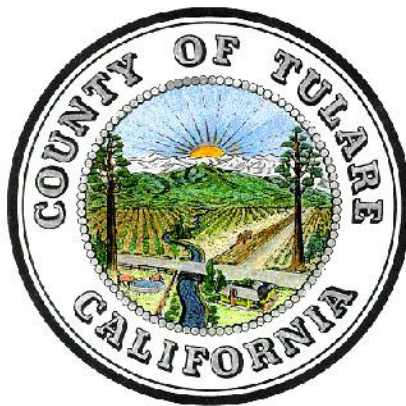


DRAFT ENVIRONMENTAL IMPACT REPORT APPENDICES

**FOR THE
ANIMAL CONFINEMENT FACILITIES
PLAN, AND DAIRY AND FEEDLOT CLIMATE ACTION PLAN**

SCH # 2011111078



**Tulare County Resource Management Agency
5961 South Mooney Boulevard
Visalia, California 93277-9394**

January 2016

**With Technical Assistance By:
Quad Knopf, Inc.
901 East Main Street
Visalia, California 93292**

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January 2016

Appendices (See Enclosed CD)

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Appendix B	Dairy and Feedlot Climate Action Plan
Appendix C	Notice of Preparation, Initial Study, Comment Letters, Notice of Public Scoping Meeting, Comments at Meeting
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Appendix A

Animal Confinement Facilities Plan

DRAFT

Tulare County

Animal Confinement Facilities Plan

SECTION 1. BACKGROUND

1.1 Regulatory History

In 1974, an Animal Waste Management Element (AWME) was prepared as part of the Environmental Resources Management Element (ERME) of the Tulare County General Plan. Included within the AWME were proposed policies for the establishment and operation of dairies and cattle feedlots. The Board of Supervisors did not adopt the AWME for incorporation into the General Plan. The policies set forth were, however, adopted by the Tulare County Planning Commission and were used after 1974 as guidelines in considering Special Use Permit applications for the establishment of confined animal facilities, in particular dairies and cattle feedlots.

The policies and guidelines utilized for the establishment and operation of confined animal facilities were from time to time reviewed and modified to provide consistency with other regulatory agencies, e.g., the California Regional Water Quality Control Board (RWQCB) and the San Joaquin Valley Air Pollution Control District (SJVAPCD). Those reviews resulted in the modification of the guidelines, particularly in regards to intensity of operations and animal density.

In 1998, the Tulare County Agricultural Advisory Committee (AAC) recommended “Dairy/Animal Confinement Facility Policies” which included locational and animal density criteria for the establishment of new dairies and animal confinement facilities. The Tulare County Planning Commission (by Resolution No. 7693), and subsequently the Board of Supervisors (by Resolution No. 98-0582), adopted the AAC’s policies on an interim basis until an Animal Confinement Facilities Plan could be adopted and incorporated into the ERME of the Tulare County General Plan.

The Phase I Animal Confinement Facilities Plan for Dairies and Bovine Animal Confinement Facilities was adopted as General Plan Amendment No. GPA 99-05 by the County Board of Supervisors in April 2000 (2000 ACFP). Policies and standards that addressed dairies and other bovine confinement facilities and associated environmental issues were included in the 2000 ACFP. Those policies and standards were premised on then-current scientific data and technology. They were, additionally, reflective of and consistent with adopted and proposed State and federal regulations.

It was intended that the policies and standards established in the 2000 ACFP provide for the development of dairies and other bovine confinement facilities on the Valley floor of the County in a manner that: protects the quality of the environment, safeguards the health, safety and general welfare of the County’s residents, and provides for the continuation and growth of bovine-related industries.

1.2 ACFP Update

Since the adoption of the 2000 ACFP, stringent statewide regulatory requirements and procedures have been expanded and updated to address the air quality and water quality aspects of dairy and bovine facilities, as administered by the RWQCB and the SJVAPCD. This Animal Confinement Facilities Plan Update is an amendment to the ERME to update and replace the 2000 ACFP with

this Animal Confinement Facilities Plan (ACFP). An objective of this ACFP is to update the way in which dairies and other bovine facilities are regulated by the County of Tulare to assure coordination and alignment with the procedures of those agencies.

Another development since the adoption of the 2000 ACFP has been the enactment of statewide climate change regulations to establish a concerted approach to addressing greenhouse gas emissions. In its adoption of the Climate Action Plan for Tulare County in 2012, the Board of Supervisors directed the preparation of a separate Climate Action Plan to address dairies and other bovine facilities. In compliance with that mandate, the Dairy CAP is to be adopted concurrent with this ACFP.

A further objective of the ACFP is to enable the County to establish a program that documents the existing dairies and bovine facilities within the County, that defines the permitted herd sizes for such facilities so as to be consistent with RWQCB and SJVAPCD approvals and that requires continuing compliance of dairies and bovine facilities with this ACFP and other County regulations.

This updated ACFP also establishes a Conformance Checklist Review procedure consistent with the California Environmental Quality Act that would apply to expansions of existing bovine facilities. To be eligible for this process, the existing bovine facility must be operating under valid RWQCB and SJVAPCD approvals, the bovine facility expansion must meet certain specified criteria and the applicant must submit any supplemental technical studies required under this ACFP to determine whether the bovine facility expansion is in compliance with the ACFP and the ACFP EIR. All new bovine facilities and those bovine facility expansions which do not meet the requirements of the Conformance Checklist Review must conduct an individualized environmental review under CEQA and be approved through the Special Use Permit process.

1.3 Purpose of the ACFP

It is the intent of this ACFP to serve as the guiding document to regulate the County's bovine facilities and projected growth over the next decade as follows:

1. To continue the regulation of the County's dairy industry to protect and enhance the County's resources, assure public health and safety, and minimize environmental impacts.
2. To identify and document those existing bovine facilities which are operating under valid RWQCB and SJVAPCD approvals, and to specify procedures to achieve compliance by those existing bovine facilities that are not yet in compliance.
3. To modify, as feasible, the scope of County regulatory responsibilities to avoid overlap and duplication with the water quality and air quality oversight provided by the RWQCB and the SJVAPC.
4. To update and simplify the permitting processes for bovine facility expansions and the establishment of new bovine facilities consistent with this ACFP.

1.4 County Bovine Facilities

Tulare County's economy is dependent on agricultural production, accounting for a total gross value in 2013 of \$7,809,626,000. Milk is the County's leading commodity with a total gross value of \$2,083,354,000, representing 27% of the 2013 crop and livestock value (Tulare County Annual Crop and Livestock Report). Tulare County has consistently ranked first in total milk production in California's counties. California is the top milk producing state in the U.S. (CDFA Dairy Statistics 2003 – 2013).

**Table 1-1
Tulare County Dairy Production**

Year	Value
2013	\$2,083,354,000
2012	\$1,813,816,000
2011	\$2,056,691,000
2010	\$1,604,172,006
2009	\$1,228,975,000
2008	\$1,757,575,000
2007	\$1,851,648,000
2006	\$1,150,842,000
2005	\$1,331,239,000
2004	\$1,345,719,000
2003	\$1,064,665,000

Source: Tulare County Animal Crop and Livestock Report 2000-2009

For informational purposes only, as of December 31, 2013, there were approximately 330 existing bovine facilities in Tulare County, consisting of approximately 302 dairies and 28 cattle feedlots, with a reported total Countywide herd size of approximately 1,000,000 bovine. Growth in bovine facilities over the next decade is expected to increase at the rate of approximately 1.5 percent annually.

The location of existing bovine facilities in the County as of 2013 and the approximate areas that are occupied by existing bovine facilities, including both the primary facilities and the agricultural areas associated with feed crop production and manure utilization, are depicted on Figure 1-1.

1.5 Relationship to General Plan Documents

The Environmental Resources Management Element of the Tulare County General Plan has been developed to establish goals and policies that would protect and enhance the County's resources (Tulare County 2001). Under the ERME, the following objectives are addressed:

- Development of policies and programs which will avoid degradation of the natural environment and offset or reverse degradation which has already occurred;
- Recognition of the complexity and interrelation of the environmental and planning processes;

- Attendance to environmental issues that, due to their importance, should be given priority attention for policy and action in order to provide for future development; and
- Acknowledgement of those resource systems that require long periods to restore or require ongoing conservation practices in order to avoid continued decline or degradation.

This Animal Confinement Facilities Plan has been prepared to be consistent with the objectives of the ERME and with the other elements of the Tulare County General Plan. The policies of this ACFP reinforce, and are reinforced by, the General Plan.

SECTION 2. GOALS, POLICIES AND STANDARDS

Introduction

This section of the ACFP identifies the goals, policies, and standards established by the County for the location, design, and operation of dairies and cattle feedlots. This section also describes the County's permitting process for the construction and operation of both new dairies and cattle feedlots and for the expansion of existing facilities.

The following definitions are applicable:

ACFP List: For each bovine facility within the County, a list that includes the Special Use Permit or other entitlement issued by the County for such bovine facility; the location and the land associated with such bovine facility; the date and reference information for each of the following: the Waste Discharge Requirements (WDRs) issued by the State of California Regional Water Quality Control Board, Central Valley Region (RWQCB), the Permit to Operate issued by the San Joaquin Valley Air Pollution Control District (SJVAPCD) and the permits issued by the County; the permitted herd size; and the reported herd size in the most current Annual Compliance Reports.

Bovine or Bovine Animal: Dairy (including mature cows and support stock) and beef cattle and/or other similar ox-like animals.

Bovine Facility: A dairy, cattle feedlot or other confined animal facility for bovines.

Bovine Facility Expansion: Any expansion of either an existing bovine facility or a new bovine facility authorized by the County under the applicable regulations.

Cattle Feedlot: An agricultural enterprise for the confined housing and feeding of milk cow support stock or other cattle including related facilities for feed storage and for manure handling and disposal.

Compliant Bovine Facility: Each existing bovine facility which has obtained WDRs from the RWQCB via General Order R5-2007-0035 or via an individual order, and which has obtained a Permit to Operate from the SJVAPCD (unless expressly exempt from such permit), and which is in compliance with the permitted herd size as provided in the ACFP List.

Confined Animal Facility: A facility where domestic animals are corralled, penned, tethered or otherwise caused to remain in restricted areas for commercial purposes and primarily fed by means other than grazing. When measuring setbacks and distances between a confined animal facility and other facilities, uses or boundaries, measurements shall be taken from or between the most proximate confined animal improvement.

Confined Animal Improvement: A physical improvement component of a confined animal facility, such as animal barns, corrals, or pens, feed storage (excluding hay barns), manure storage and handling areas and wastewater lagoons/sumps, expressly excluding areas constituting crop acreage or not otherwise utilized in milk production or the confinement of bovines.

Crop Acreage: Irrigable portion of lands serving and essential to a bovine facility, including wastewater conveyance ditches, areas used for wastewater discharge and for facility feed crops, excluding buildings, corrals and/or pens, feed and/or manure storage areas, lagoons/sumps, canals, waterways, and public road rights-of-way.

Dairy: An agricultural enterprise for the housing and support of mature cows and support stock essential to the enterprise. The dairy includes not only the facilities and structures required to house mature cows and support stock, but also feed barns and storage areas, manure storage and treatment facilities, milking barns, and crop acreage.

Existing Bovine Facility: Each of the bovine facilities existing in Tulare County as of December 31, 2013, as same may be expanded by a bovine facility expansion.

Mature Cow: A dairy cow that has produced milk at any time during its life.

New Bovine Facility: A bovine facility in Tulare County that did not exist prior to December 31, 2013, as originally approved by the County and as same may be subsequently expanded by a bovine facility expansion.

Permitted Herd Size: For an existing bovine facility, the lesser of the maximum allowable number of mature cows under the RWQCB WDRs and the maximum allowable number of mature cows under the SJVAPCD Permit to Operate and the maximum allowable number of support stock under the SJVAPCD Permit to Operate as of December 31, 2013; or for a new bovine facility or a bovine facility expansion, the lesser of the maximum allowable number of mature cows under the RWQCB WDRs and the maximum allowable number of mature cows under the SJVAPCD Permit to Operate and the maximum allowable number of support stock under the SJVAPCD Permit to Operate, as shown on the ACFP List (as same may be amended).

Support Stock: Dairy bovines other than mature cows.

2.1 Existing Bovine Facilities and Compliant Bovine Facilities

Goal 2.1 **Document the location and permitted herd sizes of the existing bovine facilities. Confirm, and validate legality of, the compliant bovine facilities.**

Policy 2.1-1 The locations and permitted herd sizes of all existing bovine facilities shall be defined and mapped based on the ACFP List on or before the first anniversary of the adoption of this ACFP.

Policy 2.1-2 All compliant bovine facilities shall be deemed for all purposes by the County as legally established bovine facilities in the locations and subject to the permitted herd sizes as provided in the ACFP List.

Policy 2.1-3 Any existing bovine facility that does not qualify as a compliant bovine facility shall be deemed for all purposes by the County as a legally established and compliant bovine facility upon having demonstrated compliance with the permitted herd sizes under both validly issued WDRs

from the RWQCB and a valid Permit to Operate from the SJVAPCD and having obtained or modified the Special Use Permit or other entitlement issued by the County for such existing bovine facility so as to be consistent with the ACFP List under the procedures set forth in Policy 2.5-4 on or before the first anniversary of the effective date of the adoption of this ACFP. Until such time that such compliance has been timely demonstrated, an existing bovine facility that does not qualify as a compliant bovine facility shall be permitted to continue its operations.

2.2 *Bovine Facilities Location and Siting*

The location of bovine facilities within Tulare County is governed by policies designed to ensure a compatible relationship among such bovine facilities and with surrounding land uses. Such policies are designed to permit the establishment of new bovine facilities and bovine facility expansions while protecting neighboring properties from potential animal confinement nuisances or similar adverse impacts. The County has established the areas appropriate for the construction and operation of bovine facilities, which are within the following Agricultural zoning districts: A-1, AF, AE, AE-10, AE-20, AE-40 and AE-80. From a regulatory perspective, bovine facilities are beneficial uses in the Agricultural zoning districts and are recognized as providing significant contributions to the economic vitality of the County as well as contributing to the health and welfare of society as a whole.

Goal 2.2 **Site new bovine facilities and bovine facility expansions within designated Agricultural zoned areas where they have been determined to be compatible with surrounding land uses. Use specific zoning and separation standards to avoid potential land use conflicts when approving the siting of new bovine facilities and bovine facility expansions. Protect agricultural uses within Agricultural zoned areas from incompatible non-agricultural uses.**

Policy 2.2-1 **Confined Animal Improvement Separation:** Confined animal improvements within a new bovine facility shall be located at least one-half mile (2,640 feet) from the nearest confined animal improvement within the nearest bovine facility.

Policy 2.2-2 **Proximity to Urban Areas.** Confined animal improvements within a new bovine facility shall not be located as follows:

- Within one mile of (a) an incorporated or unincorporated community's Urban Area Boundary (or urban-type residential zoning boundary line) (however, for those communities that have an Urban Development Boundary but do not have an Urban Area Boundary, the Urban Development Boundary line shall be used), but excluding any portion of a community's Urban Area Boundary which has been expanded to include municipal uses such as sewage treatment facilities, airports, and waste disposal sites that are located beyond the Urban Development Boundary (in which case, the decision-maker shall determine the location of the one-mile

setback area, provided that in no event shall a setback of less than one mile from a community's Urban Development Boundary be authorized), or (b) any other area zoned solely for residential use containing a concentration of at least thirty (30) legally established dwelling units measured from the outermost residential zoning boundary; or

- Within 1,000 feet of the boundary of a public park; or
- Within one-half mile (2,640 feet) of school grounds of an existing public or private school; or
- Within one-half mile (2,640 feet) of the nearest point of a primary dwelling structure in a concentration of ten (10) or more legally established, privately-owned single-family residences.

For purposes of this Policy 2.2-2, to qualify as a "concentration," such dwelling units or residences must be legally established, occupied, located within a contiguous area, and exceed a density of one dwelling unit per acre, and "legally established" dwelling units or residences are defined as dwelling units or residences, excluding travel trailers, "established in accordance with all applicable building and zoning regulations."

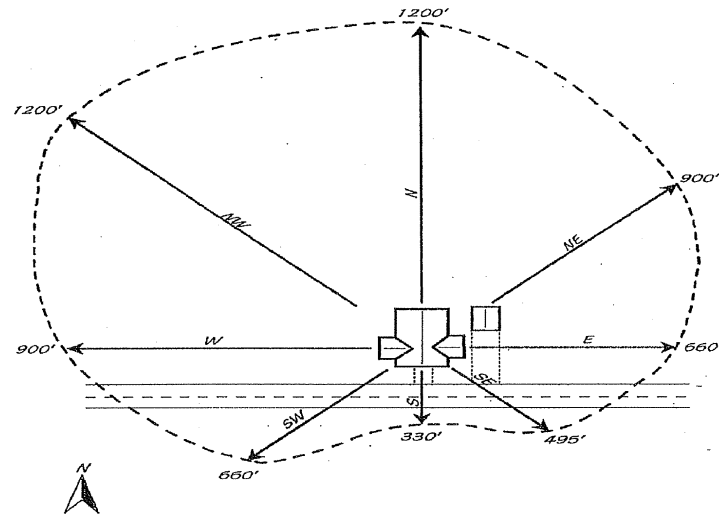
Policy 2.2-3

Proximity to Residential and Agricultural Land Uses. Confined animal improvements within a new bovine facility shall not be located closer than the distances shown on Micro-Windshed Diagram "A" (Residential) to an occupied, legally established (as defined in Policy 2.2-2) dwelling unit owned by a private property owner other than the bovine facility owner/operator or employee.

Confined animal improvements within a new bovine facility shall not be located closer than the distances shown on Micro-Windshed Diagram "B" (Agricultural) to an established, legally operating citrus grove, vineyard, deciduous fruit/nut orchard, or vegetable agricultural enterprise.

No deviations from the Micro-Windshed distances set forth in this Policy 2.2-3 may be approved unless the owner of the dwelling unit or the agricultural operation, as applicable, agrees in writing to such deviation, provided that such approval shall not be unreasonably withheld and, if it is, a finding shall be made to that effect.

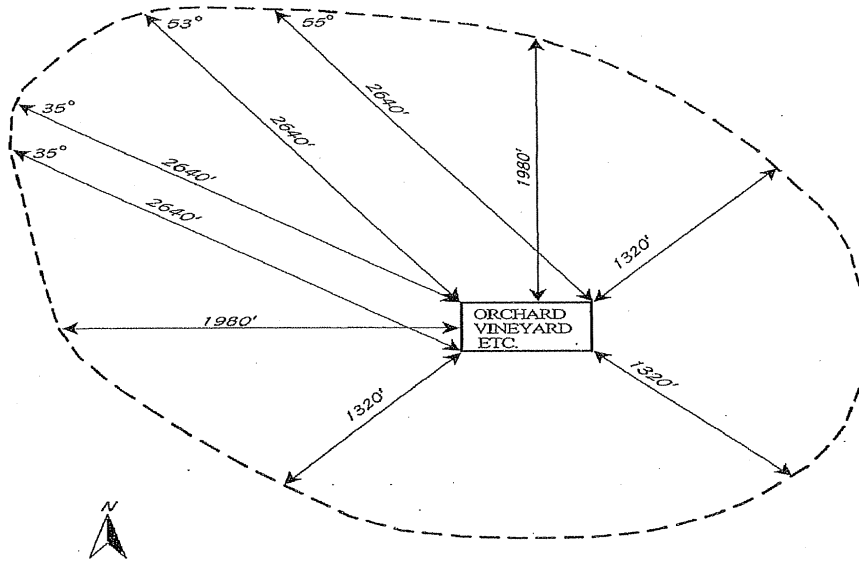
Micro-Windshed Diagram 'A'



Note: Road is shown as an example -- could be in any location.

Measurements are to be made from the geometric center of the primary dwelling structure to the most proximate part of the subject confined animal improvement.

Micro-Windshed Diagram 'B'



Measurements are to be made to the nearest edge of the affected orchard/vineyard/etc. from the most proximate part of the subject confined animal improvement.

Policy 2.2-4 **Exclusion.** The policies of this Section 2.2 shall not apply to the repair, maintenance, replacement or upgrading of a bovine facility, provided that such work does not increase the bovine capacity beyond the permitted herd size for such bovine facility.

Policy 2.2-5 **Applicability of Section 2.2 Policies.** A new bovine facility or a bovine facility expansion that does not conform to a defined separation or buffer standard under Section 2.2 may be permitted, provided that any expanded facilities will not encroach any closer than the existing facilities, or upon approval of a Special Use Permit subject to the adoption of findings that special circumstances warrant the approval of such exception to the applicable defined separation or buffer standard.

Policy 2.2-6 **Protection of Agricultural Zoned Areas.** The Agricultural zoned areas of the County have been established to promote and protect agricultural uses and activities, including bovine facilities. The County shall protect Agricultural zoned areas from conflicting uses due to the encroachment of incompatible non-agricultural uses.

2.3 *Environmental Constraints*

The placement of confined animal improvements within new bovine facilities and within bovine facility expansions shall be consistent with environmental constraints.

Goal 2.3 **To restrict the siting of confined animal improvements within new bovine facilities and within bovine facility expansions so as to avoid existing areas of environmental constraints within the County.**

Policy 2.3-1 **Flood Zone Areas.** Confined animal improvements within a new bovine facility or within a bovine facility expansion shall not be located in the following primary flood zone areas: any territory designated on the latest adopted National Flood Insurance Program, Flood Insurance Rate Maps (FIRM) as Special Flood Hazard Areas Inundated by 100-Year Flood, Zones A, AI, AO and AH, Floodway Areas in Zone AE or Other Flood Areas in Zone X, except that such improvements may be so located upon submittal to the County of a recommendation by a licensed civil engineer, based upon a field survey, of required improvements elevation above 100 year flood elevations. However, manure held as fertilizer and dairy process water used to irrigate crop acreage may be transported to and used in such flood zones in compliance with applicable RWQCB regulations.

Policy 2.3-2 **High Groundwater Areas.** Confined animal improvements within a new bovine facility or within a bovine facility expansion shall be prohibited in shallow or perched groundwater areas where the minimum vertical distance between proposed lagoon bottoms/corral surfaces and highest anticipated groundwater levels is less than five feet. Highest anticipated groundwater levels shall be established based on available records and/or site-specific

geotechnical investigation by a qualified registered professional engineer or geologist.

Policy 2.3-3 **Sink Holes.** Confined animal improvements within a new bovine facility or within a bovine facility expansion shall not be located in a sink hole or areas draining into a sink hole.

Policy 2.3-4 **Exclusion.** The policies of this Section 2.3 shall not apply to the repair, maintenance, replacement or upgrading of a bovine facility, provided that such work does not increase the bovine capacity beyond the permitted herd size for such bovine facility.

2.4 Regulatory Agency Compliance

The County recognizes that the applicable regulations and requirements of the RWQCB and the SJVAPCD, as administered by such agencies, provide a stringent and comprehensive regional scheme for regulating the specialized water quality and air quality aspects of confined animal facilities. The County seeks to avoid the imposition of duplicative and overlapping requirements that may conflict with the regulatory authority of such agencies.

Goal 2.4 **New bovine facilities and bovine facility expansions shall comply with the applicable permitting and operational regulations of the RWQCB and the SJVAPCD, as administered by such agencies.**

Policy 2.4-1 **Regional Water Quality Review Board.** New bovine facilities and bovine facility expansions shall comply with the requirements of California Code of Regulations, Title 27, pertaining to “Confined Animal Facilities,” as administered by the RWQCB. A completed Report of Waste Discharge (including required technical reports) to the RWQCB shall be submitted to the County prior to issuance of any building permits and at least 120 days prior to discharge.

Policy 2.4-2 **San Joaquin Valley Air Pollution Control District.** New bovine facilities and bovine facility expansions shall comply with the requirements of the SJVAPCD for obtaining an Authority to Construct and a Permit to Operate. A copy of the approved Authority to Construct shall be submitted to the County prior to issuance of any building permits.

Policy 2.4-3 **Changes to RWQCB WDRs and SJVAPCD Permits to Operate.** Prior to the submittal to the RWQCB or the SJVAPCD of an application to amend the existing WDRs or the Permit to Operate issued by the applicable agency for a bovine facility, an application shall be filed with the County to address such proposed changes.

2.5 Permitting Requirements – Bovine Facilities and Bovine Facility Expansions

Goal 2.5 **Improve and update the permit process for establishment of new bovine facilities and bovine facility expansions.**

- Policy 2.5-1** **Dairies:** Dairies shall be permitted on the basis of the permitted herd size and the bovine facility site boundaries, together with any crop acreage.
- Policy 2.5-2** **Cattle Feedlots:** Feedlots shall be permitted on the basis of the permitted herd size and the bovine facility site boundaries.
- Policy 2.5-3** **Bovine Facility Expansions Criteria for Conformance Checklist Review:** Bovine facility expansions may be approved through the Conformance Checklist review procedure, in accordance with California Environmental Quality Act (CEQA) Guidelines Section 15168(c)(4), provided that such bovine facility expansion complies with all applicable regulations, policies, standards and mitigation requirements set forth in the ACFP, in the ACFP Environmental Impact Report (EIR) and in the County Zoning Ordinance, as demonstrated by performance by the Resource Management Agency of a Conformance Checklist review of the expanded facilities within such bovine facility expansion and the issuance of findings in accordance with CEQA Guidelines Section 15168(c)(2). The Conformance Checklist criteria are set forth in Appendix A to this ACFP.
- Policy 2.5-4** **Special Use Permit Requirements:** All new bovine facilities and any bovine facility expansions that do not or cannot comply with the requirements under Policy 2.5-3 must obtain a Special Use Permit for such new bovine facility or for the bovine facility expansion, which shall be subject to additional environmental review in accordance with CEQA Guidelines Section 15168(c).

2.6 *Applications - New Bovine Facilities and Bovine Facility Expansions*

2.6.1 Application Contents - Applications for new bovine facilities and bovine facility expansions shall contain the following textual and mapped information:

1. Names, addresses and phone numbers of the owner and operator;
2. Site address and assessor's parcel numbers for all land application sites;
3. Bovine animal types and numbers;
4. Manure application agreements for non-owned land (if applicable);
5. A scaled plan showing:
 - a. Buildings, corrals, lanes, retention ponds/settling basins, irrigation ditches and pipelines (private and community), silage storage and manure solids storage areas;
 - b. Onsite and offsite wastewater and manure application areas (if applicable);
 - c. Surface waterways on or near the facility, such as rivers, canals, sloughs and intermittent streams;
 - d. The location of onsite and adjacent water wells within one hundred (100) feet of the property line or the bovine facility boundaries;

- e. Public facilities such as roads and easements;
- f. Access points to public roads; and
- g. Any setback or windshed constraints described in Section 3.2, Bovine Facilities, Location and Siting.

2.6.2 Environmental Review: Applicants for new bovine facilities and bovine facility expansions are required to provide such technical reports, as applicable, which the Resource Management Agency deems pertinent with respect to site-specific environmental and bovine facility siting issues. These reports may include any of the following:

- 1. Biological Resources Survey;
- 2. Cultural Resources Evaluation;
- 3. Integrated Pest Management Plan;
- 4. Dead Animal Disposal Plan;
- 5. Hazardous Materials Business Plan;
- 6. Odor Control Measures;
- 7. Dairy CAP Consistency Checklist;
- 8. Geological – Hydrological Report;
- 9. Health Risk Assessment;
- 10. Traffic Evaluation;
- 11. Water Availability Evaluation for On-Site Wells; and
- 12. Comprehensive Nutrient Management Plan (CNMP).

2.7 *Design and Operational Standards*

These standards furnish guidance to bovine facility owners and operators wishing to seek approval of a new bovine facility or a bovine facility expansion to ensure compliance with this ACFP.

- 1. **Minimum Site Requirements:** Dairy sites, including the bovine facility and crop acreage, must contain a minimum of 160 acres. Cattle feedlot sites must be a minimum of 80 acres.
- 2. **Parking Requirements:** Sufficient on-site parking shall be provided for all automobiles and trucks. The parking area and the entrance roads shall be paved or treated with an acceptable dust-retardant treatment so that dust and mud will not create conditions detrimental to air quality and to the surrounding area and roads. Pavement or treatment areas shall be maintained at all times.
- 3. **Site Access:** All drive approaches at driveways and major entrances to the improved portion of the site shall be constructed and surfaced as per the Tulare County Improvement Standards, and the applicant or applicant's contractor shall obtain an encroachment permit from the Resource Management Agency prior to issuance of any building permits for construction and/or prior to performing work within any County road right-of-way.

4. **Site Maintenance:** All public road approaches, driveways and off-street parking areas shall be designed and maintained so that mud, dust, gravel, and manure do not create conditions detrimental to the surrounding public roadways.
5. **Public Utilities:** The applicant shall make all arrangements for the relocation of all overhead and underground public utility facilities that interfere with any improvement work to be performed by the applicant. The applicant shall also make arrangements with the affected public utility company for any cost of relocating such facilities and no portion of such relocation costs will be paid by the County.
6. **Food and Agricultural Code:** Dairy facilities shall meet the requirements of Division 15 of the California Food and Agricultural Code as administered by the Milk Inspection Service of the Tulare County Environmental Health Division. Dairy applicants shall provide detailed plans of the facility to the Milk Inspection Service for review and approval prior to issuance of any building permits.
7. **Water Wells:** All new wells shall comply with the construction requirements of the Tulare County Well Ordinance.
 - a. No well, new or existing, shall be located closer than one hundred (100) feet from any animal enclosure, nor shall such enclosure encroach within one hundred (100) feet of an existing well. Alternatively, any existing well may be lined to prevent water intrusion to fifty (50) feet below existing site grade;
 - b. Inactive wells shall be properly destroyed in accordance with the Tulare County Well Ordinance; and
 - c. All agricultural wells shall have an overhead air gap at the standpipes.
8. **Lagoon Locations:** Lagoons or other manure containment facilities shall have a minimum one hundred fifty (150) foot setback from all wells, public ditches, and public waterways. They shall fully conform to the requirements of the RWQCB.
9. **Fire Protection:** The fresh water pressure tank shall be plumbed with a valved, 2-1/2-inch hose connection (National Hose Thread) in such manner as to provide ready access for pumper connection. All plumbing from the tank to the valve shall be a minimum of 4 inches O.D. Portable fire extinguishers shall be installed in the milk house as per N.F.P.A. Pamphlet #10 (10# ABC type).

A surfaced fire apparatus access, twelve (12) feet in width, shall be provided to within five (5) feet of a fresh water holding tank and a water pressure tank.

A 30-inch by 30-inch hinged inspection cover shall be located on the fresh water holding tank. The inspection cover shall be located along the portion of the tank that fronts on the surfaced access.
10. **On-Site Residences:** Should any residences or mobile homes be constructed or proposed, all densities and setbacks (separations from animal confinement and waste facilities, etc.)

shall be in compliance with the Zoning Ordinance. (If more than five unrelated employees are housed on the site, the dairy operator shall contact the Resource Management Agency to determine if a Permit to Operate Employee Housing is required by Section 7-23-1000 *et seq.* of the Tulare County Ordinance Code and, if required, obtain such permit prior to occupancy.)

11. **Facility Setback:** Buildings housing bovine animals, corrals, sump pits, and silage and hay storage areas for a new bovine facility or a bovine facility expansion shall not be located closer than one hundred (100) feet from all property lines at the perimeter of the bovine facility site. Onsite sewer systems shall be located at least one hundred (100) feet from all wells, ditches, and waterways.
12. **Flood, Water Quality and Air Quality Protection:** Bovine facility construction and operations shall be undertaken, and maintained in full accord with, the regulations and permitting requirements of the RWQCB and the SJVAPCD with respect to flood protection, water quality protection, and air quality protection.
13. **Operational Requirements:** Dead animals shall be removed from the site within forty-eight (48) hours and shall not be visible from the public road while awaiting removal. Dead animal disposal shall be made in full compliance with any applicable Dead Animal Disposal Plan.

Bovine confinement areas, manure storage areas, lagoons, and crop acreage shall be properly managed to prevent a nuisance of odors, dust, or vector harborage and breeding. Such management shall be in full compliance with any applicable Odor Control Measures and Integrated Pest Management Plan.

Bovine facility operations shall meet all of the requirements of the mosquito abatement district, if any, in which the facility is located. A fly abatement program shall be used to keep flies under control on-site so that they do not become a nuisance on-site or to surrounding property owners. All vector control operations shall be conducted in full compliance with any applicable Integrated Pest Management Plan.

2.8 Severance and Continuing Compliance

2.8.1 Severance and Site Alterations

No portion of a bovine facility site, or any required easement, shall be sold, released or conveyed, or used for purposes other than those expressly permitted unless approved by the County. This shall not restrict the sale of the entire parcel of property as a unit subject to all of the conditions required herein. In addition, if there is a change in the area available for recycled manure water, the bovine facility owner/operator shall immediately notify the Resource Management Agency.

2.8.2 Continuing Compliance

An Annual Compliance Report shall be completed and filed with the Resource Management Agency for each bovine facility in Tulare County. Appendix B to this ACFP contains a copy of the standard form of Annual Compliance Report as of the adoption of the ACFP.

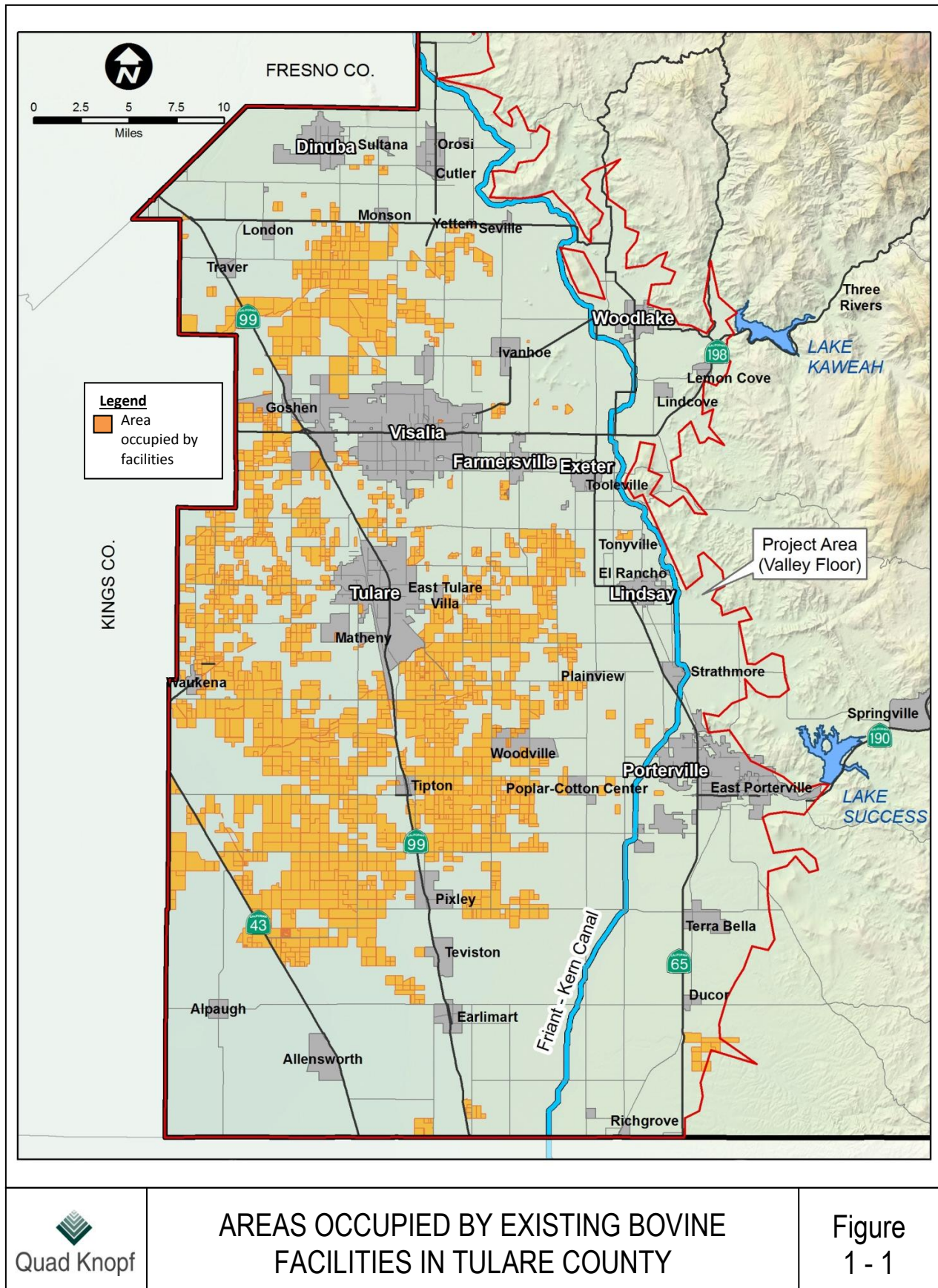
APPENDIX A TO ACFP

Bovine Facility Expansions Criteria for Conformance Checklist Review

1. Except in the case of an application by an Existing Bovine Facility seeking to become a Compliant Bovine Facility, is the Existing Bovine Facility in compliance with existing Regional Water Quality Control Board Central Valley Region (RWQCB) Waste Discharge Requirements (WDRs) and San Joaquin Valley Air Pollution Control District (SJVAPCD) Permit to Operate for the existing operations and facilities?
2. In connection with all applications for an Existing Bovine Facility expansion, would the expanded facilities covered by the application:
 - (a) generate less than 25,000 metric tons per year of Greenhouse Gas Emissions, as set forth in the Dairy Climate Action Plan (Dairy CAP), and would otherwise comply with the Dairy CAP?
 - (b) comply with Policies 2.2-1 through 2.2-3, provided that the expanded facilities would not encroach any closer than the existing facilities, and would otherwise comply with the applicable requirements of the ACFP?
 - (c) comply with the applicable mitigation measures under the ACFP Environmental Impact Report?
 - (d) comply with the applicable requirements of the County Zoning Ordinance?

APPENDIX B
TO ACFP

Standard Form of Annual Compliance Report
(as of the ACFP adoption date)



Appendix B

County of Tulare Dairy and Feedlot Climate Action Plan



County of Tulare Dairy and Feedlot Climate Action Plan

Prepared for:
County of Tulare
Resource Management Agency
Visalia, California

Prepared by:
Ramboll Environ US Corporation
Los Angeles and San Francisco, California

Date:
November 2015

Project Number:
05-13685H

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Acronyms and Abbreviations

Acronym	Definition
AB 32	Assembly Bill 32
ACFP	Animal Confinement Facilities Plan
AQMD	Air Quality Management District
ARB	Air Resources Board (California)
BAU	Business-as-Usual
BMPs	Best Management Practices
BPS	Best Performance Standards
CAP	Climate Action Plan
CAPCOA	California Air Pollution Control Officers Association
CAPs	USEPA Cap-and-Trade Program
CCAP	Climate Change Action Plan
CCR	Climate Change Research
CDFA	California Department of Food and Agriculture
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CH ₄	methane
CNRA	California Natural Resources Agency
CO ₂	carbon dioxide
CO ₂ e	carbon dioxide equivalent
EIR	Environmental Impact Report
ENVIRON	ENVIRON International Corporation
EPIC	Electric Program Investment Charge
GHG	Greenhouse Gases
GWPs	Global Warming Potentials
MT	metric tons
MWh	Megawatt-hour
N/A	Not Applicable
N ₂ O	Nitrous Oxide
OPR	Office of Planning and Research
OR	Operational Research
PEIR	Program Environmental Impact Report
PhD	Doctor of Philosophy
SB	Senate Bill
SJVAPCD	San Joaquin Valley Air Pollution Control District
USDA	United States Department Of Agriculture
USEPA	United States Environmental Protection Agency
VOCs	volatile organic compounds

1 Introduction

In August 2012, the County of Tulare (County) adopted an update of the County's General Plan, the 2030 General Plan Update (GPU). The Tulare County Climate Action Plan (Tulare CAP) released in February 2010 was adopted in conjunction with the GPU as an implementation measure to serve as a guiding document for County actions to reduce greenhouse gas (GHG) emissions and to adapt to the potential effects of climate change. The Tulare CAP was prepared to fulfill the requirements of the California Environmental Quality Act (CEQA) Guidelines for GHG emissions reduction plans developed by the California Governor's Office of Planning and Research (OPR) and adopted by the California Natural Resources Agency (CNRA).¹ The Tulare CAP was designed to provide a supporting framework to produce fewer GHG emissions during buildout under the GPU.

The GPU did not include an update of the Animal Confinement Facilities Plan (ACFP), the portion of the County's General Plan governing dairies and cattle feedlots (feedlots). The ACFP, adopted in 2001, contains the County's regulatory standards and procedures applicable to the development and operation of dairies and cattle feedlots. The GPU provided for a separate subsequent process to update the ACFP (ACFP Update) with its own CEQA review and Environmental Impact Report. Under the GPU, the County directed the preparation of a separate climate action plan as part of the ACFP Update to specifically address dairies and feedlots. This Dairy and Feedlot Climate Action Plan (Dairy CAP) serves that purpose and is to be utilized in implementation of the ACFP Update and its application to new and expanding dairies and feedlots. This Dairy CAP presents up-to-date information and analysis concerning dairy/feedlot GHG emissions and approaches for reducing dairy and feedlot-related emissions, as well as specific elements consistent with the latest OPR guidance.

1.1 Dairy GHG Background Information

Similar to most sectors, dairies and feedlots emit GHGs from typical sources like vehicles (e.g., employee vehicle trips, delivery trucks), electricity usage, and water demand. These emissions are typically carbon dioxide emissions (CO₂) from combustion. However, dairies and feedlots also emit GHGs from the animals, manure management, crop production (i.e., fertilizer usage), and other associated activities. These emissions are predominantly methane and nitrous oxide (N₂O). This is important because the global warming potential (GWP) of methane and N₂O are 25 and 298 times larger, respectively, than for CO₂.²

Two of the largest sources of emissions at dairies and feedlots are methane emissions from enteric fermentation in the animals and from manure. As with all types of animal agriculture, manure is generated on dairies and feedlots as a

¹ OPR. 2009. SB 97 CEQA Guidelines Amendments. Available at: http://resources.ca.gov/ceqa/docs/Adopted_and_Transmitted_Text_of_SB97_CEQAGuidelines_Amendments.pdf Accessed April 2015.

² 40 CFR Part 98, Table A-1.

by-product of raising animals. This manure is not a waste product; instead, it is a valuable resource full of nutrients and is treated as such by farmers. Manure has many different uses (e.g., fertilizer, soil amendment, compost feedstock, biogas feedstock, etc.) that can be used individually or in combination depending on the farm and types of potential beneficial end uses. It can be applied as a liquid or a solid to on-site fields to meet crop nutrient needs; it can be transported off-site to meet nutrient needs at a different facility; or it can be treated in an anaerobic digester to generate methane, among other options. The beneficial use of the manure is very site-specific and may vary from farm to farm. Any consideration of GHG reduction measures must be consistent with the eventual beneficial use of the manure.

Multiple CO₂-reduction measures that are typically used by industrial sectors³ are not applicable to these methane sources, which are inherent to livestock-rearing operations, including dairies and cattle feedlots. Notably, at both the state and federal regulatory levels, GHG emissions reduction targets are not imposed on livestock emissions.⁴ This is due, in large part, to the unavailability of feasible means to substantially reduce livestock emissions. Consequently, livestock emissions reduction strategies are exclusively limited to voluntary and incentive-based programs.⁵

Historically, milk production in the United States (US) was pasture-based and resulted in relatively low milk production. Over the past decades, however, US dairies have transitioned to high input and high output systems. This transition has resulted in a decrease of GHG emissions per unit of milk produced.⁶ The increased efficiency is largely due to improved efficiency in formulating total mixed ration (TMR) for the animals, i.e., feeding to the specific nutrient requirements of different breeds for optimal milk production and selectively breeding for greater milk production. California dairies typically have more productive animals (i.e., milk produced per animal) than the national average due to the more efficient systems used in the state (e.g., TMR formulation).⁷ On average, California dairy cows annually produce 23,178 lbs of milk per cow compared to a nationwide annual value of 21,822 lbs of milk per cow. Tulare County, which produces the most milk

³ Examples of these measures can be found in: CAPCOA. 2010. Quantifying Greenhouse Gas Mitigation Measures. Available at: <http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf>. Accessed April 2014.

⁴ The ARB Scoping Plan does not require any reductions from animal-related emissions (ARB Scoping Plan. Available at: http://www.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf. Accessed August 2015.). The USEPA also does not regulate livestock emissions; although the Mandatory Reporting Rule contains Subpart JJ for manure management, this provision is not currently being implemented (USEPA. 2015. Greenhouse Gas Reporting Program webpage. Resources by Subpart. Available at: <http://www.epa.gov/ghgreporting/reporters/subpart/index.html>. Accessed August 2015.).

⁵ Ibid.

⁶ Capper, J.L., R.A. Cady, and D.E. Bauman. 2009. The environmental impact of dairy production: 1944 compared with 2007. *J. Anim. Sci.* doi: 10.2527/jas.2009-1781.

⁷ U.S. Department of Agriculture (USDA). National Agricultural Statistics Service (NASS). <http://www.nass.usda.gov/>. Accessed May 2014.

in California, has slightly more efficient cows that annually produce 23,350 lbs of milk per cow.^{8,9} Correspondingly, California dairies are more efficient in terms of emitting less GHGs per unit of milk produced than average US dairies.

As of 2013, Tulare County had approximately 1,000,000 head of cattle (i.e., milking cows, heifers and other support animals, and feedlot cattle). Tulare County is projected to have approximately 1,200,000 head by the year 2023. The overwhelming majority of animals (97%) are dairy-related; feedlot cattle also produce far less manure than milking cows (approximately 40% less¹⁰). The vast majority of the dairies are “flushed-lane” dairies that periodically remove manure from dairy freestall areas, collecting manure in lagoons and recycle the flush water. Manure in the lagoons is then beneficially used, generally on local farmlands. Consistent with the history of dairying described above, many dairies already incorporate the enteric/manure-related GHG reduction measures described in this Dairy CAP.

1.2 CEQA Guidelines

CEQA Guidelines for GHG emissions reduction plans have been developed by OPR and adopted by the CNRA. CEQA Guidelines §15183.5 specifies that a plan for the reduction of GHG emissions should include or address specific elements. OPR is currently developing additional guidance with more details for climate action planning and the use of plans for the reduction of GHG emissions in a CEQA analysis.¹¹ While this guidance is being developed, OPR refers to a presentation provided during its Local Government Roundtable (June 20, 2011) regarding climate action planning¹² and to other recent climate action planning guidance documents, such as the San Joaquin Valley Air Pollution Control District’s (SJVAPCD’s) Climate Change Action Plan (CCAP).¹³

Table 1 below lists the elements to be included in a climate action plan pursuant to CEQA Guidelines §15183.5 and discusses how this Dairy CAP addresses each element as per current guidance cited above.

⁸ Total cattle (2013): Tulare = 484,845; California = 1,774,108. Milk production (2013): Tulare = 11,321,487 thousand lbs; California = 41,219,772 thousand lbs

⁹ California Department of Food and Agriculture. 2014. California Dairy Statistics Annual – 2013 Annual Data. Available at: http://www.cdfa.ca.gov/dairy/pdf/Annual/2013/2013_Annual_2012_Data.pdf Accessed April 2015.

¹⁰ USDA. Natural Resources Conservation Service. 2008. Agricultural Waste Management Field Handbook. Chapter 4. Agricultural Waste Characteristics. Available at: <http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17768.wba> Accessed April 2015.

¹¹ OPR. 2011. Climate Action Planning. Local Government Roundtable Questions and Answers. June 20. Available at: <http://opr.ca.gov/docs/capfaqs.pdf>. Accessed May 2014.

¹² OPR. 2011.

¹³ SJVAPCD. 2009. Final Staff Report – Addressing Greenhouse Gas Emissions Impacts Under the California Environmental Quality Act. Available at: <http://www.valleyair.org/Programs/CCAP/12-17-09/1%20CCAP%20-%20FINAL%20CEQA%20GHG%20Staff%20Report%20-%20Dec%2017%202009.pdf>. Accessed April 2014.

Table 1. CEQA Guidelines for CAP Elements	
CEQA Guideline Elements	Dairy CAP
1. Quantify GHG emissions, both existing and projected over a specified time period, resulting from activities within a defined geographic range.	This Dairy CAP has prepared and documented GHG emissions inventories of industry-wide emissions sources for a 2013 baseline and a 2023 future year. The GHG inventory documentation for animal-related sources is presented in Appendix A and for non-animal sources, is presented in Appendix B .
2. Establish a level, based on substantial evidence, below which the contribution to GHG emissions from activities covered by the plan would not be cumulatively considerable.	This Dairy CAP is consistent with the requirements of the Scoping Plan to meet Assembly Bill 32 (AB 32) reductions (see Section 2.2.2).
3. Identify and analyze the GHG emissions resulting from specific actions or categories of actions anticipated within the geographic area.	The GHG emissions attributable to existing facilities and anticipated future projects have been identified and evaluated in the inventory. The future year inventory accounts for projects – and potential growth – that are consistent with this Dairy CAP and the ACFP Update (see Section 3).
4. Specify measures or a group of measures, including performance standards, which substantial evidence demonstrates, if implemented on a project-by-project basis, would collectively achieve the specified emissions level.	This Dairy CAP has identified readily implementable emissions reduction strategies to reduce GHG emission levels on a project-by-project basis (Appendix C). The emissions reduction strategies to achieve GHG emissions levels consistent with the Dairy CAP are discussed in Section 4.1 . The emissions reduction strategies implementation process, including the incorporation of the measures in future projects, is addressed in Section 6 .
5. Establish a mechanism to monitor the plan's progress toward achieving the specified emissions level and to require amendment if the plan is not achieving specified levels.	The monitoring plan for tracking emissions reduction strategies performance and overall Dairy CAP performance, which provides for amendments to the Dairy CAP as needed to remain consistent with the requirements of the Scoping Plan to meet AB 32 requirements, is presented in Section 6 .
6. Adopt the GHG reduction strategy in a public process following environmental review.	This Dairy CAP has been developed in conjunction with the ACFP Update. It will undergo full CEQA review in the Program EIR (PEIR) in conjunction with the ACFP Update process.

The adoption of a Climate Action Plan with a certified analysis under CEQA provides a means to streamline the CEQA process as it relates to climate change for

individual projects. Per CEQA Guidelines¹⁴ §15183.5, a CAP can be utilized in the environmental review of future projects if it includes both the elements for a GHG emissions reduction plan specified in the CEQA Guidelines and has itself been evaluated and adopted under CEQA. Projects that are determined to be consistent with such a CAP would be presumed to have a less than cumulatively considerable impact on climate change.

¹⁴ California Code of Regulations, Title 14, Division 6, Chapter 3, Sections 15000-15387.

2 Regulatory Setting

Multiple federal, state and local regulations are applicable to GHG and climate change in general, and to CAPs in particular. This section summarizes the regulatory setting of the Dairy CAP.

2.1 Federal Regulations¹⁵

2.1.1 USEPA Mandatory Reporting of Greenhouse Gases

The United States Environmental Protection Agency's (USEPA's) Mandatory Reporting of Greenhouse Gas Rule ("USEPA Mandatory Reporting Rule") became law on January 1, 2010 (40 CFR Part 98). Designed to cover 85 to 90 percent of the nation's GHG emissions, this law requires certain large emitters and suppliers to report their GHG data on an annual basis. Generally, facilities that emit 25,000 metric tons (MT) or more of carbon dioxide equivalent (CO₂e) per year are required to report. The purpose of the law is not to control GHG emissions, but to collect accurate and pertinent data to inform future GHG policies and programs.

The USEPA Mandatory Reporting Rule currently features a subpart for livestock facilities with manure management systems that emit 25,000 MT of CO₂e per year or more (Subpart JJ - Manure Management); this subpart is not being implemented currently.¹⁶ In addition to an emissions threshold, the subpart identifies the animal population threshold below which facilities are not required to report emissions.¹⁷ For dairies, this number is calculated to be 3,200 mature dairy cows, while for cattle feedlots, this number is calculated to be 29,300 cattle. Because the USEPA has not yet implemented Subpart JJ, dairy facilities and cattle feedlots are currently not subject to federal GHG reporting requirements.

2.2 State Regulations and Agreements

2.2.1 California State Executive Order S-3-05

Recognizing the threat that climate change poses to the state of California, Governor Arnold Schwarzenegger signed Executive Order S-3-05 on June 1, 2005, and established the following GHG reduction targets for the state:

- By 2010, reduce GHG emissions to 2000 levels;
- By 2020, reduce GHG emissions to 1990 levels; and
- By 2050, reduce GHG emissions to 80 percent below 1990 levels.

¹⁵ For additional information on specific regulations, see the Tulare CAP.

¹⁶ The USEPA includes the following statement on their website regarding the implementation of Subpart JJ: "EPA will not be implementing subpart JJ of Part 98. The Consolidated Appropriations Act of FY 2014 (H. R. 3547, Page 339, Section 421) continues a provision prohibiting the expenditure of funds for this purpose." Available at: www.epa.gov/ghgreporting/reporters/subpart/index.html. Accessed April 2014.

¹⁷ 40 CFR Part 98, Subpart JJ, Table JJ-1.

2.2.2 California Global Warming Solutions Act of 2006 (Assembly Bill 32)

In response to Executive Order S-3-05, the California legislature drafted the California Global Warming Solutions Act of 2006, commonly known as AB 32, which was signed into law on September 27, 2006.¹⁸ The law requires the California Air Resources Board (ARB) to adopt rules and regulations to reduce statewide greenhouse gas emissions to 1990 levels by 2020. The law emphasizes that in adopting these regulations the ARB shall, to the extent feasible, minimize “leakage”.¹⁹ For example, regulations that result in dairy relocations outside of California would not reduce global GHGs. The law also requires the ARB to prepare a scoping plan to identify and make recommendations on the emission reduction measures, compliance mechanisms, and incentives that are necessary or desirable to achieve the maximum technologically feasible and cost-effective reductions in greenhouse gas emissions by 2020.

The initial AB 32 Climate Change Scoping Plan (“Scoping Plan”) was approved by the ARB in 2008.²⁰ The Scoping Plan was supplemented on August 24, 2011, and the First Update to the Scoping Plan was issued in May 2014.^{21,22} The Scoping Plan highlights the various measures that will be used to achieve the goals of AB 32. One of the plan’s proposed strategies is to establish a cap-and-trade program for the economic sectors responsible for the majority of California’s GHG emissions. The Scoping Plan recognizes that some sectors (e.g. agriculture) are currently not suitable for inclusion in the cap-and-trade program and, as a result, instead recommends separate complementary voluntary strategies for those sectors.

