be submitted immediately to the planning department. All information regarding site locations, Native American human remains,*

and associated funerary objects should be in a separate confidential addendum, and not be made available for public disclosure.

- *The final written report should be submitted within 3 month after work has been completed to the appropriate regional archaeological Information Center.*

Contact the native American Heritage Commission (NAHC) for:

- *A Sacred Lands File (SLF) search of the project area and information on tribal contacts in the project vicinity that may have additional cultural resource information. Please provide this office with the following citation format to assist with the Sacred Lands File search request USGS 7.5-minute quadrangle citation with the name, township, range and section.*
- *The NAHC advises the use of Native American Monitors to ensure proper identification and care given cultural resources that may be discovered. The NAHC recommends that contact be made with Native American Contacts on the attached list to get their input on potential project impact (APE). In some cases, the existence of a Native American cultural resources may be know only to a local tribe(s).*

Lack of surface evidence of archeological resources does not preclude their subsurface existence.

- *Lead agencies should include in their mitigation plan provisions for the identification and evaluation of accidentally discovered archeological resources, per California Environmental Quality Act (CEQA) J15064.5fl. In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American, with knowledge in cultural resources, should monitor all ground-disturbing activities.*
- *Lead agencies should include in their mitigation plan provisions for the disposition of recovered artifacts, in consultation with culturally affiliated Native Americans.*

Response: The project site has been farmed for many years, and the dairy facilities have been constructed without evidence of archaeological resources.

2. **Comment:** *Lead agencies should include provisions for discovery of Native American human remains or unmarked cemeteries in their mitigation plans.* ▪ *CEQA Guidelines, Section 15064.5(d) requires the lead agency to work with the Native Americans identified by this Commission if the initial Study identifies the presence of likely presence of Native American human remains within the APE. CEQA Guidelines provide for agreements with Native American, identified by the NAHC, to assure the appropriate and dignified treatment of Native American human remains and any associated grave liens.*

Health and Safety Code §Public Resources Code $5097.98 and Sec. §15064.5(d) of the CEQA Guidelines mandate procedures to be followed in *the event of an accidental discovery of any human remains in a location other than a dedicated cemetery.*

Lead agencies should consider avoidance as defined in 61 53 70 of the CEQA Guidelines when significant cultural resources are discovered during the course of project planning and implementation.

Response: The dairy facilities have been constructed without any evidence of Native American Remains.

California Regional Water Quality Control Board, Central Valley Region

3. **Comment:** *Section 2.6.8 of this most recent version of the Mitigated Negative Declaration, includes a discussion of the Regional Board's current regulation of the original portion of the dairy through a General Order, and the tentative Individual Order, which, when adopted by the Regional Board will be used to regulate the entire expanded dairy. We have no additional comments beyond those provided in our previous letters.*

   Response: Comment noted.

State of California, Department of Justice

4. **Comment:** *The District has stated that the District would place enforceable conditions on permits issued to the Bar 20 Dairy in order to ensure that the mitigation measures identified in the March 2008 Proposed Mitigated Negative Declaration and Initial Study are implemented. Specifically:*
   - *The permits will require Bar 20 to permanently close down other diaries within the District and to provide proof that these closures represent a GHG emission reduction equivalent to 10,401.3 tons of CO, per year.*
   - *Bar 20 will not be allowed to expand to its maximum permitted herd size until the other dairies have been closed.*
   - *In addition to requiring Bar 20 to provide the written evidence described in the document, the Air District would conduct site inspections at Bar 20 and the closed dairies to confirm that the mitigation measures have been implemented.*
   - *The Air District will also condition Bar 20's permits on the feeding and other mitigation measures and will conduct site inspections to ensure compliance.*
   - *The District confirmed that because the methane digester is now part of the project that the Air District has analyzed under CEQA, it is the Air District's position that Bar 20 is obligated to build and operate the methane digester and does not have the option to not do so.*

   Response: The comment above is correct. The measures identified above will be made conditions of approval and enforced by the District.

5. **Comment:** *The Initial Study substantially underestimates the increase in greenhouse gasses (GHG) from the expansion of the Bar 20 Dairy because it considers a large GHG emission source at the expanded dairy - the liquid manure lagoon - to be an existing source. The Initial Study states the net methane -emissions from the project will be a reduction equivalent to 13,868.tons of CO2 per year. We believe that even if all of the mitigation measures are implemented, the Bar 20 Diary expansion will lead to a net methane increase equivalent to 8,121 tons of C02 per year.*

   Response: On the contrary, the justification is quite valid, and conservatively protective of air quality. As described in the original engineering evaluation, this facility was partially constructed prior to the date the District began requiring permits of dairies. Generally, such facilities can be argued to have a vested right to complete construction, and are "grandfathered" into the permitting system. Had the District accepted this argument, the dairy would have been able to construct without being subjected to our Rule 2201, "New and Modified Stationary Sources", and would have therefore escaped not only the controls of our BACT determination, but also would not have been subject to a CEQA review, at all, because no discretionary permit would have been required.

   However, the District took what we believed to be a defensible position that was more protective of air quality – we "grandfathered" only the portions of the dairy for which construction had demonstrably commenced, and required all other parts of the dairy to go through the full new-source permitting process. We continue to believe that a determination that none of the dairy was grandfathered (constructed prior to permitting requirements) is indefensible, and we continue to believe that the approach taken was the alternative that is most beneficial to the protection of air quality, as the other alternative was to consider the commencement of construction to be applicable to the entire dairy, thus grandfathering in the entire dairy.