For the dairy industry, ***no reductions from animal-related emissions are required in the Scoping Plan and no targets for animal-related emissions are imposed.*** Instead, the Scoping Plan includes the installation of manure digester systems to capture methane emissions as a voluntary strategy for the agricultural sector, recognizing that economic incentives will be needed in order to make the strategy effective. The 2011 supplement to the Scoping Plan specifically highlights that most dairies in California are located in the San Joaquin Valley and are consequently subject to strict smog standards for new equipment. These strict standards apply to new equipment such as manure digester systems. Because of the low quality of the biogas produced in the manure digester systems, it is either technologically infeasible or cost prohibitive to meet SJVAPCD’s emissions standards (e.g., nitrous oxide) without financial incentives.²³ The May 2014 First Update acknowledges that the voluntary installation of manure digesters has not advanced as anticipated and identifies the challenges to the voluntary installation of manure

¹⁸ <http://www.arb.ca.gov/cc/docs/ab32text.pdf>

¹⁹ “Leakage” is defined in AB 32 as “a reduction in emissions of greenhouse gases within the state that is offset by an increase in emissions of greenhouse gases outside of the state.”

²⁰ http://www.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf

²¹ http://www.arb.ca.gov/cc/scopingplan/document/final_supplement_to_sp_fed.pdf

²² <http://www.arb.ca.gov/cc/scopingplan/document/updatescopingplan2013.htm>

²³ http://www.arb.ca.gov/cc/scopingplan/document/final_supplement_to_sp_fed.pdf at page 72.

digester systems, including the economic recession, increased feed and fuel prices, lack of sufficient financial incentives, and insufficient utility contracts. However, on a positive note, the First Update indicates that, in response, ARB is continuing to work with other agencies to remove economic obstacles to digester installations, to evaluate the co-benefits, and to examine the potential for voluntary efforts to be more widely adopted. In addition, ARB plans to work with stakeholders to determine whether and how the program should become mandatory and/or more strongly incentivized.²⁴ Tulare County will monitor these advances and make adjustments, where feasible. The Scoping Plan includes voluntary incentive program, described in Section 2.2.5.1 below, as one potential monetary incentive. In addition, the First Update incorporates a list of key recommended actions for the agriculture sector, including the following:

“In 2014, convene an interagency workgroup that includes CDFA, ARB, CEC, CPUC, and other appropriate State and local agencies and agriculture stakeholders to:

- Establish agriculture sec GHG emission reduction planning targets for the mid-term time frame and 2050.
- Expand existing calculators and tools to develop a California-specific agricultural GHG tool for agriculture facility operators to use to estimate GHG emissions and sequestration potential from all on-farm sources. The tool would include a suite of agricultural GHG emission reduction and carbon sequestration practices and would allow users to run different scenarios to determine the best approach for achieving on-farm reductions.
- Make recommendations on strategies to reduce GHG emissions associated with the energy needed to deliver water used in agriculture based on the evaluation of existing reporting requirements and data.

The Dairy Digester Workgroup will develop recommendations for a methane capture standard for 2016.

Conduct research that identifies and quantifies the GHG emission reduction benefits of highly efficient farming practices, and provide incentives for farmers and ranchers to employ those practices.”²⁵

2.2.3 California State Executive Order B-30-15

Governor Edmund G. Brown Jr. issued Executive Order B-30-15 on April 29, 2015, and identified an interim benchmark to maintain California’s reduction efforts on the path to achieving the 2050 goal to reduce GHG emissions to 80 percent below 1990 levels, which was contained in the previous executive order.

²⁴ <http://www.arb.ca.gov/cc/scopingplan/document/updatedscopingplan2013.htm>.

²⁵ *Id.* Page 61.

- By 2030, reduce GHG emissions to 40 percent below 1990 levels.

In response, all state agencies with jurisdiction over GHG emission sources are to implement measures pursuant to their statutory authority to achieve reductions to meet the 2030 and 2050 GHG emissions reduction targets. In addition, ARB plans to update the Scoping Plan to express the 2030 target in terms of the quantity of million metric tons of CO₂ equivalent reductions needed to achieve the target. While the Executive Order does not apply to cities and counties, it will result in an update of the Scoping Plan that has the potential to lead to regulatory changes that may affect the dairy sector. Legislation is required to make the Executive Order law, and legislative bills have been introduced to do so, at least one of which may pass prior to the end of the current legislative session.

2.2.4 California's Mandatory Reporting Rule

The state of California has its own mandatory reporting regulation, the Regulation for the Mandatory Reporting of Greenhouse Gas Emissions ("California Mandatory Reporting Rule") (17 CCR §§95100-95157). The California Mandatory Reporting Rule, approved in 2007, is similar to the USEPA Mandatory Reporting Rule in that it requires certain large emitters and suppliers to report their GHG data on an annual basis; however, the California emissions threshold is lower at only 10,000 MT of CO₂e per year. Like the USEPA Mandatory Reporting Rule, the California Mandatory Reporting Rule currently excludes GHG emissions related to livestock manure management systems.

2.2.5 California Greenhouse Gas Cap-and-Trade Program

To comply with the recommendations outlined in the AB 32 Scoping Plan, the ARB established the California Greenhouse Gas Cap-and-Trade Program ("Cap-and-Trade Program") (17 CCR §§95800-96023),²⁶ which took effect on January 1, 2012. From the ARB's web site: "Cap-and-trade is a market based regulation that is designed to reduce greenhouse gases (GHGs) from multiple sources. Cap-and-trade sets a firm limit or "cap" on GHGs and minimize the compliance costs of achieving AB 32 goals ... Trading creates incentives to reduce GHGs below allowable levels through investments in clean technologies ... Market forces spur technological innovation and investments in clean energy. Cap-and-trade is an environmentally effective and economically efficient response to climate change."²⁷ The first phase of the Cap-and-Trade Program only applies to in-state electrical generating facilities and large industrial facilities that emit over 25,000 MT of CO₂e per year. Compliance obligations for this first phase began on January 1, 2013, after which covered entities are required to remain at or below their respective established emissions caps. The second phase of the program began on January 1, 2015, and will extend to fuel distributors.

²⁶ <http://www.arb.ca.gov/regact/2010/capandtrade10/finalrevfro.pdf>.

²⁷ <http://www.arb.ca.gov/cc/capandtrade/capandtrade.htm>.

2.2.5.1 Dairies and Cap-and-Trade

One way the Cap-and-Trade Program allows covered entities to meet their established emissions cap is through the purchase of emission offset credits. Per the Cap-and-Trade Program regulation, an offset credit must represent a GHG emission reduction that is “real, additional, quantifiable, permanent, verifiable, and enforceable” and must result from the use of an established offset protocol (§95970). Per §95972 of the regulation, in order to be approved by the ARB, a compliance offset protocol must conservatively account for activity-shifting leakage and market-shifting leakage for the offset project type.²⁸

Dairies have a unique position in the Scoping Plan. The Scoping Plan does not require GHG emissions reductions from any animal-related sources on a dairy and does not impose any emissions reduction targets. Instead, voluntary incentive-based approaches are encouraged. Specifically, under the Cap and Trade Program, the Compliance Offset Protocol for Livestock Projects is one of the four protocols for voluntary activities that have been approved by the ARB to date.²⁹ This protocol provides the procedures necessary for quantifying and reporting GHG emission reductions associated with the installation of a biogas control system (e.g. a digester) for manure management on dairy cattle and swine farms. The protocol is designed to ensure accurate, transparent, and verifiable quantification of GHG emissions reductions associated with a digester project for generating offsets. Emission reductions quantified through the procedures outlined in the protocol can be sold in the market as emission offset credits. This arrangement can provide a financing tool that may assist in making the voluntary installation of a manure digester system feasible. In this context, feasibility depends upon achieving compliance with required emissions standards, economic viability, utility infrastructure support, and site suitability. Consequently, a proposed digester installation that is feasible for one farm may not be deemed feasible at another farm.

2.2.6 California Environmental Quality Act (CEQA) and California Senate Bill 97

Adopted in 1970, CEQA requires California lead agencies to assess the potential environmental impacts of proposed projects within their jurisdiction. However, when CEQA was first established, lead agencies were not required to assess the environmental impacts of a project’s GHG emissions. In 2007, this changed with the passage of Senate Bill 97 (“SB 97”), which required OPR to develop amendments to the CEQA Guidelines that would specifically address the analysis and mitigation of GHG emissions. The resulting amendments to the CEQA

²⁸ “Activity-Shifting Leakage” is defined in §95802 of the regulation as “increased GHG emissions or decreased GHG removals that result from the displacement of activities or resources from inside the offset project’s boundary to locations outside the offset project’s boundary as a result of the offset project activity.” “Market-Shifting Leakage” is defined as “increased GHG emissions or decreased GHG removals outside an offset project’s boundary due to the effects of an offset project on an established market for goods or services.”

²⁹ <http://www.arb.ca.gov/regact/2010/capandtrade10/coplivestockfin.pdf>.

Guidelines were adopted and became effective in March 2010. Lead agencies are now required to incorporate the analysis of GHG emissions into their CEQA reviews. Specifically, the amendments require the following, as described in the CEQA Guidelines (§15064.4):

- Quantify the GHG emissions from the project;
- Determine if the emissions exceed a significance threshold the lead agency determines to apply to the project; and
- Determine the extent to which the project complies with applicable regulations, requirements, or plans.

Additionally, new or expanding dairies and feedlots may be able to rely upon this Dairy CAP to demonstrate compliance with CEQA (§15183.5). See Section 5 for details.

2.2.7 California Senate Bill 700

California Senate Bill 700 ("SB 700") was signed into law on September 22, 2003 and effectively replaced the existing blanket exemption from air permits for agriculture with narrower, more limited exemptions in state law.³⁰ As a result, the ARB and local air agencies such as the SJVAPCD are now required to regulate air pollution from agricultural sources. Since the adoption of SB 700, SJVAPCD has established a permitting program for large dairies and cattle feedlots and has also implemented several rules that apply to the agricultural industry such as Rule 4550, *Conservation Management Practices*, which aims to limit fugitive dust emissions from agricultural operation sites, and Rule 4570, *Confined Animal Facilities*, which aims to limit emissions of volatile organic compounds (VOCs) from confined animal facilities.³¹ Neither of these rules currently addresses GHG gas emissions.

2.2.8 California Senate Bill 605

California Senate Bill 605 ("SB 605") was signed into law on September 21, 2014 and requires the ARB to develop a comprehensive strategy to reduce statewide emissions of short-lived climate pollutants (SLCPs).³² SLCPs, such as methane, have relatively high potency compared to carbon dioxide, even though they remain in the atmosphere a short amount of time. Specifically, SB 605 requires the ARB to inventory the sources and emissions of these pollutants, identify research gaps, identify existing and potential reduction measures, prioritize the development of new measures, and develop a comprehensive strategy for dealing with short-lived climate pollutant emissions by January 1, 2016. On September 30, 2015, ARB released its draft strategy describing the need and draft approach to reduce SLCP emissions to achieve the future GHG targets for the state.³³ The draft strategy

³⁰ <http://www.arb.ca.gov/ag/sb700/sb700.pdf>.

³¹ Note that dairies with fewer than 500 milking cows are exempt from the provisions of the rule except for the recordkeeping requirements.

³² http://leginfo.ca.gov/faces/billNavClient.xhtml?bill_id=201320140SB605.

³³ ARB. 2015. Draft. Short-Lived Climate Pollutant Reduction Strategy. Available at: <http://www.arb.ca.gov/cc/shortlived/2015draft.pdf>. Accessed October 2015.

states that “reduc[ing] these emissions is the only practical way to immediately slow global warming.” Agricultural emissions of methane have been identified as one of the areas the ARB is focusing on to reduce SLCP emissions.³⁴

2.3 Local Regulations, Ordinances, and Agreements

2.3.1 Tulare County

Tulare County is processing the ACFP Update as a proposed amendment to the Tulare County General Plan. This Dairy CAP is being prepared in conjunction with the ACFP Update process which will update the approval process for new and expanding dairies and feedlots. It is noted that the County’s land use authority is limited to new and expanding facilities and does not extend to existing facilities.

2.3.2 San Joaquin Valley Air Pollution Control District (SJVAPCD)

In August 2008, the Governing Board of the SJVAPCD adopted the CCAP in response to a perceived need for definitive guidance on how to address greenhouse gas emission impacts under CEQA. Specifically, the CCAP instructed the SJVAPCD Air Pollution Control Officer to develop guidance to assist both District staff and local land-use agencies (and other permitting bodies) in determining the significance of project-related impacts on global climate change under CEQA. The CCAP is generic for all land uses and is not specific to dairies.

In compliance with the CCAP, on December 17, 2009, the District issued the guidance document, *Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA*, and adopted the policy, *District Policy – Addressing GHG Emission Impacts for Stationary Source Projects under CEQA When Serving as the Lead Agency*.^{35,36} Both documents propose an approach that centers on the use of performance based standards, referred to as Best Performance Standards (BPS), to determine project significance and streamline the CEQA process. Best Performance Standards are defined in these documents as “the most effective Achieved-in-Practice means of reducing or limiting GHG emissions from a GHG emissions source” and are intended to represent pre-approved, pre-quantified emissions reductions. Projects that implement BPS in accordance with the District guidance are said to have a less than significant individual and cumulative impact on global climate change. Alternatively, projects that do not implement BPS are required to quantify project specific greenhouse gas emissions and, to obtain a less than significant impact determination, must demonstrate a reduction or mitigation of greenhouse gas emissions by 29% from the 2020 business-as-usual scenario.³⁷

³⁴ ARB. Reducing Short-lived Climate Pollutants in California. September 2014. Available at: http://arb.ca.gov/cc/shortlived/slcpl_booklet.pdf. Accessed April 2015.

³⁵ http://www.arb.ca.gov/cc/scopingplan/2013_update/draft_proposed_first_update.pdf.

³⁶ <http://www.valleyair.org/programs/CCAP/12-17-09/2%20CCAP%20-%20FINAL%20District%20Policy%20CEQA%20GHG%20-%20Dec%2017%202009.pdf>.

³⁷ Per the District, this level is set at 29% to be “consistent with GHG emission reduction targets established in ARB’s AB 32 scoping plan.” It should be noted that the May 2014 Update to the AB 32

A staff report, released concurrently with the District guidance and policy documents, presents examples of industry-specific BPS, including several for livestock-rearing operations. ***However, the report notes that the example BPS are “for illustrative purposes only, and should not be used by any lead agency as District-approved or sanctioned standards.”***³⁸ To date, the District has not approved any BPS that are applicable to livestock-rearing operations, including dairies and cattle feedlots. In the absence of the adoption of such BPS by the District, this Dairy CAP incorporates potential GHG reduction strategies as set forth in Section 4.

2.4 Funding Opportunities

Resulting from the need for financial incentives to support the voluntary installation of manure digester systems, as referenced in the May 2014 First Amendment to the Scoping Plan, certain governmental funding opportunities have been available from time to time. The reasons that such programs are needed include the extensive capital and operating costs required for an anaerobic digester. The cost of an anaerobic digester varies based on the number of animals (i.e., amount of manure sent to the digester), location of the dairy, type of digester, and end-use of the digester gas. For example, the cost of installing a digester is estimated to be \$1.15 million for a 1,000 cow dairy farm producing 744 Megawatt-hours (MWh) of electricity while the estimated digester cost is \$11.2 million for a 10,000 cow dairy farm producing 94.4 million cubic feet (12,600 MWh) of biogas.³⁹ In addition to this initial large capital cost, there are annual operating and maintenance costs. As an operation beyond dairying itself, the farmer may need to hire outside operators and/or consultants to successfully and effectively run the digester.

Due to the high capital costs and ongoing operating and maintenance costs, a digester would be cost-prohibitive for a farmer without incentives, grants, or other cost-sharing programs. Several funding opportunities have been, or are, available and have encouraged the construction of digesters. These funding opportunities include the following:

- 1603 Program: The U.S. Federal Government established the 1603 Program as part of the American Recovery and Reinvestment Act of 2009 (Recovery Act). The 1603 Program: Payments for Specified Energy Property in Lieu of Tax Credits reimbursed eligible projects for a portion of the cost of installing specified energy properties or for the production of income. Digester projects were one of the eligible projects. Out of almost 9,800 projects nationwide, 98 digester projects received funding; 5 of these projects were in California. This program is no longer providing funding for digesters.

Scoping Plan features revised 2020 baseline and target emissions levels, so that the required percent reduction in emissions is now approximately 15%.

³⁸ <http://www.valleyair.org/programs/CCAP/12-17-09/1%20CCAP%20-%20FINAL%20CEQA%20GHG%20Staff%20Report%20-%20Dec%2017%202009.pdf>.

³⁹ ESA. 2011. Economic Feasibility of Dairy Manure Digester and Co-Digester Facilities in the Central Valley of California; Prepared for the California Regional Water Quality Control Board, Central Valley Region.

- Cap-and-trade funds: ARB has developed an investment plan to inform how cap-and-trade auction proceeds should be spent. The document identifies priority investments that are intended to further the state's GHG reduction goals. As described in this document, cap-and-trade funds have been allocated to incentivize digesters in California. The expenditure plan of the California State Budget through Fiscal Year 2014-2015 specified that \$12 million is provided for Agricultural Energy and Operational Efficiency, including up to \$11.1 million for digesters and \$0.5 million for research projects. Although the California State Budget will allocate cap-and-trade funds every year, digesters are not guaranteed ongoing allocations.
- California Energy Commission (CEC): The CEC has awarded \$4 million each to two dairy farms to install and demonstrate dairy digesters.⁴⁰ In addition, CEC's Electric Program Investment Charge (EPIC) program allocates up to \$9 million a year to a competitive program for renewable energy projects including dairy digesters.
- Digester "hubs": An economic feasibility study was done on constructing a centralized digester project that would accept manure from a cluster of nearby dairy farms. This type of cost-sharing would encourage the construction of dairy digesters and spread the cost over multiple farms.⁴¹

⁴⁰ California Energy Commission (CEC). 2015. Press release March 11, 2015. Energy Commission Approves Grants for Energy Storage, Biofuel, Efficiency and Transportation Programs. Available at: http://www.energy.ca.gov/releases/2015_releases/2015-03-11_approved_grants_nr.html Accessed April 2015.

⁴¹ California Dairy Campaign. 2013. Economic Feasibility of Dairy Digester Clusters in California: A Case Study. Available at: <http://www.epa.gov/region9/organics/symposium/2013/cba-session2-econ-feas-dairy-digester-clusters.pdf> Accessed April 2015.

3 GHG Emissions Overview: Baseline and Future

As described in Section 1.2, CEQA Guidelines for GHG emissions reduction plans, such as this Dairy CAP, have been developed by OPR and adopted by the CNRA. The guidelines (CEQA Guidelines §15183.5) specify that a plan for the reduction of GHG emissions should include or address specific elements. Two of these elements include:

- Quantify GHG emissions, both existing and projected over a specified time period, resulting from activities within a defined geographic range, and
- Identify and analyze the GHG emissions resulting from specific actions or categories of actions anticipated within the geographic area.

To address these two elements for this plan, GHG inventories were prepared using a baseline year of 2013 and a future year of 2023. The future year of 2023 is consistent with the ACFP Update and the PEIR. The inventories consist of industry-specific activity (e.g., animal emissions) and other general sources (e.g., energy, transportation). Animal-related sources include enteric fermentation and manure management. Other sources include equipment exhaust, agricultural soil management, electricity use, vehicle emissions (on-farm trucks, employee vehicles), and refrigeration. Animal-related sources were estimated using methodology developed by the Intergovernmental Panel on Climate Change (IPCC) and used by ARB for quantifying annual statewide GHG emissions. All other sources were obtained from estimates developed for the Tulare County ACFP Update EIR.⁴² Table 2 summarizes the major assumptions that were used in this Dairy CAP.

⁴² See Appendix B.

Table 2. Information Used in Animal-Related Inventory Calculations

Data	Baseline (2013)	Future (2023)
Animal head counts	Tulare County Data Data reported for 2011 ^[a]	Assumed annual growth of 1.5% ^[b]
Manure Decomposition and Enteric Fermentation methodologies	IPCC ^{[c],[d]}	IPCC ^{[c],[d]}

^[a] Although the baseline used is 2013, animal head counts from 2011 were used, because the numbers were slightly greater in that year and to be consistent with the PEIR and the ACFP Update.

^[b] The assumed annual growth rate of 1.5% is consistent with the assumptions under the PEIR, the ACFP Update, and the Scoping Plan.

^[c] 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 4, Chapter 10. Available at: <http://www.ipcc-nggip.iges.or.jp/public/2006gl/>. Accessed May 2014.

^[d] Manure decomposition emissions were calculated using the methodology developed by IPCC. Statewide enteric fermentation emissions were obtained from ARB and prorated by the animal head counts assumed in Tulare. Because ARB uses the IPCC methodology as implemented in the Cattle Enteric Fermentation Model (CEFM), this approach and the emissions are consistent with IPCC and ARB methodologies.

The baseline year used in this Dairy CAP is 2013, consistent with the ACFP Update and PEIR (as described above), and includes emissions estimates from all activities at the facilities based on known data. The future year, 2023, estimates are projected from the baseline by estimating the impacts of future growth and projected increases in production. It should be noted that most dairies likely already incorporate several GHG reduction measures as part of their standard operations and emissions would reflect that to the extent that the current emissions estimation methodology reflects those measures.

Table 3. Baseline and Projected Emissions in Metric Tons CO₂e/year		
Source^{[a][b]}	Baseline (2013) GHG emissions^[c]	Future (2023) GHG emissions^[c]
Farm Equipment Exhaust	38,129	52,195
Farm Agricultural Soil	812,050	1,111,838
Farm Electricity Consumption	79,480	108,763
Dairy Equipment Exhaust	99,406	135,478
Truck Trips	23,137	28,493
Dairy Employee and Visitor Trips	15,851	16,282
Dairy Electricity Consumption	145,335	171,566
Dairy Refrigeration	63,640	85,840
Dairy Manure Decomposition	3,496,077	4,057,340
Dairy Enteric Digestion	2,463,071	2,858,495
Feedlot Manure Decomposition	29,598	34,350
Feedlot Enteric Digestion	227,068	263,522
Total	7,492,843	8,924,162
<p>^[a] Emission estimates for all source categories except for manure decomposition and enteric digestion have been taken from analyses completed for the Tulare County ACFP Update EIR. See Appendix B.</p> <p>^[b] Details regarding the manure decomposition and enteric digestion emission estimates can be found in Appendix A.</p> <p>^[c] CO₂e = carbon dioxide equivalent emissions, which is the sum of all emissions after multiplying by their global warming potentials (GWPs). GWPs are 1 for CO₂, 25 for CH₄, 298 for N₂O, and 14,800 for HFC-23 (40 CFR Part 98, Table A-1).</p>		

As shown in Table 3, most of the GHG emissions at dairies and feedlots in Tulare County are animal-related emissions (i.e., manure decomposition and enteric digestion). The future year emissions estimates are based on assumptions about the future consistent with those used in related plans (see below). For example, the animal-related emissions assume a certain percentage growth in dairy and beef cattle population.

It is noted that 2023 has been utilized as the future projected year for a number of reasons. The ACFP covers the period until 2023 and is to be updated to cover subsequent periods. In addition, AB 32 and the Scoping Plan establish regulations and requirements to meet the statewide reductions proscribed to be achieved by 2020. To date, the Scoping Plan presents the program to meet the 2020 reduction requirements of AB 32 and requires no animal-related emissions reductions from the dairy sector to meet those goals. This Dairy CAP is consistent with the current

Scoping Plan and will be updated and re-evaluated periodically to the extent that the Scoping Plan is modified, in response to the 2014 Scoping Plan Update or otherwise, as it relates to animal-related dairy emissions. Given the evolving nature of information concerning climate change, effective GHG emissions reduction strategies, and technological and practical advances regarding feasible emissions reductions protocols, as well as anticipated regulatory actions in response to the Scoping Plan Update, legislative action or otherwise, the Dairy CAP provides for periodic updates to reflect such changes. Projections for a more extended horizon (i.e., beyond 2023) are speculative at this time given the numerous variables associated with projecting manure and enteric emissions, animal herd counts, the anticipated growth of dairy operations in Tulare County, and the availability of established programs to foster feasible emissions reduction approaches.

4 GHG Emissions Reduction Strategies Evaluated

4.1 GHG Emissions Reduction Strategies

The process of identifying and evaluating GHG reduction strategies is consistent with the fourth CEQA Guideline element for climate action planning under §15183.5, as discussed in Section 1. Furthermore, a primary purpose of this Dairy CAP is to maintain the efficiency (i.e. GHG emissions/unit milk produced) achieved by California dairies over the past decades and, to the extent possible, identify approaches that could possibly be implemented at dairies to achieve additional reductions. These potential reduction strategies are discussed below. It is noted that these reduction strategies apply only to new or expanding dairies applying for discretionary county permitting that require analysis under CEQA. For expanding dairies, the measures are applicable only to the expansion, i.e., the dairy would not be required to retrofit existing equipment and/or operating procedures.

As a sector, dairies and feedlots are inherently different from other industrial sectors. The majority of emissions from dairies and feedlots are animal-related emissions (i.e., manure decomposition and enteric digestion), as shown in Table 3, rather than process or combustion-related equipment typically associated with regulated industrial sectors. No emissions reduction targets have been imposed on livestock emissions under the Scoping Plan, and no emissions reductions from livestock sources have been assumed in the Scoping Plan in order to meet statewide reduction targets. This is due to the fact that relatively few emissions reduction strategies have been identified or accepted as feasibly reducing GHG emissions from animal-related sources. Consequently, under the Scoping Plan, only voluntary and incentive-based programs, principally the voluntary use of manure digester systems supported by monetary incentives, are considered.

Why the Focus on Dairies?

Feedlot-related cattle emissions are much lower than dairies in Tulare. In contrast to dairies, beef manure is collected in feedlots. Beef animals are fed a different ration, with the focus on increasing animal bulk. As a result, some dairy emissions reduction strategies will not be applicable to beef feedlots.

However, there are some GHG reduction strategies that may have the potential to reduce emissions from the future year scenario presented in Section 2. The policies and GHG reduction strategies considered for inclusion in the Dairy CAP were drawn from GHG emission reduction guidelines completed by the California Air Pollution Control Officer's Association (CAPCOA) as well as guidance set forth by local agencies. There are currently no existing CAPs specific for the agricultural sector and thus this Dairy CAP was unable to draw on policies and reduction strategies used previously. The analysis of potential reduction strategies takes into consideration the feasibility of a given practice as to the sector overall and as to individual farms. These sources include the following:

- CAPCOA: Quantifying Greenhouse Gas Mitigation Measures⁴³
- SJVAPCD: Final Staff Report – Addressing Greenhouse Gas Emissions Impacts Under the California Environmental Quality Act⁴⁴
- CNRA: CEQA Guidelines, Appendix F – Energy Conservation⁴⁵

The feasibility of these reduction strategies is highly dependent on the management practices being used at a specific farm; a reduction strategy that is easily implemented at one dairy may be infeasible at another. The management practices are frequently chosen due to site-specific conditions that are unable to be changed. For example, a dairy in a location with crop land is unlikely (except in very specific circumstances) to adopt manure GHG reduction strategies that would require transporting the manure to an off-site facility for processing and then transporting it back to the farm. It would also be contraindicated to use any manure GHG reduction strategy that would impair or limit the end-use of the manure. As such, the GHG reduction strategies discussed herein are grouped into three categories:

- Category A (In Dairy CAP)

Although there is no typical dairy or feedlot, there are practices that are common to many facilities. Reduction strategies in this category are more likely to be feasible at a greater number of facilities due to the expected commonalities at farms. However, because of the varying nature of dairies and feedlots, the actual reduction in emissions that can be achieved will also be variable and site-dependent. Note that it is possible that reduction strategies in

⁴³ CAPCOA. 2010. Quantifying Greenhouse Gas Mitigation Measures. Available at: <http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf>. Accessed April 2014.

⁴⁴ SJVAPCD. 2009. Final Staff Report – Addressing Greenhouse Gas Emissions Impacts Under the California Environmental Quality Act. Available at: <http://www.valleyair.org/Programs/CCAP/12-17-09/1%20CCAP%20-%20FINAL%20CEQA%20GHG%20Staff%20Report%20-%20Dec%2017%202009.pdf>. Accessed April 2014.

⁴⁵ California Natural Resources Agency. 2009. CEQA Guidelines Amendments. Appendix F – Energy Conservation. Available at: http://resources.ca.gov/ceqa/docs/Adopted_and_Transmitted_Text_of_SB97_CEQA_Guidelines_Amendments.pdf Accessed April 2015.

this category may not be applicable at certain facilities due to the specific management practices used.

A new or expanding dairy implementing Category A reduction strategies would be consistent with the Dairy CAP. If a dairy finds a particular Category A strategy is not applicable to their farm, a Category B strategy may be substituted and the dairy project would also be consistent with the Dairy CAP.

- Category B (Optional/Substitute Strategies in Dairy CAP)

Reduction strategies in this category may be implemented on some farms, but are not expected to be feasible at the majority of facilities. In addition, the actual reduction in emissions that can be achieved will also be variable and site-dependent. Reduction strategies in this category are considered equivalent to and can be substituted for specific Category A strategies; a new or expanding dairy implementing such strategies would be consistent with the Dairy CAP.

- Category C (Rejected as infeasible)

Reduction strategies in this category were considered for dairies and feedlots but ultimately rejected (a comprehensive list of the strategies considered, along with an explanation on why Category C strategies were rejected, is provided in Appendix C).

4.2 Reduction Strategies by Source

Table 4 provides references to accepted methodologies to quantify the emission reductions that can be achieved with the reduction strategies discussed below:

Dairy Operation Strategies

This category of reduction strategies focuses on implementing practices designed to reduce animal- and manure-related emissions. Strategies include feed additives, ration formulation, and manure management approaches. Multiple methods exist to quantify reductions from these strategies.

Energy Conservation and Efficiency

Energy conservation and efficiency reduction strategies focus on decreasing the energy required during production. These strategies may include more efficient boilers and other energy systems, as well as replacing more fossil-fuel based energy sources with renewable energy.

Transportation

Transportation strategies include practices to reduce emissions from fossil-fuel based transportation. Strategies may reduce emissions off-site (e.g., employee trips) or on-site (e.g., farm equipment).

Water, Solid Waste, and Recycling

This category of reduction strategies focuses on practices designed to reduce GHG emissions related to water demand, solid waste processing, and use of other resources.

Miscellaneous

This category of reduction strategies represents additional reduction practices that are not otherwise included in the previous categories. These strategies range from simple practices such as planting trees (M1) to more extensive approaches such as innovative methods for reducing GHGs (M12).

Table 4. Potential GHG Reduction Strategies^{46,47}		
Dairy CAP Strategy #	Quantification Reference Strategy #^[1]	Additional Details
Dairy Operations		
D1 ⁴⁸	C9.1.5	Implement environmentally responsible purchasing of feed additives (i.e. use locally sourced materials and/or agricultural by-products such as citrus pulp and almond hulls, when available). This strategy must be consistent with TMR or other efficient feeding practices, as well as animal health and efficient milk production requirements. Multiple methodologies exist to calculate potential reductions from this strategy. These methodologies include, but are not limited to, a life cycle analysis of feed additives or an assessment of GHG emissions associated with the transportation of a specific feed mixture.
D2 ⁴⁸	C9.1.5	Use a Total Mixed Ration or other efficient feeding strategy intended to maximize feed-to-milk production efficiency in lactating cows. Improving feed ration efficiency and advanced breeding has led to the production of milk at up to four times higher per cow than in the developing world, with much less methane produced per gallon of milk. Multiple methodologies exist to calculate potential reductions from this practice. These methodologies include, but are not limited to, calculating enteric GHG emissions resulting from a specific feed mixture.

⁴⁶ Table 4 includes strategies grouped as Categories A and B; thus, this table includes all strategies included in Tables 5 and 6.

⁴⁷ Potential reduction strategies only apply to new dairies or the new area of expanding dairies. The County land use authority does not extend to existing dairy operations, and existing dairy operations are not required to implement reduction strategies.

⁴⁸ Changing the diet fed to animals is not always feasible or warranted. As described in Section 1.1, Tulare County dairies average high efficiency levels in milk production per cow. Altering animal diet may have little effect on GHG emissions, particularly GHG emissions per unit of milk.

Table 4. Potential GHG Reduction Strategies^{46,47}

Dairy CAP Strategy #	Quantification Reference Strategy #^[1]	Additional Details
D3	C9.1.4	Comply with nutrient management plans to reduce fertilizer requirements ^{[2],[3]}
D4	C9.1.4	Comply with air and water quality plans to achieve GHG benefits ^{[2],[4]}
D5 ⁴⁹	S9(3)	Use a digester, designed and operated per applicable strategies, and the captured methane for energy use to displace fossil fuel use The ARB provides a Cap-and-Trade offset protocol to calculate the emissions reductions potential from digesters. ⁵⁰
D6	O(1)	Use of scrape systems to divert manure from lagoon to another part of the storage system.
D7	O(2)	Increase solids separation.
Energy Conservation and Efficiency		
E1	C2.1.1	The facility must meet or exceed Title 24 standards in climate-controlled buildings. (e.g., not barns)
E2	C2.1.3	Provide verification of energy savings (e.g., electric bills or third-party verification)
E3	C2.1.5	Install energy efficient boilers
E4	C2.1.4	Install energy efficient appliances (e.g., for milk cooling)
E5	C2.2.1	Install energy efficient area lighting
E6	C2.3.1	Establish onsite renewable or carbon-neutral energy systems – Generic
E7	C2.3.2	Establish onsite renewable energy systems - Solar power
E8	C2.3.3	Establish onsite renewable energy systems - Wind power
E9	C2.3.4	Utilize a combined heat and power system
E10	C2.3.6	Establish methane recovery on digester for power production

⁴⁹ The economic and technological feasibility of digesters are highly dependent on the number of head and location of the farm, among other factors. Thus, a digester may not be feasible for a particular dairy.

⁵⁰ ARB. 2014. Compliance Offset Protocol – Livestock Projects Webpage. Available at: <http://www.arb.ca.gov/cc/capandtrade/protocols/livestock/livestock.htm>. Accessed August 2015.

Table 4. Potential GHG Reduction Strategies^{46,47}

Dairy CAP Strategy #	Quantification Reference Strategy #^[1]	Additional Details
Transportation [20 or more new employees]		
T1	C3.2.6	Provide bike parking if requested by employees
T2	C3.4.5	Provide end of trip facilities if requested by employees (e.g., shower for people biking)
T3	C3.4.11	Provide employer-sponsored vanpool/shuttle
T4	C3.1.5	Increase transit accessibility if adjacent to public transportation
T5	C3.4.12	Implement intra-farm bike-sharing
T6	C3.7.2	Utilize alternative fueled vehicles on-site
T7	C3.7.3	Utilize electric or hybrid vehicles on-site
Water, Solid Waste, and Recycling [NOT Manure Management]		
R1	C4.2.2	Adopt a water conservation practice (e.g., maximizing water reuse, leak checking/fixing, low flow fixtures, etc.). The expected water reduction as compared to no action should be documented.
R2	C4.2.3	Design water-efficient landscapes (decorative landscaping only)
R3	C4.2.4	Use water-efficient landscape irrigation systems (decorative landscaping only)
R4	C4.2.5	Reduce turf in landscapes and lawns (decorative landscaping only)
R5	C4.2.6	Plant native or drought-resistant trees and vegetation (decorative landscaping only)
R6	C6.1.1	Institute or extend recycling and non-manure composting services
R7	C4.1.3	Use locally sourced well or surface water
R8	C4.2.1	Install low-flow water fixtures (decorative landscaping only)
R9	C6.1.2	Recycle demolished construction material
Miscellaneous		
M1	C7.1.1	Plant trees
M2	C8.1.1	Use alternative fuels for construction equipment (Construction only)

Table 4. Potential GHG Reduction Strategies^{46,47}

Dairy CAP Strategy #	Quantification Reference Strategy #^[1]	Additional Details
M3	C8.1.2	Use electric and hybrid construction equipment (Construction only)
M4	C8.1.3	Limit construction equipment idling beyond regulation requirements (Construction only)
M5	C8.1.4	Institute a heavy-duty off-road vehicle plan
M6	C8.1.5	Implement a construction vehicle inventory tracking system (Construction only)
M7	C9.1.3	Implement a construction vehicle inventory tracking system (Construction only)
M8	C9.1.4	Additional BMPs in agriculture and animal operations ^[2]
M9	C9.1.5	Environmentally responsible purchasing ^[2]
M10	C9.1.6	Implement an innovative strategy for GHG reductions ^[2]
<p>^[1] Reference reduction strategies beginning with “C” refer to CAPCOA’s Quantifying Greenhouse Gas Mitigation Measures, which includes detailed emission reduction methodology.</p> <p>^[2] Calculated on a case-by-case basis.</p> <p>^[3] An example is minimizing additional manmade fertilizer usage.</p> <p>^[4] Examples of reduction strategies in air and water quality plans with GHG reduction co-benefits include: recycling flush lane water, BMPs designed to reduce water leaks (and corresponding reduction in indirect GHG emissions from water usage).</p>		

4.3 Feasibility Assessment Considerations

As discussed in the above sections, reduction strategies that are feasible for one farm may be infeasible or impracticable for another farm; that is why a range of categorized strategies was included in the above tables. Although the feasibility assessment will be dependent on the specific reduction strategy and farm, there are several aspects that will likely be taken into account for all reduction strategies. These considerations include, but are not limited to, the following:

- Economics: Does implementing the reduction strategy place a financial burden on the farmer without sufficient benefits?
- Size: Does the reduction strategy make sense for the size of the farm?
- Consistency with existing management practices (expanding dairies): Is the reduction strategy consistent with the existing practices used on the farm so that animal health, efficient milk production, manure reuse potential, etc. are

not compromised and that operational changes are not so burdensome as to be economically infeasible?

4.4 Additional Considerations

Greenhouse gases are a global pollutant. As such, GHG emissions – and reductions – on a global scale must be considered; a reduction in California that results in a corresponding or greater increase elsewhere does not produce benefits on a global scale. This concept, referred to as “leakage”, refers to “a reduction in emissions of [GHGs] within the state that is offset by an increase in emissions of [GHGs] outside the state.”⁵¹ One of the main considerations of AB 32 was minimizing leakage. In fact, the text of the regulation commits ARB to minimizing leakage when adopting regulations pursuant to the goals of the original regulation.⁵²

California dairies are more efficient in terms of GHG emissions per unit of milk than average U.S. dairies elsewhere (see Section 1.1). In addition, manure management policies mandated by the SJVAPCD and the Regional Water Quality Review Board result in less time for manure to remain in anaerobic conditions that are conducive to methane formation during decomposition than most other operations outside of California. Thus, if policies or other factors encourage dairies to move out of California or increase operations outside of California, then it is likely to result in an artificial decrease in the state inventory as the associated GHG emissions would simply shift to out-of-state facilities (i.e., a concept called leakage). Any regulations, practices, or programs that force dairies to move out of the state, thereby shifting the corresponding GHG emissions out of the state, would result in leakage and would conflict with the goals of AB 32. The goal of this CAP, and other similar programs, is thus to focus on ensuring dairies are in compliance with the stated goals of AB 32.

All currently available emissions reduction strategies have been considered and analyzed. As discussed above, the Dairy CAP provides for periodic updates to reflect new developments. If new feasible methods of reducing GHG emissions from dairies and feedlots become available (e.g., new offset protocols), these new emissions reduction strategies will be considered and incorporated into future Dairy CAP updates as appropriate.

⁵¹ AB 32. §38505(j).

⁵² AB 32. §38562(b)(8).

5 CEQA Implications

As discussed above in Section 2.2.6, any project that requires discretionary action in California (defined in §15378) is required to undergo a CEQA evaluation, with the corresponding requirements to assess impacts of GHGs. Any new or expanding dairy or feedlot requiring a discretionary action will be required to demonstrate that the facility has fulfilled CEQA requirements, including the requirements related to GHGs. This section discusses the requirements of new or expanding facilities and how they can use this Dairy CAP to fulfill CEQA requirements related to GHGs.

5.1 Approach to Cumulatively Considerable Level Assessment

One criterion used to assess potential significance of GHG emissions from projects is whether the project would “conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of [GHGs].”⁵³ This Dairy CAP was designed specifically to reduce GHG emissions from dairies and feedlots and to be consistent with State and Federal plans, policies, and regulations. Any new or expanding facility that can demonstrate consistency with this Dairy CAP can be expected to have less than significant impacts related to GHGs. Specifically, the approach proposed by this Dairy CAP is that a facility can fulfill CEQA requirements related to GHG emissions under one of two approaches:

1. Streamlined analysis: The facility (other than a new facility) has emissions that are below the streamlined analysis level and is implementing Dairy CAP GHG emission reduction strategies consistent with the Dairy CAP. An analysis must be done to determine consistency with this Dairy CAP. If the facility can demonstrate consistency with the Dairy CAP by showing that it has implemented reduction strategies from a defined checklist of GHG reduction practices (or demonstrate why these practices would be infeasible for the specific facility), then the facility does not need to undergo further analysis and the project is considered to have less than significant cumulative impacts related to GHGs. The proposed checklist will include reduction strategies in Category A (see Section 4).
2. Project analysis: If the facility is a new dairy OR it is an expanding facility with emissions in excess of the streamlined analysis level OR the facility is an expanding facility with emissions that are less than the streamlined analysis level and does not provide justification as to why the facility cannot incorporate the Dairy CAP-defined GHG reduction strategies (i.e., Category A strategies), then the facility must perform additional individualized analyses to indicate whether the project has cumulatively significant impacts related to GHGs. All new facilities will be required to perform an individualized analysis of GHG emissions.

⁵³ Office of Planning and Research (OPR). 2014. CEQA checklist. Section VII.b. Greenhouse Gases. Available at http://resources.ca.gov/ceqa/docs/2014_CEQA_Statutes_and_Guidelines.pdf. Appendix G. Environmental Checklist Form. Accessed April 2014.

5.2 Cumulatively Considerable Streamlined Analysis Level Determination

An element of a CAP is to establish a level, based on substantial evidence, below which the contribution to GHG emissions from activities covered by the plan would not be cumulatively considerable. The determination of a level of cumulative contribution due to GHG emissions from dairies and feedlots is informed by the statewide Scoping Plan, which is designed to identify the sources of GHG emissions reductions that will achieve the reductions mandated by AB 32. The Scoping Plan has been devised to periodically re-examine and re-evaluate its requirements based on evolving information and available data concerning the effectiveness of its strategies and requirements in timely meeting AB 32's GHG reduction goals. The current version of the Scoping Plan takes into consideration the GHG emissions from the dairy sector through the year 2020 and requires no reductions in animal-related emissions.

For purposes of the Dairy CAP, a list of emissions reductions approaches has been formulated to address GHG emissions from new and expanding dairies. A streamlined climate change evaluation under CEQA would be applied to those projects (other than a new facility) with emissions below a certain level of GHG emissions and which also incorporate available feasible GHG reductions approaches consistent with the Dairy CAP. All new dairies, as well as any expanding facilities that either exceed the streamlined analysis level or that fail to incorporate the applicable emissions reduction approaches, would be required to perform an individualized CEQA review.

In order to define the emissions level for purposes of performing an individualized CEQA review, a review was performed of existing CEQA significance thresholds as well as criteria for other GHG programs. Note that this streamlined analysis level is not intended to constitute a threshold for determining significance of GHGs under CEQA. Instead, this streamlined analysis level is designed to be one aspect of an approach to determining the level of analysis required under CEQA. This review and proposed definitions are discussed below.

5.2.1 Existing Criteria and Thresholds

Thresholds for GHGs have been identified for significance under CEQA as well as for other programs requiring reporting. These thresholds can generally be grouped into three categories: numerical thresholds, efficiency metrics, and improvements over a Business-as-Usual (BAU) scenario.

- Numerical thresholds – This type of threshold is often referred to as a “bright-line threshold” and consists of a specific numerical threshold that applies to certain types of projects. For example, the South Coast Air Quality Management District (AQMD) has defined a numerical threshold of 10,000 MT CO₂e/year applicable for stationary source projects. Any relevant project with GHG emissions above this threshold is considered to have significant impacts from GHGs. Numerical thresholds have been defined by multiple AQMDs and

considered applicable primarily to industrial stationary source projects. There are also several numerical thresholds that have been specifically defined for land use projects.

In addition to CEQA significance thresholds, there are multiple numerical thresholds used to determine inclusion in other GHG-related programs, such as ARB's Cap-and-Trade Program and Mandatory Reporting Program.

- Efficiency metrics – This type of threshold compares project emissions normalized over a service population to a defined threshold. For example, the Bay Area AQMD has defined a service population efficiency metric of 4.6 MT CO₂e/service population/year. The efficiency metric is calculated by quantifying the project's annual GHG emissions and normalizing by the service population (typically residents and employees). If the project's calculated metric is greater than the defined threshold, then the project is considered to have significant impacts from GHGs. The efficiency metrics thresholds defined by AQMDs to date have only been applied to land use development projects; no efficiency metrics thresholds have been defined for industrial projects.

Because these thresholds have only been defined for land use development projects, these thresholds were rejected for purposes of this Dairy CAP.

Although these thresholds are rejected for purposes of this Dairy CAP, efficiency metrics could serve a useful role in the dairy industry. As discussed in Section 1.1, one type of efficiency metric, e.g., GHG emissions per unit of milk produced, provides useful information on how farms have improved over time. These efficiency metrics will continue to provide useful information and future Dairy CAPs may wish to consider their use. However, they are not used for purposes of this Dairy CAP.

- Improvements compared to BAU – This type of threshold requires that a project show a defined percent reduction compared to a BAU scenario for a determination of less than significant. For example, the SJVAPCD has set a 29% reduction compared to BAU as the threshold for significance for CEQA projects that do not meet other requirements. This requires that a project proponent define a BAU scenario and calculate expected emissions from this scenario. If the project emissions demonstrate a 29% reduction as compared to BAU emissions, then the project is considered to be less than significant for GHG emissions.

A BAU scenario is the set of conditions reasonably expected to occur, taking into account current laws and regulations, but in the absence of additional GHG reduction measures. In addition, as discussed in Section 3, the majority of emissions from dairies and feedlots are animal-related whereas the majority of potential reduction measures focus on other emissions sources. Livestock-related emissions reductions strategies under the Scoping Plan include no required reductions and are limited exclusively to voluntary, incentive-based programs due to the unavailability of feasible measures to reduce these types of emissions. Because of the lack of feasible emissions reduction strategies for

livestock-related emissions as well as the consequent difficulty in defining a BAU scenario for a dairy or feedlot, defined percent reduction thresholds were rejected for the purposes of this Dairy CAP.

A summary table of the existing criteria and thresholds discussed above are provided in Appendix D.

5.2.2 Streamlined Analysis Level

As described in Section 1.2, CEQA Guidelines for GHG emissions reduction plans, such as this Dairy CAP, have been developed by OPR and adopted by the CNRA. The guidelines (CEQA Guidelines section 15183.5) specify that a plan for the reduction of GHG emissions should include or address specific elements. One of these elements includes:

- Establish a level, based on substantial evidence, below which the contribution to GHG emissions from activities covered by the plan would not be cumulatively considerable

As discussed above, both the efficiency metrics thresholds and BAU thresholds were rejected, and the review focused on the numerical thresholds. A streamlined analysis level of 25,000 MT CO₂e/year was chosen because:

- It is consistent with ARB's Cap-and-Trade program as well as with USEPA's Mandatory Reporting Rule;
- Per the USEPA's Mandatory Reporting Rule, it covers approximately 85 to 90% of emissions and the majority of large emitters;
- ARB's Mandatory Reporting Rule (10,000 MT CO₂e/year) currently excludes emissions from livestock manure management (Of note, the USEPA's Mandatory Reporting Rule also currently excludes emissions from livestock manure management (Subpart JJ));
- A threshold of 10,000 MT CO₂e/year has been defined as a CEQA significance threshold in other jurisdictions. As stated above, the streamlined analysis level in this Dairy CAP is not intended, nor is it meant to be used, as a significance threshold under CEQA. Using a threshold that has instead been used to determine applicability of other GHG programs was deemed to be more consistent with the CEQA Guidelines streamlining process.

5.3 Proposed CEQA Checklist

Table 5 lists the Category A reduction strategies, which new or expanding dairies or feedlots must (1) incorporate into their facility or (2) provide justification as to why the given strategy is not feasible for the facility.

Table 6 lists the Category B reduction strategies, which new or expanding dairies or feedlots must consider for implementation at the facility. It is anticipated that a facility may choose to replace a reduction strategy in Table 5 with a strategy in Table 6 to provide operational flexibility in reducing GHG emissions. In addition, if

expanding facilities are not able to implement Category A reduction strategies, or substitute Category B strategies, in the expansion, the facility may choose to implement an equal number of Category A or B strategies within the **existing** portion of the facility to the same or greater extent as would have been done for the expanded portion.

Table 5. Category A Reduction Strategies for Implementation at New or Expanding Facilities Consistent with the Dairy CAP		
Checklist #	Reference # (Appendix C)	Reduction Strategies
Dairy Operations		
D1	C9.1.5	Implement environmentally responsible purchasing of feed additives (i.e. use locally sourced materials and/or agricultural by-products such as citrus pulp and almond hulls, when available). This measure must be consistent with TMR or other efficient feeding strategies, as well as animal health and efficient milk production requirements.
D2	C9.1.5	Use a Total Mixed Ration or other efficient feeding strategy intended to maximize feed-to-milk production efficiency in lactating cows.
D3	C9.1.4	Comply with nutrient management plans to reduce fertilizer requirements (i.e., GHG emissions associated with fertilizer production and transportation)
D4	C9.1.4	Comply with air and water quality plans to achieve GHG benefits (e.g., less water usage)
Energy		
E1	C2.1.1	The farm must meet or exceed Title 24 standards in climate-controlled buildings (e.g., not barns)
E2	C2.1.3	Provide verification of energy savings (e.g., electric bills or third-party verification)
E3	C2.1.5	Install energy efficient boilers
E4	C2.1.4	Install energy efficient appliances (e.g., for milk cooling)
E5	C2.2.1	Install energy efficient area lighting
Transportation [20 or more new employees]		
T1	C3.2.6	Provide bike parking if requested by employees
T2	C3.4.5	Provide end of trip facilities if requested by employees (e.g., shower for people biking)
Water, Solid Waste, and Recycling (if available and not prohibited by USDA, CDFA, or other government agencies)		
R1	C4.2.2	Adopt a water conservation strategy

Table 5. Category A Reduction Strategies for Implementation at New or Expanding Facilities Consistent with the Dairy CAP		
Checklist #	Reference # (Appendix C)	Reduction Strategies
R2	C4.2.3	Design water-efficient landscapes (decorative landscaping only)
R3	C4.2.4	Use water-efficient landscape irrigation systems (decorative landscaping only)
R4	C4.2.5	Reduce turf in landscapes and lawns (decorative landscaping only)
R5	C4.2.6	Plant native or drought-resistant trees and vegetation (decorative landscaping only)

Table 6. Category B Reduction Strategies for Consideration at New or Expanding Facilities (may be used as substitutes for Category A Strategies)		
Checklist #	Reference # (Appendix C)	Measure
Dairy Operations		
D5	S9(3)	Use a digester, designed and operated per applicable standards, and the captured methane for energy use to displace fossil fuel use
D6	O(1)	Use of scrape systems to divert manure from lagoon to another part of the storage system.
D7	O(2)	Increase solids separation.
Energy		
E6	C2.3.2	Establish onsite renewable energy systems - Solar power
E7	C2.3.3	Establish onsite renewable energy systems - Wind power
E8	C2.3.4	Utilize a combined heat and power system
E9	C2.3.6	Establish methane recovery on digester
Transportation		
T3	C3.4.11	Provide employer-sponsored vanpool/shuttle
T4	C3.1.5	Increase transit accessibility if adjacent to public transportation
T5	C3.4.12	Implement intra-farm bike-sharing
T6	C3.7.2	Utilize alternative fueled vehicles on-site

Table 6. Category B Reduction Strategies for Consideration at New or Expanding Facilities (may be used as substitutes for Category A Strategies)		
Checklist #	Reference # (Appendix C)	Measure
T7	C3.7.3	Utilize electric or hybrid vehicles on-site
Water, Solid Waste, and Recycling		
R6	C6.1.1	Institute or extend recycling and composting services
R7	C4.1.3	Use locally sourced well or surface water
R8	C4.2.1	Install low-flow water fixtures (decorative landscaping only)
R9	C6.1.2	Recycle demolished construction material
Miscellaneous		
M1	C7.1.1	Plant trees
M2	C8.1.1	Use alternative fuels for construction equipment (Construction only)
M3	C8.1.2	Use electric and hybrid construction equipment (Construction only)
M4	C8.1.3	Limit construction equipment idling beyond regulation requirements (Construction only)
M5	C8.1.4	Institute a heavy-duty off-Road vehicle plan (Construction only)
M6	C8.1.5	Implement a construction vehicle inventory tracking system (Construction only)
M7	C9.1.3	Use local and sustainable building materials (Construction only)
M8	C9.1.4	Additional BMPs in agriculture and animal operations
M9	C9.1.5	Environmentally responsible purchasing
M10	C9.1.6	Implement an innovative strategy for GHG Reductions

6 Implementation and Monitoring

The Tulare CAP discusses implementation and monitoring, and this Dairy CAP will be subject to the relevant provisions in that document. As discussed throughout this document, because of the differences inherent to the dairy sector that have been described previously in the document, setting a quantitative reduction target does not make sense. However, it is important to track the progress of the dairy industry related to the goal of this Dairy CAP, namely maintaining the efficiency of milk production and, when possible, implementing GHG emissions reduction strategies.

Although this Dairy CAP focuses on new and expanding dairies, the County will also track the implementation of Category A and B measures on *existing* dairies. Often, existing, well-established dairies are in better financial condition to implement new practices that are outside the purview of “typical” operating scenarios on a dairy. It is important to account for reductions that occur at existing dairies, even if the existing dairies are not required to implement any of the reduction strategies discussed herein. Thus, implementation and monitoring will apply to existing dairies as well as new and expanding dairies.

The following are suggestions for periodic monitoring and review of the implementation of the Dairy CAP:

- Number of dairy permitting projects: A review of dairy permitting projects in Tulare County will be completed every five years. This review will monitor the number of new and expanding dairies that are permitted using the two possible approaches described in Section 5.1.
- Ease of permitting approaches: As part of the review described above, an evaluation of the ease of using the two possible approaches will be obtained from the perspective of the County’s permitting section as well as the project applicant.
- Analysis of reduction strategies: Tulare County staff will enumerate the number of Category A and B strategies that have been implemented on new, expanding, and existing dairies. To the extent possible, staff will also estimate the potential reductions that have been achieved, either by using the default methodologies referenced in Table 5 or by using site-specific information when available from the farmer.

7 Future Project GHG and Climate Change Evaluations

This Dairy CAP is intended to serve as a GHG reduction plan for the purpose of evaluating and addressing impacts of GHG emissions and climate change from future projects (CEQA Guidelines §15183.5). Because the Dairy CAP is intended to reduce the climate change impacts from new or expanding dairies and feedlots to a less than cumulatively considerable level, consistency of a future project with the Dairy CAP may be used to evaluate a project's GHG-related impacts. Projects that are determined to be consistent or in compliance with the emission reduction strategies and policies of the Dairy CAP, as discussed in Section 5, are presumed to have a less than significant impact on climate change. (See CEQA Guidelines §15064.4(b)(3))

Thus, a new or expanding dairy classified as requiring a Project Analysis must complete a site-specific GHG evaluation that complies with the three requirements as defined by OPR:

- The extent to which the project supports or includes applicable reduction strategies, or advances the actions identified in the Climate Action Plan;
- The consistency of the project with the emissions reduction targets set by the Climate Action Plan;⁵⁴ and
- The extent to which the project would interfere with implementation of Climate Action Plan strategies, practices, or actions.

As described in Section 5.1, a facility is classified as requiring a Project Analysis if:

- The facility is a new dairy, OR
- The facility has emissions above the streamlined analysis level of 25,000 MTCO₂e, OR
- The facility does not provide justification for why the facility does not incorporate the Category A GHG reduction measures (or, if applicable, substituted Category B measures).

This classification indicates that the project MAY have cumulatively significant impacts related to GHGs and additional CEQA analysis must be done.

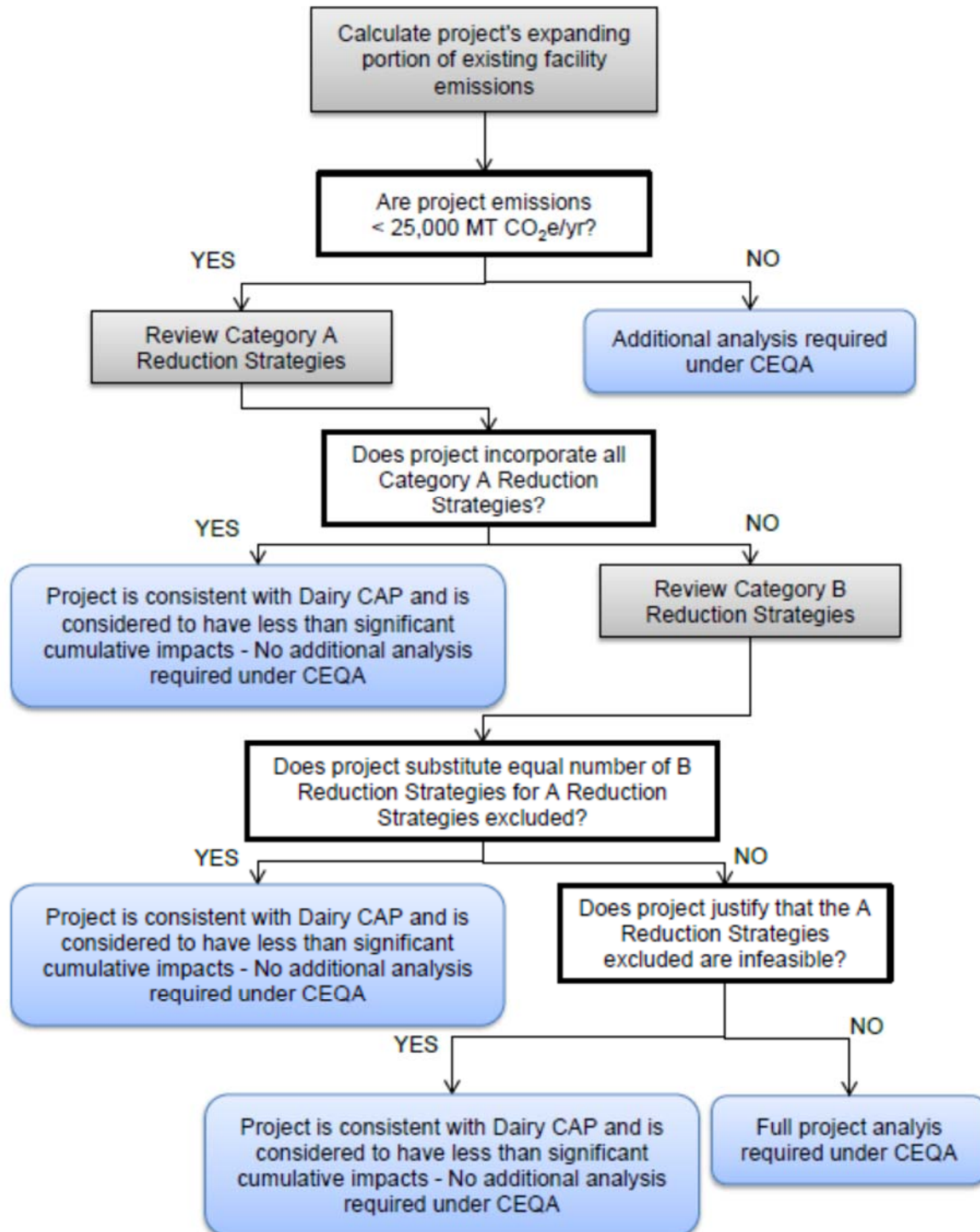
A proposed project's CEQA environmental review that references this Dairy CAP for GHG emissions and climate change impact analysis must identify the requirements specified in the Dairy CAP that apply to the project. If the applicable measures are

⁵⁴ Because the Scoping Plan expressly rejects setting required emissions reductions from dairies and cattle feedlots and does not specify any required emissions reduction targets for the livestock-rearing sector, reduction targets are not identified other than to the extent that voluntary, incentive-based programs are adopted.

not otherwise binding and enforceable, they must be incorporated as mitigation measures for the project. If Tulare County determines that a proposed project is not consistent with the Dairy CAP, it will be necessary to evaluate other project design and/or mitigation measures to make the project consistent with the Dairy CAP, or further analyze climate change impacts for significance. If a project cannot be shown to be consistent with the Dairy CAP, an environmental impact report (EIR) analysis (i.e., alternatives discussion and analysis, additional mitigation assessment, etc.) may be required.

Figure 1 illustrates this approach to determining whether an expanding facility is consistent with the Dairy CAP or would require additional CEQA analysis. All new dairies will be required to perform a Project Analysis under CEQA.

Figure 1. Flow Chart Illustrating Method of Determining Required Level of Analysis for CEQA for Expanding Facilities.



8 Future Updates

At this time, the feasible approaches to reducing animal-related GHG emissions are limited. As the location of a significant portion of dairy production operations statewide and, indeed, nationwide, the County is committed to participating at all levels in promoting any available programs to facilitate feasible GHG emissions reductions strategies for the dairy sector.

The most promising technology for addressing animal-related GHG emissions is the implementation of digesters. Under the Scoping Plan, dairy digesters are identified as a voluntary approach to reduce GHG emissions in large part due to economic infeasibility in the absence of significant subsidies, cooperation from local utilities in providing feasible and extended energy purchase terms, and infrastructure coordination and bundling of individual dairies. The County is committed to spearheading efforts to tap into state and federal subsidy programs, to establish pilot programs, to streamline permitting requirements and waive fees for digester projects, to track and document the GHG emissions reductions and effectiveness of digesters, and to solicit and maintain an inventory of interested dairies. Specific initiatives by the County include the following:

- Digester Permitting – Consideration of an ordinance similar to that adopted by Kern County to provide by-right permitting for dairy digesters less than 10 MW.
- Property Tax Equity – Consider adoption of regulations similar to those applicable to solar projects providing property tax incentives for dairy digester projects.
- Incentivize Funding – Establish County policies to actively coordinate with ARB, CEC, and CDFA to encourage continued and increased availability of incentive funding (via cap-and-trade revenues) to allow construction of dairy digesters in the County, to identify appropriate incentives for dairy digester projects in the County, and to ensure that dairies within the County have maximum access to these opportunities.
- Dairy Digester Information Officer – Designate within the County's Resource Management Agency a Dairy Digester Information Officer whose duties will include:
 - Maintaining an inventory of operating dairy digesters in the County;
 - Maintaining current information on dairy digester incentive programs, opportunities, and application deadlines;
 - Distributing via email to interested parties updates on dairy digester incentives; and
 - Co-sponsoring with Dairy Cares, Tulare County Farm Bureau, University of California Cooperative Extension, and other organizations an annual fair or symposium for dairy farmers that provides up-to-date information on digesters, digester technologies, and digester incentives, while providing

access to digester developers, lenders, investors, utilities, engineering firms, and energy companies.

These efforts are designed to promote the County and its dairy sector as an optimal location for digester investment and development.

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Appendix A

Emission Calculations

Appendix A. Dairy and Feedlot Emissions Calculations for Manure Decomposition and Enteric Fermentation

Table A-1. Feedlot Cattle Head counts

Category	Total Cattle	Other Cattle ^[a]
California (2012) ^[b]	5,350,000	1,816,164
Base Year (2012) ^[b]	1,030,000	133,886
Future Year (2023) ^[c]	1,195,357	155,380

Notes:

^[a] This category is assumed to include all cattle other than milking cows, replacement dairy heifers (0-24 months), and dairy calves (see Table A-3).

^[b] California Agricultural Statistics for 2013. Available at:

http://www.nass.usda.gov/Statistics_by_State/California/Publications/California_Ag_Statistics/index.asp

^[c] The Future Year population is projected from the Base Year assuming a 1.5% annual growth rate.

Table A-2. Methane and Nitrous Oxide Emissions Beef Cattle - Enteric Digestion and Manure Management

Source	Enteric Digestion	Manure Management	
	CO ₂ e (MMT CO ₂ e/yr)		
California (2012) ^[a]	3.1	0.40	
	CH ₄ (MT CH ₄ /yr)	CH ₄ (MT CH ₄ /yr)	N ₂ O (MT N ₂ O/yr)
California (2012) ^[a]	123,207	5,269	905
Base Year (2013) ^[b]	9,083	388	67
Future Year (2023) ^[b]	10,541	451	77
	CO ₂ e (MT CO ₂ e/yr) ^[c]	CO ₂ e (MT CO ₂ e/yr) ^[c]	
California (2012) ^[a]	3,080,184	401,499	
Base Year (2013) ^[b]	227,068	30,399	
Future Year (2023) ^[b]	263,522	35,279	

^[a] California populations and methane emissions are from the CARB 2000-2012 GHG Inventory for the year 2012. Data available here: http://www.arb.ca.gov/cc/inventory/data/tables/ghg_inventory_by_ipcc_00-12_2014-03-24.xlsx Accessed April 2015.

^[b] CARB uses the same methodology that EPA uses to estimate emissions from enteric fermentation and manure management. As such, this table assumes that Tulare emissions are proportional to the California emissions based on population.

^[c] CO₂e = carbon dioxide equivalent emissions, which is the sum of all emissions after multiplying by their global warming potentials (GWPs). GWP is 25 for CH₄ and 298 for N₂O (Table A-1, 40 CFR Part 98).

Abbreviations:

CFR - Code of Federal Regulations

CH₄ - methane

CO₂e - carbon dioxide equivalents

GWP - global warming potential

IPCC - Intergovernmental Panel on Climate Change

lbs - pounds

MT - metric tonne

yr - year

Table A-3. Dairy Cattle Head Counts

Category	Dairy Cows	Dairy Heifers 0-12 mo	Dairy Heifers 12-24 mo	Dairy Calves
California (2012) ^[a]	1,780,000	245,322	588,161	920,353
Base Year (2013) ^[b]	543,431	137,985	148,928	65,770
Future Year (2023) ^[b]	630,674	160,137	172,837	76,329

Notes:

^[a] California populations and methane emissions are from the CARB 2000-2012 GHG Inventory.

^[b] The Base Year cattle populations are assumed to be the 2011 Tulare cattle populations. The Future Year cattle populations are projected assuming a 1.5% annual growth rate.

Table A-4. Methane Emissions from Enteric Fermentation - Dairy Cattle

Category	Dairy Cows	Dairy Heifers 0-12 mo	Dairy Heifers 12-24 mo	Dairy Calves
CO₂e (MMT CO₂e/yr)				
California (2012) ^[a]	6.641	0.281	1.017	0.282
CH₄ (kg CH₄/yr)				
California (2012) ^[a]	265,623,543	11,240,117	40,681,265	11,270,084
Base Year (2013) ^[b]	81,094,420	6,322,171	10,300,886	805,379
Future Year (2023) ^[b]	94,113,385	7,337,137	11,954,599	934,676
CO₂e (MT CO₂e/yr)^[c]				
California (2012)	6,640,589	281,003	1,017,032	281,752
Baseline (2013)	2,027,360	158,054	257,522	20,134
Future Year (2023)	2,352,835	183,428	298,865	23,367

Notes:

^[a] California populations and methane emissions are from the CARB 2000-2012 GHG Inventory for the year 2012. Data available here: http://www.arb.ca.gov/cc/inventory/data/tables/ghg_inventory_by_ipcc_00-12_2014-03-24.xlsx Accessed April 2015.

^[b] CARB uses the same methodology that EPA uses to estimate emissions from enteric fermentation. As such, this table assumes that Tulare methane emissions are proportional to the California methane emissions based on population.

^[c] CO₂e = carbon dioxide equivalent emissions, which is the sum of all emissions after multiplying by their global warming potentials (GWPs). GWP is 25 for CH₄ (Table A-1, 40 CFR Part 98).

Abbreviations:

CARB - California Air Resources Board

CFR - Code of Federal Regulations

CH₄ - methane

CO₂e - carbon dioxide equivalents

GHG - greenhouse gas

GWP - global warming potential

kg - kilogram

mo - months old

MT - metric tonne

yr - year

Table A-5. Dairy Cattle Head Counts

Category	Dairy Cows	Dairy Heifers
Base Year (2013) ^[a]	534,633	352,683
Future Year (2023) ^[a]	620,463	409,303

Notes:

^[a] The Base Year cattle populations are assumed to be the 2011 Tulare cattle populations. The Future Year cattle populations are projected assuming a 1.5% annual growth rate.

Table A-6. Methane Emissions from Manure Management - Dairy Cows

	Base Year (2013)			Future Year (2023)						
	CH _{4,man} (kg CH ₄ /yr) ^[a]	V _{ex} (kg/yr) ^[b]	WMS*N _{animals} (animal) ^[c]	CH _{4,man} (kg CH ₄ /yr) ^[a]	V _{ex} (kg/yr) ^[b]	WMS*N _{animals} (animal) ^[c]	VS (kg VS/animal/yr) ^[d]	B ₀ (m ³ CH ₄ /kg VS) ^[e]	MCF (%) ^[f]	c ₁ (kg/m ³) ^[g]
Anaerobic digester	519,273	18,057,107	6,374	602,638	20,956,010	7,397	2,833	0.24	0.181	0.662
Anaerobic lagoon	104,734,878	881,293,371	311,081	121,549,102	1,022,776,936	361,023	2,833	0.24	0.748	0.662
Daily spread	126,968	159,828,502	56,417	147,351	185,487,502	65,474	2,833	0.24	0.005	0.662
Deep pit	82,721	1,568,222	554	96,001	1,819,986	642	2,833	0.24	0.332	0.662
Dry lot	0	0	0	0	0	0	2,833	0.24	0.015	0.662
Liquid/slurry	16,133,214	305,853,583	107,961	18,723,253	354,955,570	125,293	2,833	0.24	0.332	0.662
Pasture	24,229	10,166,642	3,589	28,119	11,798,804	4,165	2,833	0.24	0.015	0.662
Solid storage	876,051	137,847,860	48,658	1,016,693	159,978,070	56,469	2,833	0.24	0.04	0.662
Total	122,497,334	--	534,633	142,163,157	--	620,463	--	--	--	--
Total (MMT CO ₂ e/yr) ^[h]	3.1			3.6						

Table A-7. Methane Emissions from Manure Management - Dairy Heifers

	Base Year (2013)			Future Year (2023)						
	CH _{4,man} (kg CH ₄ /yr) ^[a]	V _{ex} (kg/yr) ^[b]	WMS*N _{animals} (animal) ^[c]	CH _{4,man} (kg CH ₄ /yr) ^[a]	V _{ex} (kg/yr) ^[b]	WMS*N _{animals} (animal) ^[c]	VS (kg VS/animal/yr) ^[d]	B ₀ (m ³ CH ₄ /kg VS) ^[e]	MCF (%) ^[f]	c ₁ (kg/m ³) ^[g]
Anaerobic digester	0	0	0	0	0	0	1,255	0.17	0.181	0.662
Anaerobic lagoon	0	0	0	0	0	0	1,255	0.17	0.748	0.662
Daily spread	26,903	47,811,006	38,096	31,222	55,486,624	44,212	1,255	0.17	0.005	0.662
Deep pit	0	0	0	0	0	0	1,255	0.17	0.332	0.662
Dry lot	653,028	386,842,083	308,241	757,866	448,946,030	357,726	1,255	0.17	0.015	0.662
Liquid/slurry	144,546	3,868,660	3,083	167,751	4,489,738	3,577	1,255	0.17	0.332	0.662
Pasture	6,913	4,095,416	3,263	8,023	4,752,897	3,787	1,255	0.17	0.015	0.662
Solid storage	0	0	0	0	0	0	1,255	0.17	0.04	0.662
Total	831,391	--	352,683	964,863	--	409,303	--	--	--	--
Total (MMT CO ₂ e/yr) ^[h]	0.02			0.02						

Notes:

^[a] Methane emissions estimated using Equation 1 (see below).

Equation 1 $CH_{4,man} = V_{ex} \times B_0 \times MCF \times c_1$

^[b] Volatile solids excreted estimated using Equation 2 (see below).

Equation 2 $V_{ex} = VS \times (WMS \times N_{animals})$

^[c] Number of animals per waste management system. Assumes Tulare has the same distribution of waste management systems as California does (CARB Annex III.B.)

^[d] Volatile solids excreted per animal (CARB Annex III.B.)

^[e] Maximum methane producing capacity (CARB Annex III.B.)

^[f] Methane conversion factor (CARB Annex III.B.)

^[g] Conversion factor representing density of methane at 25°C (CARB Annex III.B.)

^[h] CO₂e = carbon dioxide equivalent emissions, which is the sum of all emissions after multiplying by their global warming potentials (GWPs). GWP is 25 for CH₄ (Table A-1, 40 CFR Part 98).

Abbreviations:

B₀ - maximum methane producing capacity

c₁ - density of methane at 25°C

CARB - California Air Resources Board

CFR - Code of Federal Regulations

CH_{4,man} - methane emissions from manure management

CO₂e - carbon dioxide equivalents

GWP - global warming potential

kg - kilogram

m³ - cubic meters

MCF - methane conversion factor

MMT - million metric tonnes

N_{animals} - animal population

V_{ex} - amount of volatile solids excreted in each WMS

VS - volatile solids production rate

WMS - waste management system

yr - year

Table A-8. Nitrous Oxide Emissions from Manure Management - Dairy Cows

	Dairy Cow Parameters						Base Year (2013)		Future Year (2023)	
	N _{ex} (g/yr) ^[a]	Direct N as N ₂ O (g N ₂ O-N/g) ^[b]	Volatilization fraction ^[c] (fraction)	Indirect N as N ₂ O, volatilized ^[d] (g N ₂ O-N/g)	Runoff fraction ^[e] (fraction)	Indirect N as N ₂ O, runoff ^[f] (g N ₂ O-N/g)	WMS*N _{animals} (animal) ^[g]	N ₂ O _{man} ^[h] (kg N ₂ O/yr)	WMS*N _{animals} (animal) ^[g]	N ₂ O _{man} ^[h] (kg N ₂ O/yr)
Anaerobic digester	157,605	0	0.43	0.01	0.008	0.0075	6,374	6,881	7,397	7,986
Anaerobic lagoon	157,605	0	0.43	0.01	0.008	0.0075	311,081	335,841	361,023	389,758
Daily spread	157,605	0	0.10	0.01	0	0.0075	56,417	13,970	65,474	16,212
Deep pit	157,605	0.002	0.24	0.01	0	0.0075	554	603	642	700
Dry lot ^[i]	157,605	0.02	0.15	0.01	0.02	0.0075	0	0	0	0
Liquid/slurry	157,605	0.005	0.26	0.01	0.008	0.0075	107,961	204,772	125,293	237,646
Pasture	157,605	0	0.00	0.01	0	0.0075	3,589	0	4,165	0
Solid storage	157,605	0.005	0.27	0.01	0	0.0075	48,658	92,772	56,469	107,666
Total	--	--	--	--	--	--	534,633	654,839	620,463	759,967
Total (MMT CO ₂ e/yr) ^[j]								0.20		0.23

Table A-9. Nitrous Oxide Emissions from Manure Management - Dairy Heifers

	Dairy Heifer Parameters						Base Year (2013)		Future Year (2023)	
	N _{ex} (g/yr) ^[a]	Direct N as N ₂ O (g N ₂ O-N/g) ^[b]	Volatilization fraction ^[c] (fraction)	Indirect N as N ₂ O, volatilized ^[d] (g N ₂ O-N/g)	Runoff fraction ^[e] (fraction)	Indirect N as N ₂ O, runoff ^[f] (g N ₂ O-N/g)	WMS*N _{animals} (animal) ^[g]	N ₂ O _{man} ^[h] (kg N ₂ O/yr)	WMS*N _{animals} (animal) ^[g]	N ₂ O _{man} ^[h] (kg N ₂ O/yr)
Anaerobic digester ^[k]	69,044	0	0.43	0.01	0.008	0.0075	0	0	0	0
Anaerobic lagoon ^[k]	69,044	0	0.43	0.01	0.008	0.0075	0	0	0	0
Daily spread	69,044	0	0.10	0.01	0	0.0075	38,096	4,133	44,212	4,796
Deep pit ^[k]	69,044	0.002	0.24	0.01	0	0.0075	0	0	0	0
Dry lot	69,044	0.02	0.15	0.01	0.02	0.0075	308,241	723,898	357,726	840,114
Liquid/slurry	69,044	0.005	0.26	0.01	0.008	0.0075	3,083	2,561	3,577	2,973
Pasture	69,044	0	0.00	0.01	0	0.0075	3,263	0	3,787	0
Solid storage ^[k]	69,044	0.005	0.27	0.01	0	0.0075	0	0	0	0
Total	--	--	--	--	--	--	352,683	730,592	409,303	847,882
Total (MMT CO ₂ e/yr) ^[j]								0.22		0.25

Notes:

^[a] Nitrogen excreted per animal (CARB Annex III.B.)

^[b] Emission factor representing direct nitrogen as N₂O-N for the particular waste management system (CARB Annex III.B.)

^[c] Volatilization fraction of N for the animal group (CARB Annex III.B.)

^[d] Emission factor representing indirect nitrogen as N₂O-N for re-deposited volatilized N (CARB Annex III.B.)

^[e] Runoff fraction of N for the animal group (CARB Annex III.B.)

^[f] Emission factor representing indirect nitrogen as N₂O-N for runoff N (CARB Annex III.B.)

^[g] Number of animals per waste management system. Assumes Tulare has the same distribution of waste management systems as California does (CARB Annex III.B.)

^[h] N₂O emissions estimated using Equation 1 (see below).

Equation 1
$$N_2O = W_{ms} \times N_{animals} \times N_{excreted} \times [D_{EF} + (V_{frac} \times V_{EF}) + (R_{frac} \times R_{EF})] \times 1.5711$$

^[i] Data were not provided for dairy cows: dry lot; instead the data for heifers: dry lot were used.

^[j] CO₂e = carbon dioxide equivalent emissions, which is the sum of all emissions after multiplying by their global warming potentials (GWPs). GWP is 25 for CH₄ and 298 for N₂O (Table A-1, 40 CFR Part 98).

^[k] Data were not provided for dairy heifers: anaerobic digester, anaerobic lagoon, deep pit, or solid storage; instead the corresponding data for dairy cows were used.

Abbreviations:

CARB - California Air Resources Board	GWP - global warming potential	N ₂ O - nitrous oxide	WMS - waste management system
CFR - Code of Federal Regulations	kg - kilogram	N ₂ O _{man} - nitrous oxide emissions from manure management	yr - year
CO ₂ e - carbon dioxide equivalents	MMT - million metric tonnes	N _{animals} - animal population	
g - gram	N - nitrogen	N _{ex} - nitrogen excreted per animal	

Appendix B

Values Extracted from Analyses Completed for the Tulare County ACFP Update EIR

Appendix B. Values Extracted from Analyses Completed for the Tulare County ACFP Update EIR

Table B-1. Project Level GHG Emissions without Mitigation (Metric Tons/Year)

Source	CO ₂	CH ₄	N ₂ O	HFC-23	CO ₂ e
Farm Equipment Exhaust	38,054	3	0	0.0	38,129
Farm Agricultural Soil	0	0	2,725	0.0	812,050
Farm Electricity Consumption	79,107	3	1	0.0	79,480
Dairy Equipment Exhaust	99,106	12	0	0.0	99,406
Truck Trips	23,137	0	0	0.0	23,137
Dairy Employee and Visitor Trips	14,882	3	3	0.0	15,851
Dairy Electricity Consumption	144,792	6.017	1.318	0.0	145,335
Dairy Refrigeration	0	0	0	4.3	63,640
Total	399,078	27	2,730	4.3	1,277,028

Notes:

1. Project level conditions represent existing conditions relative to a zero baseline. Existing conditions are from 2013 for Dairy Electricity Consumption and 2009 for all other sources.
2. Dairy emissions include support stock at heifer and calf ranches.
3. Farm emissions are associated with dairy and cattle ranch support crops.
4. Metric Ton = 1,000 kg = 1.1 short tons
5. CO₂e = carbon dioxide equivalent emissions, which is the sum of all emissions after multiplying by their global warming potentials (GWPs). GWPs are 1 for CO₂, 25 for CH₄, 298 for N₂O, and 14,800 for HFC-23 (Table A-1, 40 CFR Part 98).

Table B-2. Cumulative GHG Emissions without Mitigation (Metric Tons/Year)

Source	CO ₂	CH ₄	N ₂ O	HFC-23	CO ₂ e
Farm Equipment Exhaust	52,145	2	0	0.0	52,195
Farm Agricultural Soil	0	0	3731	0.0	1,111,838
Farm Electricity Consumption	108,340	5	1	0.0	108,763
Dairy Equipment Exhaust	135,303	7	0	0.0	135,478
Truck Trips	28,493	0	0	0.0	28,493
Dairy Employee and Visitor Trips	14,692	4	5	0.0	16,282
Dairy Electricity Consumption	170,925	7.103	1.556	0.0	171,566
Dairy Refrigeration	0	0	0	5.8	85,840
Total	509,898	25	3,739	5.8	1,710,455

Notes:

1. Cumulative conditions represent (10 year horizon) build out conditions with a 1.5% growth rate relative to a zero baseline.
2. Dairy emissions include support stock at heifer and calf ranches.
3. Farm emissions are associated with dairy and cattle ranch support crops.
4. Metric Ton = 1,000 kg = 1.1 short tons
5. CO₂e = carbon dioxide equivalent emissions, which is the sum of all emissions after multiplying by their global warming potentials (GWPs). GWPs are 1 for CO₂, 25 for CH₄, 298 for N₂O, and 14,800 for HFC-23 (Table A-1, 40 CFR Part 98).

Abbreviations:

CH₄ - methane

CO₂ - carbon dioxide

CO₂e - carbon dioxide equivalents

GHG - greenhouse gas

GWP - global warming potential

HFC-23 - fluoroform

kg - kilogram

N₂O - nitrous oxide

Appendix C

Summary of Potential Emissions Reduction Strategies

Appendix C: Potential Reduction Strategies

Categorization		A: Likely feasible, variable efficacy B: To be considered, variable efficacy C: Rejected as Infeasible		
Strategies		Category	Notes	Checklist #
California Air Pollution Control Officers Association (CAPCOA) ^[1]				
2.0 Energy ^[2]				
2.1 Building Energy Use				
	2.1.1 Buildings Exceed Title 24 Building Envelope Energy Efficiency Standards By X%	A	See details in checklist	E1
	2.1.2 Install Programmable Thermostat Timers	C	This strategy is applicable to residences, not dairies/feedlots, and is rejected.	NA
	2.1.3 Obtain Third-party HVAC Commissioning and Verification of Energy Savings	A	See details in checklist	E2
	2.1.4 Install Energy Efficient Appliances	A	See details in checklist	E4
	2.1.5 Install Energy Efficient Boilers	A	See details in checklist	E3
2.2 Lighting				
	2.2.1 Install Higher Efficacy Public Street and Area Lighting	A	See details in checklist	E5
	2.2.2 Limit Outdoor Lighting Requirements	C	Outdoor lighting at dairies/feedlots is based on operational needs. Because of the lack of flexibility, this is rejected.	NA
	2.2.3 Replace Traffic Lights with LED Traffic Lights	C	This strategy is related to public infrastructure and is rejected.	NA
2.3 Alternative Energy Generation				
	2.3.1 Establish Onsite Renewable or Carbon-Neutral Energy Systems-Generic	C	Energy needs too small for non-wind/solar specialized systems.	NA
	2.3.2 Establish Onsite Renewable Energy Systems-Solar Power	B	See details in checklist	E6
	2.3.3 Establish Onsite Renewable Energy Systems-Wind Power	B	See details in checklist	E7
	2.3.4 Utilize a Combined Heat and Power System	B	See details in checklist	E8
	2.3.5 Establish Methane Recovery in Landfills	C	Dairies/feedlots will not have a landfill and this strategy is rejected.	NA
	2.3.6 Establish Methane Recovery in Wastewater Treatment Plants	B	See details in checklist	E9
3.0 Transportation				
3.1 Land Use/Location				
	3.1.1 Increase Density	C	This strategy is expected to have a "[n]egligible impact in a rural context" and is rejected.	NA
	3.1.2 Increase Location Efficiency	C	This strategy is expected to have a "[n]egligible impact in a rural context" and is rejected.	NA
	3.1.3 Increase Diversity of Urban and Suburban Developments (Mixed Use)	C	This strategy is expected to have a "[n]egligible impact in a rural context" and is rejected.	NA
	3.1.4 Increase Destination Accessibility	C	This strategy is expected to have a "[n]egligible impact in a rural context" and is rejected.	NA
	3.1.5 Increase Transit Accessibility	B	See details in checklist	T4

Strategies		Category	Notes	Checklist #
	3.1.6 Integrate Affordable and Below Market Rate Housing	C	This strategy is expected to be applicable in an "[u]rban and suburban context" and primarily "[a]ppropriate for residential and mixed-use projects". This strategy is rejected.	NA
	3.1.7 Orient Project Toward Non-Auto Corridor	C	This strategy is expected to be applicable in an "[u]rban and suburban context". This strategy is rejected.	NA
	3.1.8 Locate Project near Bike Path/Bike Lane	C	This strategy is expected to be applicable in an "[u]rban and suburban context". This strategy is rejected.	NA
	3.1.9 Improve Design of Development	C	This strategy is expected to have a "[n]egligible impact in a rural context" and is rejected.	NA
3.2 Neighborhood/Site Enhancements				
	3.2.1 Provide Pedestrian Network Improvements	C	Dairies/feedlots have very limited pedestrian traffic and this strategy is rejected.	NA
	3.2.2 Provide Traffic Calming Strategies	C	Dairies/feedlots have very limited pedestrian traffic and this strategy is rejected.	NA
	3.2.3 Implement a Neighborhood Electric Vehicle (NEV) Network	C	This strategy is primarily "[a]ppropriate for mixed-use projects" and is rejected.	NA
	3.2.4 Create Urban Non-Motorized Zones	C	This strategy is expected to be applicable in an "[u]rban context". This strategy is rejected.	NA
	3.2.5 Incorporate Bike Lane Street Design (on-site)	C	This strategy is expected to be applicable in an "[u]rban and suburban context". This strategy is rejected.	NA
	3.2.6 Provide Bike Parking in Non-Residential Projects	A	See details in checklist	T1
	3.2.7 Provide Bike Parking with Multi-Unit Residential Projects	C	This strategy is "[a]ppropriate for residential projects" and is rejected.	NA
	3.2.8 Provide Electric Vehicle Parking	C	This strategy would have only a negligible effect and is rejected as infeasible.	NA
	3.2.9 Dedicate Land for Bike Trails	C	This strategy is unrealistic, as dairies/feedlots are unlikely to be part of an adopted bikeway plan. This strategy is rejected.	NA
3.3 Parking Policy/Pricing				
	3.3.1 Limit Parking Supply	C	This strategy is expected to have a "[n]egligible impact in a rural context" and is rejected.	NA
	3.3.2 Unbundle Parking Costs from Property Cost	C	This strategy is expected to have a "[n]egligible impact in a rural context" and is rejected.	NA
	3.3.3 Implement Market Price Public Parking (On-Street)	C	This strategy is expected to have a "[n]egligible impact in a rural context" and is rejected.	NA
	3.3.4 Require Residential Area Parking Permits	C	This strategy is expected to be applicable in an "[u]rban context". This strategy is rejected.	NA

Strategies		Category	Notes	Checklist #
3.4 Commute Trip Reduction Programs				
3.4.1	Implement Commute Trip Reduction Program - Voluntary	C	This strategy is expected to be applicable in an "[u]rban and suburban context" and to be "[n]eligible in a rural context". This strategy is rejected.	NA
	Implement Commute Trip Reduction Program – Required	C	This strategy is expected to be applicable in an "[u]rban and suburban context" and to be "[n]eligible in a rural context". This strategy is rejected.	NA
3.4.2	Implementation/Monitoring	C	This strategy is expected to be applicable in an "[u]rban and suburban context" and to be "[n]eligible in a rural context". This strategy is rejected.	NA
3.4.3	Provide Ride-Sharing Programs	C	This strategy is expected to be applicable in an "[u]rban and suburban context" and to be "[n]eligible in a rural context". This strategy is rejected.	NA
3.4.4	Implement Subsidized or Discounted Transit Program	C	This strategy is expected to be applicable in an "[u]rban and suburban context" and to be "[n]eligible in a rural context". This strategy is rejected.	NA
3.4.5	Provide End of Trip Facilities	A	See details in checklist	T2
3.4.6	Encourage Telecommuting and Alternative Work Schedules	C	Typical operations at dairies/feedlots do not allow for telecommuting or alternative work schedule. This strategy is rejected.	NA
3.4.7	Implement Commute Trip Reduction Marketing	C	This strategy is expected to be applicable in an "[u]rban and suburban context" and to be "[n]eligible in a rural context". This strategy is rejected.	NA
3.4.8	Implement Preferential Parking Permit Program	C	This strategy is expected to be applicable in an "[u]rban and suburban context" and is rejected.	NA
3.4.9	Implement Car-Sharing Program	C	This strategy is expected to be applicable in an "[u]rban and suburban context" and to be "[n]eligible in a rural context". This strategy is rejected.	NA
3.4.10	Implement a School Pool Program	C	This strategy is "[a]ppropriate for residential and mixed-use projects" and is rejected for dairies/feedlots.	NA
3.4.11	Provide Employer-Sponsored Vanpool/Shuttle	B	See details in checklist	T3
3.4.12	Implement Bike-Sharing Programs	B	See details in checklist	T5
3.4.13	Implement School Bus Program	C	This strategy is primarily "[a]ppropriate for residential and mixed-use projects" and is rejected.	NA
3.4.14	Price Workplace Parking	C	This strategy is expected to be applicable in an "[u]rban and suburban context" and to be "[n]eligible in a rural context". This strategy is rejected.	NA
3.4.15	Implement Employee Parking “Cash-Out”	C	This strategy is expected to be applicable in an "[u]rban and suburban context" and to be "[n]eligible in a rural context". This strategy is rejected.	NA

Strategies		Category	Notes	Checklist #
3.5 Transit System Improvements				
	3.5.1 Provide a Bus Rapid Transit System	C	This strategy is expected to be applicable in an "[u]rban and suburban context" and to be "[n]eligible in a rural context". It is "[a]ppropriate for specific or general plans" and is rejected.	NA
	3.5.2 Implement Transit Access Improvements	C	This strategy is expected to be applicable in an "[u]rban and suburban context" and is rejected.	NA
	3.5.3 Expand Transit Network	C	This strategy is expected to be applicable in an "[u]rban and suburban context" and is "[a]ppropriate for specific or general plans". This strategy is rejected.	NA
	3.5.4 Increase Transit Service Frequency/Speed	C	"Urban and suburban context" "Appropriate for specific or general plans"	NA
	3.5.5 Provide Bike Parking Near Transit	C	This strategy is expected to be applicable in an "[u]rban and suburban context" and is rejected.	NA
	3.5.6 Provide Local Shuttles	C	This strategy is expected to be applicable in an "[u]rban and suburban context" and is rejected.	NA
3.6 Road Pricing/Management				
	3.6.1 Implement Area or Cordon Pricing	C	This strategy is applicable in a "[c]entral business district or urban center only" and is rejected for dairies/feedlots.	NA
	3.6.2 Improve Traffic Flow	C	Dairies/feedlots are primarily located in rural areas and do not impact the overall traffic flow. This strategy is not applicable for an individual facility and is rejected.	NA
	3.6.3 Required Project Contributions to Transportation Infrastructure Improvement Projects	C	Dairies/feedlots are primarily located in rural areas and do not impact large sections of the transportation infrastructure. This strategy is not applicable for an individual facility and is rejected.	NA
	3.6.4 Install Park-and-Ride Lots	C	Dairies/feedlots are primarily located in rural areas and do not require sufficient employees to justify a park-and-ride lot. This strategy is not applicable for an individual facility and is rejected.	NA
3.7 Vehicles				
	3.7.1 Electrify Loading Docks and/or Require Idling-Reduction Systems	C	Dairies/feedlots require the use of multiple delivery vehicles (e.g., animal feed, milk transportation, etc.). However, an individual facility often does not purchase or operate these vehicles and has no control over the selection of electric vehicles and thus the use of electrified loading docks. This strategy is not applicable for an individual facility and is rejected.	NA
	3.7.2 Utilize Alternative Fueled Vehicles	B	See details in checklist	T6
	3.7.3 Utilize Electric or Hybrid Vehicles	B	See details in checklist	T7

Strategies		Category	Notes	Checklist #
4.0 Water				
4.1 Water Supply				
	4.1.1 Use Reclaimed Water	C		NA
	4.1.2 Use Gray Water	C	Dairies/feedlots do not produce a large quantity of gray water and this strategy is rejected.	NA
	4.1.3 Use Locally Sourced Water Supply	B	See details in checklist	R7
4.2 Water Use				
	4.2.1 Install Low-Flow Water Fixtures	B	See details in checklist	R8
	4.2.2 Adopt a Water Conservation Strategy	A	See details in checklist	R1
	4.2.3 Design Water-Efficient Landscapes	A	See details in checklist	R2
	4.2.4 Use Water-Efficient Landscape Irrigation Systems	A	See details in checklist	R3
	4.2.5 Reduce Turf in Landscapes and Lawns	A	See details in checklist	R4
	4.2.6 Plant Native or Drought-Resistant Trees and Vegetation	A	See details in checklist	R5
5.0 Area Landscaping				
5.1 Landscaping Equipment				
	5.1.1 Prohibit Gas Powered Landscape Equipment	C	The equipment needed for landscaping at dairies/feedlots is minimal and this strategy is rejected.	NA
	5.1.2 Implement Lawnmower Exchange Program	C	This strategy is not applicable for an individual facility and is rejected.	NA
	5.1.3 Electric Yard Equipment Compatibility	C	The equipment needed for landscaping at dairies/feedlots is minimal and this strategy is rejected.	NA
6.0 Solid Waste				
6.1 Solid Waste				
	6.1.1 Institute or Extend Recycling and Composting Services	B	See details in checklist	R6
	6.1.2 Recycle Demolished Construction Material	B	See details in checklist	R9
7.0 Vegetation				
7.1 Vegetation				
	7.1.1 Urban Tree Planting	B	See details in checklist	M1
	7.1.2 Create New Vegetated Open Space	C		NA

Strategies		Category	Notes	Checklist #
8.0 Construction				
8.1 Construction				
	8.1.1 Use Alternative Fuels for Construction Equipment	B	See details in checklist	M2
	8.1.2 Use Electric and Hybrid Construction Equipment	B	See details in checklist	M3
	8.1.3 Limit Construction Equipment Idling beyond Regulation Requirements	B	See details in checklist	M4
	8.1.4 Institute a Heavy-Duty Off-Road Vehicle Plan	B	See details in checklist	M5
	8.1.5 Implement a Construction Vehicle Inventory Tracking System	B	See details in checklist	M6
9.0 Miscellaneous				
9.1 Miscellaneous				
	9.1.1 Establish a Carbon Sequestration Project	C	This strategy is not applicable for an individual facility and is rejected.	NA
	9.1.2 Establish Off-Site Mitigation	C		NA
	9.1.3 Use Local and Sustainable Building Materials	B	See details in checklist	M7
	9.1.4 Require Best Management Practices in Agriculture and Animal Operations	A/B	See details in checklist	D3, D4, M8
	9.1.5 Require Environmentally Responsible Purchasing	A/B	See details in checklist	D1, D2, M9
	9.1.6 Implement an Innovative Strategy for GHG Mitigation	B	See details in checklist	M10
10.0 General Plans				
10.1 General Plans				
	10.1.1 Fund Incentives for Energy Efficiency	C	This strategy is at the General Plan level and is not applicable to an individual facility. This strategy is rejected.	NA
	10.1.2 Establish a Local Farmer's Market	C	This strategy is at the General Plan level and is not applicable to an individual facility. This strategy is rejected.	NA
	10.1.3 Establish Community Gardens	C	This strategy is at the General Plan level and is not applicable to an individual facility. This strategy is rejected.	NA
	10.1.4 Plant Urban Shade Trees	C	This strategy is at the General Plan level and is not applicable to an individual facility. This strategy is rejected.	NA
	10.1.5 Implement Strategies to Reduce Urban Heat-Island Effect	C	This strategy is at the General Plan level and is not applicable to an individual facility. This strategy is rejected.	NA

Strategies		Category	Notes	Checklist #
San Joaquin Valley Air Pollution Control District (SJVAPCD) ^{[3], [4]}				
9(1)	All ruminant animal feed shall include at least 6% cottonseed, or, upon District approval, based on sufficient demonstration that use of cottonseed is not feasible, an equivalent substitute	C	The SJVAPCD specifies "that these examples of BPS are for illustrative purposes only, and should not be used by any lead agency as District-approved or sanctioned standards." In addition, this strategy is not feasible in practice and would create a fixed market for cotton seed. This strategy is rejected.	NA
9(2)	Manure from animal housing areas for mature cows shall be removed and transferred into appropriate treatment facilities at least four times a day...	C	Increasing the frequency at which barns are flushed or scraped has the potential to increase energy use by farm equipment. It also transports organic materials into treatment facilities (i.e. lagoons) more quickly, where they are more likely to produce methane sooner. This strategy is rejected.	NA
9(3) ^[2]	Collected manure shall be treated anaerobically in digesters or covered lagoons, designed and operated per NRCS standards, with captured methane used for energy recovery in a method that displaces current or required fossil fuel use...	B	See details in the checklist.	D5
Additional Measures ^[5]				
O(1)	Conversion of manure handling to scrape system.	B	Scrape systems divert manure from lagoons to another type of storage system, which can potentially reduce GHG emissions.	D6
O(2)	Increase solids separation	B	Mechanical separation of the solids from the manure has the potential to reduce GHG emissions.	D7

Notes:

^[1] CAPCOA. 2010. Quantifying Greenhouse Gas Mitigation Measures. August. Accessed at: <http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf>. Accessed on December 12, 2013.

^[2] This strategy is also consistent with CEQA, Appendix F: Energy Conservation.

^[3] SJVAPCD. 2009. Final Staff Report - Addressing Greenhouse Gas Emissions Impacts Under the California Environmental Quality Act. December 17. Accessed at: <http://www.valleyair.org/programs/CCAP/12-17-09/1%20CCAP%20-%20FINAL%20CEQA%20GHG%20Staff%20Report%20-%20Dec%2017%202009.pdf>. Accessed on December 12, 2013.

^[4] Note that the staff report states "that these examples of BPS are for illustrative purposes only, and should not be used by any lead agency as District-approved or sanctioned standards."

^[5] The additional measures are based on recent advances in the scientific understanding of methods to reduce GHGs on dairies.

Appendix D

Summary of Significance Thresholds

Appendix D: Summary of Potential CEQA Significance Thresholds

Category	Jurisdictional Body	Bright-Line Limit (MT CO ₂ e/yr)	Service Population Efficiency Metric (MT CO ₂ e/sp/yr)	Improvement Over BAU Conditions	Significance for Threshold Basis	References
State	ARB (Cap & Trade)	25,000	N/A	N/A	<p>This applicability threshold is primarily for large industrial source categories. [§ 95811]</p> <p>The threshold of 25,000 MT CO₂e/yr is designed to 1) be consistent with USEPA's Mandatory Reporting Rule (which covers approximately 85-90% of emissions) and 2) cover the majority of large emitters.</p>	17 CCR §§ 95810-95814
State	ARB (Mandatory Reporting)	10,000	N/A	N/A	<p>This threshold applies to specific industrial source categories. Note that some industrial source categories must report regardless of emissions level.</p> <p>The following emission source is listed as an exclusion, "Fugitive methane and fugitive nitrous oxide emissions from livestock manure management systems described in 40 CFR Part 98, Subpart JJ, regardless of the magnitude of emissions produced." [§ 95101]. This exclusion is consistent with US EPA's current exclusion of manure management from mandatory reporting.</p>	17 CCR § 95101
Air District	Antelope Valley	100,000	N/A	N/A	Doesn't specify.	2011. Antelope Valley AQMD. California Environmental Quality Act (CEQA) and Federal Conformity Guidelines. August. Accessed online at: http://www.avaqmd.ca.gov/Modules/ShowDocument.aspx?documentid=2908 .
Air District	Bay Area	1,100 - land use development projects 10,000 - stationary source projects	4.6 - land use development projects	N/A	<p>Thresholds were removed from the 2012 updated CEQA Guidelines. Thresholds listed here are from the 2010 draft CEQA Guidelines.</p> <p>Excerpt from BAAQMD's website dated January 16, 2014 and checked on August 13, 2015, "...the Air District has been ordered to set aside the Thresholds and is no longer recommending that these Thresholds be used as a general measure of a project's significant air quality impacts."</p> <p>The Alameda County Superior Court issued a writ of mandate ordering BAAQMD to set aside these Thresholds. The writ and decision was overturned by the Court of Appeal of the State of California, although an appeal of the Court of Appeals decision is currently pending in the California Supreme Court. There is no ruling as of yet. In the interim, many Bay Area agencies continue to use the 2014 draft guidelines.</p>	<p>2012. Bay Area AQMD. California Environmental Quality Act Air Quality Guidelines. May. Accessed online at: http://www.baaqmd.gov/~media/Files/Planning%20and%20Research/CEQA/BAAQMD%20CEQA%20Guidelines_Final_May%202012.ashx?la=en.</p> <p>2010. Bay Area AQMD. California Environmental Quality Act Air Quality Guidelines. May. Accessed online at: http://www.baaqmd.gov/~media/Files/Planning%20and%20Research/CEQA/Draft_BAAQMD_CEQA_Guidelines_May_2010_Final.ashx?la=en.</p> <p>Excerpt: http://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa/updated-ceqa-guidelines</p>

Category	Jurisdictional Body	Bright-Line Limit (MT CO ₂ e/yr)	Service Population Efficiency Metric (MT CO ₂ e/sp/yr)	Improvement Over BAU Conditions	Significance for Threshold Basis	References
Air District	Eastern Kern	25,000 - stationary source projects	N/A	20%	Thresholds apply to stationary source projects. [page 4]	2012. Eastern Kern APCD. Eastern Kern Air Pollution Control District Policy. Addendum to CEQA Guidelines Addressing GHG Emission Impacts for Stationary Source Projects when Serving as Lead CEQA Agency. March 8. Accessed online at: http://www.kernair.org/Documents/CEQA/EKAPCD%20CEQA%20GHG%20Policy%20Adopted%203-8-12.pdf .
Air District	San Diego County	2,500 - land use development projects 10,000 - stationary source projects	4.32 - land use development projects	16% (updated for recession, but including RPS and Pavley in the BAU)	Per Table 4 in the guidelines, agriculture projects have the option of using the land use development threshold or the performance threshold. The stationary source threshold should be used for the portions of the project that involve stationary source emissions.	2013. San Diego County. County of San Diego Guidelines for Determining Significance and Report Format and Content Requirements. Climate Change. November 7. Accessed online at: http://www.sdcounty.ca.gov/pds/advance/Guidelines_for_Determining_Significance_Climate_Change.pdf .
Air District	San Joaquin Valley	N/A	N/A	29% (based upon a point system)	Performance threshold applies to both stationary source and land use development projects. The District's approach relies on the use of performance based standards (Best Performance Standards [BPS]) to determine the significance of project specific GHG emission impacts. Note that no BPS have been defined specific to dairies.	2009. San Joaquin Valley APCD. District Policy. Addressing GHG Emission Impacts for Stationary Source Projects Under CEQA when Serving as the Lead Agency. December 17. Accessed online at: http://www.valleyair.org/Programs/CCAP/12-17-09/2%20CCAP%20-%20FINAL%20District%20Policy%20CEQA%20GHG%20-%20Dec%2017%202009.pdf . 2009. San Joaquin Valley APCD. Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA. December 17. Accessed online at: http://www.valleyair.org/Programs/CCAP/12-17-09/3%20CCAP%20-%20FINAL%20LU%20Guidance%20-%20Dec%2017%202009.pdf .
Air District	San Luis Obispo	1,150 - land use development projects 10,000 - stationary source projects	4.9 - land use development projects	N/A	Land use development includes the following project types: residential, commercial, and public land uses and facilities. Stationary source projects include land uses that would accommodate processes and equipment that emit GHG emissions and would require a permit to operate. [page 3-6]	2012. San Luis Obispo APCD. CEQA Air Quality Handbook. A Guide for Assessing the Air Quality Impacts for Projects Subject to CEQA Review. April. Accessed online at: http://www.slocleanair.org/images/cms/upload/files/CEQA_Handbook_2012_v1.pdf .
Air District	Santa Barbara	10,000 - stationary source projects	N/A	N/A	Threshold is for stationary source projects. [page 1]	Santa Barbara County APCD. CEQA Significance Thresholds for GHGs - Questions and Answers. Accessed online at: http://www.sbcapcd.org/apcd/ceqa-ghg-faq.pdf .
Air District	South Coast (draft)	3,000 - mixed use residential/commercial 10,000 - industrial projects (FINAL)	2020 Target: 4.8 2035 Target: 3.0	No recommendation as of September 2010	3,000 MT CO ₂ e/yr for mixed use (3,500 MT CO ₂ e/yr for residential; 1,400 MT CO ₂ e/yr for commercial). 10,000 MT CO ₂ e/yr for mixed use.	2008. South Coast AQMD. Draft Guidance Document - Interim CEQA Greenhouse Gas (GHG) Significance Threshold. October. Accessed online at: http://www.aqmd.gov/hb/2008/December/081231a.htm .
Air District	Tehama	900 - land use development projects	N/A	25%	From the CAPCOA CEQA and Climate Change document. Based on general land use projects such as residential and commercial projects. [page 3-8]	2009. Tehama County APCD. Planning & Permitting Air Quality Handbook. Guidelines for Assessing Air Quality Impacts. December. Accessed online at: http://www.tehcoapcd.net/PDF/CEQA%20Handbook%20Dec%2009.pdf

Appendix C

**Notice of Preparation, Initial Study, Comment Letters
Notice of Public Scoping Meeting, Comments at Meeting**

Notice of Preparation

NOTICE OF PREPARATION

(NOVEMBER 2011)

DRAFT ENVIRONMENTAL IMPACT REPORT FOR GENERAL PLAN AND
ORDINANCE AMENDMENT (GPA 10-002) PHASE 1 -- ANIMAL
CONFINEMENT FACILITIES PLAN UPDATE (ACFP UPDATE)

LEAD AGENCY: COUNTY OF TULARE
5961 S. MOONEY BLVD.
VISALIA, CALIFORNIA 93277

CONTACT: Michael C. Spata
Assistant Director-Planning
Environmental Assessment Officer

Acting as the lead agency, the County of Tulare will prepare an Environmental Impact Report (EIR) for the General Plan and Ordinance Amendment Update (GPA 10-002) (ACFP Update). We need to know the views of your agency as to the scope and content of the environmental information which is germane to your agency's statutory responsibilities in connection with the proposed project.

The project description and initial study (description of potential environmental effects) are attached. Additional information can be obtained by contacting Mr. Spata at 559-624-7000. Additionally, stemming from the time limits mandated by state law, your response must be sent at the earliest possible date but not later than 30 days after receipt of this notice. Please send your written response to Michael C. Spata, Assistant Director-Planning / Environmental Assessment Officer, County of Tulare, at the address shown above. Please also provide the name of a contact person in your agency.

COMMENT PERIOD:
November 30, 2011 through January 4, 2012

Signature:



Title:

Michael C. Spata, Assistant Director-Planning /
Environmental Assessment Officer

Phone:

(559)624-7000

Email:

MSpata@co.tulare.ca.us

Project Description and Vicinity Map GPA 10-002 (ACFP UPDATE)

The objective of the Animal Confinement Facilities Plan and Ordinance (Phase I) Amendment is to revise the way in which dairies and other bovine facilities are regulated by the County of Tulare. Under the existing Animal Confinement Facilities Plan (ACFP) adopted in 2000, expansions of existing dairies and other bovine facilities and establishment of new dairies and other bovine facilities must be approved through the special use permit process. Each evaluation of a dairy or bovine facility application permit must undergo individual environmental review under the California Environmental Quality Act (CEQA).

Under the proposed amended ACFP, the expansion of existing dairies and other bovine facilities (which comply with the requirements of the ACFP) may be eligible for the site plan review process, while all other expansions -- as well as the establishment of new dairies -- will be accomplished through a special use permit process. The amended ACFP may also apply the same permitting process to the establishment or expansion of all bovine animal confinement facilities (e.g., calve facilities and heifer feedlots), not just dairies.