6. **Comment:** *This letter should not be construed as support of the District's draft proposed significance threshold for GHG. The Attorney General's Office and the District will have further discussions on this issue in the near future.*

   Response: District believes that the proposed threshold is appropriate for this project. However, the District recognizes that determining the significance of GHG emissions is still an emerging science and looks forward to further dialogue with the Attorney General's office.

7. **Comment:** *The Attorney General urges the District to use its enforcement authority to ensure that Bar 20 implements all of the mitigation measures identified in the March 2008 Proposed Mitigated Negative Declaration and Initial Study in a timely manner.*

Response: As stated in District Response to Comment number X (AG's comment), all mitigation measures will be made conditions of approval and enforced by the District.

<u>**Center, Earthjustice, Sierra Club, AIR, and CRPE**</u>

8. **Comment:** *The District's analysis may significantly underestimate the emissions that will occur due to this project. First, the analysis ignores "potentially significant emissions" from the feed handling and storage operation, stating that because an emission factor has not yet been established, the emissions are assumed to be zero. Likewise the District ignores emissions from the solid manure handling system. The lack of established emission factors is not an excuse to ignore known emission sources.*

   Response: The District is currently undergoing revisions to the Dairy Emission Factors. The District cannot simply add emissions from studies that have not been properly vetted. One study that we are aware of represents a snapshot of feed storage emissions at one time and location and could be used to argue for higher emissions from feed processes, but in fact we have also received compelling arguments that this same study may significantly overestimate feed emissions. The District is currently evaluating a testing proposal which will evaluate a multitude of factors with a representative number of samples, locations, and types of feed. Future review of these studies may indeed result in a change in the current emission factors, but until that scientific review process is complete and the District has had opportunity to consider public and expert comment on any proposed changes, the premature, and therefore potentially flawed, use of such emissions data would be inconsistent with District regulatory processes and good science.

9. **Comment:** *The so-called "control efficiencies" assumed by the District to determine the "controlled emission factors" for PM10 are arbitrary and cannot be supported. The District must analyze what reductions will actually be gained by the specific mitigation measures that will be required in the operating permits for the Bar 20 Dairy and should not rely on poorly supported draft memorandum… For example, Saudi style barns are being proposed for use as the expanding dairy and being credited with a 25% control efficiency. This 25% control efficiency is not justified anywhere in the cited memo nor in the District's analysis.*

   Response: The District's PM10 control efficiencies are quite conservative. For example, the WRAP Fugitive Dust Handbook (<u>http://www.ndep.nv.gov/baqp/WRAP/final-handbook.pdf</u>) states a control efficiency of 25% for the planting of trees <u>**or**</u> shrubs. Details of the windbreak are not included in the study and the 25% control does not distinguish between the installation of trees and shrubs. It also appears that this control efficiency is for downwind windbreaks only. The District is going far beyond this handbook's suggestions by requiring a 3-row downwind windbreak, which includes two tall trees (at least one row of an evergreen specie) and one row of shrubs. Additionally, the District has determined that additional control can also be achieved by installing an upwind windbreak, which consists of a tall tree and a shrub. Both of the windbreaks combined will , in our professional judgement, result in a control efficiency much greater than 25%, however, in order to be conservative, the District is only applying a control efficiency of 22.5% for both windbreaks (12.5% for downwind and 10% for upwind).

Another example of the District's use of a conservative control efficiency in the District's *Draft Dairy/Feedlot PM_{10} Mitigation Practices and their Control Efficiencies* is the *Freestall Housing with no Exercise Pens and Non-manure Based Bedding* mitigation measure. The District has concluded that this measure results in a control efficiency of 90%. However, since the cows do not have any contact with manure and have non-manure based bedding, the control efficiency should be closer to 100%. Again, in order to be conservative, a control efficiency of 90% was used. All of the other control efficiencies include a similar degree of conservativeness.

The Saudi style barn control efficiency of 25% is also conservative considering that these type of barns are very similar to freestall barns. Generally emissions from cows housed in freestall barns are calculated by using the freestall emission factor of 1.37 lbs/hd-yr. However, in order to be conservative, the open corral emission factor of 5.46 lbs/hd-yr was used for the mature cows and 10.55 lbs/hd-yr was used for the other support stock. When applying the 25% control efficiency to both of these emission factors, the resulting controlled emission factor is 4.1 lbs/hd-yr and 7.91 lbs/hd-yr, respectively. These controlled emission factors are 2.4 times and 5.7 times higher that the 1.37 lbs/hd-yr emission factor that the District could have technically justified. Therefore, the District maintains that all the control efficiencies applied have been carefully analyzed and are very conservative.

10. **Comment:** *While the analysis claims credit for PM10 offsets that were purchased in accordance with a settlement agreement between the District and the Bar 20 Dairy, this claim is inaccurate. In fact, the Bar 20 Dairy has purchased SOx emission reduction credits at a 2.25-to-1 ratio of SOx to PM10. The District claims the purchase of these offsets is equivalent to reducing PM10…the District determined in its EPA-approved PM10 state implementation plan that controlling SOx emissions made "insignificant contributions towards attainment" (SJVAPCD 2003 at 7-3). Further, in the attached letter from EPA Region IX's Air Division Permit Office to the District and a source seeking to purchase SOx offsets to meet PM10 offset requirements, EPA states that, having approved the District's plan in which SOx control is discounted as having no impact on achieving PM10 NAAQA, "EPA can not allow the use of SOx offsets to meet PM10 offset requirements under NSR. In essence, the District has stated and EPA has concurred that controlling SOx does not provide an equivalent environmental benefit as providing the required PM10 offsets."*