The primary elements of the proposed scope of the project, the General Plan and Ordinance Amendment process ("GPA"), are identified as follows:

A. Amendments to the Tulare County General Plan, notably the Animal Confinement Facilities Plan ("ACFP"), as well as related provisions of county ordinances, are intended to provide a framework for the permitting and processing of dairy and other bovine facility expansions. Ultimately, the objective is to provide feasible approval processes for existing dairy and bovine facilities and to designate a feasible special use permit process for new and certain expanding facilities. The components of this project include the following:

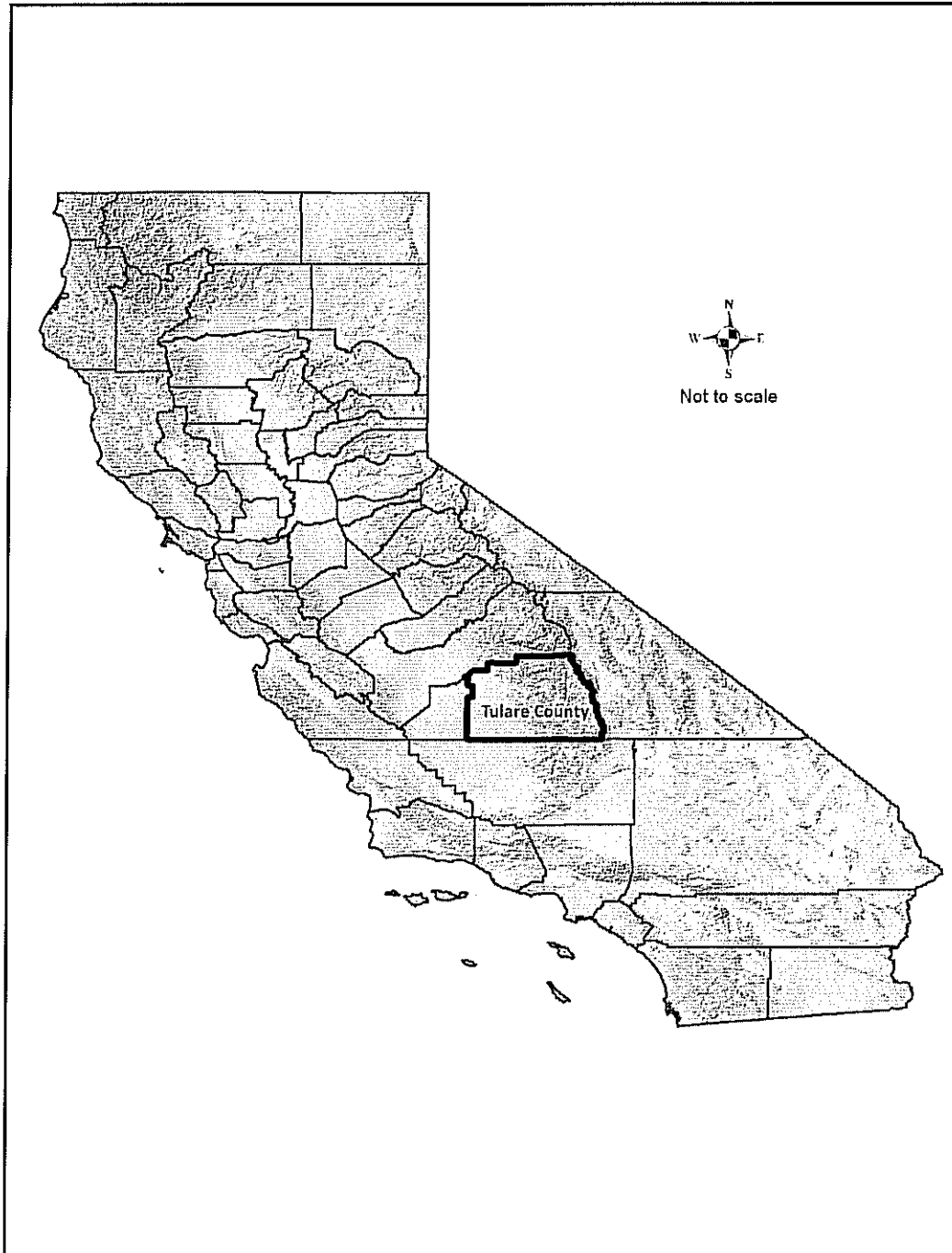
1. A defined permitting process for:

- (i) Existing dairies and bovine facilities that were constructed before 1974 without a County special use permit or environmental evaluation ("grandfathered facilities"). The intent of the project is to establish, to the extent feasible, a ministerial process designed to permit such dairies and to have the Environmental Impact Report (EIR) serve as the CEQA review document under the auspices of Tulare County as the lead agency.

- (ii) Existing dairies and bovine facilities that have expanded without issuance of a County special use permit for such expansion and have obtained valid permits from the San Joaquin Valley Air Pollution Control District (“SJVAPCD”) and the Regional Water Quality Control Board (“RWQCB”). The intent here is to establish a feasible ministerial process to authorize these expansions and to have the EIR serve as the CEQA review document under the auspices of the County as the lead agency.
 - (iii) Existing dairies and bovine facilities that have expanded without the issuance of a County special use permit for such expansion and have not obtained approval of or are in violation of SJVAPCD or RWQCB permits. The intent here is to establish a feasible ministerial process to authorize these expansions and to have the EIR serve as the CEQA review document under the auspices of the County as the lead agency.
 - (iv) Future new dairies and bovine facilities or certain expansions of existing dairies and bovine facilities would be subject to the discretionary special use permit process. The EIR will encompass future dairy and bovine facility growth at a programmatic level or for a specified time-horizon with supplemental CEQA review on a project-specific basis. The County would serve as the lead agency for CEQA purposes.
2. Streamlining of the requirements for dairy and bovine facility expansions by eliminating redundancies and overlapping standards that duplicate SJVAPCD and RWQCB jurisdictions as to air quality and water quality, respectively. This would include coordination of the County inspection program with respect to operational requirements of bovine facilities administered by the SJVAPCD and the RWQCB.
 3. To the extent that feasible technology allows, preservation of the existing buffer zones under the ACFP and identification with specificity of eligible areas for dairy and bovine facility expansions and the siting parameters therefor.

4. Description of existing levels of dairy and bovine facility development, forecasting of a growth time-horizon and identification of eligible areas within which growth may occur.
5. Evaluation of cumulative impacts, including but not limited to impacts to land use, air quality, water quality, and greenhouse gas emissions resulting from the project.

VICINITY MAP



Initial Study

ANIMAL CONFINEMENT FACILITIES PLAN AND ORDINANCE AMENDMENT

1.1 CEQA Requirements

This document is the Initial Study of the potential environmental effects of the adoption and implementation of the Animal Confinement Facilities Plan and Ordinance Amendment. The Tulare County Resource Management Agency is the Lead Agency for this project pursuant to the *California Environmental Quality Act (CEQA)* and the *CEQA Guidelines* as amended.

Section 15063 of the CEQA Guidelines permits the Lead Agency to prepare an Initial Study to determine whether a discretionary project will have a significant effect on the environment. The purposes of an Initial Study, as listed under *Section 15063[c] of the CEQA Guidelines*, include:

- (1) Provide the Lead Agency with information to use as the basis for deciding whether to prepare an EIR [Environmental Impact Report] or a Negative Declaration.*
- (2) Enable an applicant or Lead Agency to modify a project, mitigating adverse impacts before an EIR is prepared, thereby enabling the project to qualify for a Negative Declaration.*
- (3) Assist in the preparation of an EIR, if one is required, by:*
 - (A) Focusing the EIR on the effects determined to be significant,*
 - (B) Identifying the effects determined not to be significant,*
 - (C) Explaining the reasons for determining that potentially significant effects would not be significant, and*
 - (D) Identifying whether a program EIR, tiering, or another appropriate process can be used for analysis of the project's environmental effects.*
- (4) Facilitate environmental assessment early in the design of a project;*
- (5) Provide documentation of the factual basis for the finding in a Negative Declaration that a project will not have a significant effect on the environment;*
- (6) Eliminate unnecessary EIRs;*
- (7) Determine whether a previously prepared EIR could be used with the project.*

1.2 Prior Environmental Documents

The *Animal Confinement Facilities Plan, Phase I: Dairy/Bovine Animal Confinement Facilities and Program Environmental Impact Report* was adopted by the County of Tulare on April 11, 2000.

Phase I of the document referred to “dairy and other bovine animal confinement facilities.” Phase II of the ACFP document referred to “all other livestock (including swine, sheep, rabbit, poultry, ratite, and other bird) raising facilities.” Phase II was not drafted or adopted. For purposes of clarity, the proposed project for which this Initial Study is being prepared is an update to the Animal Confinement Facilities Plan – Phase I: Dairy/Bovine Animal Confinement Facilities.

2.1 Project Location

Tulare County lies in the southern half of and on the east side of the San Joaquin Valley, the great central valley of California, which is bounded on three sides by mountains – the Coast Range to the west and the Sierra Nevadas to the east and south (see Figure 1). The County itself covers approximately 4,863 square miles and encompasses 3,112,320 acres. Federal and State owned lands comprise approximately 51 percent of the County area.

The County is divided into three distinct geographic planning areas: mountains, foothills, and the Valley floor. The Valley floor covers the western approximate one-third of the County, encompassing lands generally below 600 feet in elevation. The portion of the County referenced as the Valley floor contains the majority of the County's confined animal facilities.

2.2 Project Objective and Description

The Phase I Animal Confinement Facilities Plan and Ordinance Amendment (Phase 1) objective is to revise the way dairies are regulated by the County of Tulare. Under the existing Animal Confinement Facilities Plan (ACFP) adopted in 2000, expansions of existing dairies and bovine facilities and establishment of new dairies and bovine facilities must be approved through the special use permit process. Each evaluation of a dairy or bovine facility application permit must undergo individual environmental review under the California Environmental Quality Act (CEQA). Under the proposed amended ACFP, the expansion of existing dairies (which comply with the requirements of the ACFP) may be eligible for the site plan review process, while all other expansions, as well as the establishment of new dairies, will be accomplished through a special use permit process. The amended ACFP may also apply the same permitting process to the establishment or expansion of all bovine animal confinement facilities (calve facilities and heifer feedlots), not just dairies.

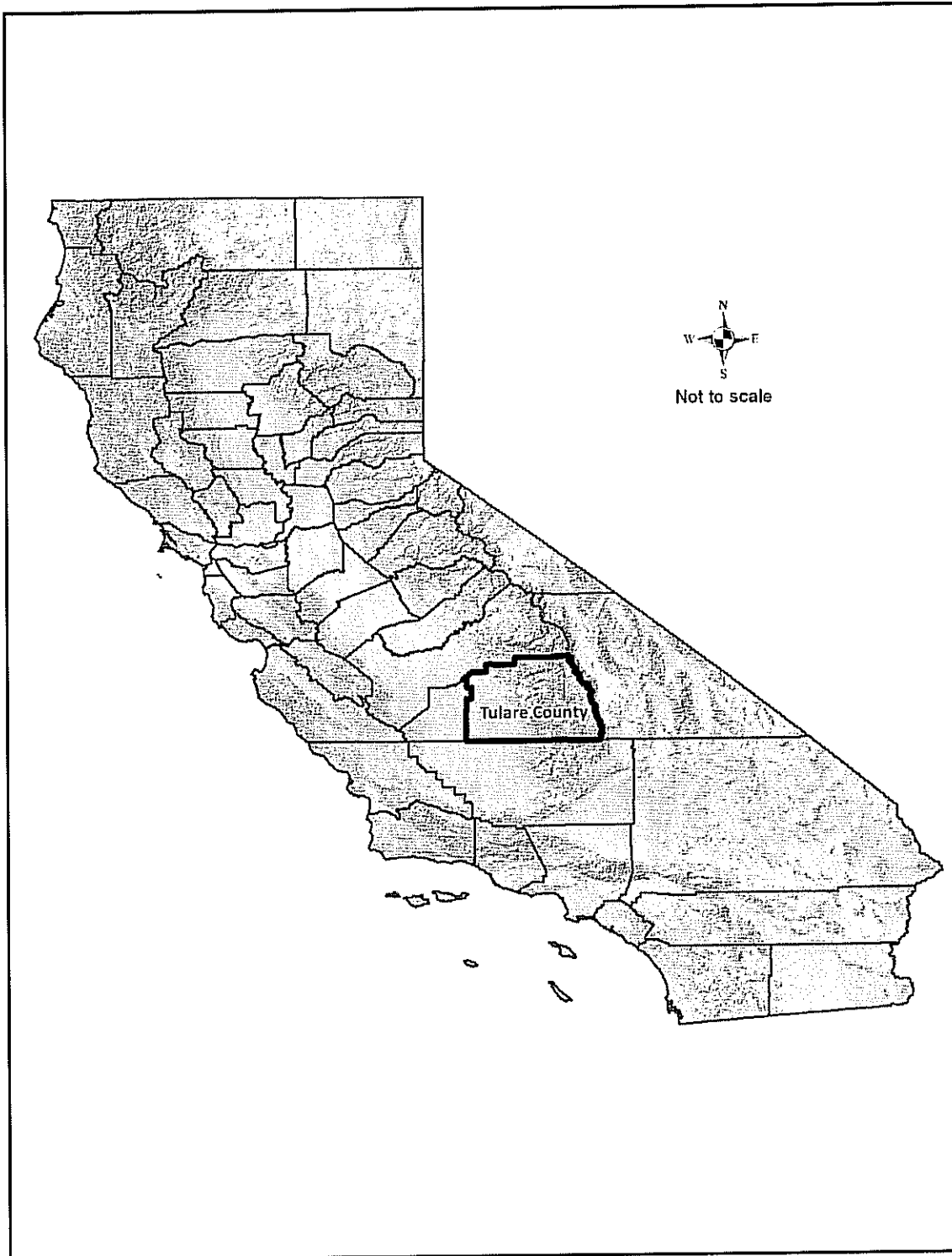
The primary elements of the proposed scope of the project, the General Plan Amendment process ("GPA") are as follows:

A. Amendments to the Tulare County General Plan, notably the Animal Confinement Facilities Plan ("ACFP"), as well as related provisions of the County Ordinance to provide for a framework for the permitting and processing of dairy and bovine facility expansions. The objective is to provide feasible approval processes for existing dairy and bovine facilities and to designate a feasible special use permit process for new and certain expanding facilities. The components would include the following:

1. A defined permitting process for:

- (i) Existing dairies and bovine facilities that were constructed before 1974 without a County special use permit or environmental evaluation ("grandfathered facilities"). The intent of the project is to establish a feasible ministerial process to permit such dairies and to have the Environmental Impact Report (EIR) serve as the CEQA review document under the auspices of the County as the lead agency.

- (ii) Existing dairies and bovine facilities that have expanded without issuance of a County special use permit for such expansion, and have obtained valid permits from the San Joaquin Valley Air Pollution Control District ("SJVAPCD") and the Regional Water Quality Control Board ("RWQCB"). The intent here is to establish a feasible ministerial process to authorize these expansions and to have the EIR serve as the CEQA review document under the auspices of the County as the lead agency.
 - (iii) Existing dairies and bovine facilities that have expanded without the issuance of a County special use permit for such expansion, and have not obtained approval of or are in violation of SJVAPCD or RWQCB permits. The intent is to establish a feasible ministerial process to authorize these expansions and to have the EIR serve as the CEQA review document under the auspices of the County as the lead agency.
 - (iv) Future new dairies and bovine facilities or certain expansions of existing dairies and bovine facilities would be subject to the discretionary special use permit process. The EIR will encompass future dairy and bovine facility growth at a programmatic level or for a specified time-horizon with supplemental CEQA review on a project-specific basis. The County would serve as the lead agency for CEQA purposes.
2. Streamlining of the requirements for dairy and bovine facility expansions by eliminating redundancies and overlapping standards that duplicate SJVAPCD and RWQCB jurisdictions as to air quality and water quality, respectively. This would include coordination of the County inspection program with respect to operational requirements of bovine facilities administered by the SJVAPCD and the RWQCB.
 3. To the extent that feasible technology allows, preservation of the existing buffer zones under the ACFP and identification with specificity of eligible areas for dairy and bovine facility expansions and the siting parameters therefor.
 4. Description of existing levels of dairy and bovine facility development, forecasting of a growth time-horizon and identification of eligible areas within which growth may occur.
 5. Evaluation of cumulative impacts including but not limited to impacts to land use, air quality, water quality, and greenhouse gas emissions resulting from the project.



Quad Knopf

TULARE COUNTY LOCATION

Figure
1

3.1 Environmental Factors Potentially Affected:

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

<input checked="" type="checkbox"/> Aesthetics	<input type="checkbox"/> Agriculture Resources	<input checked="" type="checkbox"/> Air Quality
<input checked="" type="checkbox"/> Biological Resources	<input checked="" type="checkbox"/> Cultural Resources	<input checked="" type="checkbox"/> Geology /Soils
<input checked="" type="checkbox"/> Greenhouse Gas Emissions	<input checked="" type="checkbox"/> Hazards & Hazardous Materials	<input checked="" type="checkbox"/> Hydrology/Water Quality
<input checked="" type="checkbox"/> Land Use/Planning	<input type="checkbox"/> Mineral Resources	<input checked="" type="checkbox"/> Noise
<input type="checkbox"/> Population/Housing	<input type="checkbox"/> Public Services	<input type="checkbox"/> Recreation
<input checked="" type="checkbox"/> Transportation/Traffic	<input checked="" type="checkbox"/> Utilities / Service Systems	<input checked="" type="checkbox"/> Mandatory Findings of Significance

ENVIRONMENTAL EVALUATION:

The environmental evaluation on the following pages of the Initial Study generally analyzes effects from each of five project components:

1. A defined permitting process for:
 - (i). Existing dairies and bovine facilities that were constructed before 1974 without a County permit or environmental evaluation ("grandfathered facilities").
 - (ii). Existing dairies and bovine facilities that have expanded without issuance of a County special use permit for such expansion and have obtained valid permits from the San Joaquin Valley Air Pollution Control District ("SJVAPCD") and the Regional Water Quality Control Board ("RWQCB").
 - (iii). Existing dairies and bovine facilities that have expanded without the issuance of a County special use permit for such expansion and have not obtained approval of or are in violation of SJVAPCD or RWQCB permits.
 - (iv). Future new dairies and bovine facilities or certain expansions of existing dairies and bovine facilities would be subject to the discretionary special use permit process. The EIR will encompass future dairy and bovine facility growth at a programmatic level or for a specified time-horizon with supplemental CEQA review on a project-specific basis. The County would serve as the lead agency for CEQA purposes.
2. Streamlining of the requirements for dairy and bovine facility expansions by eliminating redundancies and overlapping standards that duplicate SJVAPCD and RWQCB jurisdictions as to air quality and water quality, respectively.
3. To the extent that feasible technology allows, preservation of the existing buffer zones under the ACFP and identification with specificity of eligible areas for dairy and bovine facility expansions and the siting parameters therefor.

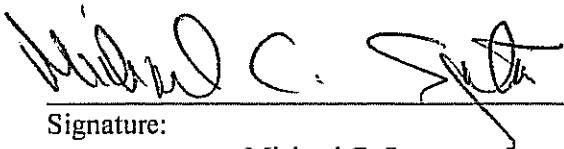
4. Description of existing levels of dairy and bovine facility development, forecasting of a growth time-horizon and identification of eligible areas within which growth may occur.
5. Evaluation of cumulative impacts including but not limited to impacts to land use, air quality, water quality, and greenhouse gas emissions resulting from the project.

Where the impacts evaluation is the same for each of these components, separate or modified analysis will not be provided. Where warranted by differing impacts or impacts at differing levels, the environmental evaluation will note and describe such differences.

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 will be prepared.
- ☐ I find 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 will be prepared.
- ☒ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.
- ☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment.
- ☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (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.


Signature:

Michael C. Spata
Assistant Director – Planning
Environmental Assessment Officer

11/28/11
Date

3.1.1 AESTHETICS –

Would the project:

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Have a substantial adverse effect on a scenic vista?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d) Create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Response:

- a) **Would the project have a substantial adverse effect on scenic vistas?** Dairies and other bovine facilities are typically located on flat, irrigated agricultural areas of Tulare County characterized by irrigated agriculture and low rise agricultural structures and rural dwellings. Scenic resources within the County include views of the Sierra Nevada Mountains and the agricultural croplands that blanket the valley floor. The Animal Confinement Facilities Plan (ACFP) and Ordinance Update will provide for the continued development of confined bovine facilities; this land usage will be consistent with current agricultural uses and support the preservation of open spaces. The existing dairies and other bovine animal facilities in the County, regardless of when they were built, almost without exception share the low rise agricultural structure and rural dwelling characteristics which are required by the current ACFP and will undoubtedly continue to be required by an ACFP update.

Irrigated agriculture and confined bovine facilities are an integral part of the Valley and its vistas and have a less than significant effect thereon.

All new facilities or expanded facilities will have to comply with the County's ACFP Update, Ordinance Amendment, and Zoning Ordinance so that no one facility or structure will become obtrusive to scenic vistas.

The scale of the typical dairy or other bovine facility is similar to that of other agricultural and residential buildings in the agricultural areas of Tulare County (see Tulare County Zoning Ordinance Section 9.7). Views experienced by motorists traveling

on nearby roads will be of the dairy milking barn, feedlots, freestall barns, hay barns, commodity barns, partially shaded corrals and cattle in the front of the property. Other structures such as manure and hay storage and treatment ponds may not be readily visible to motorists.

Finding: The impact is less than significant.

- b) **Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?** Existing, new and/or expanding dairies, and bovine facilities are located in established agricultural areas where the land has been leveled and graded for irrigated cropland. What few native trees remain are situated along creek banks or irrigation canals. Any rock outcroppings or other such scenic anomalies in the flat valley terrain have generally been removed when the land converted to intensive agricultural uses.

There are two highway segments designated by the State as being eligible for Scenic Highway classification. These include SR 198 from Visalia to Three Rivers and SR 190 from Porterville to Ponderosa. Both of the eligible highway segments travel through agricultural lands within the most easterly portions of the valley floor and continue into the foothills and mountains of the Sierra Nevadas. Dairies and other confined-bovine facilities are neither located within this area of the County, nor are they permitted by existing Tulare County policy (the ACFP). Confined facilities appurtenant to grazing activities may be so located but are not subject to a use permit.

Finding: The impact is less than significant.

- c) **Would the project substantially degrade the existing visual character or quality of the site and its surroundings?** A typical dairy facility will have a milking barn, freestall barns, shaded corrals and several other barns. The corral shades will typically be approximately 18 to 20 feet in height; the milking barn, calf barn, and commodity barn will range in height from 20 to 24 feet. Typical non-dairy bovine facilities consist of partially shaded corrals, hay barns, and manure storage and treatment ponds. All of these facilities will be consistent in appearance with current agricultural and farming-related structures (including operations) and will not significantly change the visual character of the area.

Finding: The impact is less than significant.

- d) **Would the project create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area?** Dairy facilities typically include nighttime lighting of freestall barns and corral areas, bovine facilities may include corral lighting. The effects of this lighting could result in a loss of darkness in the night sky that may be noticeable to residents in the area; some sky glow and light 'spillage' could occur. Typical mitigation measures for this impact include requirements that all outdoor lighting be directed downward on the site. These impacts and mitigation measures will

be analyzed in the EIR with mitigation measures incorporated as reasonably necessary and feasible.

Finding: The impact is potentially significant.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
3.1.2 AGRICULTURE AND FOREST RESOURCES				
In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. 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?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by GC section 51104(g))?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Result in the loss of forest land or conversion of forest land to non-forest use?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of farmland to non-agricultural use or conversion of forest land to non-forest use?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Response:

- a) **Would the project 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?** A primary impact to productive agricultural lands is the conversion of important farmlands such as Prime Farmland, Farmland of Statewide Importance and Unique Farmland to other, non-farming, uses. The California Department of Conservation maintains the Farmland Mapping and Monitoring Program and defines important farmland as:

- Prime Farmland is farmland with the best combination of physical and chemical features to sustain long-term agricultural production. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields. Land must have been used for irrigated agricultural production at some time during the four years prior to the mapping date.
- Farmland of Statewide Importance is similar to Prime Farmland but has minor shortcomings, such as greater slopes or a lesser ability to store soil moisture. Land must have been used for irrigated agricultural production at some time during the four years prior to the mapping date.
- Unique Farmland has lesser quality soils used for the production of the state's leading agricultural crops. This land is usually irrigated, but may include non-irrigated orchards or vineyards as found in some climatic zones in California. Land must have been cropped at some time during the four years prior to the mapping date.

Dairies and bovine facilities are considered an agricultural use. (Tulare County Uniform Rules for Agricultural Preserves, Board of Supervisors Resolution No. 89-1275). Milk and milk products constitute Tulare County's leading agricultural commodity. As reported in the 2010 Tulare County Annual Crop and Livestock Report, milk represented 33 percent (\$1.4 billion) of the total crop and livestock value (\$4.8 billion) for that year. The development of dairies or bovine facilities and/or expansion of existing dairies or bovine facilities have not had and will not have an adverse impact on important farmland.

Finding: No impact.

- b) **Would the project conflict with existing zoning for agricultural use, or a Williamson Act contract?** Dairies and other bovine facilities are currently permitted in the following zoning classifications, subject to the granting of a Special Use Permit.

- AE (Exclusive Agricultural, 5 acre minimum parcel size {dairies only})
- AE-20 (Exclusive Agricultural, 20 acre minimum parcel size)
- AE-40 (Exclusive Agricultural, 40 acre minimum parcel size)
- AE-80 (Exclusive Agricultural, 80 acre minimum parcel size)

- A-1 (Agricultural, 5 acre minimum parcel size) (Note that the ACFP does not permit confined animal facilities in this zone)

The California Land Conservation Act of 1965 – commonly referred to as the Williamson Act – enables local governments to enter into contracts with private landowners for the purpose of restricting specific parcels of land to agricultural or related open space use. In return, landowners receive property tax assessments which are much lower than normal because they are based upon farming and open space uses as opposed to full market value. Again, dairies and bovine facilities are a permitted agricultural use under the provisions of the Williamson Act, in accord with Tulare County Uniform Rules for Agricultural Preserves, Board of Supervisors Resolution No. 89-1275. Thus dairies and other confined-bovine facilities do not conflict with either County agricultural zoning regulations or Williamson Act contract provisions.

Finding: No impact.

- c) **Would the project conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?** Dairies and other bovine facilities are confined to the western portion of Tulare County which is devoted to intensive agricultural uses. There are no forested lands in western Tulare County. The development of dairies or other bovine facilities or expansion of existing dairies or bovine facilities has not had, and will not have, any adverse impact on forest lands. This project will not apply to ranches with grazing activities.

Finding: No impact.

- d) **Would the project result in the loss of forest land or conversion of forest land to non-forest use?** The County's eastern half is covered by foothills and mountainous regions where forest land can be found. Dairies and other bovine facilities are located in and are only permitted within the valley floor in the western portion of Tulare County. Since dairies and other bovine facilities do not exist and are not permitted east of the 600-foot elevation line of the County, where foothills and mountains occur. Dairies and other bovine facilities do not have and will not have any direct, or indirect, adverse impact on forest land.

Finding: No impact.

- e) **Would the project involve other changes in the existing environment which, due to their location or nature, could result in conversion of farmland to non-agricultural use or conversion of forest land to non-forest use?** Any increase, past or present, in production of milk could have resulted in or could result in the expansion of milk processing plants (milk, cheese, yogurt, ice cream, etc.) in Tulare County or in counties within the southern portion of the San Joaquin Valley. While most milk processing plants are located adjacent to urban centers and are connected to municipal water and

wastewater systems, these valley communities are also surrounded by agricultural lands. This possible indirect impact has been addressed, or will be addressed by applicable public entities as part of the environmental review of future processing facilities during the applicable permit processes.

Finding: The impact is less than significant.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
3.1.3 AIR QUALITY				
As available, the significance criteria established by the applicable air quality management of air pollution control district may be relied upon to make the following determinations. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is no-attainment under an applicable federal or state ambient air quality standard (including releasing emissions, which exceed quantitative thresholds for ozone precursors)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Expose sensitive receptors to substantial pollutant concentrations?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) Create objectionable odors affecting a substantial number of people?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Response:

- a) **Would the project conflict with or obstruct implementation of the applicable air quality plan?** The ACFP and the dairies and other bovine facilities permitted thereunder are subject to and must comply with the rules, regulations and attainment plans of the San Joaquin Valley Air Pollution Control District. The attainment status of air pollutants is directly related to mobile and stationary pollution sources. Conflicts with applicable air quality plans would be considered significant if the project is causing or would cause non-attainment.

Finding: The impact is potentially significant.

- b) **Would the project violate any air quality standard or contribute substantially to an existing or projected air quality violation?** Dairy and other bovine facilities operations within Tulare County may be contributing to, or may contribute to, existing and projected air quality violations; this will be addressed in the EIR.

Finding: The impact is potentially significant.

- c) **Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is no-attainment under an applicable federal or state ambient air quality standard (including releasing emissions, which exceed quantitative thresholds for ozone precursors)?** Dairy and other bovine facilities operations may have caused and could cause a cumulative increase in criteria pollutants including emissions that will exceed thresholds for ozone precursors. This will be analyzed in the EIR with mitigation measures incorporated as reasonably necessary and feasible.

Finding: The impact is potentially significant.

- d) **Would the project expose sensitive receptors to substantial pollutant concentrations?** Some of the dairy and other bovine facility operations may have exposed or may expose sensitive receptors to substantial pollutant concentrations; this will be evaluated in the EIR.

Finding: The impact is potentially significant.

- e) **Would the project create objectionable odors affecting a substantial number of people?** Dairy and other bovine facility operations may have objectionable odors that can affect a substantial number of people; this will be evaluated in the EIR.

Finding: The impact is potentially significant.

Potentially Significant <u>Impact</u>	Less Than Significant With Mitigation <u>Incorporation</u>	Less Than Significant <u>Impact</u>	No <u>Impact</u>
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3.1.4 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?**

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Response:

- a) Would the project 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? Dairy and other bovine facilities construction and operations may have adverse effects on candidate, sensitive, or special status species; this will be evaluated in the EIR.

Finding: The impact is potentially significant.

- b) Would the project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Game or U.S. Fish and

Wildlife Service? Adverse effects on riparian habitat may occur as a result of dairy and other bovine facilities construction and operations; they will be evaluated in the EIR.

Finding: The impact is potentially significant.

- c) **Would the project 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?** The EIR will evaluate potential impacts on any federally protected wetlands.

Finding: The impact is potentially significant.

- d) **Would the project 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?** The EIR will identify any areas designated as native resident or migratory wildlife corridors and incorporate mitigation measures as reasonably necessary and feasible.

Finding: The impact is potentially significant.

- e) **Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?** The ACFP Update will determine whether or not there are any such local policies or ordinances which are impacted by or would be impacted by dairy or other bovine facility construction or operations, and if these exist, will evaluate any project impacts thereon.

Finding: The impact is potentially significant.

- f) **Would the project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?** Neither the County of Tulare, nor its cities, have adopted a Habitat Conservation Plan or other local conservation plan. Pacific Gas and Electric Company has, however, adopted a Habitat Conservation Plan for its Valley facilities, including those in Tulare County. Any possible project conflicts with this Plan will be analyzed in the EIR with mitigation measures incorporated as reasonably necessary and feasible.

Finding: The impact is potentially significant.

3.1.5 CULTURAL RESOURCES –

Would the project:

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Disturb any human remains, including those interred outside of formal cemeteries?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Response:

- a) **Would the project cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?** Section 15064.5 of the CEQA Guidelines requires that lead agencies determine whether projects may have a significant effect on archaeological and historical resources. This determination applies to those resources which meet significance criteria qualifying them as a “unique archaeological resource”, or a “historically or culturally significant resource”. Although not the sole consideration, if the resource is listed on the California Register of Historical Resources (CRHR), or is eligible for listing on the CRHR, it is presumed to be a historically significant resource. If an archaeological or historical resource is found not to be significant or unique under the qualifying criteria, it need not be considered further in the planning process.

CEQA emphasizes avoidance of historical resources as the preferred strategy of reducing potential significant environmental effects resulting from projects. Development of and operation of existing dairies and other bovine facilities, the expansion of an existing dairy or other bovine facility, and construction and operation of a new dairy or other bovine facility can have had or have an adverse impact on historical resources. Such impacts will be analyzed in the EIR with mitigation measures incorporated as reasonably necessary and feasible.

Finding: The impact is potentially significant.

- b) **Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?** As described in (a) above, CEQA emphasizes avoidance of archaeological resources as an effective method for reducing

potentially significant environmental effects associated with construction and excavation activities. Existing dairies and other bovine facilities, development of new dairies or other bovine facilities and the expansion of existing dairies or other bovine facilities may have had or have an adverse impact on archaeological resources. Such impacts will be analyzed in the EIR with mitigation measures incorporated as reasonably necessary and feasible.

Finding: The impact is potentially significant.

- c) **Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?** Paleontological resources include fossilized remains of vertebrate and invertebrate organisms, fossil tracks and trackways, and plant fossils. The destruction of a unique paleontological resource or unique geologic feature constitutes a significant impact under CEQA. Treatment of paleontological resources is generally similar to treatment of cultural resources, requiring evaluation of the resources in a project's area of potential affect, assessment of potential impacts on significant or unique resources, and development of mitigation measures to reduce or eliminate potentially significant impacts. Existing dairies and other bovine facilities, construction of new dairy or other bovine facilities, and expansion of existing dairy facilities or other bovine facilities may have had or have an adverse impact on paleontological resources. Such impacts will be analyzed in the EIR with mitigation measures incorporated as reasonably necessary and feasible.

Finding: The impact is potentially significant.

- d) **Would the project disturb any human remains, including those interred outside of formal cemeteries?** The Native American group that historically inhabited the San Joaquin Valley was the Yokut. Native American burial grounds are located throughout the Southern San Joaquin Valley. The construction activities associated with the development of new dairies or other bovine facilities, or the expansion of existing dairies or other bovine facilities may have had or have an adverse impact on human remains. Such impacts will be analyzed in the EIR with mitigation measures incorporated as reasonably necessary and feasible.

Finding: The impact is potentially significant.

Potentially Significant <u>Impact</u>	Less Than Significant With Mitigation <u>Incorporation</u>	Less Than Significant <u>Impact</u>	No <u>Impact</u>
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3.1.6 GEOLOGY/SOILS –

Would the project:

- a) **Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving?**

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ii) Strong seismic ground shaking?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
iii) Seismic-related ground failure, including liquefaction?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
iv) Landslides?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Result in substantial soil erosion or the loss of topsoil?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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 or collapse?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Response:

a) Would the project 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?**

There are two earthquake faults that have been, and will be, major sources of potential seismic activity within Tulare County. These faults are:

- **San Andreas Fault.** The San Andreas Fault is located approximately 40 miles west of the Tulare County boundary. This fault has a long history of activity, and is thus the primary focus in determining seismic activity within the County.
- **Owens Valley Fault Group.** The Owens Valley Fault Group is a complex system containing both active and potentially active faults, located on the eastern base of the Sierra Nevada Mountains. The Group is located within Tulare and Inyo Counties and has historically been the source of seismic activity within Tulare County.

The primary protection from earthquake damage is the enforcement of the California Building Code and this topic will be explained in the EIR.

Finding: The impact is potentially significant.

- b) **Would the project result in substantial soil erosion or the loss of topsoil?** Soil erosion impacts will be evaluated in the EIR.

Finding: The impact is potentially significant.

- c) **Would the project 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 or collapse?** Existing dairy and other bovine facilities have evidenced no such potential. Although there is no evidence that such potential exists in the valley area of the County in which dairies and other bovine facilities can be expanded or built, Tulare County will require that any soil characteristics information necessary for a building permit or to satisfy Regional Water Quality Control Board pond design requirements be submitted, as explained in the EIR. Any other needed mitigation measures will be analyzed in the EIR and incorporated as reasonably necessary and feasible. .

Finding: The impact is potentially significant.

- d) **Would the project 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?** The soils information submitted to the County (to be explained in the EIR) in accordance with Subsection c) will provide this information essential to any mitigation measures reasonably necessary and feasible.

Finding: The impact is potentially significant.

Issues:

Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
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3.1.7 GREENHOUSE GAS EMISSIONS –

Would the project:

- | | | | | | |
|----|---|-------------------------------------|--------------------------|--------------------------|--------------------------|
| a) | Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| b) | Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Response:

- a) **Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?** Existing dairies and other bovine facilities, and new and expanding dairies and other bovine facilities, generate greenhouse gas emissions. Such emissions will be evaluated in the EIR and mitigation measures will be incorporated as reasonably necessary and feasible.

Finding: The impact is potentially significant.

- b) **Would the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?** The County of Tulare will analyze in the EIR such emissions and incorporate mitigation measures as reasonably necessary and feasible.

Finding: The impact is potentially significant.

Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
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3.1.8 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? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 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? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

		Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
c)	Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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 safety hazard for people residing or working in the project area?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g)	Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Response:

- a) **Would the project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?** Hazardous materials are used in the operation of dairies and some bovine facilities. The use of fuel stored in above ground tanks, lubricants and cleaning solutions may be required for the operation and maintenance of equipment. Pesticides for the control of vectors and medicines may be used. Agricultural chemicals, including insecticides, herbicides and fertilizers will be used on dairy croplands. The EIR will evaluate these hazards and incorporate mitigation measures as reasonably necessary and feasible.

Finding: The impact is potentially significant.

- b) **Would the project 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?** There are hazardous materials used at dairies and other bovine facilities, as noted in (a) above. The EIR will evaluate these hazards and incorporate mitigation measures as reasonably necessary and feasible.

Finding: The impact is potentially significant.

- c) **Would the project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?** New dairy and other bovine facilities sites will not be permitted within one-quarter mile of an existing or proposed school in Tulare County. Any impacts from existing dairies or other bovine facilities that want to expand and are located within one-quarter mile of an existing or proposed school will be evaluated in the EIR.

Finding: The impact is potentially significant.

- d) **Would the project 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?** The County of Tulare has not issued and will not issue a use permit for a dairy or bovine facility to be located on a hazardous materials site. Hazardous materials site locations are available on the Tulare County website at www.co.tulare.ca.us.

Finding: No impact.

- 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 safety hazard for people residing or working in the project area?** Impacts from the existence of, construction or expansion of a dairy or other bovine facility within an airport land use plan will be addressed in the EIR. Mitigation measures will be analyzed in the EIR and incorporated as reasonably necessary and feasible.

Finding: The impact is potentially significant.

- 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?** Impacts from the existence of, construction or expansion of a dairy or other bovine facility within the vicinity of a private airstrip will be addressed in the EIR. Mitigation measures will be analyzed in the EIR and incorporated as reasonably necessary and feasible.

Finding: The impact is potentially significant.

- g) **Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?** Neither existence of, nor the development of, new dairies or bovine facilities, nor the expansion of existing dairies or other bovine facilities will have had or will have any adverse effects on the County's adopted emergency response plan. There will not be any alterations to any existing traffic routes, or interference with communication facilities.

Finding: No impact.

- h) **Would the project 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?** Existing dairies and bovine facilities are located in, and new or expanded dairies and other bovine facilities will be located in, intensive agricultural areas and surrounded by irrigated crops. There is only a speculative chance that these facilities could be impacted by wildland fires.

Finding: The impact is less than significant.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
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3.1.9 HYDROLOGY/WATER QUALITY –

Would the project:

- | | | | | |
|--|-------------------------------------|--------------------------|--------------------------|-------------------------------------|
| a) Violate any water quality standards or waste discharge requirements? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 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)? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 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 that would result in substantial erosion or siltation on- or off-site? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

		Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
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?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f)	Otherwise substantially degrade water quality?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h)	Place within a 100-year flood hazard area structures, which would impede or redirect flood flows?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j)	Inundation by seiche, tsunami, or mudflow?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Response:

- a) **Would the project violate any water quality standards or waste discharge requirements?** Dairy and bovine facility operations can cause environmental degradation of groundwater quality unless the manure generated is collected, stored and used in an environmentally sound manner. All dairies and some other bovine facilities must, in accord, with General Order No. 96-270, comply with applicable manure collection, storage, and usage requirements of the Regional Water Quality Control Board, Central Valley Region (RWQCB). New or expanding dairies and some other bovine facilities are required by the RWQCB to provide and implement a nutrient management plan to define the cropland acreage available to manage the wet and dry manure as a

limiting factor for the size of the herd. The EIR will evaluate the potentially adverse effects associated with groundwater degradation and, though analysis in the EIR, will incorporate mitigation measures as reasonably necessary and feasible.

Finding: The impact is potentially significant.

- b) **Would the project 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)?** Existing, new and expanding dairies and some other bovine facilities are required by the RWQCB to provide and implement a nutrient management plan to define the cropland acreage available to manage the wet and dry manure as a limiting factor for the size of the herd. Double cropping is generally utilized by dairies to increase manure-generated nitrogen and salt uptake. Substantial increases in the amount of dairy or other bovine facility-related double-cropped lands in the County may have increased or may increase water demand to irrigate the additional crops. The impacts of existing dairies and other bovine facilities and the addition or expansion of dairies and other bovine facilities could have an adverse impact on groundwater supplies and will be evaluated in the EIR.

Finding: The impact is potentially significant.

- c) **Would the project 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 that would result in substantial erosion or siltation on- or off-site?** Dairy and other bovine facilities demonstrably have not significantly been constructed in, and will not be permitted by the RWQCB or the California Department of Fish and Game, as the case may be, in a manner that would alter the course of a stream or would substantially alter an existing drainage pattern.

Finding: No impact.

- d) **Would the project 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?** Dairy and other bovine facilities have not been permitted, nor may they be operated, in areas that alter the course of a stream or river. All surface water runoff must be retained on site in accordance with County of Tulare and RWQCB requirements.

Finding: The impact is less than significant.

- e) **Would the project 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?** RWQCB regulations require that all dairies and

other bovine facilities be constructed and operated to retain on site all facility wastewater generated, and that precipitation on and drainage through or from such facilities be directed to onsite ponds or lagoons. The EIR will analyze this issue and will incorporate mitigation measures as reasonably necessary and feasible.

Finding: The impact is potentially significant.

- f) **Would the project otherwise substantially degrade water quality?** Manure and process water applied to dairy croplands, or to croplands irrigated or fertilized by manure water or manure, may contain substantial quantities of nutrients such as nitrogen and phosphorus, and microorganisms including pathogens. If these substances enter the surface or groundwater environments in sufficient concentrations, they can cause groundwater quality degradation. Please refer to the response to 3.1.9.a. The EIR will analyze this issue and will incorporate mitigation measures as reasonably necessary and feasible.

Finding: The impact is potentially significant.

- g) **Would the project 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?** Existing and proposed new or expanded dairy or other bovine facilities, together with dwellings and for equipment associated with the facilities, are permitted within 100-year flood plains, but must demonstrate to the RWQCB and the Federal Emergency Management Agency (F.E.M.A.) that the design and operation thereof does not create a flood hazard. The EIR will analyze this issue and will incorporate mitigation measures as reasonably necessary and feasible.

Finding: The impact is potentially significant.

- h) **Would the project place within a 100-year flood hazard area structures, which would impede or redirect flood flows?** Existing, proposed new, or expanded dairy or other bovine facilities together with dwellings and for equipment associated with the facilities are permitted within 100-year flood plains, but must demonstrate to the RWQCB and F.E.M.A. that the design and operation thereof does not create nor exacerbate a flood hazard and that such structures are not impacted by the flood hazard. The EIR will analyze this issue and will incorporate mitigation measures as reasonably necessary and feasible. Please see response to 3.1.9.g.

Finding: The impact is potentially significant.

- i) **Would the project 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?** The dams which could conceivably affect dairy and other bovine facilities are Success Dam on the Tule River, and Terminus Dam on the Kaweah River. If a

catastrophic failure of either of these dams were to occur, some dairy/bovine facilities could be within an estimated three-foot depth inundation area, with flood waters arriving between 4 and 5 hours after such failure occurred. With the low probability of a dam failure occurrence, and the relatively long warning period (to the extent the warning system is operational) to ready these facilities for flooding, inundation related to dam failure is not a significant risk. However, with the extensive levee systems throughout the County that are not certified, there is a potential risk of failure. The EIR will contain relevant analysis and maps regarding any potential impact.

Finding: The impact is potentially significant.

- j) **Would the project expose people or structures to inundation by seiche, tsunami, or mudflow?** Existing, new or expanding dairy/bovine facilities locations within Tulare County are not located near a body of water which could generate seiche or tsunami effects; general terrain of the Valley floor does not support mudflow events.

Finding: No impact.

3.1.10 LAND USE/PLANNING –

Would the project:

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Physically divide an established community?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Response:

- a) **Would the project physically divide an established community?** Dairy farms and bovine facilities are confined to rural agricultural areas and do not and will not divide an established city or rural community in the county.

Finding: No impact.

- b) **Would the project 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?** The EIR will identify areas of potential conflict with existing plans and policies will incorporate mitigation measures as reasonably necessary and feasible. New policies and ordinance amendments will be proposed as part of the project.

Finding: The impact is potentially significant.

- c) **Would the project conflict with any applicable habitat conservation plan or natural community conservation plan?** The County of Tulare has not adopted a habitat conservation plan. Pacific Gas and Electric Company has, however, adopted a Habitat Conservation Plan for its Valley facilities, including those in Tualre County. Any possible project conflicts with this Plan will be analyzed in the EIR and will incorporate mitigation measures as reasonably necessary and feasible.

Finding: The impact is less than significant with mitigation.

	Potentially Significant <u>Impact</u>	Less Than Significant With Mitigation <u>Incorporation</u>	Less Than Significant <u>Impact</u>	No <u>Impact</u>
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3.1.11 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? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 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? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

Response:

- a) **Would the project 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?** Mineral resources in Tulare County are mainly sand and gravel resources located along the valley floor adjacent to the foothills and streams. The four streams that have provided most of the sand and gravel are the Kaweah River, Lewis Creek, Deer Creek, and the Tule River. Dairies and bovine facilities may be located adjacent to the foothills and streams , but are not, and may not be located within this eastern portion of the County. (Please see response to Evaluation Criteria 3.1.9.c and 3.1.9.d.)

Finding: No impact.

- b) **Would the project 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?** The proposed ACFP and Ordinance amendment will not alter any existing plans that protect mineral resources.

Finding: No impact.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
3.1.12 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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
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?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
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?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Response:

- a) **Would the project result in 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? Construction and operation of dairies and other bovine facilities may expose persons to noise levels in excess of County standards; this will be evaluated in the EIR.

Finding: The impact is potentially significant.

- b) **Would the project result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?** While there could be excessive groundborne vibration or groundborne noise during the construction of a dairy or other bovine facility, this potentially adverse effect is considered to be less than significant due to the short time construction periods and the general rural location of such dairies and bovine facilities.

Finding: The impact is less than significant.

- c) **Would the project result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?** Dairy and bovine facilities may increase ambient noise levels in the nearby vicinity; such impacts will be evaluated in the EIR.

Finding: The impact is potentially significant.

- d) **Would the project result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?** During construction of dairies or bovine facilities there may have been or may be an increase in ambient noise levels. The potentially adverse impact is considered to have been and to be less than significant as a result of the short duration and the rural location of the sites.

Finding: The impact is less than significant.

- 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?** Dairies and bovine facilities in Tulare County employ an average of 5 to 15 persons per shift and work with tractors, trucks and operating machinery. The number of shifts varies from facility to facility, but is typically either 2 or 3. The occasional noise from airplanes is considered to be less than significant, affecting only a small number of people in a minimal manner.

Finding: The impact is less than significant.

- 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?:** There are very few private airstrips in Tulare County and most are used for agricultural spraying activities. These airports are not major noise generators and will not cause a significant adverse impact on dairy or bovine employees.

Finding: The impact is less than significant.

3.1.13 POPULATION AND HOUSING –

Would the project:

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
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)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Response:

- a) **Would the project 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)?** While most dairies and other bovine facilities in Tulare County have an average of 5-15 employees per shift, indirect related employment in the dairy business is significant. A study released on February 2, 2010 (“New Study: California Dairy Industry Responsible for More than 443,000 Jobs – Three Percent of State’s Job Production”) by the California Milk Advisory Board indicated that a typical dairy farm in California generates 232 jobs including ‘on-the-farm’ and ‘beyond-the-farm’ jobs like milk tank drivers, grocery store clerks, feed farmers and employees at milk processing and cheese plants, among others. With high unemployment in Tulare County ranging from 9 percent to 18 percent, new jobs in the dairy/confined-bovine industry have not and will not have a significant effect on population growth, but may have had and have a positive impact on the County’s economy by providing more employment opportunities.

Finding: The impact is less than significant.

- b) **Would the project displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?** Existing dairies and other bovine facilities, new dairies and other bovine facilities and the expansion of existing dairies and other bovine facilities are and will be in rural areas of the County and have not had and will not have any measurable effect on loss of housing.

Finding: No impact.

- c) **Would the project displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?** Few, if any, people have been or will be displaced as a result of this project as dairies are limited to areas zoned for agricultural uses.

Finding: The impact is less than significant.

Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
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3.1.14 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 a significant environmental impact, in order to maintain acceptable service ratios for any of the public services:**

i. Fire protection?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ii. Police protection?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
iii. Schools?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
iv. Parks?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
v. Other public facilities?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Response:

- a) **Would the project 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 a significant environmental impact, in order to maintain acceptable service ratios for any of the public services?** The project has not and will not require the employment of additional fire fighters or law enforcement officers. However, implementation of this proposed general plan and ordinance amendment may necessitate the employment of additional environmental health officers, building and zoning inspectors, and animal control and planning officers. Existing public facilities and equipment have been and are able to maintain current levels of service except that there may be a need to address increased levels of service and public facilities as identified in the development impact fee studies prepared in 2011 for the County. In addition, based on recent action taken by the Board of Supervisors in 2010 and 2011, new development may be subject to development impact fees. Any potentially significant public services and facilities

impacts will be addressed with reasonably feasible mitigation. No other public services are or will be significantly affected by the project. Any potentially affected school districts can mitigate any increased student enrollment impacts by the imposition of school impact fees from residential structures and milk barns (other dairy/other bovine facilities are exempt from such fees).

Finding: The impact is less than significant with mitigation.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
3.1.15 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?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Response:

- a) **Would the project 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?** With the high unemployment in Tulare County, dairy and other bovine animal facilities' employment centers on hiring persons currently living in the County. Even if new employees have moved into or will move into the County, the indirect project impact on existing recreational facilities is less than significant, except that there may be a need to address increased levels of service for parks and recreation facilities as identified in the development impact fee studies prepared in 2011 for the County. In addition, based on recent action taken by the Board of Supervisors in 2010 and 2011, new development may be subject to development impact fees. Any potentially significant park and recreation impact will be addressed with reasonably feasible mitigation.

Finding: The impact is less than significant with mitigation.

- 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?** No recreational facilities have been or will be provided by the project.

Finding: No impact.

	Potentially Significant <u>Impact</u>	Less Than Significant With Mitigation <u>Incorporation</u>	Less Than Significant <u>Impact</u>	No <u>Impact</u>
3.1.16 TRANSPORTATION/TRAFFIC –				
Would the project:				
a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management City for designated roads or highways?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) Result in inadequate emergency access?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Response:

- a) Would the project conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel

and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit? Project developments have and will comply with all applicable plans and policies, including, for example, the Circulation Element of the Tulare County General Plan, the Tulare County Ordinance Code, and the pertinent transportation related policies of the Tulare County Association of Government. Attention will be given to addressing potential accelerated physical deterioration of public and private roads resulting from the proposed project.

Finding: The impact is less than significant with mitigation.

- b) **Would the project conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?** The traffic impacts associated with the project will be analyzed in the EIR and will incorporate mitigation measures as reasonably necessary and feasible.

Finding: The impact is potentially significant.

- c) **Would the project result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?** No adverse effects have or will occur.

Finding: No impact.

- d) **Would the project substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?** Farm equipment uses the rural roads; any potential mitigation measures will be evaluated and will be proposed in the EIR.

Finding: The impact is potentially significant.

- e) **Would the project result in inadequate emergency access?** All existing, new and expanding dairies and bovine facilities have been, and will be, required to obtain an encroachment permit which addressed or will address any issues associated with emergency access.

Finding: No impact.

- f) **Would the project conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?** There is no conceivable relationship between the activities and related transportation impacts of these agricultural, low-density land use project developments and the cited policies, plans or programs. There are no such potential conflicts.

Finding: No impact.

3.1.17 UTILITIES/SERVICE SYSTEMS –

Would the project:

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
g) Comply with federal, state, and local statutes and regulations related to solid waste?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Response:

- a) **Would the project exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?** All dairies and bovine facilities are required to comply with RWQCB requirements. Any additional County requirements conceivably essential to mitigate this impact will be evaluated in the EIR.

Finding: The impact is potentially significant.

- b) **Would the project 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?** No new water or wastewater treatment facility has been or will be required as a result of the project.

Finding: No impact.

- c) **Would the project 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?** All dairies and confined-bovine facilities are and will be required by the RWQCB to contain storm water drainage on site and the EIR will incorporate mitigation measures as reasonably necessary and feasible.

Finding: The impact is potentially significant.

- d) **Would the project have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?** The EIR will evaluate the use of water, and the water sources for, dairies and confined-bovine facilities; mitigation measures appropriate to identified impacts will be proposed in the EIR.

Finding: The impact is potentially significant.

- e) **Would the project 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?** Dairies and confined-bovine facilities are not and will not be served by such facilities.

Finding: No impact.

- f) **Would the project be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?** The County of Tulare can accommodate the small amount of solid waste that is generated from dairies and confined-bovine facilities; such solid waste typically averages no more than one to two cubic yards per day.

Finding: The impact is less than significant.

- g) **Would the project comply with federal, state, and local statutes and regulations related to solid waste?** Project developments and their operations do not, and will not, conflict with federal, state or local regulations related to solid waste.

Finding: No impact.

Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
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3.2 Mandatory Findings of Significance

- | | | | | |
|--|-------------------------------------|--------------------------|-------------------------------------|--------------------------|
| a) Does the project have the potential to: substantially 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; substantially reduce the number or restrict the range of an endangered, rare, or threatened species; or eliminate important examples of the major periods of California history or prehistory? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| b) Does the project have the potential to achieve short-term environmental goals to the disadvantage of long-term environmental goals? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| c) Does the project have possible environmental effects that are individually limited but cumulatively considerable? "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probably future projects. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| d) Will the environmental effects of a project cause substantial adverse effects on human beings, either directly or indirectly? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Response:

- a) Does the project have the potential to: substantially 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; substantially reduce the number or restrict the range of an endangered, rare, or threatened species; or eliminate important examples of the major periods of California history or prehistory? Dairies and other bovine confinement facilities are primarily located on land that has been converted to intensive agricultural use. Most of this irrigated farmland is used to grow field crops including alfalfa, barley, corn, grain and sudan grass. Today, the historically occurring native habitats that once occupied this portion of the San Joaquin Valley have been mostly replaced by human-created habitats, principally agricultural. The animal species that

remain are likely limited to those species occurring in intensively farmed croplands. However, appropriate mitigation measures will be incorporated as reasonably necessary and feasible

Finding: The impact is potentially significant.