Response: First, the requirement to purchase PM10 emission reduction credits was outlined in a settlement agreement between the District and Bar 20 Dairy. The basis for this requirement was the assumption that Bar 20 dairy would fail the Ambient Air Quality Analysis (AAQA). However, upon further review of the project and the proposal of additional mitigation measures by Bar 20, the project passed the AAQA, and was judged, based on our conservative computer modeling, to be no threat to cause local exceedances of the state or federal PM10 ambient air quality standards. Therefore, the District's regulations no longer required PM10 ERCs to be surrendered. Despite that fact, Bar 20 Dairy was nonetheless required by the District to surrender those credits as a part of the monetary penalty associated with the settlement agreement.

Second, EPA has since revised its position on the use of SOx emissions reductions to offset PM10 increases. EPA now realizes that our plan does NOT say that SOx emissions reductions do not result in PM10 reductions, and in fact the plan repeatedly discusses SOx as a precursor to PM10. The plan's position was that the remaining sources of SOx in the Valley, after years of aggressive control efforts by the District, emit so little SOx that further regulations requiring additional reductions would be of no benefit towards attainment of the PM10 standard. Since SOx is an accepted precursor to PM10 in the San Joaquin Valley, of course SOx emissions reductions do cause PM10 reductions, and in fact District modeling staff has determined the appropriate, technically justified offset ratio, which we have then used in this analysis. EPA now accepts that our plan allows for projects with SOx-for-PM10 offsetting trades. Of course, the District has achieved attainment of the federal PM10 standard, demonstrating that the plan was appropriate and adequate to achieve its purpose.

11. **Comment:** *The reductions that result from feeding in accordance with NRC guidelines are already factored into the emission factor (SJVAPCD 2005 at 3-4). Therefore, the District's analysis double-counts VOC reductions from this control measure.*

    Response: The District believes that there is insufficient evidence to demonstrate that all the facilities tested in the research used to determine emission factors fed their herds a diet based on NRC guidelines and that there is a conflict in the evidence. However, in order to calculate conservative emissions reductions for the Bar 20 Dairy project, the District adjusted the original control efficiency of 10%, which was included in the District Rule 4570 staff report by 50% to 5%. The 5% control therefore represents a very conservative reduction in emissions from this project and alleviates any of the inconsistencies and conflicts found in the evidence. Therefore, it is our professional opinion that emission reductions will be achieved through this practice.

    Furthermore, if the District was to assume, for arguments sake, that the reductions achieved by this measure should not be accounted for, this would only add approximately 4.9 tons of VOC emissions towards the project, resulting in yet an overall decrease in emissions of 10.8 tons-VOC/yr (-15.74

tons/yr + 4.9 tons/yr). The project emissions would still be less than significance.

12. **Comment:** *Bar 20 Dairy is a Major Source of Methanol and thus the District must require MACT. The MND fails to analyze the impact of methanol on nearby receptors. Thus, even setting aside the specific control technology required, there is no dispute that this source emits toxic air contaminants that pose potentially serious health risks to surrounding communities. CEQA, at a minimum requires these potentially significant adverse impacts to be assessed.*

    Response: The District does not agree that Bar 20 Dairy is a proposed major source of hazardous air pollutants (HAPs) subject to the MACT requirements of the Federal Clean Air Act, Section 112(g) (administered locally through SJVAPCD Rule 2550, *Federally Mandated Preconstruction Review for Major Sources of Air Toxics*). Under Rule 2550, newly constructed facilities or reconstructed units or sources[1] at existing facilities would be subject to the preconstruction review requirements if they have the potential to emit hazardous air pollutants (air toxics) in "major" amounts (10 tons or more of an individual pollutant or 25 tons or more of a combination of pollutants) and the new units are not already subject to a standard promulgated under Section 112(d), 112(j), or 112(h) of the Clean Air Act."

    As discussed on pages 90 through 92 of the engineering evaluation, based on the current dairy emission factors, emissions of each individual HAP from Bar 20 Dairy are expected to be below 10 tons per year and total HAP emissions are expected to be below 25 tons per year. Therefore, this facility will not be a major air toxics source and the provisions of Rule 2550 do not apply.

    There are several recently completed and ongoing research studies that that will be considered in future revisions of the current emission factors for dairies, including the study conducted by Dr. Mitloehner cited in the January 22, 2008 Sierra Club et al comment letter. These studies have not been fully vetted or reviewed in the context of establishing standardized emission factors. For instance, although Dr. Mitloehner indicates a high methanol emissions rate from fresh manure in the cited study, in the same report he also indicates that the flushing of manure may significantly reduce alcohol emissions, including methanol.

    Future review of these studies may indeed result in a change in the current emission factors and/or control efficiencies for various practices and controls, but until that scientific review process is complete and the District has had opportunity to consider public comment on any proposed changes, the premature, and therefore potentially flawed, use of such emissions data would be inconsistent with District regulatory processes and good science.

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[1] Reconstruction" is defined as a change that costs 50 percent of the cost of constructing a new unit or source like the one being modified.

In response to the health impacts, the District has already assessed the methanol emission impacts based on our current emission factor and have found those impacts to be insignificant. The District strongly disagrees with the methanol calculations proposed by the commenters' of 130,484 lbs-methanol/yr and find no merit in this proposed value. Nonetheless, in order to demonstrate that the health impacts would still be negligible, the proposed values were included in the HRA (liberally assuming that the emissions proposed by the commenters' are correct) and we found no increase in chronic and acute risk. In other words, there are insignificant impacts to the nearby receptors even by using the proposed exaggerated methanol values.[2]

13. **Comment:** *The Bar 20 Dairy is a Major Source under the Clean Air ACT. The following sections demonstrate that emissions from the identified sources are reasonably capable of being captured, notwithstanding CAPCOA's outdated, conclusory claims.*

    <u>Milk parlors</u>: The District's conclusion that these emissions are fugitive is undercut by its own rule 4570, which demonstrates that these emissions are reasonably capable of being captured by these sources…Furthermore, contrary to the District's assertion that "no facility currently encloses the holding area" (id), the staff report for Rule 4570 describes the Hauls Dairy, an 1,100 head dairy in Montana that encloses its animals in buildings and then vents the buildings to a biofilter (id. At 28).

    <u>Cow Housing:</u> In its section entitled "Housing Animals in Buildings," the staff report notes that the Hauls Dairy, encloses its animals in building and then vents the buildings to a biofilter (SJVAPCD 2006 at 28)…. In addition, the North Florida Holsteins Dairy in Bell, Florida houses its entire herd of 6,400 dairy cows, with 3,700 milking cows, in tunnel ventilation barns.

    Response: Pursuant to Section 3.25 of District Rule 2201, a major source is a stationary source with post-project emissions or a Post Project Stationary Source Potential to Emit (SSPE2), equal to or exceeding one or more of the threshold values. In determining whether a facility is a major source, fugitive emissions are not counted unless the facility belongs to certain specified source categories. 40 CFR 71.2 (Definitions, Major Source (2)) states the following:

    (2) A major stationary source of air pollutants or any group of stationary sources as defined in section 302 of the Act, that directly emits, or has the potential to emit, 100 tpy or more of any air pollutant (including any major source of fugitive emissions of any such pollutant, as determined by rule by the Administrator). <u>The fugitive emissions of a stationary source shall not be</u>

[2] The chronic and acute relative Exposure levels are very high compared to predicted concentrations and Talk about why we disagree with the Emission factor

considered in determining whether it is a major stationary source for the purposes of section 302(j) of the Act, unless the source belongs to one of the following categories of stationary source: (i) Coal cleaning plants (with thermal dryers); (ii) Kraft pulp mills; (iii) Portland cement plants; (iv) Primary zinc smelters; (v) Iron and steel mills; (vi) Primary aluminum ore reduction plants; (vii) Primary copper smelters; (viii) Municipal incinerators capable of charging more than 250 tons of refuse per day; (ix) Hydrofluoric, sulfuric, or nitric acid plants; (x) Petroleum refineries; (xi) Lime plants; (xii) Phosphate rock processing plants; (xiii) Coke oven batteries; (xiv) Sulfur recovery plants; (xv) Carbon black plants (furnace process); (xvi) Primary lead smelters; (xvii) Fuel conversion plants; (xviii) Sintering plants; (xix) Secondary metal production plants; (xx) Chemical process plants; (xxi) Fossil-fuel boilers (or combination thereof) totaling more than 250 million British thermal units per hour heat input; (xxii) Petroleum storage and transfer units with a total storage capacity exceeding 300,000 barrels; (xxiii) Taconite ore processing plants; (xxiv) Glass fiber processing plants; (xxv) Charcoal production plants; (xxvi) Fossil-fuel-fired steam electric plants of more than 250 million British thermal units per hour heat input; or (xxvii) Any other stationary source category which, as of August 7, 1980, is being regulated under section 111 or 112 of the Act.

Because agricultural operations do not fall under any of the specific source categories listed above, fugitive emissions are not counted when determining if an agricultural operation is a major source. 40 CFR 71.2 defines fugitive emissions as "those emissions which could not reasonably pass through a stack, chimney, vent, or other functionally-equivalent opening."

Since emissions at the dairy are not actually collected, a determination of whether emissions could be reasonably collected must be made by the permitting authority. The California Air Pollution Control Association (CAPCOA) prepared guidance in 2005 for estimating potential to emit of Volatile Organic Compounds from dairy farms. The guidance states that *"VOC emissions from the milking centers, cow housing areas, corrals, common manure storage areas, and land application of manure are not physically contained and could not reasonably pass through a stack, chimney, vent, or other functionally-equivalent opening. No collection technologies currently exist for VOC emissions from these emissions units. Therefore, the VOC emissions from these sources are considered fugitive."* The guidance also concludes that, because VOC collection technologies do exist for liquid waste systems at dairies, *"... the VOC emissions from waste lagoons and storage ponds are considered non-fugitive."* The District has researched this issue and concurs with the CAPCOA assessment, as discussed in more detail below.

Milking Center

The mechanical system for the milking parlors can be utilized to capture the gases emitted from the milking parlors, however in order to capture all of the gases, and to keep an appropriate negative pressure throughout the system, the holding area would also need to be entirely enclosed. No facility currently encloses the holding area since cows are continuously going in and out of the barn throughout the day. The capital required to enclose this large area would also be significant. Since the holding area is primarily kept open, the District cannot reasonably demonstrate that emissions can pass through a stack, chimney, vent, or other functionally equivalent opening.