- b) **Does the project have the potential to achieve short-term environmental goals to the disadvantage of long-term environmental goals?** Tulare County is required by law to prepare and adopt a comprehensive, long-term general plan for the physical development of its jurisdictional area. As the growth of the dairy industry has had and has the potential to significantly effect the physical development of the County, a separate plan, a component of the Environmental Resources Management Element of the general plan, was adopted in April 2000. The Phase I Animal Confinement Facilities Plan Amendment is a proposed update to this plan.

Finding: The impact is less than significant.

- c) **Does the project have possible environmental effects that are individually limited but cumulatively considerable?** "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probably future projects. The air quality impacts of the project, and health impacts related thereto, are cumulatively considerable as are the greenhouse gas emissions. Water quality impacts associated with the existence and growth of confined animal facilities are also cumulatively considerable, as may be land use impacts and the loss of habitat for special-status animals.

Finding: The impact is potentially significant.

- d) **Will the environmental effects of a project cause substantial adverse effects on human beings, either directly or indirectly?** The number of milk cows and support stock that are and may be located in Tulare County, as well as other bovine facilities, has a potentially adverse health impact associated with air quality degradation. The project may also further contribute to existing groundwater quality contamination from farming operations.

Finding: The impact is potentially significant.

Comment Letters

Comment Letters

1. Greg and Laurie Schwaller, January 4, 2012
2. David Warner, Director of Permit Services, San Joaquin Valley Air Pollution Control District, January 3, 2012
3. David Deel, Associate Transportation Planner, Caltrans, December 14, 2011
4. James Herota, Staff Environmental Scientist, Central Valley Flood Protection Board, December 14, 2011
5. Reagen O'Leary, Environmental Scientist, Department of Fish and Game, December 21, 2011
6. Mark S. Kielty, Planning and Building Director, City of Tulare, February 22, 2012

January 4, 2012

Mr. Michael C. Spata
Assistant Director-Planning
Environmental Assessment Officer
County of Tulare
5961 S. Mooney Blvd.
Visalia, CA 93277

Dear Mr. Spata:

Thank you for the opportunity to comment on the proposed Tulare County Animal Confinement Facilities Plan and Ordinance Amendment, pursuant to the NOP.

PROJECT DESCRIPTION:

We echo the priorities expressed by the residents of Tulare County in response to the workshops conducted at the outset of the County's General Plan Update process. These included clean air, a clean and reliable water supply, protection of our agricultural and open space lands, and a more diverse economy.

We understand the substantial contribution to the County's economy that is made by the dairy and other bovine facilities industry, and we can understand the industry's desire to reduce regulation, oversight, and costs. However, in light of the extreme growth of the industry in Tulare County and its tremendous impact on our health, quality of life, environment, and economy, it is essential that any revisions to the permitting and CEQA review processes related to dairies and bovine facilities ("ACFs"), whether new or expanding, ensure that their cumulative impacts are fully evaluated, avoided to the degree possible, mitigated to the degree feasible, and monitored regularly, with a fee-based full cost-recovery program included to verify compliance, and clear and enforceable consequences for failure to perform and maintain compliance.

Jobs are important, but both the costs and benefits of job creation through increasing ACFs must be closely examined in the DEIR. If dairies and bovine facilities in Tulare County employ an average of 5 to 15 persons per shift and a typical ACF operates 2 or 3 shifts, then permitting a new ACF might create directly from 10 to as many as 45 jobs. What do these jobs typically pay? What kind of benefits do they provide (e.g., housing, insurance, retirement)? How long do workers typically stay in such jobs? What are the working conditions (e.g., health, safety, hours, breaks, recreation)? What are the opportunities for and likelihood of training and advancement? And what does it cost the citizens of Tulare County to provide jobs in this industry, in terms of business incentives, tax breaks, and impacts to public and environmental health and safety? The NOP states that the Milk Advisory Board indicates that a typical dairy farm in California generates 232 jobs including those on the farm and those beyond the farm. The DEIR should clarify and document this information. Would many of these jobs already exist and already be filled (e.g., grocery store clerks, employees at milk processing and cheese plants) because hundreds

of existing dairies are already providing exactly the same product, so no new employees are needed? And how often do lay-offs or plant closures occur when volatile milk prices fall?

1.2 Prior Environmental Documents

The DEIR must explain why the County was ordered to prepare, and in June, 2001, agreed to prepare, a DSPEIR to settle CEQA litigation on the ACFP-Phase I which it adopted in 2000, and why, over ten years later (after having agreed to carry out these actions within *nine months* from the effective date of the agreement), the DSPEIR has not been acted on. (Was the DSPEIR circulated in October, 2006? What happened?) During this time period, many hundreds of thousands of cows have been added to the bovine population of Tulare County, absent the action required by the court to “include a reasonable analysis and discussion of cumulative air quality impacts, groundwater quality impacts, and air quality impact mitigations measures” for the ACFP. Now, the ACFP must also address greenhouse gas emissions impacts and mitigation.

The DEIR must also explain why Phase II of the ACFP was never drafted or adopted. The health, safety, and welfare of the residents of Tulare County and their environment must be served by this plan and the CEQA process, not just the interests of the dairy industry. The DEIR (or DSPEIR, whichever it should be) must weigh clearly and fully the heavy costs of the industry along with its economic benefits.

The DEIR should include a study of the County’s carrying capacity for this type of resource-intensive, highly polluting industry. With over a million cows already crowded into the County, the DEIR should determine where this threshold exists and whether it has already been crossed.

2.1 Project Location

The description of the project location must be expanded to include the factors that subject the County to what is often the worst air quality in the nation, causing extensive and expensive adverse impacts to public health and quality of life. We cannot change our geography or our situation in the air basin, so we must focus on what we can do to avoid and reduce damaging (and even fatal) emissions and particulates and their effects on the air, water, soil, and living creatures in Tulare County.

The description must also include information on the number of ACFs, their locations, the number of animals, the size and number of lagoons and their locations, the prevailing winds, water table levels, soil types, watercourses (seasonal, permanent, and floodways), levees, dairy wastewater gallons applied to cropland, tons of manure produced and recycled and/or hauled offsite (and type and location of disposition), herd sizes, number and location of “grandfathered” facilities, number and location of facilities that have expanded without County SUP, the number and location of facilities that have expanded without the issuance of a County SUP and have not obtained approval of or are in violation of SJVAPCD or RWQCB permits, and the number and location of proposed future new dairies and dairies wishing to expand.

The description of the project location must also show where the eligible areas within which growth of ACFs may occur. These descriptions should include best approximations of acreage involved and should also graphically illustrate the growth of ACFs in Tulare County (including number of facilities, number of animals, acreage, emissions, and waste).

2.2 Project Objective and Description

The DEIR must explain the differences between the special use permit process and the site plan review process and show how it would affect the health, safety, and welfare of the public and the environment to allow expansion of existing dairies (which comply with the requirements of the ACFP) to be eligible for the site plan review process. The DEIR must clearly explain the advantages and disadvantages of having the amended ACFP apply the same permitting process to the establishment or expansion of all bovine animal confinement facilities.

The DEIR must clearly identify the criteria it is using to determine what is a “feasible” approval process for approving existing, new, and expanding dairy and bovine facilities, and what is a “feasible” special use permit process. “Feasible” must carefully weigh the impacts of this industry on the health of the public, the economy, and the environment, and fully analyze its cumulative impacts when balancing the industry’s desires and the public interest

The fact that too many dairies and bovine facilities have expanded without issuance of a County special use permit and/or obtained approval of, or are in violation of, SJVAPCD or RWQCB permits highlights the importance of a stronger, better coordinated County inspection program and of not overly-streamlining the requirements for dairy and bovine facility expansions. The DEIR must analyze these problems and propose a strong, fully funded program to curtail these problems. The 1992 Agricultural Advisory Committee addressed dairy issues including lack of tracking of solid waste disposal, increasing herd sizes without obtaining a special use permit, and the fact that the County’s animal density standards in its 1974 Animal Waste Management Element were more permissive than the RWQCB’s requirements. The 2000 Phase I ACFP program EIR raised issues including degradation of surface water, groundwater, and air quality; land use conflicts; potential health hazards; and loss of natural habitat. The DEIR must address these issues as well.

The DEIR must clearly explain how “the extent that feasible technology allows” will be determined with regard to preservation of the existing buffer zones under the ACFP. Under what circumstances would the existing buffer zones be changed? The criteria for areas eligible for ACFP expansions and the siting parameters must take into account factors including airsheds, viewsheds, watersheds, and the impacts to the public roads (with accompanying air quality issues) in the County. Energy is another important issue to be factored in. These facilities require a lot of power, but they could be generating much of what they need on-site.

A significant part of the project’s objective should be to help Tulare County comply with AB32 and to significantly reduce its greenhouse gas emissions. The DEIR should document the ACFs’ contribution to

the County's overall GHG emissions and pay particular attention to how these can be avoided or mitigated and how compliance with these measures will be monitored and enforced.

It is very important that the DEIR provide information that is as accurate as possible regarding the number of existing and proposed dairies, number of existing and proposed animals, etc. The sources of the information should be included. (For example, the County's proposed General Plan Update Background Report in 2008 stated that in 2003 the County had 303 dairies and 358,000 dairy cows per the University of California Agriculture and Natural Resources Department. The 2010 version of the Background Report switched the data source to the California Department of Food and Agriculture and the USDA, and stated that in 2007 the County had 332 dairies and over 481,000 dairy cows. But in July, 2007, the County was reporting 812,249 head. And in 2011, the Fresno Bee reported that we had over a million cows. The DEIR must explain which source(s) will be used for these data and why.

3.1 Environmental Factors Potentially Affected

3.1.1 AESTHETICS

3.1.1 a) Would the project have a substantial adverse effect on a scenic vista? The rating for this impact should be changed from LTS to Potentially Significant Impact. While it is true that dairies are largely open spaces (although the sight of cows up to their knees in acres of waste-filled mud in the rainy season and of cows dead in the dung-filled dust in the hot summers does not enhance the view of open spaces), and that the related structures are typically low-rise and not inordinately intrusive, the views experienced by motorists traveling on nearby roads too often do not include the uplifting and iconic vision of the Sierra Nevada and the Kettleman Hills bordering and defining the Valley -- because these views are partially or totally obscured by dust and smog and haze to which the ACFs are major contributors. The DEIR must note this significant and substantial adverse effect and work to avoid or mitigate it.

3.1.1 b) Would the project substantially damage scenic resources? While it is, unfortunately, true, that "what few native trees remain are situated along creek banks or irrigation canals," it is not too late to address this woeful and significant impact of our wholesale reworking of the Valley in the attempt to maximize its profit potential without regard to the many costs of doing so. The DEIR should address the opportunities for mitigation through the restoration of natural waterways and wetlands, which could provide habitat, flood and erosion control, wastewater purification, migration and travel corridors for both humans and animals, recreational opportunities, air cleaning, and scenic resources, among other benefits.

3.1.1 d) Would the project create a new source of substantial light or glare? Sky glow and light spillage are the bane of the night in Tulare County, where increasingly fewer residents and visitors can still thrill to the opportunity to see the Milky Way, the constellations, shooting stars, and other glories of the night skies, and nocturnal animals can still function naturally without the disruption of artificial light. The DEIR should require that ACFs' exterior lighting be highly energy efficient, operated by motion sensors, and comply with the specifications of the International Dark-Sky Association and Illuminating

Engineering Society to reduce glare, light trespass, and skyglow (please see www.darksky.org , which includes a model ordinance). These avoidance and mitigation measures should be required as a condition for every permit.

3.1.2 AGRICULTURE AND FOREST RESOURCES

3.1.2 a) Would the project convert Prime Farmland, Unique Farmland , or Farmland of Statewide Importance to non-agricultural use? The DEIR should address the impacts of dairy lagoons on future uses of an ACF's land. Can the lagoon area be remediated and restored so that it can be returned to other agricultural uses? What about the related cropland that is constantly treated with dairy waste? (As of July, 2007, the County was reporting 812,249 head, with 8,203,563,554 dairy wastewater gallons applied to cropland, and 1,233,320 tons of manure recycled and/or hauled offsite, with the proviso that "the data is only as accurate as the information provided by the dairymen.") Will these soils be able to sustainably support agriculture in the future? The DEIR should address how these impacts can be mitigated; remediation and restoration should be conditions of permit issuance, with secured funds set aside sufficient to achieve these purposes upon sale of an ACF for other use.

3.1.2 e) Involve other changes in the existing environment which could result in conversion of farmland to non-agricultural use? Please see 3.1.2 a above.

3.1.3 AIR QUALITY

Unfortunately, ACFs produce significant adverse impacts in all of the air quality categories. The DEIR must provide the public and decision-makers with all the facts necessary to an understanding of this significantly impactful sector of the County's agricultural industry. The DEIR must include, as a minimum, the information that the SJVAB has been designated as nonattainment for the federal PM 2.5 standard and serious nonattainment for the 8-hour federal ozone standard. Cumulative dairy emissions within the SJAB will increase by 23%; a "substantial portion of the cumulative increase is because of the increased number of dairies in Tulare County" (DSPEIR p. 3-53).

Tulare County is classified extreme non-attainment for ozone and severe non-attainment for federal PM10 and non-attainment with federal PM 2.5 (the deadliest particles). Major contributing sources of PM10 emissions are entrained roadway dust and farming operations. Dairies are major contributors in both these areas.

The ACFP/FPEIR (p. 69) describes how 80,000 pound dairy milk tankers traveling on minor roads inadequate to the weight and frequent trips of these vehicles are degrading and destroying the County's rural roads at an accelerated rate. Since the County doesn't have the money to re-engineer and rebuild and maintain the roads for this type of traffic, the County will abandon the roads and no longer maintain them, so that they will go back to dirt, and rely on the dairies to keep down the mud and dust on the abandoned roads (see also the GPU Background Report p. 5-39ff).

"Dust (PM10), NOx and ROG emissions from any dairy project site would contribute to criteria pollutant emissions generated throughout the SJVAB. . . . "An increase in greenhouse gases, including methane, in the atmosphere is an international environmental issue" (DSPEIR p. 3-54).

"Ammonia (NH3) is a strong alkali that is a severe eye, ear, and throat irritant. Ammonia reacts with nitrates and sulfates in the air to form ammonium nitrate that is a particulate less than or equal to 2.5 microns. It is a precursor of PM-2.5" (ACFP/FPEIR, p. 75). About 90% of ammonia emissions come from animal husbandry, with cattle and calves accounting for about 43%; there are additional ammonia emissions after the spreading of manure" (ACFP/FPEIR, p. 76). PM-2.5 is the deadliest of particulates.

"Each new dairy or other animal confinement facility that is constructed in the county would contribute on an incremental basis to the generation of PM-10, ammonia (a precursor to PM-10), and ROG (a precursor to ozone). Because the San Joaquin Valley is designated as "non-attainment" for both PM-10 and ozone, any increase in emissions would further the non-attainment status" (*Ibid*

"Emissions of fugitive dust and gaseous air pollutants from dairy operations and non-dairy cattle feedlots are recognized to contribute a significant fraction of the total air pollutant emissions within the SJVAB" (SPDEIR, p. D-1).

"Dairy-related emissions within Tulare County are predicted to increase by roughly 38% in the future compared to existing [2004] rates" (SPDEIR, p. D-5), and this is based just on proposed future dairies and dairy expansions at that time. The DEIR should show the actual increase that has occurred and project the additional increase through the project horizon.

It should be noted that the SJVAPCD has just lowered the hourly PM 2.5 concentration threshold for Real-Time Outdoor Activity Risk (ROAR) substantially from 140 ug/m3 to 76 ug/m3, to reflect knowledge from health research in the Valley and elsewhere about the linear nature of health risk from PM 2.5 (risk rises in lockstep with concentration levels) and makes the PM 2.5 level 5 risk threshold proportional to the ozone level 5. In addition, the EPA's AQI for PM 2.5 has not been updated by the agency since 1997 despite the fact that the 24 hr. standard was lowered from 65 ug/m3 to 35 ug/m3 (see www.cvhpi.org). These facts, in conjunction with new health research demonstrating how health risk is magnified during exercise, have been primary factors behind recent SJVAPCD Real-Time Air Advisory Network revisions.

The DEIR must address how these air quality issues can be avoided and/or mitigated to the extent that the County will be able to comply with the requirements of AB32 and its own proposed Climate Action Plan. It should also include data on the health impacts and costs of poor air quality on the residents, crops, forests, water resources, and economy of Tulare County. It should also include and evaluate the impacts of pesticides, herbicides, and related chemicals used at ACFs on air quality, health, and the economy.

3.1.4 BIOLOGICAL RESOURCES

Since only about 1% of the Valley's wetlands, vernal pools, and riparian areas remain, it is critically important that these remnants be protected and conserved. Avoidance of adverse impacts to these

essential environments should be a mandatory condition of permitting ACFs. We have no shortage of bovines, but we cannot afford to lose the last vestiges of the natural environment that sustained all life in this Valley for hundreds of thousands of years. In the shameful absence of any adopted Habitat Conservation Plan or other local conservation plan, the least the County can do for our fellow creatures is to ensure that ACFs do not interfere with wildlife corridors and the wetlands, vernal pools, and riparian areas vital to wildlife survival. Buffer zones of a minimum of 100' to 300' should be established on both sides of the centerline of waterways and riparian areas and around wetlands and vernal pools as a mandatory condition of ACF permitting, with the requirement that appropriate native vegetation be encouraged and maintained within these zones.

3.1.5 CULTURAL RESOURCES

The DEIR should note and emphasize the very specific requirements for dealing with human remains. These requirements are spelled out in Section 7050.5 of the Health and Safety Code:

(b) In the event of discovery or recognition of any human remains in any location other than a dedicated cemetery, there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains until the coroner of the county in which the human remains are discovered has determined, in accordance with Chapter 10 (commencing with Section 27460) of Part 3 of Division 2 of Title 3 of the Government Code, that the remains are not subject to the provisions of Section 27491 of the Government Code or any other related provisions of law concerning investigation of the circumstances, manner and cause of any death, and the recommendations concerning the treatment and disposition of the human remains have been made to the person responsible for the excavation, or to his or her authorized representative, in the manner provided in Section 5097.98 of the Public Resources Code. The coroner shall make his or her determination within two working days from the time the person responsible for the excavation, or his or her authorized representative, notifies the coroner of the discovery or recognition of the human remains.

(c) If the coroner determines that the remains are not subject to his or her authority

and if the coroner recognizes the human remains to be those of a Native American, or has reason to believe that they are those of a Native American, he or she shall contact, by telephone within 24 hours, the Native American Heritage Commission.

For additional information, see the Native American Heritage Commission website, www.nahc.ca.gov.

3.1.8 HAZARDS/HAZARDOUS MATERIALS

The DEIR must discuss the significant hazards and known continuing and cumulative adverse impacts of not only the fuels, lubricants, cleaning solutions, pesticides, medicines, insecticides, herbicides, and fertilizers used by the ACFs, but must also specifically address the hazards caused by the dairy lagoons, which contaminate soil and groundwater and also emit noxious odors.

3.1.9 HYDROLOGY/WATER QUALITY

The DEIR should address the following, as a minimum, with regard to highly significant impacts of ACFs on hydrology and water supply and quality.

When 51 wells were sampled at ACFs throughout Tulare County in 2001 and 2002, per the DSPEIR, sodium violated the human toxicity threshold in approximately 88% of the samples, the taste and odor threshold was violated in approximately 77% of the samples, nitrate levels exceed the California Primary Maximum Contaminant Level and California Public Health Goal for Drinking Water in 35% of the samples (and the sample wells do not represent the highest nitrate concentrations in Tulare County; when nitrate concentrations for the 51 wells plus Central Valley RWQCB monitoring wells were combined and averaged the average nitrate concentration for approximately *half* of the wells in both sets of data exceeded the EPA primary MCL, per DSPEIR, p. F-6), total coliform was detected in 19.6% of the samples (and fecal coliform in one; the state has a health goal of zero total coliform because the presence of any coliform in drinking water causes a health risk), and the TDS (total dissolved solids) threshold was exceeded in about 12% of the samples (DSPEIR, p. 3-56).

Wells up-gradient of dairies have the lowest nitrate concentrations, while wells down-gradient have the highest concentrations (DSPEIR, p. 3-57). The highest concentrations were generally found in wells located down-gradient of croplands (DSPEIR, p. F-8). Animal waste contains high levels of nitrogen compounds; nitrate is the most common form of nitrogen associated with runoff or seepage from dairies to groundwater, and it was detected at somewhat elevated concentrations in the dairies from which groundwater samples were taken. Nitrate can cause health problems to infants, children, and other groups.

Drinking well water containing total nitrogen exceeding the MCL value (35% of the sampled wells exceeded the MCL value for nitrates) can lead to methemoglobinemia ("blue baby syndrome"; hemoglobin is converted to the methemoglobin form in the circulatory system, which reduces the oxygen-distributing capacity of blood throughout the body) in infants, children, and sensitive individuals, and nitrate can form nitrosamine, a suspected human carcinogen; EPA also notes birth-defect potential. Nitrate is highly soluble in water and can often percolate freely through soil and into groundwater. Ammonia is often absorbed to soils and incorporated into soil complexes. Coliform and fecal coliform indicate bacterial contamination from waste from warm-blooded animals. Pathogens such as *E. coli*, hepatitis, and salmonella can cause very severe effects for all, but pose the greatest risk to infants, children, the elderly, and the ill. Salinity (measured as TDS or sodium, and exceeded in about 12% of the 51 wells sampled) poses a health risk to those on restricted-sodium diets, and is also detrimental to agriculture; it also violates drinking water thresholds associated with tastes and odors.

Tulare County is facing a water crisis, per the Board of Supervisors. The County's burgeoning dairy industry has adverse impacts on the County's water quality and also uses tremendous amounts of water (at about 100 gallons per head per day times a dairy total of over a million head, that's a lot of water). What would be the effects on water quality of a major flood event in our ever-growing dairy area?

Pesticides used in ACFs also contaminate groundwater, surface water, and drinking water. According to an article in the January, 2012, *Sierra* magazine, "Some neurologists dub the 300-mile-long string of Central Valley farm towns between Bakersfield and Sacramento 'Parkinson's Alley,' and recently released statistics back them up. A study published last year by researchers at the University of California, Los Angeles, found that Central Valley residents under age 60 who lived near fields where the pesticides paraquat and maneb had been used between 1974 and 1999 had a Parkinson's rate nearly five times higher than other residents in the region." UCLA epidemiologist Beate Ritz "discovered that California counties reporting the highest pesticide use also had the highest rates for Parkinson's-related deaths. . . . Ritz found that when insecticides were applied to more than a third of a county's acreage, the risk of its residents' dying from Parkinson's disease increased 2.5-fold. She also found studies that revealed that as many as 40 percent of the area's Parkinson's cases are never mentioned on death certificates, possibly because many migrant workers fail to report the disease, or move on before symptoms arise. Ritz and her research team found that Central Valley residents who consumed private well water and lived within 500 feet of farmland with documented long-term pesticide use were almost twice as likely to get Parkinson's disease."

Growers in the Central Valley "use about 115 million pounds of pesticides every year. . . . More than 1 million people in the region have tap water that isn't safe to drink because of nitrate contamination from manure, fertilizers, and leaking septic tanks most of these residents are from low-income and Spanish-speaking households. . . . Recent groundwater sampling found that the water in 75 percent of the private domestic wells in Tulare County . . . contains unsafe levels of nitrates."

Last year, "the State Water Resources Control Board released the results of a domestic-well-water survey in Tulare County; pesticides turned up in 13 of 19 wells sampled." Last year, "state regulators

tested 136 wells and found pesticides in 103 of them. “ The herbicide Paraquat “is of particular concern to Parkinson’s researchers because of its synergistic effect particularly when used with the fungicide maneb. . . . long-term exposures to paraquat and maneb caused an eight-fold increase in the development of Parkinson’s for people under age 60. Paraquat was banned by the European Union in 21007 but is still widely used in the United States; about 75,000 pounds of it are applied annually to alfalfa, grapes, and other crops in Tulare County. The EPA banned maneb for use on corn, grapes, and apples in 2005 but continues to allow its use on almonds, which are abundant in the Central Valley.” “Another chemical of particular concern to Parkinson’s researchers is the fungicide ziram . . . people exposed to the fungicide for 25 years or longer have a three-times-greater chance of developing the disease.”

Former Visalia police chief Bruce McDermott and other local residents are interviewed in the *Sierra* magazine article. The former president of the Central Valley Parkinson’s Disease Support Group states that “All of our doctors have told us, ‘Move. Get out of the valley. It’s not a healthy place to be.’”

The DEIR must address the adoption of policies with implementation measures and funding sources identified to carry out the Data Needs Assessment and Recommendations in the DSPEIR on pp. F-12 and F-13. These recommendations include (1) comparing data from the U.S. Geological Survey National Water Information System database (~ 763 wells) and the California Department of Health Services database (~ 1479 public water supply wells) to provide a relationship between nitrate concentrations and well depth and help to define relationships between nitrate concentrations and the geochemical environment and sources, with time trends defined and nitrate inputs to groundwater defined over time, etc.; (2) looking at two GIS groundwater layers for depth-to-surface groundwater level and permeability or soil type to characterize permeability to groundwater, indicating which areas constitute risk if near a dairy and groundwater nitrate concentrations were elevated; (3) identifying areas more susceptible to groundwater contamination and incorporating them into ArcView /GIS/ArcInfo GRID to categorize susceptibility to contamination and identify potential hotspots; (4) allow for a cumulative risk assessment for nitrates and other pollutants; (5) evaluation of regional, county, state, and RWQCB regulations and EPA guidance on dairy discharge to groundwater to determine the best way to mitigate dairy discharges; (6) collection of demographic data relating to drinking behaviors of Tulare County residents to quantify exposures to nitrates or other chemical pollutants.

The DEIR should also examine and discuss impacts that have occurred and resulting measures that have been implemented in areas where major dairy development has been a force for much longer than it has been in Tulare County. For example, many dairies have moved from the greater LA area to Tulare County. In the Chino Basin there, dairies are being connected to the Orange County Sanitation District’s Regional Interceptor line in order to divert tons of biochemical oxygen demand, suspended solids, and dissolved solids from degrading the water quality of the underlying aquifer and the Santa Ana River. How much would a similar project cost Tulare County, to protect its aquifers and wells from potentially devastating spills of manure-laden dairy waters? What will keep Tulare County from incurring the same environmental degradation and huge infrastructure costs that have plagued the Chino Basin area (which has far fewer milk cows than Tulare County)?

Dairies are a major potential source of direct discharge, leaching from storage, floating debris, and run off from the site. When the Water Board's own test data show that 63% of sampled valley dairies have at least one nitrate-polluted well, when 40% of sampled household wells in Tulare County contained unsafe amounts of nitrate, when more than 20% of the County's State-regulated public water systems failed the nitrate test, when students can't drink the water at their schools and residents have to buy bottled water for drinking (article in *Sacramento Bee*, 02/16/08, "Suit pins bad water in Tulare on dairies"), Tulare County must address this growing problem with determination and dispatch. This ACFP, General Plan and Ordinance Amendment (GPA 10-002) EIR process is the time and the place to do so.

The DEIR must thoroughly describe these impacts, direct and indirect, current and cumulative, and provide adequate avoidance and mitigation measures for them. It is "vitally important that an EIR avoid minimizing the cumulative impact. Rather, it must reflect a conscientious effort to provide public agencies and the general public with adequate and relevant detailed information about them" (*Kings County Farm Bureau v. City of Hanford*, 1990).

The DEIR must also detail how the County's levee systems are already in disastrously poor condition, as described in the 2005-06 Grand Jury report; the levees do not just pose a potential risk of failure: they have failed in several instances in recent flood events. The DEIR should discuss the likely impacts of flooding of and run off from dairy lagoons and how this could be avoided or mitigated.

3.1.14 PUBLIC SERVICES

The DEIR should certainly address the need for development impact fees, which are long overdue in Tulare County. As discussed previously, the hugely adverse impact of dairy tanker trucks on the County's rural roads (and consequently its air quality) must be addressed by the DEIR. These impacts should be mitigated by impact fees. Impact fees could also be imposed to fund the Data Needs Assessment and Recommendations in the DSPEIR on pp. F-12 and F-13.

Impact fees should also be imposed to fund the necessary monitoring and inspection of the ACFs. Tulare County is projected to have well over twice as many dairy cows as any other county in the San Joaquin Valley, despite the adverse impacts to air and water quality, public health, and GHG emissions caused by dairy operations. Of the eight counties in the SJVAB, Tulare County accounts for more than 30% of the total dairy AUs and more than 16% of total feedlot cattle (DSPEIR, p. 3-53). Yet Tulare County has only one inspector for its hundreds of dairies, and inspects only about 1/5 of its dairies annually (so that a typical dairy gets inspected only about once every five years). This is certainly not in the public's interest, which requires timely monitoring and reporting and enforcement of policies and implementation and mitigation measures, especially since the dairies have had a history of increasing their number of animals beyond permitted limits. The number of inspectors should be increased so that every dairy can be inspected annually, and this public service should be funded by impact fees.

A survey conducted by the Association of Environmental Professionals (AEP) found that 82% of the lead agencies responsible for monitoring mitigation efforts had "inadequate in-house staff and funding to

perform monitoring and reporting.” “Two thirds of the agencies said that they had not taken enforcement actions against project sponsors for failing to comply with mitigation measures or to perform adequate monitoring and reporting.” Two thirds also said that they had no established procedure for modifying a mitigation measure if it is determined infeasible or inadequate once implementation and monitoring is attempted, and that they “had never modified measures that were determined to be inadequate once monitoring had begun.” Therefore, the DEIR, ACFP, and Ordinance Amendment should ensure through concrete policies and implementation measures that Tulare County’s ACFs are required to pay impact fees sufficient to maintain staff to monitor and report on mitigation efforts and results and to fine operations that do not maintain compliance with requirements.

3.1.16 TRANSPORTATION/TRAFFIC

As discussed above, the accelerated physical deterioration of public and private roads resulting from the proposed project should be addressed through the long-overdue implementation of impact fees.

3.1.17 UTILITIES/SERVICE SYSTEMS

The DEIR should examine and discuss impacts that have occurred and resulting measures that have been implemented in areas where major dairy development has been a force for much longer than it has been in Tulare County. For example, many dairies have moved from the greater LA area to Tulare County. In the Chino Basin there, dairies are being connected to the Orange County Sanitation District’s Regional Interceptor line in order to divert tons of biochemical oxygen demand, suspended solids, and dissolved solids from degrading the water quality of the underlying aquifer and the Santa Ana River. How much would a similar project cost Tulare County, to protect its aquifers and wells from potentially devastating spills of manure-laden dairy waters? What will keep Tulare County from incurring the same environmental degradation and huge infrastructure costs that have plagued the Chino Basin area (which has far fewer milk cows than Tulare County)?

The DEIR should include a study of the County’s carrying capacity for this type of resource-intensive, highly polluting industry. With over a million cows already crowded into the County, the DEIR should determine where this threshold exists and whether it has already been crossed. There is a limit to how much untreated waste we can continue to dump into our air, soil, and water without critically adverse consequences (many feel those consequences are already too severe), and Tulare County already has the greatest overdraft of all the counties in California on its water supply. Further contamination of our dwindling water supply is untenable. These conditions are not sustainable and must be addressed by the DEIR.

3.2 Mandatory Findings of Significance

The inevitability of the project’s substantial degradation of the quality of the environment, impedance of the achievement of long-term environmental goals, cumulatively considerable adverse environmental effects, and substantial adverse effects on human beings is already well documented. The DEIR should

extensively describe and analyze the effectiveness of the Phase I ACFP that was adopted in April, 2000, in addressing the issues listed in this NOP. That information should help to determine what needs to be included in the Phase I ACFP Amendment to enable that update to more successfully address those issues.

Tulare County is our home. We do not want it to be a place where doctors have to tell their patients that it is not healthy to live here and that they should move.

Since 2003, at the outset of the General Plan Update process, its citizens have been telling the County that their priorities are clean air, a clean and reliable water supply, protection of our agricultural and open space lands, and a more diverse economy (and growth focused in our existing communities). The County must respect and strive toward the fulfillment of these priorities while crafting the DEIR and the ACFP and the ordinance amendment cited in this NOP. A strong economy is important, and ACFs are major players in our economy, but all of us are responsible for promoting cleaner air, a safe water supply, and a healthy and sustainable future for our county.

Thank you for considering our comments.

Sincerely,

Greg and Laurie Schwaller

43857 South Fork Dr.
Three Rivers, CA 93271



San Joaquin Valley

AIR POLLUTION CONTROL DISTRICT



January 3, 2012

Michael C. Spata
County of Tulare
Planning Department
5961 S. Mooney Blvd
Visalia, CA 93277



Project: Draft Environmental Impact Report for General Plan and Ordinance Amendment (GPA 10-002) Phase 1 – Animal Confinement Facilities Plan Update (ACFP Update)
District CEQA Reference Number: 20110543

Dear Mr. Spata:

The San Joaquin Valley Unified Air Pollution Control District (District) has reviewed the Notice of Preparation of an Environmental Impact Report (EIR) at a program level for the project referenced above consisting of a revision to the framework under the Animal Confinement Facilities Plan for the permitting and processing of dairy and other bovine facility expansions and news dairies in the County of Tulare, CA. The District offers the following comments:

1. The proposed revised permitting and processing regulatory framework itself under the Animal Confinement Facilities Plan will not have an adverse impact on air quality. However, new dairies and bovine facilities or expansion of existing dairies/facilities proposed for the San Joaquin Valley Air Basin would add emissions of air pollutants and conflict with our efforts to improve air quality unless these emission increases are mitigated effectively through elements of EIR. Future development or expansion of dairy and bovine facilities within the air basin would contribute to the overall decline in air quality due to emissions resulting from construction activities, increased traffic associated with the operation and ongoing operational emissions. The District makes the following recommendations regarding future development:
 - a) Construction Emissions: Use of heavy equipment and earth moving operations during project construction can generate fugitive dust and engine combustion

Sayed Sadredin
Executive Director/Air Pollution Control Officer

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Fresno, CA 93726-0244
Tel: (559) 230-6000 FAX: (559) 230-6061

Southern Region
34946 Flyover Court
Bakersfield, CA 93308-9725
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emissions that may have substantial temporary impacts on local air quality. Heavy-duty construction equipment is usually powered by diesel engines. In July 1998, the Air Resources Board listed the particulate fraction of diesel exhaust as a toxic air contaminant, identifying both chronic and carcinogenic public risks. Combustion emissions also include nitrogen oxides (NOx) and reactive organic gases (ROG). Fugitive dust emissions result from land clearing, demolition, and site preparation activities. The District recommends that the EIR include an analysis of construction emissions attributable to the anticipated number of anaerobic digesters to be constructed in the San Joaquin Valley Air Basin.

Feasible mitigation of construction exhaust emission includes use of construction equipment powered by engines meeting, at a minimum, Tier II emission standards, as set forth in §2423 of Title 13 of the California Code of Regulations, and Part 89 of Title 40 Code of Federal Regulations. Feasible mitigation of fugitive dust emissions includes compliance with District Regulation VIII (Fugitive PM10 Prohibition).

The District recommends that the EIR include a provision requiring future project specific environmental assessments to require the following mitigation measure as a condition of project approval: "Off-road construction equipment used on site shall achieve fleet average emissions equal to or less than the Tier II emissions standard of 4.8 g/hp-hr NOx. This can be achieved through any combination of uncontrolled engines and engines complying with Tier II and above engine standards."

Compliance with District Regulation VIII is not an option, and thus not a mitigation measure. However, the District recommends that the EIR recognize that on a project specific basis, compliance with District Regulation VIII is expected to substantially reduce fugitive dust emissions.

Although construction related impacts are short-term in nature, the District recommends that the EIR require future project specific environmental assessments to include a screening level analysis to determine if construction related emissions would exceed the following thresholds of significance: 10 tons per year NOx, 10 tons per year ROG, and 15 tons PM10. Furthermore, the District recommends that the EIR require a project specific EIR to be prepared if project specific construction emissions cannot be reduced below the respective significance threshold.

- b) Operational Emissions: The District recommends that the EIR include an analysis of operational emissions attributable to the anticipated number of anaerobic digesters to be operated in the San Joaquin Valley Air Basin. It should also include a provision requiring future project specific environmental assessments to require a project specific EIR if operational emissions exceed the thresholds of significance listed above.

For the significance determination, the District recommends that permitted (stationary sources) and non-permitted (mobile and area sources) sources be analyzed separately. The analysis should include characterization of both existing and post-project emissions.

Potential mitigation measures include implementation of clean air business practices such as contracting with carrier, delivery, security, or other services utilizing electric, low-emission, and/or alternative fuel vehicles; utilizing heavy-duty vehicles that are CARB certified to optional low-emission standards for NOx; and surrendering Emission Reduction Credits (ERCs), or payment into a District operated Voluntary Emission Reduction Agreement. The District recommends that the EIR discuss all feasible mitigation measures and establish the basis for making specific mitigation measures conditions of approval when evaluating subsequent project specific impacts.

- c) Potential Health Impacts: Accurate quantification of health risks and operational emissions requires detailed site specific information, e.g. type of emission source, proximity of the source to sensitive receptors, and trip generation information. The required level of detail is typically not available until project specific approvals are being granted. The District recommends that the EIR discuss potential health risks associated with installation and operation of dairies/bovine facilities and identify all feasible mitigation measures. Furthermore, the District recommends that the EIR establish the basis for making specific mitigation measures conditions of approval when evaluating subsequent project specific impacts.
 - d) Nuisance Odors: Accurate characterization of nuisance odors requires detailed site specific information. The required level of detail is typically not available until project specific approvals are being granted. The District recommends that the EIR discuss potential nuisance odors associated with operation of dairies/bovine facilities and identify all feasible mitigation measures. Furthermore, the District recommends that the EIR establish the basis for making specific mitigation measures conditions of approval when evaluating subsequent project specific impacts.
- 2) The District recommends that the EIR include the following elements, in addition to the effects identified above:
- a) A discussion of the methodology, model assumptions, inputs and results used in characterizing the project's impact on air quality.
 - b) A discussion of project design elements and mitigation measures, including characterization of the effectiveness of each mitigation measure incorporated into the project.
 - c) A discussion of dairy operations including the following:
 - i) Breakdown of herd composition by the following categories:

- Milk Cows
 - Dry Cows
 - Heifers 15-24 months
 - Heifers 7-14 months
 - Heifers 4-6 months
 - Calves under 3 months
- ii) Description of manure process flow (from housing to lagoon(s)).
- iii) Identify if manure will be composted onsite.
- iv) Identify the type of housing (flush, scrape, etc) and exact method of manure handling for each type of cow.
- d) District's attainment status – The document should include a discussion of whether the project would result in a cumulatively considerable net increase of any criteria pollutant or precursor for which the San Joaquin Valley Air Basin is in non-attainment. Information on the District's attainment status can be found online by visiting the District's website at <http://valleyair.org/aqinfo/attainment.htm>.
- e) Greenhouse Gases (GHGs) –The District recommends that the environmental document include a discussion of greenhouse gas emissions generated by the project, the effect they will have on global climate change, and proposed design elements and mitigation measures to lessen the effects.

District Rules and Regulations

- 3) Future dairies and bovine facilities or expansions of existing dairies and bovine facilities that would be approved subsequent to the EIR would be subject to District permit requirements. They may be subject to the following District rules: Regulation VIII (Fugitive PM₁₀ Prohibitions), Rule 4102 (Nuisance), Rule 4601 (Architectural Coatings), and Rule 4641 (Cutback, Slow Cure, and Emulsified Asphalt, Paving and Maintenance Operations). In the event an existing building will be renovated, partially demolished or removed, the project may be subject to District Rule 4002 (National Emission Standards for Hazardous Air Pollutants). The following rules are specific to confined animal operations:
- Rule 4102 (Nuisance) – This rule applies to any source operation that emits or may emit air contaminants or other materials. In the event that the project or construction of the project creates a public nuisance, it could be in violation and be subject to District enforcement action.
 - Rule 4550 (Conservation Management Practices) – The purpose of this rule is to limit fugitive dust emissions from agricultural operation sites. These sites include areas of crop production, animal feeding operations and unpaved roads/equipment areas. The District's CMP handbook can be found online at the District's website at: http://www.valleyair.org/farmpermits/updates/cmp_handbook.pdf.
 - Rule 4570 (Confined Animal Facilities) – District Rule 4570 was adopted by the District's Governing Board on June 15, 2006. Dairies with greater than or equal to


500 milk cows are subject to the requirements of District Rule 4570. Therefore, a Rule 4570 application shall also be submitted to the District.

The above list of rules is neither exhaustive nor exclusive. To identify other District rules or regulations that apply to this project or to obtain information about District permit requirements, the applicant is encouraged to contact the District's Small Business Assistance Office at (559) 230-5888. Current District rules can be found online at: www.valleyair.org/rules/1ruleslist.htm.

District staff is available to meet with you and/or the applicant to discuss the regulatory requirements that are associated with this project. If you have any questions or require further information, please call Patia Siong at (559) 230-5930 and provide the reference number at the top of the letter.

Sincerely,

David Warner
Director of Permit Services

A handwritten signature in black ink, appearing to read 'Arnaud Marjollet', with a long horizontal flourish extending to the right.

Arnaud Marjollet
Permit Services Manager

DW:ps

cc: file

Michael Spata - GPA 10-002_NOP_Animal Confinement Facilities Plan Update

From: David Deel <david_deel@dot.ca.gov>
To: Michael Spata <mspata@co.tulare.ca.us>
Date: 12/14/2011 3:54 PM
Subject: GPA 10-002_NOP_Animal Confinement Facilities Plan Update

Michael -

Caltrans has a "No Comments" at this time.
We look forward to reviewing the DEIR or Neg Dec and corresponding traffic study when routed.
I have faxed the SCH.

If you have any further questions, please contact me.

David Deel - Associate Transportation Planner
Office of Planning & Local Assistance - North Section
CALTRANS - District 6

Desk: 559.488.7396
Fax: 559.488.4088

CENTRAL VALLEY FLOOD PROTECTION BOARD

3310 El Camino Ave., Rm. 151
SACRAMENTO, CA 95821
(916) 574-0609 FAX: (916) 574-0682
PERMITS: (916) 574-2380 FAX: (916) 574-0682



December 14, 2011

Mr. Michael Spata
Tulare County Resource Management Agency
5961 South Mooney Boulevard
Visalia, California 93277-9394



Subject: Animal Facilities Plan and Ordinance Amendment (General Plan Amendment No. GPA 10-002) SCH Number: 2011111078 Notice of Preparation of a Draft EIR

Dear Mr. Spata:

Staff for the Central Valley Flood Protection Board has reviewed the subject document and provides the following comments:

The proposed project is located within the jurisdiction of the Central Valley Flood Protection Board. The Board is required to enforce standards for the construction, maintenance, and protection of adopted flood control plans that will protect public lands from floods. The jurisdiction of the Board includes the Central Valley, including all tributaries and distributaries of the Sacramento River and the San Joaquin River, and designated floodways (Title 23 California Code of Regulations (CCR), Section 2).

A Board permit is required prior to starting the work within the Board's jurisdiction for the following:

- The placement, construction, reconstruction, removal, or abandonment of any landscaping, culvert, bridge, conduit, fence, projection, fill, embankment, building, structure, obstruction, encroachment, excavation, the planting, or removal of vegetation, and any repair or maintenance that involves cutting into the levee (CCR Section 6);
- Existing structures that predate permitting or where it is necessary to establish the conditions normally imposed by permitting. The circumstances include those where responsibility for the encroachment has not been clearly established or ownership and use have been revised (CCR Section 6);
- Vegetation plantings that will require the submission of detailed design drawings; identification of vegetation type; plant and tree names (i.e. common name and scientific name); total number of each type of plant and tree; planting spacing and irrigation method that will be utilized within the project area; a complete vegetative management plan for maintenance to prevent the interference with flood control, levee maintenance, inspection and flood fight procedures (Title 23, California Code of Regulations CCR Section 131).

December 14, 2011
Mr. Michael Spata
Page 2 of 2

In accordance with CEQA Guidelines Section 15130 "Discussion of Cumulative Impacts. (a) An EIR shall discuss cumulative impacts of a project when the project's incremental effect is cumulatively considerable, as defined in section 15065(a)(3). Where a lead agency is examining a project with an incremental effect that is not "cumulatively considerable," the lead agency need not consider that effect significant, but shall briefly describe its basis for concluding that the incremental effect is not cumulatively considerable."

Vegetation requirements in accordance with Title 23, Section 131(c) states, "Vegetation must not interfere with the integrity of the adopted plan of flood control, or interfere with maintenance, inspection, and flood fight procedures."

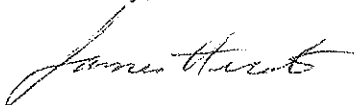
The accumulation and establishment of woody vegetation that is not managed has a negative impact on channel capacity and increases the potential for levee over-topping and flooding. When a channel develops vegetation that then becomes habitat for wildlife, maintenance to initial baseline conditions becomes more difficult as the removal of vegetative growth is subject to federal and state agency requirements for on-site mitigation within the floodway.

Hydraulic impacts – Hydraulic impacts due to encroachments could impede flows, reroute flood flows, and/or increase sediment accumulation. The Draft EIR should include mitigation measures for channel and levee improvements and maintenance to prevent and/or reduce hydraulic impacts. Off-site mitigation outside of the State Plan of Flood Control should be used when mitigating for vegetation removed within the project location.

The permit application and Title 23 CCR can be found on the Central Valley Flood Protection Board's website at <http://www.cvfpb.ca.gov/>. Contact your local, federal and state agencies, as other permits may apply.

Should you have any further questions, please contact me by phone at (916) 574-0651, or via email at jherota@water.ca.gov.

Sincerely,



James Herota
Staff Environmental Scientist
Floodway Projects Improvement Branch

cc: Governor's Office of Planning and Research
State Clearinghouse
1400 Tenth Street, Room 121
Sacramento, California 95814



December 21, 2011

Michael C. Spata

Assistant Director-Planning/Environmental Assessment Officer

Tulare County Resource Management Agency

County of Tulare

5961 South Mooney Boulevard

Visalia, California 93277



**Subject: Notice of Preparation
Animal Confinement Facilities Plan and Ordinance Amendment
(General Plan Amendment 10-002)
SCH No. 2011111078**

Dear Mr. Spata:

The Department of Fish and Game (Department) has reviewed the Notice of Preparation (NOP) submitted by the County of Tulare Resource Management Agency (County) for the draft Environmental Impact Report (DEIR) that would address the Animal Confinement Facilities Plan and Ordinance Amendment (ACFPOA). Approval of the ACFPOA would consist of changes of existing policies and permitting processes for confined bovine facilities within Tulare County. The objective of the ACFPOA is to revise the way in which dairies and other bovine facilities are regulated by the County of Tulare. Under the ACFPOA, the expansion of existing dairies and other bovine facilities may be eligible for the site plan review process, while all other expansions, as well as the establishment of new dairies, will be accomplished through a special use permit process. The ACFPOA may also apply the same permitting process to the establishment or expansion of all bovine animal confinement facilities, not just dairies.

The components of the ACFPOA include:

- Establishing a ministerial process designed to permit all bovine facilities constructed before 1974.
- Establishing a ministerial process designed to authorize bovine facility expansions that have already occurred without issuance of a County special use permit but have obtained valid permits from the San Joaquin Valley Air Pollution Control District (SJVAPCD) and the Regional Water Quality Control Board (RWQCB).
- Establishing a ministerial process designed to authorize bovine facility expansions that have already occurred without issuance of a County special use permit and have not obtained approval of or are in violation of SJVAPCD and RWQCB permits.
- The Environmental Impact Report (EIR) would encompass future dairy and bovine facility growth at a programmatic level or for a specified time-horizon with supplemental California Environmental Quality Act (CEQA) review on a project-specific basis.

The proposed EIR would serve as the CEQA review document under the auspices of the County as lead agency. Ultimately, the objective is to provide feasible approval processes for existing dairy and bovine facilities and to designate a feasible special use permit process for new and certain expanding facilities.

In addition the proposed EIR would streamline the requirements for dairy and bovine facility expansions by eliminating redundancies and overlapping standards that duplicate SJVAPCD and RWQCB jurisdictions as to air quality and water quality, respectively. Preservation of the existing buffer zones under the original Animal Confinement Facilities Plan (ACFP) would be retained in the ACFPOA to the extent feasible. The proposed EIR would include a description of existing levels of dairy and bovine facility development, a forecast of growth, and identification of eligible areas where growth may occur. Cumulative impacts would be evaluated for, but not limited to, land use, air quality, water quality, and greenhouse gas emissions resulting from the ACFPOA.

The Department appreciates the opportunity to comment on the ACFPOA in the early phases of the CEQA process. We would like to take this opportunity to offer recommendations on how the DEIR could adequately address potential impacts to special-status species, loss and/or degradation of habitat associated with such species, interference with wildlife migration patterns, loss of wetlands, loss of riparian habitat, and degradation of water quality which could occur through the expansion of existing bovine facilities and the approval to construct new bovine facilities. It is recommended that we meet to discuss how the ACFPOA DEIR can streamline dairy permitting as well as reducing bovine facility impacts to natural resources.

It appears that in the NOP the County identified that the ACFPOA would have a potentially significant impact on all biological resources included within the CEQA checklist. The DEIR should clearly identify these impacts and disclose how they would be avoided, minimized, and compensated for in order to bring the proposed impacts down to a less than significant level with mitigation incorporated.

The Department is concerned that the County is proposing to use an EIR as a means to determine certain projects as ministerial. Ministerial projects are exempt from the requirements of CEQA and where a project involves an approval that contains elements of both a ministerial action and a discretionary action; the Project will be deemed discretionary and will be subject to the requirements of CEQA (Guidelines section 15268(a) and (d)). Therefore, in light of Section 15268 of the Guidelines discussed above and that the expansion or construction of a new bovine facility could be considered a discretionary action by Tulare County, it does not appear that the proposed DEIR can be used to authorize an expansion of or the new construction of a bovine facility through a ministerial process, particularly if such approval could result in significant impacts on biological resources.

Our further specific comments pertaining to the ACFPOA follow: Our recommendations should be included in the CEQA document prepared for this Project as enforceable mitigation measures.

Department Jurisdiction

Trustee Agency Authority: The Department is a Trustee Agency with responsibility under CEQA for commenting on projects that could impact plant and wildlife resources. Pursuant to Fish and Game Code Section 1802, the Department has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and the habitat necessary for biologically sustainable populations of those species. As a Trustee Agency for fish and wildlife resources, the Department is responsible for providing, as available, biological expertise to review and comment upon environmental documents and impacts arising from Project activities, as those terms are used under CEQA (Division 13 (commencing with Section 21000) of the Public Resources Code).

As a Trustee Agency for fish and wildlife resources of this State, we believe the ACFPOA would have the following impacts to sensitive plant and wildlife resources:

- "Take" ("take" as defined in Fish and Game Code Section 86) of State-listed species and State Species of Special Concern.
- "Take" ("take" as defined in Section 3 of the Federal Endangered Species Act of 1973) of Federally-listed species.
- Loss and degradation of habitat associated with State and federally-listed species.
- Loss or degradation of riparian habitat and wetlands.
- Degradation of groundwater (nitrogen compounds, salts, pesticides, and other constituents of concern) that may be hydrologically and hydraulically connected to surface waters, wetlands, or riparian habitat and the potential impacts to plant and animal species that utilize these environments.
- The potential to impact surface water quality due to irrigation return waters and storm water runoff from croplands where dairy wastes are applied.
- The potential to impact adjacent wildlife refuges, ecological reserves, and mitigation lands due to irrigation and storm water runoff from croplands where dairy wastes are applied.
- Interference with wildlife migration patterns.
- Increased wildlife mortality from vehicle and equipment strikes.

Responsible Agency Authority: The Department has regulatory authority over projects that could result in the "take" of any species listed by the State as threatened or endangered, pursuant to Fish and Game Code Section 2081. If the Project could result in the "take" of any species listed as threatened or endangered under the California Endangered Species Act (CESA), the Department may need to issue an Incidental Take Permit (ITP) for the Project. CEQA requires a Mandatory Finding of Significance if a project is likely to substantially impact threatened or endangered species (sections 21001(c), 21083, Guidelines sections 15380, 15064, 15065). Impacts must be avoided or mitigated to less than significant levels unless the

CEQA Lead Agency makes and supports a Statement of Overriding Consideration (SOC).

The CEQA Lead Agency's SOC does not eliminate the Project proponent's obligation to comply with Fish and Game Code Section 2080. The ACFP adopted in 2000 and the Draft Supplemental Program Environmental Impact Report (DSPEIR) were reviewed by the Department and the Department provided comment on these documents through three different letters dated: April 28, 1999; February 14, 2000; and December 12, 2006. The Department is concerned that the ACFP adopted in 2000 and the current proposed DEIR are not adequately addressing potential impacts associated with the expansion and construction of new bovine facilities on special status species, the potential for "take" of special-status species, the loss and/or degradation of habitat associated with such species, interference with wildlife migration patterns, loss of wetlands, loss of riparian habitat, and impacts to water quality.

The Department is also concerned that project applicants may not understand their responsibility to comply with laws and regulations pertaining to Fish and Game Code and consider that in the completion of the review or permitting process through the current ACFP, the Project is subsequently also in compliance with other State and Federal laws. In other words, compliance with CESA does not automatically occur based solely on local agency project approvals or CEQA compliance; and CEQA compliance by the Lead Agency which includes an SOC in regards to listed species cannot be utilized by the Department to support issuance of "take" authorization. Consultation with the Department by both the Project proponent and the County (acting as the Lead Agency), is warranted to ensure that Project implementation does not result in unauthorized "take" of a State-listed species. It is unclear how this will occur through the ministerial process. The proposed DEIR should clearly define the method by which project applicants would be advised of their responsibility to comply with Fish and Game Code in cases where the facility expansion (including the use of additional crop land for waste disposal) or new facility development will impact habitat capable of supporting special status species either directly or cumulatively and how the mitigation measure would be enforced.