Furthermore, the commenters' completely mischaracterizes the District Rule 4570 staff report by saying that "the Hauls Dairy encloses its animals in buildings and then vents the buildings to a biofilter". In addition, the comment also implies that the holding area from the Hauls dairy including the milk parlor is enclosed. This is truly a misrepresentation of what is stated in the staff report which only states that the Hauls dairy encloses their milkers (referring to the freestall barns). The staff report does not include any references to the dairy biogas being vented to a biofilter. The Final Draft staff report has been attached (see Appendix G).

Cow Housing

Although there are smaller dairy farms that have partially enclosed freestall barns, these barns are not fully enclosed and none of the barns have been found to vent the exhaust through a collection device. The airflow requirements through dairy barns are extremely high, primarily for herd health purposes. The airflow requirements will be even higher in the San Joaquin Valley, where temperatures reach in excess of 110 degrees in the dry summer. Collection and control of the exhaust, including the large amounts of airflow have not yet been achieved by any facility. Due to this difficultly, the District cannot reasonably demonstrate that emissions can pass through a stack, chimney, vent, or other functionally equivalent opening.

Furthermore, the commenters' completely mischaracterizes the District Rule 4570 staff report by saying that "the Hauls Dairy encloses its animals in buildings and then vents the buildings to a biofilter". This is truly a misrepresentation of what is stated in the staff report which only states that the Hauls dairy encloses their milkers (referring to the freestall barns). The staff report does not include any references to the dairy biogas being vented to a biofilter. The Final Draft staff report has been attached (see Appendix G).

Manure storage Areas

Many dairies have been found to cover dry manure piles. Covering dry manure piles is also a mitigation measure included in District Rule 4570. However, the District was not able to find any facility, which currently captures the emissions from the storage or handling of manure piles. Although many of these piles are covered, the emissions cannot easily be captured. Therefore, the District cannot reasonably demonstrate that these emissions can pass through a stack, chimney, vent, or other functionally equivalent opening. In addition, emissions from manure piles have been shown to be insignificant from recent studies.

Land Application
Emissions generated from the application of manure on land cannot reasonably be captured due to the extremely large areas, in some cases thousands of acres, of cropland at dairies. Therefore, the District cannot reasonably demonstrate that these emissions can pass through a stack, chimney, vent, or other functionally equivalent opening.

Feed Handling and Storage
The majority of dairies store the silage piles underneath a tarp or in an agbag. The entire pile is covered except for the face of the pile. The face of the pile is kept open due to the continual need to extract the silage for feed purposes. The silage pile is disturbed 2-3 times per day. Because of the ongoing disturbance to these piles, it makes it extremely difficult to design a system to capture the emissions from these piles. In fact, as far as the District is aware, no system has been designed to successfully extract the gases from the face of the pile to capture them, and, as important, no study has assessed the potential impacts on silage quality of a continuous air flow across the silage pile, as would be required by such a collection system. Therefore, the District cannot demonstrate that these emissions can be reasonably expected to pass through a stack, chimney, vent, or other functionally equivalent opening.

Therefore, the VOC emissions from these sources are considered fugitive. The District has determined that control technology to capture emissions from lagoons (biogas collection systems, for instance) is in use; therefore, these emissions can be reasonably collected and are not fugitive. Therefore, only emissions from the lagoons, storage ponds, IC engines, and gasoline tanks will be used to determine if this facility is a major source.

14. **Comment:** *Project design Elements – According to the District's estimates, the anaerobic digester adds at least 9.82 tons per year of NOx, 1.54 tons of PM10 per year, and 0.65 tons per year of VOC. When all these emissions are included, as required... The emission level exceeds the major source threshold of 50,000 lbs/yr. Therefore, the project will make the Bar 20 Dairy a major source of VOC.*

    Response: As shown above in response to comment number 13, the emissions from the cow housing, milking parlor, manure storage areas, land application, and feed handling and storage areas are considered fugitive and as such will not be included in the major source calculations. The calculations shown in Appendix A of the MND demonstrate that even with the project design elements; Bar 20 Dairy is not a major source.

15. **Comment:** *The September 21, 2006 version of District Rule 2201 requires the purchase of offsets for criteria pollutants. The District claims that agricultural sources are exempt from the requirement to purchase offsets under Section 4.6.9 of Rule 2201 and therefore does not require the project to fully offset the net increase in PM10 and VOC emissions pursuant to that Rule.*

Response: The District does not agree that offsets are required for the proposed project under District Rule 2201. Section 4.6.9 of District Rule 2201 (amended 9/21/06) exempts agricultural operations from providing or generating offsets in accordance with CA Health and Safety Code, section 42301.18(c), and EPA has recently proposed approval of this rule into the state implementation plan. These laws prohibit districts from requiring offsets for agricultural sources unless those sources are allowed to generate emission reduction credits. Since there are currently no criteria or protocol for verifying emission reductions are permanent or surplus, the District does not allow such sources to generate emission reduction credits at this time. Therefore, under State law and District regulation, the District is prohibited from requiring offsets for increases in emissions at dairies until such time as the District develops a protocol for banking voluntary emissions reduction credits at dairies. Work on such a protocol is proceeding. The first public meeting regarding the banking of emission reduction credits at dairies has been held. After the protocol for banking dairy emissions reductions has been workshopped through the public process and approved by our board and oversight agencies, the District will begin requiring offsets for such increases, as allowed by state law.