The ACFPOA has the potential to reduce the number or restrict the range of endangered, rare, or threatenend species (as defined in Section 15380 of CEQA).

Federal and/or State-listed species known to occur in Tulare County that should be fully addressed in the DEIR include:

<u>Species</u>	<u>Listing</u>
Kaweah brodiaea <i>Brodiaea insignis</i>	Stated listed - Endangered
California jewel-flower <i>Caulanthus californicus</i>	Federally listed - Endangered Stated listed - Endangered
Hoover's spurge <i>Chamaesyce hooveri</i>	Federally listed - Threatened
Springville clarkia <i>Clarkia springvillensis</i>	Federally listed - Threatened Stated listed - Endangered

<u>Species</u>	<u>Listing</u>
San Joaquin Valley Orcutt grass <i>Orcuttia inaequalis</i>	Federally listed – Threatened Stated listed – Endangered
San Joaquin adobe sunburst <i>Pseudobahia peirsonii</i>	Federally listed – Threatened Stated listed – Endangered
Keck's checkerbloom <i>Sidalcea keckii</i>	Federally listed – Endangered
Vernal pool fairy shrimp <i>Branchinecta lynchi</i>	Federally listed – Threatened
Vernal pool tadpole shrimp <i>Lepidurus packardii</i>	Federally listed – Endangered
Valley elderberry longhorn beetle <i>Desmocerus californicus dimorphus</i>	Federally listed – Threatened
Western spadefoot <i>Spea hammondi</i>	State Species of Special Concern
California tiger salamander <i>Ambystoma californiense</i>	Federally listed – Threatened State listed – Threatened
Western pond turtle <i>Emys marmorata</i>	State Species of Special Concern
Blunt nosed leopard lizard <i>Gambelia sila</i>	Federally listed – Endangered Stated listed – Endangered
Swainson's Hawk <i>Buteo swainsoni</i>	State listed – Threatened
Western snowy plover <i>Charadrius alexandrinus nivosus</i>	Federally listed – Threatened
Mountain plover <i>Charadrius montanus</i>	State Species of Special Concern
Burrowing owl <i>Athene cunicularia</i>	State Species of Special Concern
San Joaquin antelope squirrel <i>Ammospermophilus nelsoni</i>	State listed – Threatened
Tipton kangaroo rat <i>Dipodomys nitratoideus nitratoideus</i>	Federally listed – Endangered Stated listed – Endangered
San Joaquin Kit Fox <i>Vulpes macrotis mutica</i>	Federally listed – Endangered State listed – Threatened
American badger <i>Taxidea taxus</i>	State Species of Special Concern

Fully Protected Species: The Department has jurisdiction over fully protected species of birds, mammals, amphibians, reptiles, and fish pursuant to Fish and Game Code Sections 3511, 4700, 5050, and 5515. "Take" of any fully protected species is prohibited and the Department cannot authorize their "take". Full avoidance of fully protected species must be adhered to. This is accomplished by adequately surveying (by a qualified biologist) an action area to confirm absence or presence of fully protected species. Survey guidance is available by contacting the Department. In the event that fully protected species are detected during protocol-level surveys, consultation with the Department is warranted to discuss how to

implement the proposed action and avoid "take". Fully protected species that occur within the action area of the ACFPOA include blunt-nosed leopard lizard and golden eagle.

Unlisted Species: Species of plants and animals need not be officially listed as Endangered, Rare, or Threatened (E, R, or T) on any state or federal list to be considered E, R, or T under CEQA. If a species can be shown to meet the criteria for E, R, or T, as specified in the CEQA Guidelines (California Code of Regulations, Title 14, Chapter 3, Section 15380), it should be fully considered in the DEIR for the ACFPOA.

Bird Protection: The Department has jurisdiction over actions which may result in the disturbance or destruction of active nest sites or the unauthorized "take" of birds. Fish and Game Code sections that protect birds, their eggs, and nests include sections 3503 (regarding unlawful "take," possession or needless destruction of the nest or eggs of any bird), 3503.5 (regarding the "take," possession or destruction of any birds-of-prey or their nests or eggs), and 3513 (regarding unlawful "take" of any migratory nongame bird). Appropriate avoidance and minimization measures for raptors and other nesting birds in the ACFPOA action area should be included in the DEIR.

Stream Alteration Agreement (SAA): The Department also has regulatory authority with regard to activities occurring in streams and/or lakes along with riparian habitat associated with, and supported by the features, that could adversely affect any fish or wildlife resource, pursuant to Fish and Game Code sections 1600 et seq. The DEIR should address how the ACFPOA would impact Department jurisdictional features. Projects covered by the proposed ACFPOA that would impact jurisdictional features should submit a Stream Alteration Notification (SAN) to the Department. The Department is required to comply with CEQA in the issuance or the renewal of an SAA. For additional information on notification requirements, please contact our staff in the Stream Alteration Program at (559) 243-4593.

Water Pollution: Pursuant to Fish and Game Code Section 5650, it is unlawful to deposit in, permit to pass into, or place where it can pass into the "Waters of the State" any substance or material deleterious to fish, plant life, or bird life, including non-native species. The DEIR should address how the ACFPOA could result in pollution of "Waters of the State." The Regional Water Quality Control Board (RWQCB) also has jurisdiction regarding discharge and pollution to "Waters of the State" including stormwater runoff into surface waters.

The Department has concerns regarding the potential discharge of storm water runoff or other potential discharges from the facility site where animal wastes and other constituents of concern could impact seasonal wetlands such as vernal pool habitat; surface water bodies including but not limited to Cross Creek, the St. John's and Tule rivers, Deer Creek, Elk Bayou, and Bates Slough; and shallow groundwater which is hydrologically and hydraulically connected to seasonal wetlands and vernal pool habitat. Wastewater from confined animal facilities is known to contaminate surface and groundwater alike. Surface water and groundwater contamination includes the increase of nitrogen compounds, salts, pesticides, hormones, pathogens, dissolved solids, and other constituents of concern. The CEQA document prepared

for this Project should evaluate the potential impacts to groundwater and surface water contamination, and the potential related impacts to plants and wildlife that depend on these aquatic resources for all or part of their life cycle.

Potential Project Impacts and Recommendations

Special-Status Plant Species: Special-status plant species are well documented within Tulare County. Appropriate avoidance, minimization, and mitigation measures for special-status plant species should be incorporated into the DEIR. The Department recommends the Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities (November 24, 2009) be followed for projects proposed in areas where there is potential habitat for special status plant species to occur. This protocol, which is intended to maximize detectability, includes the identification of reference populations to facilitate the likelihood of field investigations occurring during the appropriate floristic period. In the absence of protocol-level surveys being performed, additional surveys may be necessary. Further, special-status plant species should be avoided whenever possible by delineation and observing a no-disturbance buffer of at least 50 feet from the outer edge of the plant population(s) or specific habitat type(s) required by special-status plant species. If buffers cannot be maintained, then consultation with the Department should occur to determine appropriate minimization and mitigation measures for impacts to special-status plant species. Should a State or federally-listed plant species be identified during botanical surveys then consultation with the Department and/or the United States Fish and Wildlife Service (USFWS) is recommended to determine if the acquisition of an ITP is warranted prior to conducting ground-disturbing activities. These measures should be included in the DEIR.

Riparian Habitat and Wetlands: Riparian habitat and wetlands are of extreme importance to a wide variety of plant and wildlife species. Riparian habitat and wetlands (vernal pools and waterways) are known to exist throughout Tulare County. The Department considers projects that impact these resources as significant if they result in a net loss of acreage or habitat value. The Department has a no-net-loss policy regarding impacts to wetlands. When wetland habitat can not be avoided, impacts to wetlands should be compensated for with the creation of new habitat, preferably on-site, on a minimum of an acre-for-acre basis. Potential impacts to special status resources posed by wetland creation should also be considered. Wetlands that have been inadvertently created by leaks, dams or other structures, or failures in man-made water systems are not exempt from this policy.

Formal wetland delineations should be conducted on Project sites by a qualified biologist to determine the location and extent of wetland habitats, including vernal pools and swales. The wetland delineations should be submitted to the US Army Corps of Engineers (ACOE) for verification.

In addition to delineating all surface waters and wetlands, the Department recommends the following minimum no-disturbance buffers. Depending upon what Project-related activities are proposed in these areas, larger buffers may be warranted to avoid impacts.

- A 250-foot no-disturbance buffer delineated from the high water mark of vernal pools and swales.
- The riparian vegetation along waterways should be protected with a 200-foot no-disturbance buffer delineated from the high water mark of each surface water body.
- A 100- foot no-disturbance buffer delineated from the high water mark of each surface water channel that has no riparian vegetation.

Wetlands, verified by ACOE, should be adequately described, designated on a site map, and included in the DEIR. The size of the buffers should be clearly delineated both on the map and in the text of the mitigation measures.

Valley Elderberry Longhorn Beetle (VELB): VELB are known to occur throughout Tulare County. Mexican elderberry (*Sambucus mexicanus*), the required host plants for VELB, are known to occur throughout Tulare County. Appropriate avoidance, minimization, and mitigation measures for VELB should be incorporated into the DEIR. The Department recommends that the measures are consistent with the "Conservation Guidelines for the Valley Elderberry Longhorn Beetle" (USFWS 1999).

California Tiger Salamander (CTS): CTS are present throughout eastern Tulare County. Appropriate avoidance, minimization, and mitigation measures for CTS should be incorporated into the DEIR. In areas with seasonal wetlands suitable to serve as breeding habitat for CTS and associated uplands (grasslands and oak woodlands) which could be used by CTS for refugia habitat, the Department recommends that the proposed DEIR include a condition that the Project applicant complete one of the following: (1) Prior to commencing Project-related activities, hire a qualified biologist to conduct surveys following the protocol contained in the "Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a Negative Finding of the California Tiger Salamander" (USFWS 2003). It should be noted that this survey protocol requires surveying in more than one year and this time frame can be prolonged depending on precipitation and meeting other requirements of the protocol. If CTS is found during the surveys, an ITP Application should be submitted to the Department; or (2) Project applicants can assume presence of CTS and consult early on with the Department on the steps necessary to submit an ITP application, pursuant to Section 2081 of the Fish and Game Code.

Blunt-nosed leopard lizard (BNLL): BNLL are known to occur throughout western Tulare County. The DEIR should evaluate and address potential Project-related impacts to this species, and should include appropriate species specific avoidance and minimization measures. This species is Fully Protected and therefore no "take", incidental or otherwise can be authorized by the Department. Therefore, the proposed DEIR should include a mitigation measure that protocol-level surveys must be conducted and results submitted to the Department prior to any ground disturbing activities in all areas of suitable habitat. Suitable

habitat includes all grassland and shrub scrub habitat that contains required habitat elements, such as small mammal burrows. This includes the area to be disturbed, as well as access points, travel routes, and an appropriate buffer. These surveys, the parameters of which were designed to optimize detectability, must be conducted to reasonably assure the Department that "take" of this Fully-Protected species will not occur as a result of disturbance associated with Project implementation. In the event that this species is detected during protocol-level surveys, consultation with the Department is warranted to discuss how to implement the Project and avoid take. The 'Approved Survey Methodology for the Blunt-nosed Leopard Lizard' dated May 2004 by the Department should be used.

Swainson's Hawk: Swainson's hawks are present throughout Tulare County. Mature trees could be impacted that could be used as nesting habitat. To avoid impacts to the species, surveys should be conducted following the survey methodology developed by the Swainson's Hawk Technical Advisory Committee (SWHA TAC, 2000), prior to any ground disturbance. These surveys, the parameters of which were designed to optimize detectability, must be conducted to reasonably assure the Department that "take" of this species will not occur as a result of disturbance associated with Project implementation. In the event that this species is detected during protocol-level surveys, consultation with the Department is warranted to discuss how to implement the Project and avoid "take," or if avoidance is not feasible, to acquire a State ITP prior to any ground-disturbing activities.

Removal of mature trees is a potentially significant impact to nesting raptors that should be mitigated. The Department considers removal of known raptor nest trees, even outside of the nesting season, to be a significant impact under CEQA, and, in the case of Swainson's hawk, it could also result in "take" under CESA. This is especially true with species such as Swainson's hawk that exhibit high site fidelity to their nest and nest trees year after year. Regardless of nesting status, trees that must be removed should be replaced with an appropriate native tree species planting at a ratio of 3:1 in an area that will be protected in perpetuity. This mitigation is needed to offset potential impacts to the loss of potential nesting habitat.

Swainson's hawks generally forage within 10 miles of their nest tree. The Department's Staff Report Regarding Mitigation for Impacts to Swainson's Hawks (DFG, 1994) recommends the following:

- Projects within 1 mile of an active nest tree should provide a minimum of one acre of habitat management (HM) land for each acre of development authorized.
- Projects within 5 miles of an active nest but greater than 1 mile should provide a minimum of 0.75 acres of HM land for each acre of urban development authorized.
- Projects within 10 miles of an active nest tree but greater than 5 mile from an active nest tree should provide a minimum of 0.5 acres of HM land for each acre of urban development authorized.

Funding of a sufficient long-term endowment for the management of the protected properties should be paid by the Project sponsors. In addition to fee title acquisition of grassland habitat, mitigation could occur by the purchase of conservation or suitable agricultural easements. Suitable agricultural easements would include areas limited to production of crops such as alfalfa, dry land and irrigated pasture, and cereal grain crops. Vineyards, orchards, cotton fields, and other dense vegetation do not provide adequate foraging habitat. Additionally, nest trees are an extremely limited resource in the southern San Joaquin Valley; the Department recommends that lands protected as foraging habitat for Swainson's hawks be no more than 10 miles from a Swainson's hawk nest in order to be beneficial to the species. Mitigation measures for Swainson's hawk should be fully addressed in the DEIR.

Burrowing Owl: If any ground-disturbing activities will occur during the burrowing owl nesting season (approximately February 1 through August 31), and potential burrowing owl burrows are present within the Project footprint, implementation of avoidance measures is warranted. In the event that burrowing owls are found, the Department's Staff Report on Burrowing Owl Mitigation (CDFG 1995) recommends that impacts to occupied burrows be avoided by implementation of a no-disturbance buffer zone of a minimum distance of 250 feet, unless a qualified biologist approved by the Department verifies through non-invasive methods that either: 1) the birds have not begun egg laying and incubation; or 2) that juveniles from the occupied burrows are foraging independently and are capable of independent survival. Failure to implement this buffer zone could cause adult burrowing owls to abandon the nest, cause eggs or young to be directly impacted (crushed), and/or result in reproductive failure, in violation of Fish and Game Code and the Migratory Bird Treaty Act.

If eviction of burrowing owls is included within the DEIR, the Department recommends passive relocation during the nonbreeding season. The DEIR should describe all avoidance measures that would be employed in the event that owls are found on the Project sites, as well as methods that would be used to evict owls from burrows. The DEIR should specify how the impact of evicting owls would be mitigated to a less than significant level. The Department's Staff Report on Burrowing Owl Mitigation (CDFG 1995) recommends that foraging habitat be acquired and permanently protected to offset the loss of foraging and burrow habitat. The Department also recommends replacement of occupied burrows with artificial burrows as mitigation for the potentially significant impact of evicting a burrowing owl.

Other Nesting Birds: The proposed DEIR should address that if Project-related activities must occur during the breeding season (February through mid-September); surveys for active nests should be conducted by a qualified biologist no more than 30 days prior to commencing project-related activities. A minimum no-disturbance buffer of 250 feet should be delineated around active nests until the breeding season has ended or until a qualified biologist has determined that the birds have fledged and are no longer reliant upon the nest or parental care for survival.

Listed Rodent Species : San Joaquin antelope squirrel (SJAS) and Tipton kangaroo Rat (TKR) are known to occur throughout western Tulare County. In order to prevent the "take" of individuals of any of the species that may be present in below-ground burrows, the Department

recommends that in areas of potentially suitable habitat which could support these species that the entrances of any burrows be avoided by a minimum 50 feet. Biological monitors should be present during all ground-disturbing and other construction-related activities to ensure that "take" of above-ground and below-ground listed rodents does not occur, and any necessary mitigation measures should be included to ensure that individuals are not impacted by construction equipment or staged materials. If the above minimization measures are not feasible, focused multi-night live trapping efforts should be conducted by appropriately permitted biologists. If listed small mammal species are detected, and the potential for "take" cannot be avoided, acquisition of an ITP, pursuant to Fish and Game Code Section 2081(b), would be warranted prior to Project implementation. Mitigation measures for special status rodent species should be fully addressed in the DEIR.

San Joaquin Kit Fox (SJKF): SJKF are present throughout Tulare County. SJKF populations are known to den in right-of-ways, vacant lots, parks, landscaped areas, golf courses, etc., and population numbers fluctuate over years. Presence/absence in any one year does not necessarily depict the potential for kit fox to occur on a site. This is true for many other listed species in the San Joaquin Valley. It is important to note that SJKF may be attracted to the construction and disposal areas of the site due to the type and level of activity (grading, excavation, etc.) and the loose, friable soils that are created as a result of intensive ground disturbance. The Department recommends that the USFWS "Standardized recommendations for protection of the San Joaquin kit fox prior to or during ground disturbance" (2011) be followed. Preconstruction surveys should also be conducted a maximum of 30 days prior to ground disturbing activities. In the event that this species is detected during surveys, consultation with the Department is warranted to discuss how to implement the Project and avoid "take," or if avoidance is not feasible, to acquire a State ITP prior to any ground-disturbing activities. The Department also recommends consulting with the USFWS on potential impacts to this species. Mitigation measures for SJKF should be fully addressed in the DEIR.

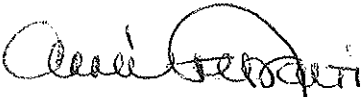
Impacts to Adjacent Habitat Lands: Tulare County houses several special management lands for habitat values for special-status species including the Department owned Stone Corral Ecological Reserve and Allensworth Ecological Reserve, the Pixley National Wildlife Refuge, and a large wetland complex protected by the Wetland Reserve Program (WRP). These habitat lands, as well as associated mitigation parcels acquired and owned by the Department, are lands that have been permanently secured specifically for the conservation of threatened and endangered species or to mitigate for other project-related impacts to listed species and the habitat on which they depend, as well as to create a regional habitat conservation strategy for many at risk species. Implementation of the ACFPOA in areas adjacent to the lands could degrade the habitat quality, directly impact wildlife utilizing these areas, or limit the habitat connectivity of these lands. Any project related impacts to these lands must be avoided. The proposed DEIR should consider these impacts and identify appropriate minimization and mitigation measures prior to finalization. Appropriate sized buffers in and around the project site, as well as protection of remaining natural lands connecting the habitat areas mentioned above, should be established and protected in perpetuity. Minimization measures should be implemented to prevent, even during storm events, any run-off or waste discharge, from

Mr. Michael Spata
December 21, 2011
Page 12

traveling onto any of these habitat lands.

More information on survey and monitoring protocols for sensitive species can be found at the Department website (www.dfg.ca.gov/wildlife/nongame/survey_monitor.html). If you have any questions on these issues, please contact Reagen O'Leary, Environmental Scientist, at the address provided on this letterhead, by telephone at (559) 243-4014, extension 244, or by electronic mail at roleary@dfg.ca.gov.

Sincerely,


Jeffrey R. Single, Ph.D.
Regional Manager

cc: United States Army Corps of Engineers
San Joaquin Valley Office
1325 J Street
Sacramento, California 95814-2922

Regional Water Quality Control Board
Central Valley Region
1685 E Street
Fresno, California 93706-2020

United States Fish and Wildlife Service
2800 Cottage Way, Suite W-2605
Sacramento, California 95825

Shane Barrow
BLM
P.O. Box 310
Alpaugh, California 93201

Colonel Allensworth SHP
Star Route 1, Box 148
Earlimart CA 93219

Scott Frazier
Kern National Wildlife Refuge

Literature Cited

DFG, 1994. Staff Report Regarding Mitigation for Impacts to Swainson's Hawks (*Buteo Swainsoni*) in the Central Valley of California. California Department of Fish and Game.

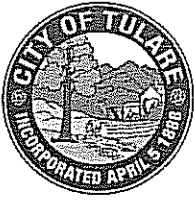
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USFWS, 1999. Conservation Guidelines for the Valley Elderberry Longhorn Beetle. United States Fish and Wildlife Service.

USFWS, 2011. Standard Recommendations for the Protection of the San Joaquin Kit Fox Prior to or During Ground Disturbance. United States Fish and Wildlife Service.



Planning and Building Department

February 22, 2012

Tulare County RMA
Michael C. Spata
5961 S. Mooney Blvd.
Visalia, CA 93277

Re: Animal Confinement Facilities Plan (ACFP) and Ordinance Amendment

Dear Mr. Spata:

Notice has been sent to the City of Tulare regarding possible amendments to the ACFP and related ordinance. The project as we understand would establish a ministerial process for existing dairies. Such an action causes concern to the city and residents who may be affected by the lack of adequate CEQA review.

Regardless of the process, dairy impacts must be mitigated, and must be done so with a high degree of transparency. Should the county eliminate the public review process, the transparency of county action (or inaction) is also eliminated.

- The city has concerns that existing dairies will be allowed to expand within the city's growth boundary areas. Staff recommends that dairies not be allowed to expand within a city's growth boundary because of the potential to limit economic development and create additional land use conflicts such as noise, dust and odors.
- The county needs to explain what is meant by ".... feasible ministerial process"?
- The current ACFP provides for a one-mile setback from a UDB for new dairies. Will this restriction be expanded to prohibit existing dairies from expanding in growth boundary areas?
- The city expects any "ministerial process" to address air quality and water quality for any continued operation of existing dairies within city growth boundary areas and to provide for appropriate mitigation measures. Amendments to the ACFP and ordinance should also address impacts to city streets and facilities.

- Does the county intend to incorporate the findings, conclusions and mitigation measures of the 2006 Supplemental EIR into the revised ACFP?

The city looks forward to the release of the DEIR. Should you have any questions please do not hesitate to contact this office at 559-684-4217.

Very Truly Yours,

A handwritten signature in black ink, appearing to read "Mark S. Kielty". The signature is fluid and cursive, with the first name "Mark" being the most prominent.

MARK S. KIELTY, AICP
Planning & Building Director

C: Don Dorman, City Manager
Bonnie Simoes, Principal Planner

**Notice of Public Scoping Meeting,
Comments at Meeting**

COUNTY OF TULARE
NOTICE OF PUBLIC SCOPING MEETING
FOR THE ANIMAL CONFINEMENT FACILITIES PLAN, GENERAL PLAN
AND ORDINANCE AMENDMENT (GPA 10-002) ENVIRONMENTAL
IMPACT REPORT

DATE OF MEETING: **FEBRUARY 2, 2012**

**LOCATION AND
TIME OF MEETING:** **BOARD OF SUPERVISORS, ROOM A & B
2800 WEST BURREL AVENUE
VISALIA, CALIFORNIA 93291
2:00 PM**

LEAD AGENCY: **COUNTY OF TULARE
5961 S. MOONEY BLVD.
VISALIA, CALIFORNIA 93277**

CONTACT PERSON: **Michael C. Spata
Assistant Director-Planning
Environmental Assessment Officer
559.624.7000
mspata@co.tulare.ca.us**

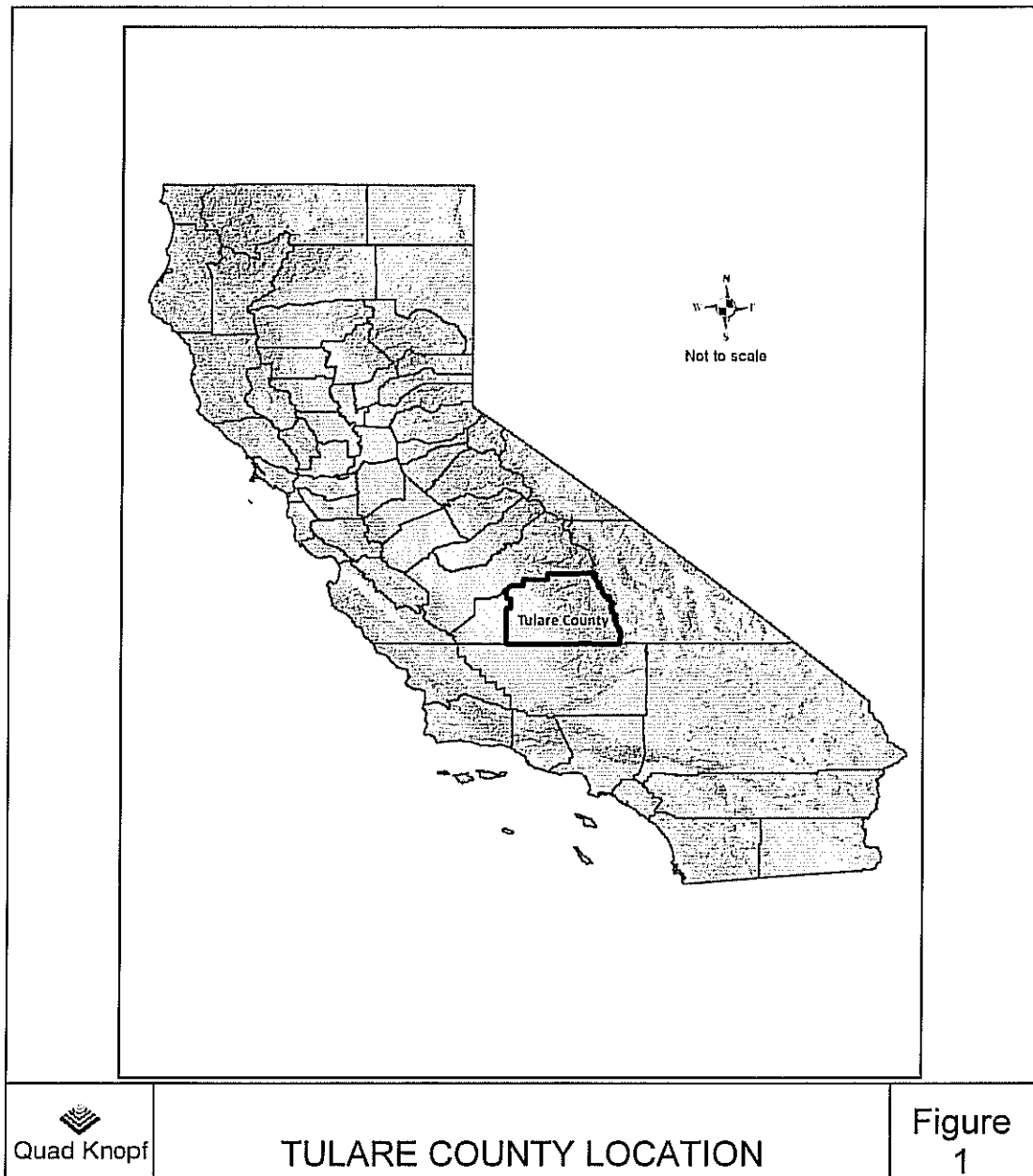
Pursuant to the California Environmental Quality Act (CEQA), the County of Tulare will be the lead agency for preparation of an Environmental Impact Report (EIR) for the General Plan and Ordinance Amendment Update (GPA 10-002) (ACFP Update). We are interested in hearing from the general public, interested individuals, groups, organizations, and agencies that may be affected by the project. A public scoping meeting has been scheduled for the purpose of presenting preliminary information about the project, and to obtain public comments concerning the scope of issues to be studied in the Draft EIR. Pursuant to CEQA Section 15082, the meeting will provide participants with an overview of the project and an opportunity to make comment. The following is a summary of the location, project description and the upcoming scoping meeting:

PROJECT LOCATION:

Tulare County lies in the southern half of and on the east side of the San Joaquin Valley, the great central valley of California, which is bounded on three sides by

mountains – the Coast Range to the west and the Sierra Nevadas to the east and south (see Figure 1). The County itself covers approximately 4,863 square miles and encompasses 3,112,320 acres. Federal and State owned lands comprise approximately 51 percent of the County area.

The County is divided into three distinct geographic planning areas: mountains, foothills, and the Valley floor. The Valley floor covers the western approximate one-third of the County, encompassing lands generally below 600 feet in elevation. The portion of the County referenced as the Valley floor contains the majority of the County's confined animal facilities.



PROJECT DESCRIPTION:

The objective of the Animal Confinement Facilities Plan and Ordinance (Phase I) Amendment is to revise the way in which dairies and other bovine facilities are regulated by the County of Tulare. Under the existing Animal Confinement Facilities Plan (ACFP) adopted in 2000, expansions of existing dairies and other bovine facilities and establishment of new dairies and other bovine facilities must be approved through the special use permit process. Each evaluation of a dairy or bovine facility application permit must undergo individual environmental review under the California Environmental Quality Act (CEQA).

Under the proposed amended ACFP, the expansion of existing dairies and other bovine facilities (which comply with the requirements of the ACFP) may be eligible for the site plan review process, while all other expansions -- as well as the establishment of new dairies -- will be accomplished through a special use permit process. The amended ACFP may also apply the same permitting process to the establishment or expansion of all bovine animal confinement facilities (e.g., calve facilities and heifer feedlots), not just dairies.

The primary elements of the proposed scope of the project, the General Plan and Ordinance Amendment process ("GPA"), are identified as follows:

A. Amendments to the Tulare County General Plan, notably the Animal Confinement Facilities Plan ("ACFP"), as well as related provisions of county ordinances, are intended to provide a framework for the permitting and processing of dairy and other bovine facility expansions. Ultimately, the objective is to provide feasible approval processes for existing dairy and bovine facilities and to designate a feasible special use permit process for new and certain expanding facilities. The components of this project include the following:

1. A defined permitting process for:

- (i) Existing dairies and bovine facilities that were constructed before 1974 without a County special use permit or environmental evaluation ("grandfathered facilities"). The intent of the project is to establish, to the extent feasible, a ministerial process designed to permit such dairies and to have the Environmental Impact Report (EIR) serve as the CEQA review document under the auspices of Tulare County as the lead agency.

- (ii) Existing dairies and bovine facilities that have expanded without issuance of a County special use permit for such expansion and have obtained valid permits from the San Joaquin Valley Air Pollution Control District (“SJVAPCD”) and the Regional Water Quality Control Board (“RWQCB”). The intent here is to establish a feasible ministerial process to authorize these expansions and to have the EIR serve as the CEQA review document under the auspices of the County as the lead agency.
 - (iii) Existing dairies and bovine facilities that have expanded without the issuance of a County special use permit for such expansion and have not obtained approval of or are in violation of SJVAPCD or RWQCB permits. The intent here is to establish a feasible ministerial process to authorize these expansions and to have the EIR serve as the CEQA review document under the auspices of the County as the lead agency.
 - (iv) Future new dairies and bovine facilities or certain expansions of existing dairies and bovine facilities would be subject to the discretionary special use permit process. The EIR will encompass future dairy and bovine facility growth at a programmatic level or for a specified time-horizon with supplemental CEQA review on a project-specific basis. The County would serve as the lead agency for CEQA purposes.
2. Streamlining of the requirements for dairy and bovine facility expansions by eliminating redundancies and overlapping standards that duplicate SJVAPCD and RWQCB jurisdictions as to air quality and water quality, respectively. This would include coordination of the County inspection program with respect to operational requirements of bovine facilities administered by the SJVAPCD and the RWQCB.
 3. To the extent that feasible technology allows, preservation of the existing buffer zones under the ACFP and identification with specificity of eligible areas for dairy and bovine facility expansions and the siting parameters therefor.
 4. Description of existing levels of dairy and bovine facility development, forecasting of a growth time-horizon and identification of eligible areas within which growth may occur.

5. Evaluation of cumulative impacts, including but not limited to impacts to land use, air quality, water quality, and greenhouse gas emissions resulting from the project.

POTENTIAL SIGNIFICANT ENVIRONMENTAL EFFECTS:

Based on information prepared as part of an environmental Initial Study for the project, it has been determined that several potentially significant effects could result from implementation of the project. These impacts involve the following areas of review: Aesthetics, Air Quality, Biological Resources, Cultural Resources, Geology and Soils, Green House Gas Emissions, Hazards & Hazardous Materials, Hydrology and Water Quality, Land Use/Planning, Noise, Transportation and Traffic, and Utilities and Service Systems.

Comments Received at
February 2, 2012 Scoping Meeting

**ACFP Scoping Meeting
February 2, 2012**

1. J.P. Cativiela - coalition is in support of County's effort; improve economics; likes streamline; long time coming; wants good environmental doc; County Supervisor Ishida "open for business"; dairies are lynchpin of jobs in the County; enables dairies to modernize with less paperwork.
2. Michele Garcia, Medical Director, Fresno/Madera Medical Society - Air quality issues; wants environmental document for good air quality analysis.
3. Lori Schwaller - will the document address the history of dairies in the County.
4. Darren Montero, California Dairies - streamlining will make things better.
5. Kevin Aberrathe, Board Member CARES - will be nice to have the County come up to speed with other Counties. Good thing to move industry forward and economy.
6. Paul Souza - Cal Western Dairymen - all in support of the project. Likes the streamlining between regulatory agencies.

Appendix D

SJVAPCD Rules and Regulations

- 1. Rule 2201: New and Modified Stationary Source Review Rule**
- 2. Rule 2301: Emission Reduction Credit Banking**
- 3. Rule 3190: Conservation Management Practices Plan Fee**
- 4. Rule 4550: Conservation Management Practices**
- 5. Rule 4570: Concentrated Animal Feeding Operations**
- 6. Regulation VIII: PM10 Requirements**

1. Rule 2201: New and Modified Stationary Source Review Rule

RULE 2201 NEW AND MODIFIED STATIONARY SOURCE REVIEW RULE (Adopted September 19, 1991; Amended March 11, 1992; Amended October 29, 1992; Amended December 17, 1992; Amended October 21, 1993; Amended June 15, 1995; Amended August 20, 1998; Amended June 21, 2001, but not effective until August 20, 2001; Amended April 25, 2002; Amended December 19, 2002; Amended April 20, 2005; Amended December 15, 2005; Amended September 21, 2006; Amended December 18, 2008, but not in effect until June 10, 2010; Amended April 21, 2011)

1.0 Purpose

The purpose of this rule is to provide for the following:

- 1.1 The review of new and modified Stationary Sources of air pollution and to provide mechanisms including emission trade-offs by which Authorities to Construct such sources may be granted, without interfering with the attainment or maintenance of Ambient Air Quality Standards; and
- 1.2 No net increase in emissions above specified thresholds from new and modified Stationary Sources of all nonattainment pollutants and their precursors.

2.0 Applicability

This rule shall apply to all new stationary sources and all modifications to existing stationary sources which are subject to the District permit requirements and after construction emit or may emit one or more affected pollutant. The requirements of this rule in effect on the date the application is determined to be complete by the Air Pollution Control Officer (APCO) shall apply to such application.

3.0 Definitions

- 3.1 Actual Emissions: emissions having occurred from a source, based on source test or monitoring data, actual fuel consumption, and process data. If source test or monitoring data is not available, other appropriate, APCO-approved, emission factors may be used.
- 3.2 Actual Emissions Reduction (AER): the decrease of actual emissions, compared to the Baseline Period, from an emissions unit and selected for use as emission offsets or ERC banking. AER shall meet the following criteria:
 - 3.2.1 Shall be real, enforceable, quantifiable, surplus, and permanent.
 - 3.2.2 To be considered surplus, AER shall be in excess, at the time the application for an Emission Reduction Credit or an Authority to Construct authorizing such reductions is deemed complete, of any emissions reduction which:

- 3.2.2.1 Is required or encumbered by any laws, rules, regulations, agreements, orders, or
 - 3.2.2.2 Is attributed to a control measure noticed for workshop, or proposed or contained in a State Implementation Plan, or
 - 3.2.2.3 Is proposed in the APCO's adopted air quality plan pursuant to the California Clean Air Act.
- 3.2.3 Emissions reductions attributed to a proposed control measure, which are excluded pursuant to Section 3.2.2.2 and 3.2.2.3 may be re-eligible as AER if the control measures identified in the District Air Quality Plan or State Implementation Plan (SIP), are determined not to be necessary for attainment or maintenance of Ambient Air Quality Standards and the APCO and United States Environmental Protection Agency (EPA) have approved amendments to the plan or SIP to reflect this determination.
- 3.3 Administrative Change: a change to an existing permit that:
 - 3.3.1 Corrects typographical errors; or
 - 3.3.2 Identifies a change in the name, address, or phone number of any person identified in the permit, or provides a similar minor administrative change at the source; or
 - 3.3.3 Changes the components of emissions monitoring equipment or other components, which have no effect on the quantity of emissions from an emissions unit, or
 - 3.3.4 Allows for the change of ownership or operational control of a source where the APCO determines that no other change is necessary.
- 3.4 Affected Pollutants: those pollutants for which an Ambient Air Quality Standard has been established by the EPA or by the California Air Resources Board, (ARB), and the precursors to such pollutants, and those pollutants regulated by the EPA under the Federal Clean Air Act or by the ARB under the Health and Safety Code including, but not limited to, VOC, NO_x, SO_x, PM_{2.5}, PM₁₀, CO, and those pollutants which the EPA, after due process, or the ARB or the APCO, after public hearing, determine may have a significant adverse effect on the environment, the public health, or the public welfare.
- 3.5 Agricultural Source: equipment or operations that emit air contaminants and that are used in the production of crops or the raising of fowl or animals.
- 3.6 Air Quality Improvement Deduction: a 10 percent discount factor applied to Actual Emission Reductions (AER) before the AER is eligible for banking.

- 3.7 Ambient Air Quality Standards: include State and National Ambient Air Quality Standards. (In the inclusion of this rule in the State Implementation Plan, all references in this rule to Ambient Air Quality Standards shall be interpreted as National Ambient Air Quality Standards.)
- 3.8 Baseline Emissions (BE): for a given pollutant, shall be equal to the sum of:
- 3.8.1 The pre-project Potential to Emit for:
- 3.8.1.1 Any emissions unit located at a non-Major Source,
- 3.8.1.2 Any Highly-Utilized Emissions Unit, located at a Major Source, provided that if the unit has a Specific Limiting Condition (SLC), all units combined under the SLC have an average combined annual Actual Emissions during the two consecutive years immediately prior to filing of an application for an Authority to Construct equal to or greater than 80% of the units' pre-project SLC limit,
- 3.8.1.3 Any Fully-Offset Emissions Unit, located at a Major Source, provided that if the unit has a SLC, all units under the SLC also qualify as Fully Offset Emissions Units, or
- 3.8.1.4 Any Clean Emissions Unit, located at a Major Source, provided that if the unit has a SLC, all units under the SLC also qualify as Clean Emissions Units.
- 3.8.2 The Historic Actual Emissions (HAE) for emissions units not specified in Section 3.8.1.
- 3.9 Baseline Period: a period of time equal to either
- 3.9.1 the two consecutive years of operation immediately prior to the submission date of the Complete Application; or
- 3.9.2 at least two consecutive years within the five years immediately prior to the submission date of the Complete Application if determined by the APCO as more representative of normal source operation; or
- 3.9.3 a shorter period of at least one year if the emissions unit has not been in operation for two years and this represents the full operational history of the emissions unit, including any replacement units; or
- 3.9.4 zero years if an emissions unit has been in operation for less than one year (only for use when calculating AER).

- 3.10 Best Available Control Technology (BACT): is the most stringent emission limitation or control technique of the following:
- 3.10.1 Achieved in practice for such category and class of source;
 - 3.10.2 Contained in any State Implementation Plan approved by the Environmental Protection Agency for such category and class of source. A specific limitation or control technique shall not apply if the owner of the proposed emissions unit demonstrates to the satisfaction of the APCO that such a limitation or control technique is not presently achievable; or
 - 3.10.3 Contained in an applicable federal New Source Performance Standard; or
 - 3.10.4 Any other emission limitation or control technique, including process and equipment changes of basic or control equipment, found by the APCO to be cost effective and technologically feasible for such class or category of sources or for a specific source.
- 3.11 Biomass-fired power facility: a facility generating electrical power and fueled exclusively on biomass fuels consisting of at least 90% of one or more of the following constituents: alfalfa, barley, bean straw, corn, oats, wheat, orchard and vineyard pruning, and forest residues. Grape stems, grape pumice, almond and walnut shells, construction wood waste, urban wood waste, and lawn trimmings are not considered biomass fuels.
- 3.12 Cargo Carriers: trains dedicated to a specific Stationary Source and vessel dockside activities as defined in 45 Federal Register 52696 (August 7, 1980) for vessels dedicated to a specific Stationary Source. Motor vehicles, as defined by the Vehicle Code of the State of California, are not considered Cargo Carriers.
- 3.13 Clean Emissions Unit: for a given pollutant, an emissions unit that meets one of the following criteria:
- 3.13.1 The unit is equipped with an emissions control technology with a minimum control efficiency of at least 95% (or at least 85% for lean-burn, internal combustion engines); or
 - 3.13.2 The unit is equipped with emission control technology that meets the requirements for achieved-in-practice BACT as accepted by the APCO during the five years immediately prior to the submission of the complete application.
- 3.14 Complete Application: an application for an Emission Reduction Credit or an Authority to Construct for a new or modified emissions unit which has been

evaluated and found to include all information necessary to determine compliance with applicable rules and requirements.

- 3.15 Contiguous or Adjacent Property: a property consisting of two or more parcels of land with a common point or boundary, or separated solely by a public roadway or other public right-of-way.
- 3.16 Daily Emissions Limitation (DEL): one or more permit conditions which restrict a unit's maximum daily emissions, to a level at or below the emissions associated with the maximum design capacity. A daily emissions limitation must be:
 - 3.16.1 Contained in the latest Authority to Construct and contained in or enforceable by the latest Permit to Operate for the emissions unit; and
 - 3.16.2 Enforceable, in a practical manner, on a daily basis.
- 3.17 Emissions Unit: an identifiable operation or piece of process equipment such as a source operation which emits, may emit, or results in the emissions of any affected pollutant directly or as fugitive emissions.
- 3.18 Federal Major Modification: same as "Major Modification" as defined in 40 CFR 51.165 and part D of Title I of the CAA. SB 288 Major Modifications are not federal major modifications if they meet the criteria of one of the following exclusions:
 - 3.18.1 Less-Than-Significant Emissions Increase Exclusion: An emissions increase for the project, or a net emissions increase for the project (as determined pursuant to 40 CFR 51.165 (a)(2)(ii)(B) through (D), and (F)), that is not significant for a given regulated NSR pollutant, as defined in 40 CFR 51.165, is not a federal major modification for that pollutant.
 - 3.18.1.1 To determine the post-project projected actual emissions from existing units, the provisions of 40 CFR 51.165 (a)(1)(xxviii) shall be used.
 - 3.18.1.2 To determine the pre-project baseline actual emissions, the provisions of 40 CFR 51.165 (a)(1)(xxxv)(A) through (D) shall be used.
 - 3.18.1.3 If the project is determined not to be a federal major modification pursuant to the provisions of 40 CFR 51.165 (a)(2)(ii)(B), but there is a reasonable possibility that the project may result in a significant emissions increase, the owner or operator shall comply with all of the provisions of 40 CFR 51.165 (a)(6) and (a)(7).

- 3.18.1.4 Emissions increases calculated pursuant to this section are significant if they exceed the significance thresholds specified in Table 3-1 of this rule.

Table 3-1, Significance Thresholds

POLLUTANT	THRESHOLD (POUNDS PER YEAR)
VOC	0
NO _x	0
PM _{2.5}	20,000 of direct PM _{2.5} emissions or
	80,000 of sulfur dioxide emissions or
	80,000 of nitrogen oxide emissions
PM ₁₀	30,000
SO _x	80,000

- 3.18.2 Plantwide Applicability Limit (PAL) Exclusion: An SB 288 major modification that does not cause facility-wide emissions to exceed a pre-established PAL, as defined in 40 CFR 51.165 (f)(2)(v), for the respective pollutant, is not a federal major modification for that pollutant. PAL exclusions shall not be allowed for either NO_x or VOC pollutants.

- 3.18.2.1 For the purposes of this exclusion, a PAL must be established by a permitting action prior to the SB 288 major modification permitting action.

- 3.18.2.2 All PALs shall be established according to the provisions of 40 CFR 51.165 (f)(1) through (15).

- 3.18.2.3 All PALs shall comply with the requirements under 40 CFR 51.165 (f)(1) through (15) to either maintain, renew or retire the PAL.

- 3.19 Fugitive Emissions: emissions that could not reasonably pass through a vent, chimney, stack, or other functionally equivalent opening. Emissions that are not vented through a stack but can reasonably be captured and vented through a stack are not considered Fugitive. Fugitive emissions shall be included in all calculations, except as provided for in Section 3.24 and as allowed in the applicable 40 CFR Part 51.165.

- 3.20 Fully Offset Emissions Unit: for a given pollutant, an emissions unit for which

- 3.20.1 Offsets have been provided for the unit's full potential to emit; or

- 3.20.2 Offsets have been provided for the entire stationary source's potential to emit in excess of the offset trigger level; or

- 3.20.3 Offsets have previously been provided for the stationary source's NSR balance as calculated pursuant to the NSR rule in effect at the time of the offset action, and the emissions unit was installed after the County baseline date as indicated below:

Table 3-2, County Baseline Dates

COUNTY	BASELINE DATE
San Joaquin County	May 29, 1979
Stanislaus County	June 19, 1979
Merced, Madera, or Kings County	May 21, 1979
Fresno County Oil Fields	September 20, 1983
Fresno County all other sources	January 1, 1977
Tulare County	June 26, 1979
Kern County Heavy Oil Production	September 12, 1979
	June 22, 1987 for heavy oil production operations with negative cumulative net emissions change as of June 22, 1987
Kern County all other sources	December 28, 1976

- 3.21 Heavy Oil: crude oil having an American Petroleum Institute gravity of 20 degrees or less as determined by test method ASTM 287-82.
- 3.22 Highly Utilized Emissions Unit: for a given pollutant, an emissions unit for which the average annual Actual Emissions during the two consecutive years immediately prior to filing of an application for an Authority to Construct were equal to or greater than 80% of the unit's pre-project Potential to Emit. The unit must have been in operation for at least two years and, during that entire period, the unit must have complied with all applicable emission limits and performance standards.
- 3.23 Historical Actual Emissions (HAE): Actual Emissions occurring during the Baseline Period, after discounting for:
- 3.23.1 Any emissions reductions required or encumbered by any laws, rules, regulations, agreements, orders, or permits; and
 - 3.23.2 Any emissions reductions attributed to a control measure noticed for workshop, or proposed or contained in a State Implementation Plan, and
 - 3.23.3 Any emissions reductions proposed in the District air quality plan for attaining the annual reductions required by the California Clean Air Act, and

- 3.23.4 Any Actual Emissions in excess of those required or encumbered by any laws, rules, regulations, orders, or permits. For units covered by a Specific Limiting Condition (SLC), the total overall HAE for all units covered by SLC must be discounted for any emissions in excess of that allowed by the SLC.
- 3.24 Major Source: for each pollutant, 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 following threshold values.
- 3.24.1 For determining major source status, fugitives shall only be included for calculating the air pollutant post-project emissions or SSPE2 if the source is included in the list of source categories identified in the major source definition in 40 CFR Part 70.2, or when determining if a stationary source is a major air toxics source as defined in Rule 2520.

Table 3-3, Major Source Emission Thresholds

POLLUTANT	THRESHOLD (POUNDS PER YEAR)
VOC	20,000
NO _x	20,000
CO	200,000
PM _{2.5}	200,000
PM ₁₀	140,000
SO _x	140,000

- 3.24.2 For the purpose of determining major source status, the SSPE2 shall not include 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. This ERC quantity includes all ERC held as certificates and all emission reduction credits that have been sold or transferred.
- 3.25 Modification:
- 3.25.1 An action including at least one of the following items:
- 3.25.1.1 Any change in hours of operation, production rate, or method of operation of an existing emissions unit, which would necessitate a change in permit conditions.
- 3.25.1.2 Any structural change or addition to an existing emissions unit which would necessitate a change in permit conditions. Routine replacement shall not be considered to be a structural change.

- 3.25.1.3 An increase in emissions from an emissions unit caused by a modification of the Stationary Source when the emissions unit is not subject to a daily emissions limitation.
 - 3.25.1.4 Addition of any new emissions unit which is subject to District permitting requirements.
 - 3.25.1.5 A change in a permit term or condition proposed by an applicant to obtain an exemption from an applicable requirement to which the source would otherwise be subject.
- 3.25.2 A reconstructed Stationary Source shall be treated as a new Stationary Source and not as a modification.
- 3.25.3 Unless previously limited by a permit condition, the following shall not be considered a modification:
 - 3.25.3.1 A change in ownership of an existing emissions unit with valid Permit to Operate provided that the APCO determines that all applicable offset provisions required by the Permit to Operate will be met;
 - 3.25.3.2 A change in ownership of an entire existing Stationary Source with a valid Permit to Operate;
 - 3.25.3.3 A change which consists solely of a transfer of location of an emissions unit within a Stationary Source; or
 - 3.25.3.4 Routine replacement of a whole or partial emissions unit where the replacement part is the same as the original emissions unit in all respects except for the serial number.
- 3.26 Offsets: emission reductions recognized by the APCO in the form of Emission Reduction Credits that are issued in accordance with the provisions of Rule 2301 (Emission Reduction Credit Banking), or other Actual Emissions Reductions that may be used to mitigate an emission increase as part of the same Stationary Source Project in accordance with the provisions of this rule.
- 3.27 Potential to Emit: the maximum capacity of an emissions unit to emit a pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the source to emit a pollutant, including pollution control equipment and restrictions in hours of operation or on the type or amount of material combusted, stored, or processed, shall be treated as part of its design only if the limitation or the effect it would have on emissions is incorporated into the applicable permit as an enforceable permit condition.

- 3.28 PM2.5: particulate matter with an aerodynamic diameter smaller than or equal to a nominal 2.5 microns.
- 3.29 PM10: particulate matter with an aerodynamic diameter smaller than or equal to a nominal ten microns, as defined in District Rule 1020, Definitions.
- 3.30 Pre-baseline ERCs: Emission Reduction Credits that were banked prior to the baseline year for a given District-adopted and EPA-approved Attainment Plan.
- 3.31 Precursor: a directly emitted air contaminant that, when released into the atmosphere, forms or causes to be formed or contributes to the formation of a secondary air contaminant for which an Ambient Air Quality Standard has been adopted, or whose presence in the atmosphere will contribute to the violation of one or more Ambient Air Quality Standards. The following precursor-secondary air contaminant relationships shall be used for the purposes of this rule:

Table 3-4, Precursors

PRECURSOR	SECONDARY AIR CONTAMINANT
Volatile Organic Compounds	a. Photochemical oxidants (Ozone) b. The organic fraction of PM10
Nitrogen Oxides	a. Nitrogen Dioxide b. The nitrate fraction of PM2.5 c. The nitrate fraction of PM10 d. Photochemical oxidants (Ozone)
Sulfur Oxides	a. Sulfur dioxide b. Sulfates c. The sulfate fraction of PM2.5 d. The sulfate fraction of PM10

- 3.32 Quarter: for a non-Seasonal Source, this is defined as a calendar quarter. For a Seasonal Source, a quarter is defined as the entire operating season.
- 3.33 Reasonable Further Progress: as defined by the federal Clean Air Act, Section 182(c)(2)(b).
- 3.34 Reconstructed Source: any Stationary Source undergoing reconstruction where the fixed capital cost of the new components exceeds 50% of the fixed capital cost of a comparable, entirely new Stationary Source. Fixed capital cost is the capital needed to provide depreciable components. Reconstructed Source cost shall include only the cost of all emission-producing equipment and associated integral activities at the stationary source. A reconstructed Stationary Source shall be considered a new Stationary Source and not as a modification of an existing Stationary Source.

- 3.35 Routine Replacement: routine replacement in whole or in part of any article, machine, equipment, or other contrivance with a valid District Permit To Operate provided that all of the following conditions are met:
- 3.35.1 There is no increase in permitted emissions from the replacement unit(s).
 - 3.35.2 There is no increase in design capacity, unless an old part is no longer available in which case the replacement can result in a design capacity increase of up to 10%. No change to the permitted throughput or emissions is authorized due to a change in design capacity as part of routine replacement. Such changes shall require application for permit modification.
 - 3.35.2.1 Permitted throughputs are throughput limits upon which emission calculations are, or could be, based.
 - 3.35.2.2 If there are no throughput limiting conditions, permitted throughput shall be a throughput rate which affects emissions.
 - 3.35.3 The replacement equipment performs the same function as the equipment being replaced.
 - 3.35.4 The replacement does not constitute a Reconstructed Source (as defined by this rule) or Reconstruction (as defined by any applicable New Source Performance Standard). Reconstructed Source cost shall include only the cost of all emission-producing equipment and associated integral activities at the stationary source.
 - 3.35.5 When the entire emissions unit is replaced as a routine replacement action, the emissions unit shall either have been addressed by a BARCT rule or shall be equipped with a control device capable of at least 85% emission control.
- 3.36 SB 288 Major Modification: as defined in 40 CFR Part 51.165 (as in effect on December 19, 2002) and part D of Title I of the CAA (as in effect on December 19, 2002). For the purposes of this definition, the SB 288 major modification thresholds for existing major sources are listed as follows:

Table 3-5, SB 288 Major Modification Thresholds

POLLUTANT	THRESHOLD (POUNDS PER YEAR)
VOC	50,000
NO _x	50,000
PM ₁₀	30,000
SO _x	80,000

- 3.37 Seasonal Source: any Stationary Source with more than 90% of its annual emissions occurring within a consecutive 120-day period.
- 3.38 Specific Limiting Condition (SLC): permit terms or conditions, which can be enforced in a practical manner, contained in Authorities to Construct and Permits to Operate and established pursuant to New Source Review provisions that restrict the total overall permitted emissions from two or more emissions units.
- 3.39 Stationary Source: any building, structure, facility, or installation which emits or may emit any affected pollutant directly or as a fugitive emission. Building, structure, facility or installation includes all pollutant emitting activities including emissions units which:
- 3.39.1 Are under the same or common ownership or operation, or which are owned or operated by entities which are under common control; and
 - 3.39.2 Belong to the same industrial grouping either by virtue of falling within the same two-digit standard industrial classification code or by virtue of being part of a common industrial process, manufacturing process, or connected process involving a common raw material; and
 - 3.39.3 Are located on one or more contiguous or adjacent properties; or
 - 3.39.4 Are located on one or more properties wholly within either the Western Kern County Oil Fields or the Central Kern County Oil Fields or Fresno County Oil Fields and are used for the production of light oil, heavy oil or gas. Notwithstanding the provisions of this definition, light oil production, heavy oil production, and gas production shall constitute separate Stationary Sources.
- 3.40 Stationary Source Project: a single permitting action involving the modification, addition or shutdown of one or more emissions units. If any increase in emissions from a new or modified emissions unit is permitted based on emission reductions from one or more emissions units included in the stationary source project, the following condition must also be met:
- 3.40.1 The modification or shutdown resulting in the necessary emission reductions shall occur not later than the date of initial operation of the new or modified emissions unit. If the new or modified emissions unit is, in whole or in part, a replacement for an existing emissions unit at the same stationary source, the APCO may allow a maximum of 90 days as a start up period for simultaneous operation of the existing emissions unit and the replacement emissions unit.