16. **Comment:** *The District's Best Available Control Technology Analysis is flawed. Dairy emissions are controllable using (1) enclosed and connected milk parlors and cow housing units vented to biofilters, and (2) anaerobic digester systems, because these technologies are considered Achieved in Practice.*

    Response: <u>Enclosures</u>: District staff has researched the use of biofilters for inclusion in the Dairy BACT Guideline. The District has been able to verify that biofilters have been used to control odors and/or emissions from wastewater treatment plants, composting operations, and enclosed barns at some poultry and swine confined animal facilities. However, to date, the District has not been able to confirm a single case of an enclosed dairy barn vented to a biofilter. As stated in the Final DPAG BACT Report, the reports of dairy barns vented to biofilters remain unverified and therefore cannot be deemed Achieved-in-Practice BACT.

    The fact that biofilters have been used at poultry and swine facilities also does not render this option Achieved in Practice for dairy facilities. Dairy and swine facilities are not the same source category because the design and operation of these facilities differ significantly from that at dairies. Additionally, the airflow rate required to dissipate heat from the larger dairy animals is much higher. The higher airflow rate would necessitate a substantially larger biofilter than that employed at poultry or swine facilities in order to provide the minimum residence time needed to control emissions. Due to these reasons, the technological feasibility of capturing and controlling the air exhaust from dairy barns remains in question. However, the District has considered this technology as a technologically feasible BACT option, and has performed a cost-effectiveness analysis, which concluded that this option is not cost-effective at this time.

Anaerobic Digesters: Recent studies have indicated that lagoons, which are the most typical method for storage of animal waste from dairy animals, are not as large of a source of VOC emissions as previously thought.[3]

One of the potential drawbacks for air quality that can result from anaerobic digestion is the emission of oher pollutants resulting from the combustion of biogas. These pollutants include oxides of nitrogen (NO_X), sulfur oxides (SO_X), particulate matter (PM_{10} and $PM_{2.5}$), and carbon monoxide (CO). Current air quality modeling has demonstrated that the high levels of biogenic and anthropogenic VOC emissions in the San Joaquin Valley Air Basin cause NO_X to be the limiting reactant for ozone production. Therefore, in terms of ozone production, large reductions in VOC emissions can be offset by relatively smaller increases in NO_X emissions. This factor must be considered when determining if anaerobic digesters will reduce ozone formation in the San Joaquin Valley Air Basin. Additionally, several recent studies have demonstrated that particulate matter, especially fine particulate ($PM_{2.5}$) such as that produced by combustion, can pose a significant health risk. In summary, lagoon VOC emissions are lower than previously thought, and it is possible, even probable, that emissions of combustion contaminants (NO_X, SO_X, PM_{10}, $PM_{2.5}$, CO), including precursors for the formation ozone and fine particulate, will offset the benefits of any VOC reductions.

Finally, although there are several digesters in operation at agricultural facilities, including dairies, only one installation is equipped with advanced NOx controls capable of meeting District BACT requirements. This installation is currently under review, as the permittee has expressed difficulty in meeting these very strict NOx requirements. Given that the relevant NOx control technologies are still in the development and demonstration mode, and digesters with none or limited combustion pollutant controls are not beneficial to the protection of air quality in the San Joaquin Valley, the District cannot consider anaerobic digesters to be achieved-in-practice BACT.

With that said, the Bar 20 Dairy is installing a digester as a project design element. The digester will reduce GHG emissions by treating and compressing the resulting biogas, and injecting it into PG&E's natural gas transmission system. This will have all of the benefits of controlling the emissions from the lagoon, but will do it without the combustion processes, and the attendant degradation in air quality, that are normally associated with anaerobic digester systems.

17. **Comment:** *The District must analyze BACT for CO2.*

Response: In asking that the District apply BACT requirements to greenhouse gas pollutants, the commenter's point to requirements listed in Clean Air Act Section 165, which addresses Prevention of Significant

[3] Air Resources Board & San Joaquin Valley Air Pollution Control District Status Report on Dairy Research Related to SB 700 Implementation (June 12, 2006) (<http://www.arb.ca.gov/ag/caf/dairyresearchsummaryjune2006final.pdf>)

Deterioration (PSD). PSD requirements are the pre-construction mandates applicable in areas that are in attainment with an individual pollutant's ambient air quality standard. The federal EPA has not declared the San Joaquin Valley attainment (or nonattainment) for any greenhouse gases, and in fact the EPA has not established ambient air quality standards for GHGs. Therefore, one cannot apply PSD regulations to greenhouse gases. In addition, EPA has retained delegation for implementing PSD in the San Joaquin Valley air basin, so if such a finding of attainment had been made, EPA would be the agency responsible for implementing relevant PSD requirements, such as those specified in the cited section. Similarly, although the commenter did not cite federal CAA nonattainment New Source Review requirements, such non-attainment requirements can not be applied to GHGs for all the same reasons – no ambient air quality standards have been established, and no attainment status has been promulgated.

18. **Comment:** *The GHG Emissions inventory is incomplete. A GHG inventory must include the project's direct and indirect GHG emissions. A complete inventory of a project's emissions should include, at minimum, an estimate of emissions from the following:*
    - *Digestive processes of dairy animals;*
    - *Waste products generated by the animals and dairy operations, including waste collection, storage, processing, and disposal;*
    - *Cultivation, processing, transport, and storage of feed consumed by dairy animals;*
    - *Site preparation, construction, and dairy operation using vehicles and machinery;*
    - *Manufacturing and transport of building materials;*
    - *Electricity generation and transmission for the heating, cooling, lighting, cleaning, and other energy demands of project;*
    - *Water supply and transportation to the project;*
    - *Fossil fuel combustion required for live animal and animal product transport; and*
    - *Any outsourced activities and contracting.*

    Response: While the GHG emissions generated by the direct sources at the dairy, such as the digestive processes and waste handling mentioned in the top two bullets, are accounted for as accurately as possible in the original CEQA evaluation, the bulk of the comment is expanding the scope of the analysis in a global fashion that is impossible and incalculable.