3.41 Temporary Replacement Emissions Unit (TREU): an emissions unit which is at a Stationary Source for less than 180 days in any twelve month period and replaces an existing emissions unit which is shutdown for maintenance or repair.

3.41.1 The Potential to Emit from a TREU must not exceed the Potential to Emit from the existing emissions unit.

3.41.2 If a TREU is used to replace a TREU, the combined time at the Stationary Source for the two TREU shall not exceed a total of 180 days in any twelve-month period.

3.41.3 An emissions unit not removed from the Stationary Source within 180 days is not a TREU.

4.0 Source Requirements

4.1 Best Available Control Technology (BACT): BACT requirements shall be triggered on a pollutant-by-pollutant basis and on an emissions unit-by-emissions unit basis. Unless exempted pursuant to Section 4.2, BACT shall be required for the following actions:

4.1.1 Any new emissions unit or relocation from one Stationary Source to another of an existing emissions unit with a Potential to Emit exceeding 2.0 pounds in any one day;

4.1.2 Modifications to an existing emissions unit with a valid Permit to Operate resulting in an Adjusted Increase in Permitted Emissions (AIPE) exceeding 2.0 pounds in any one day;

4.1.3 Any new or modified emissions unit, in a stationary source project, which results in an SB 288 Major Modification or a Federal Major Modification, as defined in this rule.

4.2 BACT Exemptions: BACT shall not be required for the following:

4.2.1 CO emissions from a new or modified emissions unit at a Stationary Source with a post project Stationary Source Potential to Emit (SSPE2) of less than 200,000 pounds CO per year;

4.2.2 Cargo Carriers;

4.2.3 For existing facilities, the installation or modification of an emission control technique performed solely for the purpose of compliance with the requirements of District, State or Federal air pollution control laws, regulations, or orders, as approved by the APCO, shall be exempt from Best Available Control Technology for all air pollutants, provided all of the following conditions are met:

- 4.2.3.1 There shall be no increase in the physical or operational design of the existing facility, except for those changes to the design needed for the installation or modification of the emission control technique itself;
- 4.2.3.2 There shall be no increase in the permitted rating or permitted operating schedule of the permitted unit;
- 4.2.3.3 There shall be no increase in emissions from the stationary source that will cause or contribute to any violation of a National Ambient Air Quality Standard, Prevention of Significant Deterioration increment, or Air Quality Related Value in Class I areas; and
- 4.2.3.4 The project shall not result in an increase in permitted emissions or potential to emit of more than 25 tons per year of NO_x, or 25 tons per year of VOC, or 15 tons per year of SO_x, or 15 tons per year of PM-10, or 50 tons per year of CO.
- 4.2.3.5 The project shall not constitute a federal major modification.
- 4.2.4 New emissions unit or modification of an existing emissions unit for voluntary reduction in emissions, for the sole purpose of generating emission reduction credits. This exemption applies only to the pollutant for which emission reduction credits are obtained. BACT may be required for other affected pollutants;
- 4.2.5 Temporary Replacement Emissions Units;
- 4.2.6 Routine Replacement; or
- 4.2.7 Transfer of location of emissions units within the same stationary source.
- 4.3 Adjusted Increase in Permitted Emissions (AIPE) Calculations: Adjusted Increase in Permitted Emissions shall be calculated as

$$AIPE = PE2 - HAPE$$

Where:

AIPE = Adjusted Increase in Permitted Emissions, pounds per day

PE2 = the emissions units post project Potential to Emit, pounds per day

HAPE = the emissions unit's Historically Adjusted Potential to Emit, pounds per day

- 4.4 Historically Adjusted Potential to Emit (HAPE) Calculations: Historically Adjusted Potential to Emit shall be calculated as

$$\text{HAPE} = \text{PE1} \times (\text{EF2} / \text{EF1})$$

Where:

PE1 = The emissions unit's Potential to Emit prior to modification or relocation

EF2 = The emissions unit's permitted emission factor for the pollutant after modification or relocation. If EF2 is greater than EF1 then EF2/EF1 shall be set to 1.

EF1 = The emissions unit's permitted emission factor for the pollutant before the modification or relocation

- 4.5 Emission Offset Requirements:

- 4.5.1 If emission offset requirements are triggered pursuant to Section 4.5.3, emission offsets shall be provided for net emissions increases resulting from a project. Offset quantities shall be calculated pursuant to Section 4.7.
- 4.5.2 For Stationary Sources with a quarterly Potential to Emit which remain constant throughout the year, the amount shall be calculated in pounds per year. For Stationary Sources with quarterly Potential to Emit that is not constant throughout the year, and for Seasonal Sources the amount shall be calculated in pounds per quarter.
- 4.5.3 Offset requirements shall be triggered on a pollutant-by-pollutant basis. Unless exempted pursuant to Section 4.6, offsets shall be required if the post-project Stationary Source Potential to Emit (SSPE2) equals or exceeds the following offset threshold levels:

Table 4-1, Emissions Offset Threshold Levels

POLLUTANT	SSPE2 (POUNDS /YEAR)
VOC	20,000
NO _x	20,000
CO (non-attainment areas)	30,000
CO (attainment areas)	200,000
SO _x	54,750
PM ₁₀	29,200

- 4.5.4 Offsets shall be required for PM_{2.5} and PM_{2.5} precursor emission increases for such increases that constitute new major sources or federal major modifications.
- 4.6 Emission Offset Exemptions: Emission offsets shall not be required for the following:

- 4.6.1 Increases in carbon monoxide in attainment areas if the applicant demonstrates to the satisfaction of the APCO, that the Ambient Air Quality Standards are not violated in the areas to be affected, and such emissions will be consistent with Reasonable Further Progress, and will not cause or contribute to a violation of Ambient Air Quality Standards;
- 4.6.2 Emergency equipment that is used exclusively as emergency standby equipment for electric power generation or any other emergency equipment as approved by the APCO that does not operate more than 200 hours per year for non-emergency purposes and is not used pursuant to voluntary arrangements with a power supplier to curtail power. Equipment exempted by this section shall maintain a written record of hours of operation and shall have permit conditions limiting non-emergency operation;
- 4.6.3 Portable equipment which is registered as such in accordance with the provisions of Rule 2280 (Portable Equipment Registration) or the Statewide Portable Equipment Registration Program (California Code of Regulation Title 13, Article 5, Sections 2450-2465), or equipment registered in accordance with the provisions of Rule 2250 (Permit-Exempt Equipment Registration).
- 4.6.4 On-site soil or groundwater decontamination performed by, under the jurisdiction of, or pursuant to the requirements of an authorized health officer, agricultural commissioner, fire protection officer, or other authorized government officers, provided emissions do not exceed 4,000 pounds per year of any affected pollutant from all emissions units associated with decontamination project;
- 4.6.5 Temporary Replacement Emissions Units.
- 4.6.6 A transfer of location of an entire Stationary Source within the District, under the same owner and provided:
 - 4.6.6.1 The Potential to Emit of any affected pollutant will not be greater at the new location than at the previous location when all emissions units are operated at the same permitted conditions; and
 - 4.6.6.2 BACT is applied to all emissions units with a Potential to Emit exceeding 2.0 pounds per day; and
 - 4.6.6.3 The transferred Stationary Source is not added to an existing Stationary Source.

- 4.6.7 A transfer of location of an emissions unit from one Stationary Source to another within the District, under the same owner and provided:
 - 4.6.7.1 The Potential to Emit of any affected pollutant will not be greater at the new location than at the previous location when all emissions units are operated at the same permitted conditions, and
 - 4.6.7.2 The offsets that would be otherwise required for the unit at the new location have been provided for the emissions unit previously.
- 4.6.8 For existing facilities, the installation or modification of an emission control technique performed solely for the purpose of compliance with the requirements of District, State or Federal air pollution control laws, regulations, or orders, as approved by the APCO, shall be exempt from offset requirements for all air pollutants provided all of the following conditions are met:
 - 4.6.8.1 There shall be no increase in the physical or operational design of the existing facility, except for those changes to the design needed for the installation or modification of the emission control technique itself;
 - 4.6.8.2 There shall be no increase in the permitted rating or permitted operating schedule of the permitted unit;
 - 4.6.8.3 There shall be no increase in emissions from the stationary source that will cause or contribute to any violation of a National Ambient Air Quality Standard, Prevention of Significant Deterioration increment, or Air Quality Related Value in Class I areas; and
 - 4.6.8.4 The project shall not result in an increase in permitted emissions or potential to emit of more than 25 tons per year of NO_x, or 25 tons per year of VOC, or 15 tons per year of SO_x, or 15 tons per year of PM-10, or 50 tons per year of CO.
- 4.6.9 Agricultural Sources, 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.
 - 4.6.9.1 In no case shall the offset exemption in section 4.6.9 apply to an agricultural source that is also a major stationary source for the pollutant for which the offset exemption is sought.

4.7 Emission Offset Quantity Calculations:

4.7.1 For pollutants with a pre-project Stationary Source Potential to Emit (SSPE1) greater than the emission offset threshold levels, emission offsets shall be provided for:

4.7.1.1 All increases in Stationary Source emissions, calculated as the sum of differences between the post-project Potential to Emit (PE2) and the Baseline Emissions (BE) of all new and modified emissions units, plus

4.7.1.2 All increases in Cargo Carrier emissions.

4.7.2 For pollutants with a pre-project Stationary Source Potential to Emit (SSPE1) less than or equal to the offset threshold levels, emission offsets shall be provided for:

4.7.2.1 All increases in Stationary Source emissions above the offset trigger levels, calculated as the difference between the SSPE2 and the offset trigger level, plus

4.7.2.2 All increases in Cargo Carrier emissions.

4.7.3 The quantity of offsets calculated pursuant to Sections 4.7.1 and 4.7.2 shall be multiplied by the appropriate Distance Offset Ratio to determine the final quantity of offsets required.

4.7.4 PM10 Emissions: In determining the quantity of required PM10 offsets, the Total Suspended Particulate Matter (TSP) emissions for which full offsets have been previously provided shall not be recalculated as PM10.

4.8 Distance Offset Ratio: For offset calculations, the distance offset ratio shall be as shown below:

4.8.1 For NO_x and VOC offsets for new major sources and federal major modifications, the distance offset ratio shall be 1.5;

4.8.2 For PM_{2.5} and PM_{2.5} precursor offsets for new major sources and federal major modifications, the offset ratio shall be 1.0;

4.8.3 The requirements of section 4.8.1 shall not apply if the District demonstrates to the satisfaction of the federal Environmental Protection Agency that all major sources of NO_x and VOC in the District are equipped with federal BACT, as defined in CAA Section 169(3). After EPA approval of such a demonstration, the standard distance offset ratios listed in Table 4-2 shall apply for new major sources and federal major

modifications, except that where the original location of the offsets is at the same stationary source as the new or modified emissions unit, the distance offset ratio shall be 1.2.

- 4.8.4 For all other projects not specified above, the standard distance offset ratio shall be as shown in Table 4-2:

Table 4-2, Standard Distance Offset Ratio

ORIGINAL LOCATION OF EMISSION OFFSETS	OFFSET RATIO
at the same Stationary Source as the new or modified emissions unit	1.0
within 15 miles of the new or modified emissions unit's Stationary Source	1.2 for Non-Major Sources 1.3 for Major Sources
15 miles or more from the new or modified emissions unit's Stationary Source	1.5

- 4.9 Pre-project Stationary Source Potential to Emit (SSPE1) shall be calculated as the sum of the following:

- 4.9.1 The Potential to Emit from all units with valid Authorities to Construct (ATC) or Permits to Operate (PTO) at the Stationary Source.

4.9.1.1 For a unit with both a valid ATC and a PTO or a unit with multiple valid ATC, use the ATC or PTO with the highest potential emissions.

4.9.1.2 For units subject to an SLC, the Potential to Emit shall be based on the overall Potential to Emit limit for all units covered by the SLC and not the sum of the individual Potential to Emit of each emissions unit.

- 4.9.2 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. This quantity includes all ERC held as certificates and all emission reduction credits that have been sold or transferred. Reductions shall be added to the SSPE1 as positive values.

- 4.10 Post-project Stationary Source Potential to Emit (SSPE2) shall be calculated, on a pollutant-by-pollutant basis, as the sum of the following:

- 4.10.1 The Potential to Emit from all units with valid Authorities to Construct or Permits to Operate at the Stationary Source, except for emissions units proposed to be shutdown as part of a Stationary Source Project.

- 4.10.1.1 The Potential to Emit of the post-project Authority to Construct will be used for new or modified units, provided that the ATC will include new conditions canceling the existing ATC or PTO for those units, otherwise use the ATC or PTO with the highest potential emissions.
 - 4.10.1.2 For units subject to an SLC, the Potential to Emit shall be based on the overall Potential to Emit limit for all units covered by the SLC and not the sum of the individual Potential to Emit of each emissions unit.
- 4.10.2 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. This quantity includes all ERC held as certificates and all emission reduction credits that have been sold or transferred. Reductions shall be added to the SSPE2 as positive values.
- 4.11 Calculations involving PM10 emissions
 - 4.11.1 For existing Stationary Sources for which particulate matter emissions have been calculated as Total Suspended Particulate (TSP), the PM10 emissions shall be recalculated from TSP values using PM10 emission factors or speciation data.
 - 4.11.2 In the absence of PM10 emissions factors or speciation data, assume 50% of the total suspended particulates is PM10.
 - 4.11.3 If the applicant has previously provided full offsets for total suspended particulate matter emissions, those total suspended particulate matter emissions need not be recalculated as PM10, for the purpose of determining the quantity of offsets.
- 4.12 Actual Emissions Reductions (AER) Calculations: Actual Emissions Reductions shall be calculated, on a pollutant-by-pollutant basis, as follows:
$$\text{AER} = \text{HAE} - \text{PE2}$$

Where:
HAE = Historic Actual Emissions
PE2 = Post-project Potential to Emit

 - 4.12.1 Prior to banking, AER shall be discounted by 10 percent (10%) for Air Quality Improvement Deduction, and shall comply with all applicable provisions of Rule 2301 (Emission Reduction Credit Banking).

- 4.13 Additional Offset Requirements: Offsets obtained subject to this rule shall comply with the following provisions:
- 4.13.1 Major Source shutdowns or permanent curtailments in production or operating hours of a Major Source may not be used as offsets for emissions from a Major Source, a Federal Major Modification, or an SB 288 Major Modification, unless the ERC, or the emissions from which the ERC are derived, has been included in an EPA-approved attainment plan.
 - 4.13.2 Offsets from another district may be used only if the source of the offsets is within 50 miles of the proposed emissions increases and the APCO has reviewed the permit conditions issued by the district in which the proposed offsets are obtained and certifies that such offsets meet the requirements of this rule and CH&SC Section 40709.6.
 - 4.13.3 Interpollutant offsets:
 - 4.13.3.1 Interpollutant offsets may be approved by the APCO on a case-by-case basis, provided that the applicant demonstrates to the satisfaction of the APCO, that the emission increases from the new or modified source will not cause or contribute to a violation of an Ambient Air Quality Standard. In such cases, the APCO shall, based on an air quality analysis, impose offset ratios equal to or greater than the requirements of this rule.
 - 4.13.3.1.1 In no case shall exempt compounds or the other compounds excluded from the definition of VOC be used as offsets for VOC.
 - 4.13.3.1.2 Interpollutant offsets between PM10 and PM10 precursors may be allowed.
 - 4.13.3.1.3 PM10 emissions shall not be allowed to offset NOx or reactive organic compound emissions in ozone nonattainment areas, nor be allowed to offset SO2 emissions in sulfate nonattainment areas.
 - 4.13.3.1.4 Interpollutant offsets between NOx and VOC may be allowed.
 - 4.13.3.2 Interpollutant offsets between PM2.5 and PM2.5 precursors are allowed at specific ratios as established by US EPA, or as approved into the State Implementation Plan by the US EPA.

- 4.13.4 Actual Emissions Reductions (AER) used as offsets must have occurred during the same calendar quarter as the emissions increases being offset except as allowed pursuant to Sections 4.13.6 through 4.13.9.
- 4.13.5 AER used as offsets for a Seasonal Source must have occurred during the same time period as the proposed source will operate except as allowed pursuant to Sections 4.13.6 through 4.13.9.
- 4.13.6 AER used as offsets for a biomass-fired power facility may have occurred during any quarter.
- 4.13.7 AER for PM that occurred from October through March, inclusive, may be used to offset increases in PM during any period of the year.
- 4.13.8 AER for NO_x and VOC that occurred from April through November may be used to offset increases in NO_x and VOC during any period of the year.
- 4.13.9 AER for CO that occurred from November through February may be used to offset increases in CO during any period of the year.
- 4.13.10 AER used as offsets for new and modified Major Sources must be obtained from an area:
 - 4.13.10.1 That has a nonattainment classification that is equal to or higher than the area in which the new or modified Major Source is located, and
 - 4.13.10.2 Where emissions contribute to a violation of a national Ambient Air Quality Standard in the area in which the new or modified Major Source is located.
- 4.13.11 Offsets required as a condition of an Authority to Construct or a Permit to Operate shall commence not later than the date of initial operation of the new or modified emissions unit.
 - 4.13.11.1 If the new or modified emissions unit is, in whole or in part, a replacement for an existing emissions unit at the same stationary source, the APCO may allow a maximum of 90 days as a start up period for simultaneous operation of the existing emissions unit and the replacement emissions unit.
- 4.13.12 Nothing in this rule shall be construed as requiring ERC used as NSR offsets to be discounted at time of use, except for the additional offsets as required by Sections 4.8, 4.13.3, and as described in Section 7.0.

4.14 Ambient Air Quality Standards:

4.14.1 Emissions from a new or modified Stationary Source shall not cause or make worse the violation of an Ambient Air Quality Standard. In making this determination, the APCO shall take into account the increases in minor and secondary source emissions as well as the mitigation of emissions through offsets obtained pursuant to this rule. Modeling used for the purposes of this rule shall be consistent with the requirements contained in the most recent edition of EPA's "Guideline on Air Quality Models" unless the APCO finds such model is inappropriate for use. After making such a finding, the APCO may designate an alternative model only after allowing for public comments and only with the concurrence of the ARB or the EPA.

4.14.1.1 At the discretion of the APCO, a new or modified source which is not subject to the public noticing requirements of Section 5.4 shall be exempted from the requirements of Section 4.14.1.

4.15 Additional Requirements for new Major Sources and Federal Major Modifications

4.15.1 Alternative siting: For those sources for which an analysis of alternative sites, sizes, and production processes is required under Section 173 of the Federal Clean Air Act, the applicant shall prepare an analysis functionally equivalent to the requirements of Division 13, Section 21000 et. seq. of the Public Resources Code.

4.15.2 Compliance by Other Owned, Operated, or Controlled Source: The owner of a proposed new Major Source or federal major modification shall demonstrate to the satisfaction of the APCO that all major Stationary Sources owned or operated by such person (or by any entity controlling, controlled by, or under common control with such person) in California which are subject to emission limitations are in compliance or on a schedule for compliance with all applicable emission limitations and standards.

5.0 Administrative Requirements

The administrative requirements of Sections 5.1 through 5.7, inclusive, shall be applied to all applications for a new or modified emissions unit except for power plants proposed to be constructed in the District and for which a Notice of Intention (NOI) or Application for Certification (AFC) has been accepted by the California Energy Commission. For such power plants, the administrative requirements of Section 5.8 shall apply.

- 5.1 Complete Application: The APCO shall determine whether the application is complete not later than 30 days after receipt of the application, or after such longer time as both the applicant and the APCO may agree.
 - 5.1.1 If the APCO determines that the application is not complete, the applicant shall be notified in writing of the decision specifying the information required. Upon receipt of any resubmittal of the application, a new 30-day period to determine completeness shall begin.
 - 5.1.2 Completeness of an application or resubmitted application shall be evaluated on the basis of the information requirements set forth in the District Rules and Regulations as they exist on the date on which the application or resubmitted application is received.
 - 5.1.3 Upon determination that the application is complete, the APCO shall notify the applicant in writing.
 - 5.1.4 The APCO may, during the processing of the application, request an applicant to clarify, amplify, correct, or otherwise supplement the information submitted in the application.
- 5.2 Preliminary Decision: Following acceptance of an application as complete, the APCO shall perform the evaluations required to determine compliance with this rule and make a preliminary written decision as to whether an Authority to Construct should be approved, conditionally approved, or disapproved.
 - 5.2.1 The APCO shall deny any Authority to Construct if the APCO finds that the subject of the application would not comply with the standards set forth in this rule or any other District rule.
 - 5.2.2 The decision shall be supported by a succinct, written analysis.
- 5.3 Final Action: Within 180 days after acceptance of an application as complete, or within 180 days after the lead agency has approved the project under the California Environmental Quality Act, whichever occurs later, the APCO shall take final action on the application after considering all written comments.
- 5.4 Public Notification and Publication Requirements: The APCO shall provide public notification and publication for the following types of applications:
 - 5.4.1 New Major Sources, Federal Major Modifications, and SB 288 Major Modifications.
 - 5.4.2 Applications which include a new emissions unit with a Potential to Emit greater than 100 pounds during any one day for any one affected pollutant;

- 5.4.3 Modifications that increase the Stationary Source Potential to Emit (SSPE1) from a level below the emissions offset threshold level to a level exceeding the emissions offset threshold level for one or more pollutants;
- 5.4.4 New Stationary Sources with post-project Stationary Source Potential to Emit (SSPE2) exceeding the emissions offset threshold level for one or more pollutants;
- 5.4.5 Any permitting action resulting in a Stationary Source Project Increase in Permitted Emissions (SSIPE) exceeding 20,000 pounds per year for any one pollutant.
- 5.5 Public Notification and Publication Actions: For the types of applications listed in Section 5.4, the APCO shall perform the following actions:
 - 5.5.1 Within ten (10) calendar days following the preliminary decision the APCO shall publish in at least one newspaper of general circulation in the District a notice stating the preliminary decision, noting how pertinent information can be obtained, and inviting written public comment for a 30 day period following the date of publication.
 - 5.5.2 No later than the date of publication, the APCO shall transmit to the applicant its preliminary written decision, the analysis, and a copy of the notice submitted for publication.
 - 5.5.3 No later than the date of publication, the APCO shall transmit to the ARB and to any person who requests such information, its preliminary written decision, the analysis, and a copy of the notice submitted for publication. For new Major Sources, Federal Major Modifications, and SB 288 Major Modifications, the APCO shall also transmit the preliminary written decision and supporting documents to the EPA.
 - 5.5.4 No later than the time the notice of the preliminary decision is published, the APCO shall make available for public inspection at the District office the information submitted by the applicant and the analysis.
 - 5.5.5 The APCO shall provide written notice of the final action to the applicant, and the ARB, and shall publish such notice in a newspaper of general circulation, except that for an application not subject to Section 5.4, the APCO shall not be subject to this section. In such a case, the applicant shall receive notification as provided in Rule 2040 (Applications). For new Major Sources, Federal Major Modifications, and SB 288 Major Modifications, the APCO shall also transmit written notice of the final action to the EPA.

- 5.5.6 No later than the time of notice of final action is published, the APCO shall make available for public inspection at the District office a copy of the notice submitted for publication and all supporting documents.

5.6 Authority to Construct (ATC) - General Conditions

- 5.6.1 An ATC shall not be issued unless the new or modified source complies with the provisions of this rule and all other applicable District Rules and Regulations.
- 5.6.2 An ATC shall require that the new or modified source be built according to the specifications and plans contained in the application.
- 5.6.3 An ATC shall include all those conditions which the APCO deems necessary to assure construction and operation in the manner assumed in making the analysis to determine compliance with this rule.
- 5.6.4 An ATC shall include all those conditions relating to the satisfaction of the offset requirements of this rule.
- 5.6.5 An ATC issued for an emissions unit that relies on reduction in emissions from other units included in the Stationary Source Project, must include a condition that requires initiating and completing construction on those units that provide the reduction prior to commencing operation of the unit with increase in emissions.
 - 5.6.5.1 If the new or modified emissions unit is, in whole or in part, a replacement for an existing emissions unit at the same stationary source, the APCO may allow a maximum of 90 days as a start up period for simultaneous operation of the existing emissions unit and the replacement emissions unit.

5.7 Permit to Operate (PTO) - General Conditions

- 5.7.1 A PTO shall require that the new source or modification be operated in the manner assumed in making the analysis to determine compliance with this rule and as conditioned in the Authority to Construct.
- 5.7.2 A PTO shall include daily emissions limitations and other enforceable conditions which reflect applicable emission limits including the offset requirements.
- 5.7.3 The APCO shall determine if the applicant has complied with all the conditions in the ATC. The APCO may allow conditions which have not been met at the time the PTO is issued to be incorporated into the Permit to Operate, provided that compliance with that condition is demonstrated by a specified date.

- 5.7.4 Any source which provides offsets shall be subject to enforceable permit conditions containing specific operational and emissions limitations, which ensure that the emissions reductions will be provided in accordance with the provisions of this rule and shall continue for the reasonably expected life of the proposed source. Where the source of offsets is not subject to a permit, a written contract shall be required between the applicant and the owner of such source, which contract, by its terms, shall be enforceable by the APCO. The permit and contract shall be submitted to the ARB to be forwarded to the EPA as part of the State Implementation Plan. A violation of the emission limitation provisions of any such contract shall be chargeable to the applicant.
- 5.7.5 Offsets required as a condition of an ATC or a PTO shall commence not later than the date of initial operation of the new or modified source,
- 5.7.5.1 If a new or modified Stationary Source is, in whole or in part, a replacement for an existing Stationary Source on the same or contiguous property the APCO may allow a maximum of 90 days as a start up period for simultaneous operation of the existing Stationary Source and the new or replacement source.
- 5.8 Power plants which will be licensed by the California Energy Commission: The administrative requirements of this section shall be applied to all power plants proposed to be constructed in the District and for which a Notice of Intention (NOI) or Application for Certification (AFC) has been accepted by the California Energy Commission. The APCO may apply for reimbursement of all costs incurred, including lost fees, in order to comply with the provisions of this section.
- 5.8.1 Intent to Participate and Preliminary Report: Within 14 days of receipt of a NOI, the APCO shall notify the ARB and the California Energy Commission of the APCO's intent to participate in the NOI proceeding. If the APCO chooses to participate in the NOI proceeding, the APCO shall prepare and submit a report to the ARB and the California Energy Commission prior to the conclusion of the nonadjudicatory hearings specified in Section 25509.5 of the Public Resources Code. The report shall include at least:
- 5.8.1.1 A preliminary specific definition of BACT for the proposed facility.
- 5.8.1.2 A preliminary discussion of whether there is substantial likelihood that the requirements of this rule and all other District rules can be satisfied by the proposed facility.

- 5.8.1.3 A preliminary list of conditions which the proposed facility must meet in order to comply with this rule or any other applicable District rules. The preliminary determinations contained in the report shall be as specific as possible within the constraints of the information contained in the NOI.
- 5.8.2 Equivalency of Application for Certification to Application for Authority to Construct: The APCO shall consider an Application for Certification (AFC) to be equivalent to an application for an Authority to Construct, and subject, as such, to all definitions and requirements of this rule.
- 5.8.3 Upon receipt of an AFC for a power plant, the APCO shall conduct a Determination of Compliance review. This review shall determine whether an AFC is complete, and within 20 calendar days of receipt of the AFC, the APCO shall so inform the California Energy Commission and the applicant in writing.
 - 5.8.3.1 If the APCO determines that the application is not complete, the information required shall be specified, and the AFC shall be returned to the applicant for resubmittal. Upon receipt of any resubmittal of the application, a new 20 day period to determine completeness shall begin.
 - 5.8.3.2 Completeness of an application or resubmitted application shall be evaluated on the basis of the information requirements set forth in District Rules and Regulations as they exist on the date on which the application or resubmitted application is received.
- 5.8.4 The APCO may request from the applicant any information necessary for the completion of the Determination of Compliance review. If the APCO is unable to obtain the information, the APCO may petition the presiding Commissioner of the California Energy Commission for an order directing the applicant to supply such information.
- 5.8.5 Within 180 days of accepting an AFC as complete, the APCO shall make a preliminary written decision as to whether a Determination of Compliance Certification should be approved, conditionally approved, or disapproved. The APCO shall deny any Determination of Compliance Certification if the APCO finds that the subject of the application would not comply with the standards set forth in this rule or any other District rule. The decision shall be supported by a succinct, written analysis.
- 5.8.6 Notification and Publication actions shall be conducted according to the requirements of Section 5.5.

5.8.7 Within 240 days after acceptance of an application as complete, the APCO, after considering all written comments, shall take final action on the application, which action shall consist of the following:

5.8.7.1 The APCO, if all requirements of this rule are met, shall issue and submit to the California Energy Commission a Determination of Compliance, or advise the Commission that a Determination of Compliance cannot be issued.

5.8.7.2 Public inspection of final action documents shall be provided for in accordance with Section 5.5.6

5.8.8 Equivalency of Determination of Compliance to Authority to Construct: A Determination of Compliance shall confer the same rights and privileges as an Authority to Construct provided that the California Energy Commission approves the Application for Certification and the certificate granted by the Commission includes all conditions of the Determination of Compliance.

5.8.9 The APCO shall issue a Permit to Operate to any applicant receiving a certificate from the California Energy Commission pursuant to this rule provided that the construction or modification is in compliance with all conditions of the certificate and of the Determination of Compliance, and provided that the Permit to Operate includes the conditions prescribed in Section 5.7.

5.9 Enhanced Administrative Requirements

Application for a certificate of conformity with the procedural requirements of 40 CFR Part 70 shall be subject to the following enhanced administrative requirements in addition to any other applicable administrative requirements of Section 5.0:

5.9.1 New Sources and Significant Permit Modifications

5.9.1.1 Public Notification: The APCO shall provide a written notice of the proposed permit and, upon request, copies of the APCO analysis to interested parties. Interested parties shall include affected states, ARB and persons who have requested in writing to be notified. The notice shall also be given by publication in a newspaper of general circulation in the District and by any other means if necessary to assure adequate notice to the affected public. The public shall be given 30 days from the date of publication to submit written comments on the APCO's proposed action.

- 5.9.1.2 The notice shall provide the following information:
 - 5.9.1.2.1 The identification of the source, the name and address of the permit holder, the activities and emissions change involved in the permit action;
 - 5.9.1.2.2 The name and address of the APCO, the name and telephone number of District staff to contact for additional information;
 - 5.9.1.2.3 The availability, upon request, of a statement that sets forth the legal and factual basis for the proposed permit conditions;
 - 5.9.1.2.4 The location where the public may inspect the Complete Application, the APCO's analysis, the proposed permit, and all relevant supporting materials;
 - 5.9.1.2.5 A statement that the public may submit written comments regarding the proposed decision within at least 30 days from the date of publication and a brief description of commenting procedures, and
 - 5.9.1.2.6 A statement that members of the public may request the APCO or his designee to preside over a public hearing for the purpose of receiving oral public comment, if a hearing has not already been scheduled. The APCO shall provide notice of any public hearing scheduled to address the proposed decision at least 30 days prior to such hearing;
- 5.9.1.3 The APCO shall provide written response to persons or agencies that submitted written comments which are postmarked by the close of the public notice and comment period. All written comments and responses to such comments shall be kept on file at the District office and made available upon request.
- 5.9.1.4 A copy of the Complete Application, the APCO's analysis and the proposed permit shall be made available at District offices for public review and comment during normal business hours. The APCO's analysis shall include a statement that sets forth the legal and factual basis for the proposed permit conditions, including references to the applicable statutory and regulatory provisions.

- 5.9.1.5 The APCO shall provide written notice to the EPA of the proposed decision along with copies of the proposed permit, the APCO's analysis, the public notice submitted for publication, and all necessary supporting information.
- 5.9.1.6 If the EPA does not object pursuant to Section 5.9.1.9, the APCO shall issue the final permit.
- 5.9.1.7 If the EPA does not object in writing to the APCO's preliminary decision during the EPA's 45 day review period, any person may petition the EPA within 60 days after the expiration of the EPA's 45 day review period. Any such petition shall be based only on objections to the permit that were raised with reasonable specificity during the public comment period, unless the petitioner demonstrates to the EPA that it was impracticable to raise such objections within such period, or unless grounds for such objections arose after such period. Petitions shall be based on the compliance of the permit provisions with applicable requirements.
- 5.9.1.8 Within 180 days after acceptance of an application as complete, or within 180 days after the lead agency has approved the project under the California Environmental Quality Act, whichever occurs later, the APCO shall take final action on the application after considering all written comments.
- 5.9.1.9 The APCO shall not issue a permit if the EPA objects to its issuance in writing within 45 days of receipt of the APCO's notice of preliminary decision on the proposed permit.
 - 5.9.1.9.1 Any EPA objection shall include a statement of the EPA's reasons for objection and a description of the terms and conditions that the permit must include to respond to the objections. The EPA shall provide the permit applicant a copy of the objection.
 - 5.9.1.9.2 If the APCO fails, within 90 days after the date of EPA's objection, or within 180 days from the date the application was deemed complete plus any extension allowed by the state law, whichever is sooner, to revise and submit a proposed permit in response to the objection, the APCO shall not issue a certification on conformity to Title V.
 - 5.9.1.9.3 If the EPA objects to the permit as a result of a public petition, the APCO shall not issue the permit until

EPA's objection has been resolved, except that a petition for review does not stay the effectiveness of a permit or its requirements if the permit was issued after the end of the 45-day review period and prior to an EPA objection. If the APCO has issued a permit prior to receipt of an EPA objection, the EPA will modify, terminate, or revoke such permit, and shall do so consistent with procedures in Section 70.7(g)(4) or (5)(i) and (ii) of the 40 CFR regulations, and the APCO may thereafter reissue only a revised permit that satisfies EPA objection.

5.9.1.9.4 EPA objection shall be limited to compliance with applicable requirements and the requirements of 40 CFR Part 70.

5.9.2 Minor Permit Modifications

5.9.2.1 Within 5 working days after the receipt of a Complete Application for a minor permit modification, the APCO shall provide notification of the proposed permit modification to the EPA, affected states, and interested parties pursuant to Section 5.9.1.1.

5.9.2.2 The APCO shall not issue a final permit modification until after a 45-day period review of the proposed permit modification by EPA or until EPA has notified the APCO that EPA will not object to issuance of the permit modification, whichever is first.

5.9.2.3 Within 90 days after APCO's receipt of an application for a minor permit modification or 15 days after the end of the EPA's 45-day review, whichever is later, the APCO shall do one of the following:

5.9.2.3.1 Issue the permit as proposed;

5.9.2.3.2 Deny the permit modification application;

5.9.2.3.3 Determine that the requested modification does not meet the minor permit modification criteria and should be reviewed pursuant to the administrative requirements for significant permit modifications; or

5.9.2.3.4 Revise the draft permit modification and transmit the new proposed permit modification to EPA and the affected states.

6.0 Certification of Conformity

A new or modified source subject to the requirements of Rule 2520 may choose to apply for a certificate of conformity with the procedural requirements of 40 CFR Part 70. A certification of conformity will allow changes authorized by the Authority to Construct to be incorporated into the Part 70 permit as administrative permit amendments.

- 6.1 The APCO will issue a written certificate of conformity with the procedural requirements of 40 CFR 70.7 and 70.8, and with the compliance requirements of 40 CFR 70.6(8)(c), if the following conditions are met:
 - 6.1.1 The Authority to Construct is issued in conformance with the Enhanced Administrative Requirements of this rule;
 - 6.1.2 The content of the Authority to Construct issued by the APCO complies with the requirements set forth in Section 9.0 of District Rule 2520 (Federally Mandated Operating Permits);
 - 6.1.3 An application for a certificate of conformity with the requirements of 40 CFR Part 70 is submitted with the application for Authority to Construct. The content of application for the certificate of conformity must comply with the requirements of Sections 7.1 of District Rule 2520 (Federally Mandated Operating Permits);
 - 6.1.4 The Authority to Construct contains a statement of conformity with the requirements of Title V and 40 CFR Part 70;
 - 6.1.5 EPA has not objected to the issuance of the Authority to Construct, or EPA's objections have been resolved to the satisfaction of EPA administrator; and
 - 6.1.6 The Part 70 operating permit being issued will contain the federally enforceable requirements contained in the Authority to Construct.
- 6.2 The certificate of conformity with the procedural requirements of 40 CFR Part 70 is valid as long as the Authority to Construct with which it was issued is valid.
- 6.3 Modifications to an Authority to Construct for which a certificate of conformity has been issued are subject to the administrative requirements of Section 11.0 of District Rule 2520 that apply to permit modifications and changes, as well as the requirements of all District Rules that apply to modifications of Authorities to Construct.

7.0 Annual Offset Equivalency Demonstration and Pre-baseline ERC Cap Tracking System

7.1 Offset Tracking System

The APCO shall implement a system for tracking the following for each permitting action:

7.1.1 The quantity of offsets that would have been required for new major sources and federal major modifications in the District had the federal new source review requirements, codified in 40 CFR 51.165, and Title I part D of the Clean Air Act (CAA), been applied to these sources. These requirements include offsetting the full emissions from new major sources, using actual emissions baselines when required under 40 CFR 51.165, and providing offsets necessary to meet the CAA offset ratio requirements and provide a net air quality benefit.

7.1.2 The quantity of offsets actually required for all new and modified sources in the District pursuant to the requirements of this rule, and, for the purposes of the Pre-baseline ERC Cap Tracking System outlined in any District-adopted and EPA-approved attainment plan.

7.1.3 The surplus value of creditable emission reductions used as offsets by stationary sources.

7.1.3.1 The surplus value shall be determined at the time of ATC issuance for the sources using the emission reductions to satisfy offset requirements of this rule.

7.1.3.2 The determination of surplus value shall specify all requirements that apply to the offsets being reviewed, the methodology used to calculate the impact of these requirements, and all calculations performed in arriving at the final surplus value.

7.1.4 For purposes of the requirements of Section 7.0, surplus value shall be defined as the quantity of actual emission reductions achieved by a source in excess of the following requirements:

7.1.4.1 Any emission reduction required by a stand-alone federal requirement or regulation, including, but not limited to, Acid Rain, New Source Performance Standard, Reasonably Available Control Technology, and Maximum Achievable Control Technology, whether or not the requirements are part of the State Implementation Plan (SIP) or a local attainment plan.

7.1.4.2 Any emission reduction relied upon by a permitting authority for

attainment purposes, such as through an attainment plan, including emission reductions relied upon for Reasonable Further Progress calculations.

7.1.4.3 Any emission reduction achieved by shutting down an existing source or curtailing production or operating hours below baseline levels whose original emission is not included in the District's emission inventory.

7.1.4.4 Any emission reduction based on a source-specific or source category-specific SIP provision used to comply with CAA requirements.

7.1.4.5 Any emission reduction required by a condition of a permit issued to comply with CAA New Source Review requirements, except that any emission reduction required by a permit condition, which was placed on a permit solely to assure compliance with a state or local requirement, which is not on its own federally enforceable, shall not be included in this class.

7.1.4.6 Any emission reduction based on a source-specific emission limitation resulting from an EPA enforcement case.

7.1.5 For purposes of the requirements of Section 7.0, creditable shall be defined as emission reductions are real, surplus, quantifiable, enforceable and permanent. The creditability of a given emission reduction may be subject to review by the EPA.

7.2 Annual Demonstration Report

The APCO shall annually prepare a report with the following demonstrations to be provided to the public, the ARB and the EPA in accordance with the dates specified in Section 7.3. The District shall also make available to the public, the ARB and the EPA the data used to prepare the demonstrations.

7.2.1 Demonstration on Equivalency of Offset Requirements

7.2.1.1 The report shall include a comparison of the annual quantity of federal offsets that would have been required (as tracked pursuant to Section 7.1.1) to the annual quantity of offsets actually required under this rule, including any excess offsets required from previous reporting years (as tracked pursuant to Section 7.1.2).

7.2.1.2 The report shall also describe any additional emission reductions retired to address a shortfall in required offsets as specified in

Section 7.4.1.1. Such description shall, at a minimum, specify the emission reductions used and the surplus value of those reductions. The surplus value of these reductions may also be used in demonstrating equivalency under section 7.2.2

7.2.2 Demonstration on Creditability of Emission Reductions

7.2.2.1 The report shall include a comparison of the annual quantity of federal offsets that would have been required (as tracked pursuant to Section 7.1.1) to the surplus value of creditable emission reductions used as offsets during the year (as tracked pursuant to Section 7.1.3).

7.2.2.2 For purposes of the demonstration described in Section 7.2.2, the comparison may also include the surplus value of additional creditable emission reductions that have not been used as offsets and have been banked or have been generated as a result of permitting actions. The surplus value of these reductions may also be used to remedy any shortfall as specified under Section 7.4.1.1.

7.2.2.2.1 The surplus value of these additional credits shall be determined as of the date of the issuance of the Authority to Construct utilizing such reductions in demonstration described in this subsection.

7.2.2.2.2 Any such additional emission reductions used in this demonstration shall be permanently retired and shall not be used to meet any offset or netting requirements and shall not be used in future demonstrations required by Section 7.0.

7.2.2.2.3 Additional emission reductions described in Section 7.2.2.2 shall only be included in the comparison to the extent the annual quantity of federal offsets that would have been required (as tracked pursuant to Section 7.1.1) exceeds the surplus value of creditable emission reductions used as offsets (as tracked pursuant to Section 7.1.3).

7.2.2.2.4 Any additional emission reductions described in Section 7.2.2.2 that are not included in the demonstration required by this subsection, may be used in future demonstrations in accordance with this subsection.

7.3 Reporting Schedule

- 7.3.1 The report shall cover the period August 20 to August 19 of each year. For the Initial report, the District shall track offset requirements for new and modified sources for which a complete application for Authority to Construct was submitted after August 20, 2001. Additional emission reductions, other than banked emission reductions, may be used in the equivalency demonstration only if the reduction occurred after August 20, 2001
- 7.3.2 For each reporting period, the APCO shall submit the report and data described in Section 7.2 to ARB and the EPA no later than November 20 of each year. In addition, the APCO shall release the report to the public and shall present it to the District Governing Board, each year, at the first Board meeting following its submittal to the EPA.
- 7.3.3 All documents created and/or used in implementing the requirements of Section 7.0 shall be kept and maintained by the APCO for no less than five years from the date of their creation and/or use.

7.4 Remedy for Emission Offset Shortfalls

7.4.1 Failure to Demonstrate Equivalency in Offset Requirements

- 7.4.1.1 If the comparison described in Section 7.2.1 does not show, or EPA determines the comparison erroneously shows, that the annual quantity of offsets actually required under this rule (as tracked pursuant to Section 7.1.2) equals or exceeds the annual quantity of federal offsets that would have been required (as tracked pursuant to Section 7.1.1), the District shall retire additional creditable emission reductions that have not been used as offsets and have been banked or have been generated as a result of permitting actions such that the surplus value of these emission reductions satisfies any shortfall.

- 7.4.1.1.1 The surplus value of these additional credits shall be determined as of the date of the issuance of the Authority to Construct utilizing such reductions in demonstration described in this subsection.

- 7.4.1.1.2 Any such additional emission reductions used in this demonstration shall be permanently retired and shall not be used to meet any offset or netting requirements and shall not be used in future demonstrations required by Section 7.0.

- 7.4.1.2 If the District does not have sufficient additional creditable emission reductions to satisfy the shortfall described in 7.4.1.1, all ATCs issued after the report deadline for that year shall comply with the offset requirements of 40 CFR 51.165, and part D of Title I of the CAA, for each pollutant for which there is a shortfall, until the applicability and offset requirements of this rule are revised to comply with the federal new source review requirements and approved into the SIP by EPA.
- 7.4.1.3 If the APCO fails to submit a report meeting the requirements of Section 7.2.1, all ATC issued after the report deadline and until the APCO submits to ARB, EPA and the public a report complying with the requirements of Section 7.2.1 shall comply with the offset requirements of 40 CFR 51.165, and part D of Title I of the CAA.

7.4.2 Failure to Demonstrate Adequate Creditable Emission Reductions

- 7.4.2.1 If the comparison described in Section 7.2.2 does not show, or EPA determines the comparison erroneously shows, that the surplus value of creditable emission reductions used as offsets during the year (as tracked pursuant to Section 7.1.3) combined with additional emission reductions as described in Section 7.2.2.2 equals or exceeds the annual quantity of federal offsets that would have been required (as tracked pursuant to Section 7.1.1), all ATCs issued, for new major sources or federal major modifications, for each pollutant for which there is a shortfall, after the report deadline shall ensure that emission reductions used to satisfy offset requirements are creditable and that the surplus value of those credits is determined at the time of ATC issuance.
- 7.4.2.2 The requirements of Section 7.4.2.1 shall remain in effect until this rule is revised to require offset discounting at time of use and such revision is approved into the SIP by EPA, or until a subsequent annual report prepared in accordance with Section 7.2.2 demonstrates that the surplus value of creditable emission reductions used as offsets (as tracked pursuant to Section 7.1.3) combined with additional emission reductions as described in Section 7.2.2.2 equals or exceeds the annual quantity of federal offsets that would have been required (as tracked pursuant to Section 7.1.1).
- 7.4.2.3 If the APCO fails to submit a report meeting the requirements of Section 7.2.2, all ATCs issued for new major sources or federal major modifications after the report deadline and until the APCO

submits to ARB, EPA and the public a report complying with the requirements of Section 7.2.1 shall ensure that emission reductions used to satisfy offset requirements are creditable and that the surplus value of those credits is determined at the time of ATC issuance.

7.5 Pre-Baseline ERC Usage Caps from District Attainment Plans

7.5.1 ERCs that were banked prior to the baseline year for a given District-adopted and EPA-approved Attainment Plan shall not be used to offset emissions increases under the provisions of this rule if the usage of such credits during the effective period of the plan exceeds the respective pollutant's Pre-Baseline ERC Usage Cap in the plan.

7.5.2 Such caps on pre-baseline ERC usage remain in effect until the end of the plan's effective period, or until such time as EPA approves revised caps through an Attainment Plan revision process or a Rate of Progress update.

8.0 Application Shield for Routine Replacement

8.1 For a Routine Replacement for which an Authority to Construct is required, the permitted source may continue to operate under an application shield, provided that all of the following conditions are met.

8.1.1 An application for the Routine Replacement has been submitted within seven calendar days of completing the routine replacement.

8.1.2 The source operates in compliance with all applicable requirements of the federal, state, and District rules and regulations.

8.2 When the application has been deemed complete by the APCO, the application shield shall be made effective retroactive from the date of application submittal until the application is either approved or denied,

8.2.1 The application shield is not applicable if the District's final action is delayed due to the failure of the applicant to submit timely information requested by the District. The source must also submit additional information for any requirements that become applicable after a complete application is submitted, but before a PTO is issued.

8.3 The application shield does not exempt the operator from any applicable requirements.

8.4 The application shield applies only to an application for a Routine Replacement and does not authorize any increases to the permitted throughput or emissions due to a change in design capacity as part of a Routine Replacement.

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2. Rule 2301: Emission Reduction Credit Banking

RULE 2301 EMISSION REDUCTION CREDIT BANKING (Adopted September 19, 1991;
Amended March 11, 1992; Amended December 17, 1992)

1.0 Purpose

The purposes of this rule are to:

- 1.1 Provide an administrative mechanism for sources to store emission reduction credits for later use as offsets where allowed by District Rules and Regulations or State and Federal Rules and Regulations.
- 1.2 Provide an administrative mechanism for sources to transfer emission reduction credits to other sources for use as offsets as allowed by Rule 2201 (New and Modified Stationary Source Review Rule) or State and Federal Rules and Regulations.
- 1.3 Define eligibility standards, quantitative procedures and administrative practices to ensure that emission reduction credits (ERCs) are real, permanent, quantifiable, surplus, and enforceable.

2.0 Applicability

The provisions of this rule apply to all transactions involving the storage, transfer, or use of emission reduction credits of affected pollutants.

3.0 Definitions

Unless otherwise defined, terms as used in this rule are defined in Rule 2201 (New and Modified Stationary Source Review Rule).

- 3.1 Actual Emission Reductions: as defined in Rule 2201 (New and Modified Stationary Source Review Rule). If the reductions are authorized by an Authority to Construct, the adjustments made to the actual emissions reductions as defined in Rule 2201 (New and Modified Stationary Source Review Rule), shall be based on the rules, plans, workshop notices at the time the application for such Authority to Construct was deemed complete.
- 3.2 Bankable Emission Reductions: emission reductions of pollutants and their precursors for which ambient air quality standards exist and which meet the provisions of this rule. Such reductions may be deposited in the District's ERC Bank. Once banked and certified, the emission reductions become ERCs.
- 3.3 Banking: the District's system of quantifying, certifying, recording, and storing ERCs for future use or transfer. This system shall be called the District's Emission Reduction Credit Bank (herein referred to as the ERC Bank).

- 3.4 Banking Register: the document that records all ERC deposits, withdrawals, transfers, and transactions.
- 3.5 Baseline Period: the same period as defined in Rule 2201 (New and Modified Stationary Source Review Rule).
- 3.6 Emission Reduction Credits (ERCs): reductions of actual emissions from emission unit recognized by the District as available for use as tradeoffs or offsets in accordance with the requirements of this rule. To be eligible for certification as ERCs, emissions reductions must be real, surplus, permanent, quantifiable and enforceable. All emission reductions meeting these requirements may be certified as ERCs.
- 3.7 ERC Certificate: a document certifying title to a defined quantity and type of ERCs issued by the District to the owner(s) identified on the Certificate.
- 3.8 Non-inventoried Emissions: those emissions of an air pollutant into the atmosphere from any source which has not been recorded on the District emission inventory.
- 3.9 Non-permitted Emissions: those emissions of an air pollutant into the atmosphere from non-permitted emission sources that are not required to have air pollution permits. Non-permitted emissions may include emissions from agricultural waste burning, mobile source emissions, exempt emissions units, and sources that were never subject to the requirements of Rule 2201 (New and Modified Stationary Source Review Rule).
- 3.10 Offset: the use of an ERC to mitigate emission increases of an affected pollutant from a new or modified source subject to the requirements of Rule 2201 (New and Modified Stationary Source Review Rule).
- 3.11 Shutdown: shall mean either the earlier of the permanent cessation of emissions from an emitting unit or the surrender of that unit's operating permit. If, prior to the surrender of the operating permit, the APCO determines that:
 - 3.11.1 the unit has been removed or fallen into an inoperable and unmaintained condition such that startup would require an investment exceeding 50% of the current replacement cost; and
 - 3.11.2 the owner cannot demonstrate to the satisfaction of the APCO that the owner intended to operate again, then the APCO may cancel the permit and deem the source shutdown as of the date of last emissions. Evidence of an intent to operate again may include valid production contracts, orders, other agreements, or any economically based reasons which would require the operation of the emitting unit after initial cessation of emissions.

3.12 Transfer: the conveyance of an ERC from one entity to another.

4.0 Eligibility of Emission Reductions

4.1 Emissions Reductions Occurring Before September 19, 1991

For the purpose of this section District means the San Joaquin Unified Air Pollution Control District (SJVUAPCD) or any former county Air Pollution Control District that is now included in the SJVUAPCD.

Upon application and approval by the APCO, the following emissions reductions occurring prior to September 19, 1991 may receive Emissions Reduction Banking Certificates:

4.1.1 Emission reductions occurring after January 1, 1988 and prior to the date of adoption of this rule which have been recognized by the District pursuant to a banking rule or pursuant to a formal internal tracking mechanism shall be deemed eligible emission reductions, provided:

4.1.1.1 the APCO determines that such emission reductions comply with the definition of AER;

4.1.1.2 the reductions are real, surplus, permanent, quantifiable, and enforceable; and

4.1.1.3 they have not been used for approval of an Authority to Construct or used as offsets.

4.1.2 Emissions reductions occurring prior to January 1, 1988 which have been recognized by the District pursuant to a banking rule or were formally recognized in writing by the District as available for offsets shall be eligible for emissions reductions banking certificates provided:

4.1.2.1 the APCO determines that such emissions reductions comply with the definition of AER, and such reductions are real, surplus, permanent, quantifiable, and enforceable;

4.1.2.2 the reductions have not been used for the approval of an Authority to Construct or used as offsets;

4.1.2.3 the reductions are included in or have been added to the 1987 emissions inventory, or will be accounted for in subsequent revisions to the 1991 AQAP and will be included in the Plan's annual tracking of emissions reductions.

- 4.1.2.4 a banking application is filed prior to June 17, 1993 in accordance with the requirements of Section 6.0, and the applicable requirements of Section 8.0 are met.
 - 4.1.3 Except for reductions listed below, emission reductions for NOx, VOC, and CO (in non-attainment areas for CO) occurring prior to January 1, 1988 shall not be eligible for use as offsets, netting, or in any way mitigating an increase in emissions until the District, through rulemaking, has adopted an appropriate discounting or other mitigation measures to show progress towards air quality attainment. The restrictions shall not apply to the following reductions:
 - 4.1.3.1 reductions for which the District issued an Emissions Reduction Certificate according to a banking rule prior to December 17, 1992.
 - 4.1.3.2 Reductions for which the District has accepted a banking application in accordance with the provisions of this rule prior to December 17, 1992.
 - 4.1.3.3 Reductions authorized by the District for use as offsets, or as mitigation for new or modified emissions units prior to December 17, 1992.
 - 4.1.4 Under no circumstances shall any emissions reductions occurring before September 19, 1991, other than as described in sections 4.1.1 or 4.1.2 be eligible for emissions reduction credit banking certificates.
- 4.2 Emissions Reductions Occurring After September 19, 1991

For emission reductions occurring after September 19, 1991, the following criteria must be met in order to deem such reductions eligible for banking:

 - 4.2.1 The emission reductions are real, surplus, permanent, quantifiable, and enforceable;
 - 4.2.2 AERs are calculated in accordance with the calculation procedures of Rule 2201 (New and Modified Stationary Source Review Rule) and comply with the definition of AERs of Rule 2201 (New and Modified Stationary Source Review Rule). Adjustment to emissions reductions for the Community Bank shall be made at the time the reductions are quantified pursuant to Rule 2201 (New and Modified Stationary Source Review Rule).
 - 4.2.3 An application for ERC has been filed no later than 180 days after the emission reductions occurred.