    If one assumes that CEQA GHG analyses should be expanded in this way, then not one house, not one school, not one daycare center, not one hospital can be built in California. In fact, <u>no</u> construction can take place in the state of California, because we believe that such indirect impacts as are contemplated by the commenter are impossible to fully analyze, even if it were possible to contract a fully-funded multi-year research project by an institution of higher learning for each proposed building project.

    As just one example, the commenter asks the applicant to describe the GHG impact of the construction of the building materials used in the building of the dairy. This would require determining the manufacturer that formed the metal pipes used to make the corrals, and then determining what that facility's GHG impacts were during the time that it manufactured those pipes. Then we'd have to take a look at the mining operation that mined the ore, and the foundry that turned the ore into the metal that became the pipe, and the transportation routes involved in each of the intermediate steps, and the final transportation route that the pipe took to the job site. Then, of course, you'll have to do the same analysis for the mines, foundries, and manufacturers that produced the waste transfer piping, the fans, the light fixtures, etc. Then we'd have to do the same for the logging/lumber mill/transportation systems and the oil production/refinery/plastic manufacturer/transportation systems, and on, and on.

This expansion was not envisioned by the authors of the CEQA law, and we are not proposing to expand the scope in such a way at this time. We are limiting our analysis to the identifiable and quantifiable direct GHG impacts caused by the dairy.

19. **Comment:** *The greenhouse gas emissions analysis in the MND dramatically understates total Project GHG emissions by excluding or underestimating a number of important sources of GHG.*

    Response: As demonstrated in the MND, the District has analyzed and quantified GHG emissions from the construction and operation of the project. It is the District's opinion that construction and operation of the project are the relevant sources of GHG emissions. Thus, the District has not excluded important sources of GHG emissions and the MND does not understated total project GHG emissions.

20. **Comment:** *The MND cannot legitimately include emissions from liquid manure from new cows as part of the environmental baseline for the project.*

    Response: On the contrary, the justification is quite valid, and conservatively protective of air quality. As described in the original engineering evaluation, this facility was partially constructed prior to the date the District began requiring permits of dairies. Generally, such facilities can be argued to have a vested right to complete construction, and are "grandfathered" into the permitting system. Had the District accepted this argument, the dairy would have been able to construct without being subjected to our Rule 2201, "New and Modified Stationary Sources", and would have therefore escaped not only the controls of our BACT determination, but also would not have been subject to a CEQA review, at all, because no discretionary permit would have been required.

    However, the District took what we believed to be a defensible position that was more protective of air quality – we "grandfathered" only the portions of the dairy for which construction had demonstrably commenced, and required all other parts of the dairy to go through the full new-source permitting process. We continue to believe that a determination that none of the dairy was grandfathered (constructed prior to permitting requirements) is indefensible, and we continue to believe that the approach taken was the alternative that is most beneficial to the protection of air quality, as the other alternative was to consider the commencement of construction to be applicable to the entire dairy, thus grandfathering in the entire dairy.

21. **Comment:** *Substantial evidence does not support the MND's use of GHG Emission Factors. The MND's use of low emissions factors for dairy cows are not supported by substantial evidence and minimize project emission. CO2 emissions from manure decomposition and enteric fermentation is also not calculated.*

    Response: The emission factors used by the District are based on the emission factors developed by the California Air Resources Board, which is the expert and the leading authority in all aspects related to Greenhouse Gas emissions. The District will not second guess ARB on its approved and posted emission factors and will continue to use these emission factors until these factors are either updated or revised. Any new study needs to be properly vetted by ARB and a scientific review needs to be performed before the District can accept any other emission factors. In addition, previous conversations with ARB staff have led the District to believe that the ARB emission factors may even represent worst-case conditions at a dairy.

22. **Comment:** *Though in one part of the MND carbon dioxide emissions are calculated for construction equipment that was used during the Project's construction prior to obtaining a permit or performing a CEQA review (MND at 2-28), the MND does not acknowledge these emissions in its assessment of total GHG emissions from the proposed dairy expansion.*

    Response: As demonstrated in the MND, carbon dioxide emissions from construction have been acknowledged, quantified, and assessed in determining the total GHG emissions from the proposed dairy expansion.

23. **Comment:** *Not only is proposed mitigation inadequate and unverified, but other feasible measures which would result in significant emissions reductions are not made conditions of project approval.*

    Response: The District disagrees that the proposed mitigation is inadequate and unverified. It has been demonstrated in the MND that the project's design elements and proposed mitigation measures will reduce project GHG emissions below the District's significance threshold for GHG. Thus, no additional mitigation measures are required.

24. **Comment:** *GHG emission reductions claimed from mitigation measures are not adequately documented. Except for the feeding of cottonseed oil, none of the emissions reductions claimed are supported with documented evidence. The manure removal control efficiency is apparently based on a news alert from Science for Environmental Policy, which is not provided. The MND likewise provides no direct support for the significant GHG reductions it attributes to direct application and incorporation of manure into soil, citing only to a VOC efficiency control factor provided by the Dairy*

Permitting Advisory Group and baselessly assuming the same benefits for manure methane control.

Response: The news alert from *Science for Environmental Policy* provided a summary of a study performed by Weiske et al, entitled, *Mitigation of greenhouse gas emissions in European conventional and organic dairy farming* (see Appendix H). This study was cited in the previous set of comments submitted by the same commenters'. The study clearly states a potentially significant amount of reductions that can be achieved through daily removal of manure. The District used the control efficiency outlined in the study and considers it to be a conservative control for removal of manure even though the dairy removes the manure 4 times more than the study evaluated.

The reductions applied for incorporating manure into the soil are expected to significantly reduce methane emissions. However due to the lack of data, the District applied what we believe to be a conservative control efficiency of 29%, comparing it to the minimum amount of reductions we would achieve for VOCs, as stated in the Dairy Permitting Advisory Group (DPAG) report. The District has throughout the MND and the engineering evaluation been consistent with using VOC reductions as a surrogate for methane reductions (i.e., emissions from anaerobic treatment lagoons compared to standard lagoons). Therefore, it is quite reasonable to apply the same concept to this analysis.

25. **Comment:** *The District must clarify whether the digester is now fully incorporated into the Project or is still being analyzed as a separate project. If the digester is in fact part of the Project, the ATC for the Project must be revised to make the digester an enforceable element of the Project.*

    Response: The digester and the dairy expansion have been analyzed as one single, cohesive project. If the digester is not constructed, the MND would be inadequate to support approval of the project, thus, requiring preparation and circulation of a new environmental review document.

26. **Comment:** *Though the MND claims that a "conservative" 95 percent control efficiency will be applied for the digester, this is, in fact, higher than 85 percent capture rate the EPA assumes in its policy book on methane emissions reduction (US EPA 2006a). The MND must provide a valid explanation for using a higher control efficiency.*

    Response: A completely enclosed system without any leaks, such as the completely enclosed digester system proposed by Bar 20 dairy is expected to have a100% capture efficiency. In addition, the biogas collected will be sent into the natural gas pipeline system. This results in a 100% capture and nearly 100% control efficiency for this type of proposed operation. Therefore, the 95% overall control efficiency used by the District is conservative.

27. **Comment:** *The District claims that the existing lagoons at Bar 20 are actually designed as storage ponds, which do not convert volatile solids to methane as readily, and therefore reduce the emissions for these sources by 40 percent. However, in its calculations for the dairies to be closed by Bar 20, the District uses the higher emission factor it assigned to the post-project, properly-designed treatment lagoons.*

    Response: The District concurs with this comment and has made all the appropriate adjustments to the emission calculations. (see Appendix A of the MND)

28. **Comment:** *It has come to our attention that the JMC dairy, which Bar 20 proposes to purchase and shut down, ceased to operate at some time before August 22, 2006. Because this dairy closed long before this Project will be approved, it can be assumed that the offsets claimed by Bar 20 are not valid and should not be included in the MND as mitigation.*

    Response: The shutting down of JMC Dairy coincided with the construction of the Bar 20 Dairy expansion and the inclusion of those cows to the expanded dairy. Therefore the resulting emission reductions were contemporaneous with construction of the BAR 20 Dairy and is considered to be an appropriate mitigation measure.

29. **Comment:** *Without thorough documentation of which dairies will be shut down, when, what emissions will be eliminated, and an analysis of whether they would have shut down in spite of the proposed Project, this commitment cannot stand as a mitigation measure for the purposes of avoiding an EIR.*

    Response: In addition to disclosing which dairies will be shut down, the MND characterizes and quantifies the resulting emission reductions. The closing of the dairies is enforceable through District permit requirements, and it is appropriate mitigation for the project.

30. **Comment:** *The MND inappropriately dismisses feasible enteric emission reductions.*

    Response: Per CEQA Guidelines, Section 15021.2.(b), in deciding whether changes in a project are feasible, an agency may consider specific economic, environment, legal, social, and technological factors. Furthermore, per CEQA Guidelines, Section 15126.4(3) mitigation measures are not required for affects which are not found to be significant. The District's MND demonstrates that the projects impact on Global Climate Change would be less than significant. Therefore, the District's consideration of cost effectiveness is appropriate and additional mitigation is not required because emissions are less than significant.
31. **Comment:** *Once all feasible on-site mitigation has been implemented, the District must use offsets to fully mitigate any remaining greenhouse gas emissions generated by the Project.*

Response: As demonstrated in the MND, project design elements combined with implementation of all feasible on-site mitigation will reduce the project's GHG emissions to a level that is less than significant. Thus, offsets will not be required.

32. **Comment:** *The proposed significance threshold of 42,000 tons for greenhouse gases cannot be relied on because there is a fair argument that environmental effects may still be significant at levels below this threshold.*

    Response: The District's rationale for the proposed significance threshold is clearly presented within Appendix F of the MND. The District's threshold was developed using an approach that is congruent with methodology presented in the California Air Pollution Control Officers Association (CAPCOA) January 2008 white paper on evaluating and addressing greenhouse gas emissions under CEQA.

The County of Fresno Department of Community Health

33. **Comment:** *The Fresno County Department of Public Health, Environmental Health Division has reviewed the above noted revised document and offers no new comments at this time.*

    Response: Comment noted.

California Integrated Waste Management Board

34. **Comment:** *Please contact your Local Enforcement Agency (LEA), The Fresno County Department of Community Health (Department), to determine how this operation is to be regulated. Steve Crump is the current contact person and can be reached at (559) 445-3271. Please include him (or the Department), and the Board in any future planning and environmental documentation for this proposed project.*

    Response: The Applicant has contacted Steve Crump and will comply with any regulations for the proposed project set forth by the California Integrated Waste Management Board.