- 4.2.4 For non-permitted emission units, emissions must have been included in the 1987 emissions inventory and the source creating ERCs shall apply for and acquire a Permit to Operate subject to enforceable permit conditions which ensures that the emission reductions will be provided in accordance with the provisions of this rule, and shall continue for the reasonably expected life of the proposed stationary source. If the district, pursuant to state laws, is prohibited to permit the emission unit, the stationary source creating ERCs shall execute a legal binding contract with the District which ensures that the emission reductions will be provided in accordance with the provisions of this rule, and shall continue for the reasonably expected life of the proposed source.
- 4.3 A stationary source which provided offsets for increase in permitted emissions pursuant to Rule 2201 (New and Modified Stationary Source Review Rule) and has been issued an Authority to Construct since January 1, 1988 may apply to bank such offsets pursuant to section 4.2 if the Authority to Construct is voluntarily surrendered, expires or is canceled or if the Permit to Operate resulting from such Authority to Construct is voluntarily modified, surrendered or is revoked.
- 4.4 The following emission reductions are not eligible as ERCs for banking:
 - 4.4.1 Emission reductions from the shutdown or curtailment of gasoline dispensing operations, or dry cleaning operations.
 - 4.4.2 Emission reductions occurring at a fossil fuel-fired power plant as the result of the operation of a cogeneration facility.
 - 4.4.3 Emission reductions occurring from the shutdown or curtailment of a stationary source for which the District originally provided the required offsets.
 - 4.4.4 Emission reductions occurring from the shutdown or curtailment of a stationary source for which the offsets originally provided are no longer enforceable by the District such as reductions in open burning of agricultural waste used to offset emissions from a resource recovery project.
- 5.0 ERC Certificate Application Procedures
 - 5.1 Any entity which owns or operates a source at which an eligible emission reduction has occurred or will occur may apply for an ERC Certificate in accordance with the requirements of this rule.
 - 5.2 The entity requesting the ERC Certificate shall make an application on forms supplied by the District.

- 5.3 An application shall be filed for each emission reduction. The application may be for reductions in one or more affected pollutant. The application shall contain sufficient information to allow for adequate evaluation of actual emission reductions from each emission unit.
- 5.4 In accordance with the provisions of Rule 1030 (Confidential Information) and Section 114(c) of the Federal Clean Air Act, applicants may claim confidentiality of information contained in the application.
- 5.5 Except for reductions covered under Section 4.1.2, ERC Certificate applications for reductions shall be submitted within 180 days after the emission reduction occurs. For reductions covered under Section 4.1.2, ERC Certificate applications shall be filed with the District by June 17, 1993.
- 5.6 Where appropriate, to confirm emission reductions claimed in conjunction with an application for an ERC Certificate, the District may require source tests, continuous monitoring, production records, fuel use records, or any other appropriate means of measurement.
- 5.7 The form of the ERC Certificate shall be established by the APCO.
- 5.8 ERC applicants for emission reductions derived from a single reduction at a single emitting unit may apply for and receive single or multiple ERC Certificates. Multiple ERC Certificates shall be issued for each owner's proportional share.
- 6.0 Registration of ERC Certificates
 - 6.1 The APCO may only grant an ERC Certificate after the emission reductions have actually occurred upon satisfaction of the following applicable provision(s):
 - 6.1.1 A revised Permit to Operate has been issued if the emission reductions were created as a result of greater operating efficiencies or from the application of more efficient control technology. This revised permit must include specific quantifiable emission limits reflecting the reduced emissions;
 - 6.1.2 If the emission reductions were created as a result of the shutdown of a permitted emissions unit, the relevant Permit(s) to Operate has been surrendered and voided.
 - 6.1.3 If the emission reductions from a permitted emissions unit were created by means of reducing production or production rates, the relevant Permit(s) to Operate have been modified to reflect the emission reductions.

- 6.1.4 If the emission reductions were created as a result of the application of greater operating efficiencies or from the application of a more efficient control technology to a then non-permitted source: Permit(s) to Operate has been obtained; or a written contract between the owner or operator of such source and the ERC applicant has been executed, which by its terms, shall be enforceable by the APCO. The referenced permit or contract shall include specific quantifiable emission limits reflecting reduced emissions. If the emissions reductions were created as a result of the modification of a non-permitted emissions unit, the stationary source shall be prohibited from operating a new emissions unit in the same source category without first obtaining Authority to Construct and Permit to Operate.
- 6.2 When all the requirements of this rule have been satisfied and the emission reduction has actually occurred, the APCO shall issue the ERC Certificate. Upon the APCO's determination to grant an ERC Certificate, title to such ERC shall be registered in the Banking Register. Such titles may be computerized and made available for public inspection.
- 6.3 All information concerning titles, interests, and other matters such as liens, encumbrances, and changes of record shall be identified in the District's ERC Banking Register, as well as pertinent date(s) concerning such information, until such time as the ERC Certificate is used, canceled, or nullified by operation of law.
- 6.4 Each ERC Certificate shall be numbered, bear the date of issuance, be signed by the District official charged with the responsibility of keeping the District's ERC Bank, and bear the seal of the District. One (1) copy of the ERC Certificate shall be retained by the District, and the original shall be delivered to the owner or party acting for the owner. The record of issued ERC Certificates shall be retained by the District, and this record may be in computer storage. Delivery by the District of an ERC Certificate to an owner shall be accomplished in person or by registered mail. The person accepting the ERC Certificate must sign a receipt therefor and provide such proof of identity as the APCO shall require.
- 6.5 At the option of joint owners of ERCs, such persons may receive one (1) ERC Certificate for the entirety or separate ERC Certificates reflecting each proportional share, provided that such ERCs are derived from a single reduction at a single emitting unit. The District's ERC Bank shall reflect the consolidation or separation of the ERCs, and the previous Certificate(s) shall be canceled upon the issuance of the new Certificate(s).
- 6.6 After receiving written notice from an owner that they have released their right of control of valid existing banked emission reductions, or if an owner fails to file an application for banking emission reductions in accordance with procedures outlined in this rule, the APCO may place such emission reductions in the District's Community Bank without consent from the owner.

- 6.7 Adjustments to the quantity of banked ERCs shall be allowed without the owner's consent so long as the action to reduce the quantity of ERCs is consistent with applicable District, state, and federal rules and/or planning requirements, including Reasonable Further Progress. Actions to reduce the quantity of banked ERCs which are inconsistent with applicable District, state, or federal rules shall require the consent of the owner. Such adjustments shall only be made after public notice and hearing.
- 6.8 Prior to adjusting the estimated quantity or the conditions of deposit, use, or withdrawal of banked ERCs for any reason, the APCO shall notify the ERC Certificate owner in writing.
- 6.9 Except as provided in Section 6.7 of this rule, deposits are permanent until used by the depositor or any party to whom the ERC Certificate has been transferred. After issuance of the ERC Banking Certificate, subsequent changes in regulations to require the type of reduction which is banked shall not reduce or eliminate the deposit.
- 6.10 If the APCO determines that additional mandatory emission reductions will be necessary to achieve ambient air quality standards, the APCO may declare a full or partial moratorium on banked ERCs of the applicable contaminant. Prior to imposing any kind of moratorium, the APCO must provide public notice that the District has determined that sufficient emission reductions cannot be achieved through the imposition of controls on existing permitted or non-permitted emissions units. Should such a determination be made, a moratorium on deposits shall first be imposed. Should the APCO determine that a moratorium on withdrawals of banked ERCs is also necessary to attain applicable air quality standards, a public notice shall first be provided to this effect. Only after a public hearing resulting in the determination that a moratorium is needed and written notice to ERC Certificate owners of the applicable contaminant may any moratorium be imposed. Any such moratorium shall be lifted upon the determination by the APCO and public notice that Reasonable Further Progress can be demonstrated by the District.
- 6.11 Title to an ERC shall be deemed registered at the time the required information concerning the ERC is entered into the Register.
- 6.12 All dealings with ERCs or any interest therein, and all liens, encumbrances, and charges upon the same subsequent to the first registration thereof, shall be deemed to be subject to the terms of this regulation, and to such amendments and alterations as may hereafter be made.
- 6.13 The APCO may reissue lost or destroyed ERC Certificates after the owner vouches that the original has been lost or destroyed.

7.0 Withdrawal, Transfer, and Use of ERCs

- 7.1 ERCs may be used at the time of, or anytime after deposit into the District's ERC Bank by the owner of the ERC Certificate to provide contemporaneous offsets for increase in onsite emissions from new or modified emission units.
- 7.2 An ERC Certificate may be transferred or used in whole or in part and in accordance with provisions of this rule. Transfer in whole or in part of a registered ERC Certificate shall be done in accordance with application procedures of this rule. Upon payment of an application fee, a new ERC Certificate certifying the title or interest in the ERC, shall be issued and the last previous original(s) shall be canceled. Such cancellation shall be recorded in the Banking Register.
- 7.3 Nothing in this rule prevents the lease or temporary transfer, in whole or in part of, ERCs represented by ERC Certificates. However, all transfers shall be considered permanent until modified by application which demonstrates to the satisfaction of the APCO that the emissions for which the ERCs were required have either ceased or other emission reductions have been secured.
- 7.4 All emissions reductions to be used as offsets which are not contemporaneous with emissions increases shall be transferred by application pursuant to this rule. Reductions to be used as offsets which are contemporaneous and meet the requirements of Rule 2201 (New and Modified Stationary Source Review Rule) and the requirements of this rule may take place without application for ERC.

8.0 Administrative Requirements

- 8.1 The APCO shall determine whether an ERC Banking Certificate application is complete not later than 30 calendar days following receipt of the application, or after a longer time period agreed upon in writing by both the applicant and the APCO.
- 8.2 If the APCO determines that the application is not complete, the applicant shall be notified in writing of the decision, specifying the additional information that is required. The applicant shall have 90 days to submit the requested information. Upon receipt of all requested information, the District shall have 30 days to determine completeness. If no data is submitted or the application is still incomplete, the APCO may cancel the ERC Banking Certificate application with written notification to applicant. Upon determination that the application is complete, the APCO shall notify the applicant in writing. Thereafter, only information to clarify, correct, or otherwise supplement the information submitted in the application may be requested.
- 8.3 Withdrawal of a banking application by an applicant shall result in cancellation of the application; any resubmittal shall be evaluated using a baseline calculated as of the date of resubmittal.

- 8.4 Upon acceptance of a complete application, the APCO shall have 60 days to perform an initial assessment of the application. Upon completion of this initial assessment the District shall provide written notice of such to the applicant and shall also provide written notice of acceptance to ARB and EPA and publish notice in a newspaper of local and general circulation in the District. The notice shall specify the applicant and the quantity of emission reductions requested and a statement of the initial assessment.

Publication of the notice shall commence a 30 day public comment period during which the APCO shall accept written comments on the merits of the ERC Certificate application. Upon conclusion of this 30 day period, the APCO shall have 30 days to render a decision as to whether the APCO approves, conditionally approves, or denies the application. This decision shall be promptly supplied in writing to the applicant and published in a newspaper of local circulation.

The noticing requirements period shall be waived by the APCO if the emission reductions have already been subject to ARB, EPA and public comment. Noticing requirements shall not be waived for emissions reduction which were not formally banked and which occurred prior to January 1, 1988.

- 8.5 The applicant or any other party may appeal the APCO's decision following provisions specified in the applicable rules in Regulation V (Procedure Before the Hearing Board).
- 8.6 The District shall maintain a Banking Register, which shall consist of a record of all deposit applications, deposits, withdrawals, and transactions with regard to the District's ERC Bank.

3. Rule 3190: Conservation Management Practices Plan Fee

RULE 3190 CONSERVATION MANAGEMENT PRACTICES PLAN FEE (Adopted May 20, 2004; Re-adopted August 19, 2004.)

1.0 Purpose

The purpose of this rule is to recover the District's costs for the review and management of Conservation Management Practices (CMP) Applications and Plans required by Rule 4550 (Conservation Management Practices).

2.0 Applicability

This rule applies to each owner/operator of an Agricultural Operation Site subject to Section 5.0 of Rule 4550 (Conservation Management Practices).

3.0 Definitions

3.1 Agricultural Operation Site (AOS): as defined in Rule 4550 (Conservation Management Practices).

3.2 Air Pollution Control Officer (APCO): as defined in Rule 1020 (Definitions).

3.3 Animal Feeding Operation (AFO): as defined in Rule 4550 (Conservation Management Practices).

3.4 Cattle AFO: an AFO that meets the criteria of Standard Industrial Classification (SIC) 021, as defined in the SIC Manual, dated 1987.

3.5 Conservation Management Practice Program Evaluator (CMP Program Evaluator): an entity or agency designated by the APCO for verifying CMP Applications.

3.6 Dairy Cattle AFO: an AFO that meets the criteria of Standard Industrial Classification (SIC) 024, as defined in the SIC Manual, dated 1987.

3.7 NRCS: as defined in Rule 4550 (Conservation Management Practices).

3.8 RCD: the Resource Conservation District.

3.9 Source Operation: as defined in Rule 1020 (Definitions).

4.0 Exemptions

The provisions of this rule do not apply to any AOS subject to the District's Permit To Operate requirements.

5.0 CMP Application Fees

5.1 Agricultural Operation Sites containing Animal Feeding Operations subject to Rule 4550

The owner/operator of an AFO shall pay the applicable fee in Schedule 1, based on the number of animals, for each Initial CMP Application that is required by Rule 4550.

SCHEDULE 1: INITIAL AFO CMP APPLICATION FEE

Type and Size (number of animals)	Initial CMP Application Fee
A: Dairy Cattle AFO	
799 or less	\$62.75
800 to 1,999	\$125.50
2,000 or Greater	\$251.00
B: Cattle AFO, other than a Dairy	
999 or less	\$62.75
1,000 to 4,999	\$125.50
5,000 or Greater	\$251.00
C: Turkey AFO	
109,999 or less	\$62.75
110,000 to 219,999	\$125.50
220,000 or Greater	\$251.00
D: Laying Hen AFO	
164,999 or less	\$62.75
165,000 to 349,999	\$125.50
350,000 or Greater	\$251.00
E: Chicken AFO, other than a Laying Hen AFO	
249,999 or less	\$62.75
250,000 to 349,999	\$125.50
350,000 or Greater	\$251.00

5.1.1 The Initial CMP application fee for an AOS, with two or more AFOs covered by a single CMP application, shall be the highest fee in Schedule 1 which, would apply to each individual AFO Initial CMP application.

5.1.2 A separate or additional fee is not required for reviewing the portion of the CMP Application addressing the growing and harvesting of crops at an AOS that contains an AFO subject to Schedule 1.

5.2 Agricultural Operation Site not containing Animal Feeding Operations subject to Rule 4550

The owner/operator of an AOS that does not include an AFO shall pay the applicable fee in Schedule 2.

SCHEDULE 2: INITIAL NON-AFO CMP APPLICATION FEE

Size (in acres)	Initial CMP Application Fee
500 acres or less	\$120.00
501 acres to 1,999 acres	\$350.00
2,000 acres or greater	\$550.00

5.3 Multiple Agricultural Operation Sites not containing Animal Feeding Operations subject to Rule 4550

An owner/operator of multiple AOSs shall pay the applicable fee as shown in Schedule 2. This fee is based on the total size in acres of all the AOSs for which, an Initial CMP Application is required by Rule 4550. The CMP applications for all AOSs shall be submitted to the APCO at the same time.

5.4 CMP Plan Renewal Fee

The owner/operator shall pay a renewal fee of \$100.00 every two years for each CMP Plan that is required by Rule 4550.

5.5 CMP Modification Fee

No additional fees are required to request a modification of a previously approved CMP Plan.

6.0 CMP Application Review Discount

Notwithstanding Section 5.0, the Initial CMP Application Fee in Sections 5.1, 5.2, and 5.3 shall be reduced by 50% if all of the following conditions are met:

- 6.1 The CMP Application(s) has been verified in writing by a CMP Program Evaluator prior to submittal to the APCO,
- 6.2 The CMP Program Evaluator's verification contains all supporting information required by the APCO to evaluate the application, and
- 6.3 The application is not subject to late fees.

7.0 Fee Notification

- 7.1 The APCO shall provide the AOS owner/operator with an invoice for the applicable Initial CMP Application fee. Nonpayment of the invoiced fees within 60 days of the original invoice date, may result in the denial of the CMP Application.
- 7.2 The APCO shall provide the AOS owner/operator with an invoice for the first renewal fee upon approval of the initial CMP Application and biennially thereafter. CMP Plan renewal fees are due and payable within 60 days of the invoice date.

8.0 Late Fees

If payment of any charges levied under this rule is not received by the APCO within 60 days of the invoice date, the charges shall be increased in accordance with the schedule provided in Rule 3010, Section 11.0 Late Fees.

4. Rule 4550: Conservation Management Practices

RULE 4550 CONSERVATION MANAGEMENT PRACTICES (Adopted May 20, 2004;
Re-adopted August 19, 2004)

1.0 Purpose

The purpose of this rule is to limit fugitive dust emissions from agricultural operation sites.

2.0 Applicability

This rule applies to agricultural operation sites located within the San Joaquin Valley Air Basin.

3.0 Definitions

3.1 Administrative change: a change to a CMP Plan that

3.1.1 Corrects typographical errors: or

3.1.2 Identifies a change in the name, address, or phone number of any person identified in the CMP Plan, or provides a similar minor administrative change which has no effect on the selected CMPs and does not change any information that could be used to determine emissions reduction; or

3.1.3 Allows for the change of ownership or operational control of an agricultural operation site or agricultural parcel.

3.2 Agricultural Operations: the growing and harvesting of crops or the raising of fowl or animals, for the primary purpose of earning a living, or of conducting agricultural research or instruction by an educational institution.

3.3 Agricultural Operation Site: one or more agricultural parcels that meet the following:

3.3.1 Are under the same or common ownership or operation, or which are owned or operated by entities which are under common control; and

3.3.2 Are located on one or more contiguous or adjacent properties wholly within the San Joaquin Valley Air Basin.

- 3.4 Agricultural Parcel: a portion of real property, including, but not limited to, cropland, and animal feeding operation (AFO) used by an owner/operator for carrying out a specific agricultural operation. Roads, vehicle/equipment traffic areas, and facilities, on or adjacent to the cropland or AFO are part of the agricultural parcel.
- 3.5 Air Pollution Control Officer (APCO): as defined in Rule 1020 (Definitions).
- 3.6 Animal Feeding Operation (AFO): a lot or facility where animals have been, are, or will be gathered, fed, stabled, for a total of 45 days or more in any 12 month period and where crops, vegetation, forage growth, or post-harvest residues are not sustained over any portion of the lot or facility (as defined in 40 CFR 122.23 (b)(1)).
- 3.7 Board: as defined in Rule 1020 (Definitions).
- 3.8 Conservation Management Practice (CMP): an activity or procedure that reduces air pollutants normally emitted by, or associated with, an agricultural activity.
- 3.9 Conservation Management Practice Application (CMP Application): a document prepared and submitted by the owner/operator of an agricultural operation site that lists the selected CMPs for implementation. The CMP application also contains, but is not limited to, contact information for the owner/operator, and a site plan or map describing the agricultural operation site and locations of agricultural parcels where CMPs will be implemented and other information describing the extent, duration of CMP implementation and other information needed by the District to calculate emission reductions.
- 3.10 Conservation Management Practice Category (CMP Category): a grouping, including, but not limited to, agricultural activities related to land preparation, harvesting, handling and raising of fowl or animals, and the use of agricultural unpaved roads, and unpaved vehicle/equipment traffic areas. The CMP category "other" includes CMPs to reduce windblown emissions and agricultural burning emissions.
- 3.11 Conservation Management Practice Handbook (CMP Handbook): a handbook, developed in cooperation with agricultural stakeholders, that contains program guidance and criteria to assist owners/operators in selecting CMPs and preparing CMP Applications. The Handbook will include descriptions of the CMPs, District CMP applications, and other useful information about the CMP Program. The CMP Handbook is not an official District document.

- 3.12 Conservation Management Practice List (CMP List): the list of CMPs by CMP categories as approved by the District Board on May 20, 2004.
- 3.13 Conservation Management Practice Plan (CMP Plan): a CMP Application approved by the APCO.
- 3.14 Conservation Management Practice Program (CMP Program): a District program with the purpose of reducing air pollutants from agricultural operation sites.
- 3.15 Contiguous or Adjacent Property: as defined in Rule 2201 (New and Modified Stationary Source Review Rule).
- 3.16 District: as defined in Rule 1020 (Definitions).
- 3.17 Fugitive Dust: as defined in Rule 8011 (General Requirements).
- 3.18 Mature Dairy Cow: a cow that has had its first calf.
- 3.19 NRCS: the United States Department of Agriculture Natural Resource Conservation Service.
- 3.20 Owner/Operator: as defined in Rule 8011 (General Requirements).
- 3.21 Particulate Matter: as defined in Rule 8011 (General Requirements).
- 3.22 Paved Road: as defined in Rule 8011 (General Requirements).
- 3.23 PM10: as defined in Rule 1020 (Definitions).
- 3.24 Road: as defined in Rule 8011 (General Requirements).
- 3.25 San Joaquin Valley Air Basin: as defined in Rule 1020 (Definitions).
- 3.26 Unpaved Road: as defined in Rule 8011 (General Requirements).
- 3.27 Unpaved Vehicle/Equipment Traffic Area: as defined in Rule 8011 (General Requirements).
- 3.28 Vehicle: as defined in Rule 8011 (General Requirements).

4.0 Exemptions

4.1 The provisions of this rule, except for the recordkeeping provisions of Section 6.5.2, shall not apply to any of the following sources:

4.1.1 Agricultural operation site where the total acreage of all agricultural parcels is less than 100 acres excluding the AFO and exempted lands pursuant to Section 4.1.2 thru Section 4.1.5.

4.1.2 Woodland and wasteland not actually under cultivation or used for pasture.

4.1.3 Land placed in the Conservation Reserve Program meeting the definition and criteria set by the NRCS.

4.1.4 Agricultural parcel that are 3000 feet or more above mean sea level.

4.1.5 Agricultural operation parcel used for the purpose of:

4.1.5.1 Propagating young trees, shrubs, and other miscellaneous crops for transplanting, and exhibiting plants under controlled conditions inside a building with walls and roof, or

4.1.5.2 Providing grazing rangeland or pasture, or

4.1.5.3 Forestry, including but not limited to timber harvest operations, silvicultural practices, forest management burning, or forest protection practices.

4.2 The provisions of this rule, except for the recordkeeping provisions of Section 6.5.2, shall not apply to any of the following sources within an agricultural operation site:

4.2.1 An AFO of mature dairy cows with less than 500 mature dairy cows, whether milked or dry, or

4.2.2 An AFO of cattle, other than mature dairy cows or veal calves, with less than 190 cattle, other than mature dairy cows or veal calves. Cattle includes, but is not limited to, heifers, steers, bulls and cow/calf pairs, or

4.2.3 An AFO of turkeys with less than 55,000 turkeys, or

4.2.4 An AFO of chickens, other than laying hens, with less than 125,000 chickens (other than laying hens), or

4.2.5 An AFO of laying hens with less than 82,000 laying hens, or

4.2.6 An AFO other than an AFO for mature dairy cows, cattle, turkeys, chickens, or laying hens.

4.3 This rule does not exempt the owner/operator from any other District regulations.

5.0 Requirements

5.1 Effective on and after July 1, 2004, an owner/operator shall implement the applicable CMPs selected pursuant to Section 6.2 for each agricultural operation site.

5.2 An owner/operator shall prepare and submit a CMP Application for each agricultural operation site, pursuant to Section 6.0, to the APCO for approval. A CMP Application approved by the APCO shall constitute a CMP Plan.

5.3 Except as provided by Section 5.4, an owner/operator shall implement the CMPs as contained in the CMP Plan approved pursuant to Section 6.0 for each agricultural operation site no later than ten (10) days after notification by the APCO of the approval of the CMP Application.

5.4 An owner/operator that discontinues the implementation of a CMP as committed to in a CMP Plan or makes other changes that are inconsistent with the CMP Plan shall comply with the requirements of Section 6.3.4.

6.0 Administrative Requirements

6.1 CMP Application Preparation

An owner/operator shall prepare a CMP Application for each agricultural operation site. Each CMP Application shall include, but is not limited to, the following information:

6.1.1 The name, business address, and phone number of the owner/operator responsible for the preparation and the implementation of the CMP Plan.

6.1.2 The signature of the owner/operator and the date that the application was signed.

6.1.3 A plot plan or map which contains the following information:

- 6.1.3.1 The location of the agricultural operation site,
- 6.1.3.2 The location of each agricultural parcel on the agricultural operation site,
- 6.1.3.3 The location of unpaved roads and unpaved equipment/traffic areas to be covered by the CMP Plan, and
- 6.1.3.4 The location where the CMP will be implemented.
- 6.1.3.5 The plot plan or map shall be maintained on-site and made available to the APCO upon request.

6.1.4 The following information, for each agricultural parcel of the agricultural site:

- 6.1.4.1 The CMPs, selected pursuant to Section 6.2, implemented or planned for implementation during July 1, 2004 to December 31, 2004, and the CMPs, selected pursuant to Section 6.2, planned for implementation for 2005 and subsequent years, and
- 6.1.4.2 The crop, AFO, or other use of the agricultural parcel.

6.1.5 Information necessary to calculate emission reductions including, but not limited to:

- 6.1.5.1 The crop or animals and total crop acreage or number of animals and the total length (miles) of unpaved roads, and the total area (acres or square feet) of the unpaved equipment and traffic areas to be covered by the CMP Plan, and
- 6.1.5.2 Other information as determined by the APCO.

6.2 CMP Selection

An owner/operator shall select one (1) CMP from the CMP list for each of the applicable CMP categories for each agricultural parcel of an agricultural operation site, except as provided below:

- 6.2.1 If an agricultural operation site or agricultural parcel has crop rotation, an owner/operator shall select one (1) CMP from the CMP list for each of the applicable CMP categories for each rotated crop type.
- 6.2.2 If a CMP can only be selected for implementation on a portion of an agricultural operation site, an owner/operator shall select an additional CMP within the CMP category to be implemented on the remaining acreage or remaining AFO.
- 6.2.3 An owner/operator may select a substitute CMP from another CMP category when no feasible CMP can be identified from one category. This provision shall not apply for the unpaved road, and unpaved vehicle/equipment traffic area CMP categories.
 - 6.2.3.1 An owner/operator may identify or develop a new CMP not on the CMP list to be used to comply with the requirements of this rule. Prior to use of the new CMP the owner/operator must obtain the interim approval of the APCO to use a new CMP to meet the requirements of Section 6.2. The owner/operator shall demonstrate that the new CMP achieves PM10 emission reductions that are at least equivalent to other CMPs on the CMP list that could be selected for the applicable operation.
 - 6.2.3.2 The APCO will perform an independent analysis of proposed CMPs to determine that they achieve PM10 emission reductions that are at least equivalent to other CMPs on the CMP list that could be selected for the applicable operation. This analysis shall be made using the most recent emission factors provided by EPA or CARB when available. CMPs that are not shown to achieve equivalent emission reductions will be disapproved. The District shall maintain a list of CMPs determined to be equivalent under this section.
 - 6.2.3.3 An owner/operator may satisfy the requirements of Rule 8081 by implementing CMPs for the unpaved road and unpaved vehicle/equipment traffic area CMP categories that are equivalent to the control measures specified in Rule 8081.

6.3 CMP Application Submission

An owner/operator shall submit a CMP Application, prepared pursuant to Section 6.1, to the APCO according to the following schedule:

- 6.3.1 No later than December 31, 2004, for an agricultural operation site, existing as of July 1, 2004.
- 6.3.2 No later than December 31, 2004, for an agricultural operation site or agricultural parcel acquired, or that becomes subject to the provisions of Section 5.0 after July 1, 2004 but before November 1, 2004.
- 6.3.3 Within 90 days for an agricultural operation site or an agricultural parcel that is acquired or becomes subject to the provisions of Section 5.0 after October 31, 2004.
- 6.3.4 Within 60 days of any operational, administrative, or other modification that necessitates the revision of the CMP Plan. A modification includes, but is not limited to, the following:
 - 6.3.4.1 Administrative changes to any information provided pursuant to Section 6.0,
 - 6.3.4.2 Implementation of a CMP other than the CMP listed in a CMP Plan,
 - 6.3.4.3 Change of the crop or AFO on a agricultural parcel, and
 - 6.3.4.4 Any other changes as determined by the APCO.
- 6.4 CMP Application Review and Evaluation
 - 6.4.1 The APCO shall:
 - 6.4.1.1 Review the CMP Application and determine whether the submitted CMP Application is complete. Completeness shall be determined by evaluating whether the CMP Application meets the requirements of Section 6.1 of this rule and the applicable requirements of Rule 3190.
 - 6.4.1.2 Notify the owner/operator in writing of the determination that the CMP Application is, or is not, complete and request the owner/operator to provide additional information within 30 days.

6.4.1.3 Evaluate and either approve or disapprove the CMP Application and provide written notification to the owner/operator within 180 days after receipt of the complete CMP Application, of the approval or disapproval of the CMP Application.

6.4.2 A CMP Application for a modification to a CMP Plan pursuant to Section 6.3.4.1 shall be deemed approved as submitted unless written comments are transmitted by the APCO to the owner/operator within 30 days of receipt of the CMP application.

6.4.3 A CMP Application for a modification to a CMP Plan pursuant to Sections 6.3.4.2, 6.3.4.3, and 6.3.4.4 shall be deemed conditionally approved as submitted unless written comments are transmitted by the APCO to the owner/operator within 30 days of receipt of the CMP application.

6.4.4 The approval of a CMP Application shall not serve to excuse the owner or operator from complying with law, nor shall it excuse any violation.

6.5 Recordkeeping

An owner/operator shall, upon request, make available to the APCO the records required to be kept pursuant to Section 6.5.1 and Section 6.5.2.

6.5.1. An owner/operator subject to Section 5.0 shall maintain the following records for a minimum of five (5) years:

6.5.1.1 A copy of each CMP Application and CMP Plan.

6.5.1.2 Supporting information necessary to confirm the implementation of the CMPs.

6.5.2 An owner/operator claiming exemption pursuant to Section 4.0 shall maintain records for a minimum of five (5) years that demonstrate that the agricultural operation site or agricultural parcel qualified for the exemption.

6.6 Loss of Exemption

An owner/operator of an agricultural operation site or agricultural parcel that becomes subject to the provisions of Section 5.0 of this rule, through loss of exemption, shall comply with all applicable provisions of this rule pursuant to the schedule in Section 6.3.

7.0 Compliance Schedule

Unless otherwise noted, all provisions of this rule shall be effective on and after May 20, 2004.

8.0 Backstop Provision

If by December 31, 2005, the CMP Program has not achieved the PM10 emission reduction commitment for the PM10 Reasonable Further Progress Plan due in 2006, the District shall take actions necessary to meet the reduction target for the CMP Program such as revising the exemption thresholds, or increasing the total number of CMPs required to be implemented or other actions. The APCO will revise the CMP Program requirements and CMP Applications and notify the owner/operator in writing of the changes.

5. Rule 4570: Concentrated Animal Feeding Operations

RULE 4570 CONFINED ANIMAL FACILITIES (Adopted June 15, 2006; Readopted June 18, 2009; Amended October 21, 2010)

1.0 Purpose

The purpose of this rule is to limit emissions of volatile organic compounds (VOC) from Confined Animal Facilities (CAF).

2.0 Applicability

The provisions of this rule shall apply to any Confined Animal Facility.

3.0 Definitions

- 3.1 Aerated Static Pile (ASP): a system designed, constructed, maintained, and operated for decomposing organic material in which the material is placed on top of perforated plates or pipes that are connected to blowers that either push or pull air through the piles.
- 3.2 Aerobic Digester: a basin or tank designed, constructed, maintained, and operated for the aerobic treatment of liquid or solid manure that is approved by the APCO, ARB, and EPA.
- 3.3 Aerobic Lagoon: a lagoon designed, constructed, maintained, and operated in accordance with the applicable standards for aerobic lagoons in the Natural Resource Conservation Service (NRCS) California Field Office Technical Guide Conservation Practice Standard Code 359 or other applicable standards approved by the APCO, ARB, and EPA.
- 3.4 Alternative Mitigation Measure: a mitigation measure that is determined by the APCO, ARB, and EPA to achieve reductions that are equal to or exceed the reductions that would be achieved by other mitigation measures listed in this rule that owners/operators could choose to comply with rule requirements.
- 3.5 Anaerobic Digester: a basin or tank designed, constructed, maintained, and operated for the anaerobic treatment of liquid or solid manure in accordance with the applicable standards for anaerobic digesters in the Natural Resource Conservation Service (NRCS) California Field Office Technical Guide Conservation Practice Standard Code 365 or 366 or other applicable standards approved by the APCO, ARB, and EPA.
- 3.6 Anaerobic Treatment: the decomposition of organic matter by microbes in the absence of oxygen. During this process four main reactions occur. In the first reaction, complex organic materials (e.g. carbohydrates, proteins, and fats) are hydrolyzed to form soluble organic molecules (e.g. sugars, amino acids, and

fatty acids). In the second reaction, soluble organic molecules ferment to form acetic acid, formic acid, and volatile fatty acids. In the third reaction, volatile fatty acids undergo acetogenesis to form acetic acid and formic acid. In the fourth reaction, acetic acid and formic acid undergo methanogenesis to form methane and carbon dioxide.

- 3.7 Anaerobic Treatment Lagoon: a lagoon designed, constructed, maintained, and operated in accordance with the standards for anaerobic lagoons in the Natural Resource Conservation Service (NRCS) California Field Office Technical Guide Conservation Practice Standard Code 359 or other applicable standards approved by the APCO, ARB, and EPA.
- 3.8 Animal Manure: any animal excretions and mixtures containing animal excretions, except for material meeting the definition of separated solids.
- 3.9 APCO: as defined in Rule 1020 (Definitions).
- 3.10 ARB: as defined in Rule 1020 (Definitions).
- 3.11 Beef Feedlot: a CAF that is primarily concerned with raising cattle for the production of meat for commercial purposes.
- 3.12 Biofilter: a pollution control technique using living material to capture and biologically degrade process pollutants. A biofilter is usually a bed of organic material (medium), typically a mixture of compost and wood chips or shreds. As air passes through the biofilter, the microbes on the organic material convert contaminants in the air stream to carbon dioxide and water.
- 3.13 CDFA: California Department of Food and Agriculture or any person designated to act on its behalf.
- 3.14 Cereal Grains: grasses (members of the monocot families Poaceae or Gramineae) cultivated for the edible components of their fruit. These grains include corn, rice, wheat, barley, sorghum, millet, oats, rye, triticale, and fonio. For the purposes of this rule, buckwheat and quinoa will also be considered cereal grains.
- 3.15 Certified Nutritionist: a nutritionist certified by the American Registry of Professional Animal Scientists or who is approved by the APCO, ARB, and EPA.
- 3.16 Class One Mitigation Measures: a mitigation measure or combination of measures for the specific source category that, at the time of rule adoption, are considered to be the Best Available Retrofit Control Technology (BARCT) for VOC, as defined in the California Health and Safety Code Section 40406.

- 3.17 Class Two Mitigation Measures: a mitigation measure or combination of measures for the specific source category that achieve VOC reductions equal to or greater than those achieved by Class One Mitigation Measures, but are considered beyond the Best Available Retrofit Control Technology (BARCT) standards for existing facilities after taking into account environmental, energy, economic, legal, social, and technological factors. These measures are considered to be between BARCT (the standard for existing facilities) and Best Available Control Technology (BACT), equivalent to BACT, or theoretically feasible measures that may be beyond BACT.
- 3.18 Composting: the controlled biological decomposition of organic material, under aerobic (with air) or anaerobic (without air) conditions, to form a humus-like material.
- 3.19 Confined Animal Facility (CAF): a facility where animals are corralled, penned, or otherwise caused to remain in restricted areas for commercial purposes and primarily fed by a means other than grazing for at least forty-five (45) days in any twelve (12) month period.
- 3.20 Contiguous or Adjacent Property: as defined in Rule 2201 (New and Modified Stationary Source Review).
- 3.21 Corral: an area where animals are confined without separate stalls in which the animals may rest. (also referred to as dry lot, pen, exercise pen, loafing barn, saudi barn or open lot).
- 3.22 Dairy: a CAF that is primarily concerned with the production of milk, butter, or cheese for commercial purposes.
- 3.23 Day: a twenty-four hour period beginning at 12:00 a.m. and ending at midnight.
- 3.24 District: as defined in Rule 1020 (Definitions).
- 3.25 Dry Manure/Dry Separated Solids: manure or separated solids with less than 50% moisture, by weight, not including any materials used for on-site composting operations.
- 3.26 Dry Rolled Corn: any corn that is crushed between rollers without previous treatment with steam or another softening process.
- 3.27 Emission Mitigation Plan: a document that lists and describes all VOC mitigation measures to be implemented at the CAF.

- 3.28 EPA: the United States Environmental Protection Agency or any person designated to act on its behalf.
- 3.29 Facility: a source or group of air pollution sources located on one or more properties that are contiguous, adjacent, or separated only by a public right-of-way and are under common ownership, common control, or operated by entities that are under common ownership or control. A facility includes, but is not limited to, all barns, buildings, coops, corrals, feed storage areas, installations, milking parlors, structures, and systems for the collection, distribution, storage, and treatment of manure on the properties.
- 3.30 Feed Bunk: the area where feed is placed for the animals to eat the feed.
- 3.31 Feedlanes: the area in which the animal stands while eating feed. This area may also be referred to as a flush or scrape concrete lane.
- 3.32 Freestall Barn: a structure for housing animals in which the animals are contained in pens under a roof and have free access to feed bunks, waterers, and stalls for resting.
- 3.33 High Moisture Corn: corn which, at harvest, has a kernel moisture of greater than 25%.
- 3.34 In-corral Mounds: mounds of manure and/or soil which are constructed, designed, maintained, and operated by the owner/operator to allow animals to have a dry area to lay and rest during the wet season.
- 3.35 Lagoon: a basin constructed, maintained, and operated to store and treat manure. This does not include basins primarily used to collect runoff and stormwater.
- 3.36 Land Incorporate: use of a method, such as tilling, injecting, or plowing, that covers manure with soil.

- 3.37 Large CAF: a CAF that maintains, on any one day, at least the following number of animals:

Table 1 – Large CAF Definition by Livestock Category	
Livestock Category	Large CAF Definition
Dairy	1,000 milking cows
Beef Feedlots	3,500 beef cattle
Other Cattle Facility	7,500 calves, heifers, or other cattle
Poultry Facilities	
Chicken	650,000 head
Duck	650,000 head
Turkey	100,000 head
Swine Facility	3,000 head
Horses Facility	2,500 head
Sheep and Goat Facilities	15,000 head of sheep, goats, or any combination of the two
Any livestock facility not listed above	30,000 head

- 3.38 Licensed Veterinarian: a veterinarian licensed by the State of California or a veterinarian that is approved by the APCO, ARB, and EPA.
- 3.39 Livestock: any domesticated animal kept or raised for the production of eggs, milk, wool, or meat.
- 3.40 Mature Cow: a cow that has had at least one calf.
- 3.41 Medium Dairy CAF: a dairy CAF that maintains, on any one day, at least 500 milking cows, but is not a large dairy CAF.
- 3.42 Milking Cow: a cow that is currently producing milk (lactating).
- 3.43 Mitigation Measure: an activity, practice, or technology that reduces VOC air pollutants emitted by or associated with a CAF.
- 3.44 NRC: the National Research Council of the United States of America.
- 3.45 NRCS: the Natural Resource Conservation Service operated under the United States Department of Agriculture.
- 3.46 Nursery Pig: For the purposes of this rule, any pig that has been weaned and is less than forty-five (45) pounds in weight.
- 3.47 Other Cattle Facility: a CAF housing cattle that does not meet the definition of a Beef Feedlot or Dairy.

- 3.48 Owner/Operator: any person who owns, leases, supervises, or operates a Confined Animal Facility or equipment on such a facility.
- 3.49 Oxygen Barrier Film: a plastic film with an oxygen transfer rate not exceeding $200 \text{ cm}^3/(\text{m}^2\text{-24 hrs})$ as measured by ASTM D3985 or a plastic film with an equivalent oxygen transfer rate as determined by methods approved by the APCO and EPA.
- 3.50 Phase Feeding: the feeding of multiple diets during the nursery stage and during the grower/finisher phase.
- 3.51 Phototropic Lagoon: a lagoon where at least 10% of the bacteria in the lagoon are photosynthetic bacterium; the bacteriochlorophyll a concentration is above $1081 \text{ }\mu\text{g/L}$; or that is designed, constructed, maintained, and operated according to other standards approved by the APCO, ARB, and EPA.
- 3.52 Poultry: any domesticated birds kept or raised for eggs or meat.
- 3.53 Poultry Litter: poultry excretions and bedding, including, but not limited to, dried solids, manure, urine and bedding from chickens, turkeys, geese, or ducks.
- 3.54 Poultry Molt: the periodic replacement of feathers by shedding old feathers while producing new ones.
- 3.55 Processed Cereal Grain or Processed Corn: cereal grains or corn that have undergone one or more processes to changes the underlying chemical structure compared to the cereal grain or corn as harvested.
- 3.56 Rain Event: precipitation greater than 0.1 inch in 24 hours at the facility.
- 3.57 Separated Solids: solids removed from manure by a solid separator system, not including any materials used for onsite composting operations.
- 3.58 Shade Structure: a structure designed, constructed, installed, maintained, and operated to provide shade for livestock.
- 3.59 Solid Separator System: a system for separating solid manure from the liquid manure stream that is designed, installed, constructed, operated, and maintained in accordance with the applicable standards in California NRCS Field Office Technical Guide Conservation Practice Standard Code 632 or other applicable standards approved by the APCO, ARB, and EPA. Solid separator systems may include, but are not limited to, flat belt separators, roller press separators,

vibrating screen separators, stationary inclined screen separators, weeping walls, and settling basins.

- 3.60 Split-Sex Feeding Program: a feeding program that separates male and female swine after they are moved from the nursery and feed different diets to more closely match the nutrient requirements of the different sexes.
- 3.61 Steam-Flaked Cereal Grains: cereal grain that is processed by cooking the grain with steam under pressure and then flaking the resulting material through heated rollers.
- 3.62 Steam-Flaked Corn: corn that is processed by cooking the corn with steam under pressure and then flaking the resulting material through heated rollers.
- 3.63 Storage Pond: a basin constructed, maintained, and operated, to store manure, after it has been treated or processed in a lagoon.
- 3.64 Swine: for the purposes of this rule, and determination of the threshold in Table 2, any weaned pig of at least forty-five (45) pounds in weight, such as finishing pigs and breeding stock.
- 3.65 USDA: the United States Department of Agriculture or any person designated to act on its behalf.
- 3.66 VOC Control Device: a device, into which captured air is vented, that reduces the VOC content in the air prior to the air being released into the atmosphere.
- 3.67 Volatile Organic Compounds (VOC): as defined in Rule 1020 (Definitions).
- 3.68 Weatherproof Covering/Storage Structure: A covering, such as a building or tarp, constructed, installed, maintained, and operated such that the material inside or underneath the covering is not moved or moistened by weather conditions outside of the covering including, but not limited, to wind and rain. The covering shall be maintained according to manufacturer recommendations and adhere to the applicable standards in NRCS California Field Office Technical Guide (FOTG) Conservation Practice Standard Codes 313 or other applicable standards approved by the ARB, APCO, and EPA.
- 3.69 Year: any consecutive 365-day period.

4.0 Exemptions

Except for the recordkeeping requirements of Section 7, the provisions of this rule shall not apply to a CAF, which remains at all times below all of the regulatory thresholds in Table 2:

Table 2 - CAF Thresholds for Regulation		
Livestock Category	Regulatory Threshold Through October 21, 2010	Regulatory Threshold On and after October 22, 2010
Dairy	1,000 milking cows	500 milking cows
Beef Feedlots	3,500 beef cattle	3,500 beef cattle
Other Cattle Facility	7,500 calves, heifers, or other cattle	7,500 calves, heifers, or other cattle
Poultry Facilities		
Chicken	650,000 head	400,000 head
Duck	650,000 head	400,000 head
Turkey	100,000 head	100,000 head
Swine Facility	3,000 head	3,000 head
Horses Facility	3,000 head	3,000 head
Sheep and Goat Facilities	15,000 head of sheep, goats, or any combination of the two	15,000 head of sheep, goats, or any combination of the two
Any livestock facility not listed above	30,000 head	30,000 head

5.0 Requirements

5.1 Permit Requirements:

5.1.1 Owner/operators shall obtain a Permit-to-Operate for the facility.

5.1.2 A thirty-day (30) public noticing and commenting period shall be required for all large CAFs receiving their initial Permit-to-Operate or Authority-to-Construct.

5.1.3 Facility Emission Mitigation Plan

The owner/operator shall submit a facility emission mitigation plan as part of the Permit-to-Operate application or Authority-to-Construct application. The mitigation plan shall contain the following information:

5.1.3.1 The name, business address, and phone number of the owners/operators responsible for the preparation and the implementation of the mitigation measures listed in the mitigation plan.

5.1.3.2 The signature of the owners/operators attesting to the accuracy of the information provided and adherence to implementing the activities specified in the mitigation plan at all times and the date that the application was signed.

5.1.3.3 A list of all mitigation measures chosen to comply with Rule 4570 requirements.

5.1.3.3.1 The mitigation measures shall be chosen from the applicable portions of Sections 5.5 or 5.6.

5.1.3.3.2 The owner/operator of CAFs that are not a dairy, beef feedlot, other cattle, swine, or poultry operations shall submit a mitigation plan demonstrating facility-wide reductions of at least 30% or submit a mitigation plan that adheres to all of the requirements of Sections 5.5 or 5.6, whichever section best fits the facility.

5.1.3.3.3 Owners/operators may substitute a mitigation measure from one section in the applicable table (Tables 3.1 through 4.6) for a mitigation measure in another section of the applicable table, provided it is demonstrated that the substitution would result in equal or greater emission reductions. Alternative mitigation measures must be approved prior to initial use.

5.1.3.3.4 In lieu of compliance with Section 5.1.3.3.1, Section 5.1.3.3.2, or Section 5.1.3.3.3, an owner/operator may demonstrate that facility-wide reductions are equal to that which the compliance with those sections would have achieved.

5.1.4 Facility Emission Inventory

The Permit-to-Operate application or Authority-to-Construct application shall include the following information, which is in addition to the facility emission mitigation plan:

5.1.4.1 The maximum number of animals at the facility in each production stage (facility capacity).

5.1.4.2 Any other information necessary for the District to prepare an emission inventory of all regulated air pollutants emitted from the facility, as determined by the APCO.

5.1.5 The approved mitigation measures from the facility's mitigation plan will be listed on the Permit-to-Operate or Authority-to-Construct as permit conditions.

5.1.6 The District shall act upon the Authority to Construct application or Permit-to-Operate application within six (6) months of receiving a complete application.

5.2 Permit Renewal/Change

5.2.1 Renewal - The District shall review each plan/permit at least once every three (3) years and update to reflect changes in the operation and feasibility of mitigation measures.

5.2.2 Change to Permit – If a temporary suspension of one or more mitigation measure provided for in Section 5.4 continues beyond the allowed suspension period:

5.2.2.1 The owners/operators shall, within that allowed period, submit a new emission mitigation plan designating a mitigation measure to be implemented in lieu of the mitigation measure that was suspended; and

5.2.2.2 The owner/operator shall obtain approval of the amended mitigation plan from the APCO and EPA by submittal of an Authority-to-Construct application.

5.3 Mitigation Measure Implementation

Owners/operators of any CAF shall implement all VOC emission mitigation measures, as contained in the permit application, on and after 365 days from the date of issuance of either the Authority-to-Construct or the Permit-to-Operate, whichever is sooner.

5.4 Temporary Suspension of Mitigation Measures

An owner/operator may temporarily suspend use of mitigation measure(s) provided all of the following requirements are met:

5.4.1 It is determined by a licensed veterinarian, certified nutritionist, CDFA, or USDA that any mitigation measure being suspended is detrimental to animal health or necessary for the animal to molt, and a signed written copy of this determination shall be retained on-site and made available for inspection upon request,

- 5.4.2 The owner/operator notifies the District, within forty-eight (48) hours of the determination that the mitigation measure is being temporarily suspended; the specific health condition requiring the mitigation measure to be suspended; and the duration that the measure must be suspended for animal health reasons,
- 5.4.3 The emission mitigation measure is not suspended for longer than recommended by the licensed veterinarian or certified nutritionist for animal health reasons,
- 5.4.4 If such a situation exists, or is expected to exist for longer than thirty (30) days, the owners/operators shall, within that thirty (30) day period, submit a new emission mitigation plan designating a mitigation measure to be implemented in lieu of the mitigation measure that was suspended, and
- 5.4.5 The APCO, ARB, and EPA approve the temporary suspension of the mitigation measure for the time period requested by the owner/operator and a signed written copy of this determination shall be retained on-site.

- 5.5 Phase I Mitigation Measures: Owners/operators of large CAFs shall comply with the following Phase I Mitigation Measures in Section 5.5 until compliance with all applicable Phase II Mitigation Measures in Section 5.6 is demonstrated in accordance with the compliance schedule in Section 8.0.

5.5.1 Dairy CAF: Owners/operators of a large Dairy CAF shall comply with the Phase I requirements in Table 3.1:-

Table 3.1 – Large Dairy CAF Phase I Mitigation Measure Requirements	
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.
B. Owners/operators shall incorporate at least one (1) of the following feed mitigation measures:	
Class One Mitigation Measures	
1.	a. Cover the horizontal surface of silage piles, except for the area where feed is being removed from the pile.
2.	a. Collect leachate from the silage piles and send it to a waste treatment system such as a lagoon at least once every twenty-four (24) hours.
3.	a. Implement an alternative mitigation measure(s), not listed above.
Class Two Mitigation Measures	
4.	a. Enclose silage in a bag and vent to a VOC control device with a combined VOC capture and VOC control efficiency of at least 80%, or b. Enclose silage in a weatherproof structure and vent to a VOC control device with a combined VOC capture and VOC control efficiency of at least 80%, or c. Eliminate silage from animal diet.
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Table 3.1 – Large Dairy CAF Phase I Mitigation Measure Requirements (continued)	
C. Owners/operators shall incorporate at least one (1) of the following mitigation measures in each milk parlor:	
Class One Mitigation Measures	
1.	a. Flush or hose milk parlor immediately prior to, immediately after, or during each milking.
2.	a. Implement an alternative mitigation measure(s), not listed above.
Class Two Mitigation Measures	
3.	a. Enclose and vent the milk parlor to a VOC control device with an overall VOC capture and VOC control efficiency of at least 80% when animals are in the parlor.
D. Owners/operators housing animals in freestalls shall incorporate at least two (2) of the following mitigation measures in each freestall barn:	
Class One Mitigation Measures	
1.	a. Vacuum or scrape freestall flush lanes immediately prior to, immediately after, or during each milking.
2.	a. Inspect water pipes and troughs and repair leaks at least once every fourteen (14) days.
3.	a. Use non-manure-based bedding and non-separated solids based bedding for at least 90% of the bedding material, by weight, for freestalls (e.g. rubber mats, almond hulls, sand, or waterbeds).
4.	a. Remove manure that is not dry from individual cow freestall beds at least once every fourteen (14) days.
5.	a. Rake, harrow, scrape, or grade bedding in freestalls at least once every fourteen (14) days.
6.	a. Use a dry manure handling system, such as scraping, instead of a liquid manure handling system, such as a flush system.
7.	a. Have no animals in exercise pens, corrals, or drylots at any time.
8.	a. Flush freestalls more frequently than the milking schedule.
9.	a. Implement an alternative mitigation measure(s), not listed above.
Class Two Mitigation Measures	
10.	a. Vacuum manure instead of flushing or scraping and apply manure directly to land either through injection or incorporation within seventy-two hours of removal from animal housing or vacuum truck.
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Table 3.1 – Large Dairy CAF Phase I Mitigation Measures Requirements (continued)	
E. Owners/operators housing animals in corrals shall incorporate at least six (6) of the following mitigation measures in each corral where animals have been housed in the last thirty (30) days:	
Class One Mitigation Measures	
1.	a. Clean manure from corrals at least four (4) times per year with at least sixty (60) days between cleaning, or b. Clean corrals at least once between April and July and at least once between October and December, or c. Clean concreted areas such that the depth of manure does not exceed twelve (12) inches at any point or time, except for in-corral mounding.
2.	a. Manage corrals such that the manure depth in the corral does not exceed twelve (12) inches at any time or point, except for in-corral mounding.
3.	a. Knockdown fence line manure build-up prior to it exceeding a height of twelve (12) inches at any time or point.
4.	a. Scrape or flush feed aprons in corrals at least once every seven (7) days.
5.	a. Slope the surface of the pens at least 3% where the available space for each animal is 400 square feet or less. Slope the surface of the pens at least 1.5% where the available space for each animal is more than 400 square feet per animal.
6.	a. Maintain corrals to ensure drainage and prevent water from standing more than forty-eight (48) hours after a storm, or b. Maintain corrals and drylots so that there are not indentions in the surface where puddles may form and remain for more than forty-eight (48) hours.
7.	a. Install floats on the troughs or use another method approved by the APCO, ARB, and EPA to ensure that the water in the troughs does not intentionally or unintentionally overflow or spill onto an earthen ground.
8.	a. Inspect water pipes and troughs and repair leaks at least once every fourteen (14) days.
9.	a. Harrow, rake, or scrape pens sufficiently to maintain a dry surface.
10.	a. Install no shade structures in the corrals, or b. Install shade structures such that they are constructed with a light permeable roofing material, or c. Install all shade structures uphill of any slope in the corral.
11.	a. Implement an alternative mitigation measure(s), not listed above.
Class Two Mitigation Measures	
12.	a. Use lime or a similar absorbent material in the pens according to the manufacturer's recommendations to minimize moisture in the pens, or b. Apply thymol to corral soil in accordance with the manufacturer's recommendation.
13.	a. House animals in an enclosure vented to a VOC control device with a combined VOC capture and VOC control efficiency of at least 80%.
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Table 3.1 – Large Dairy CAF Phase I Mitigation Measures Requirements (continued)	
F. Owners/operators that handle or store solid manure or separated solids outside the animal housing shall incorporate at least two (2) of the following mitigation measures:	
Class One Mitigation Measures	
1.	a. Cover dry manure piles outside the pens with a weatherproof covering from October through May, except for times, not to exceed twenty-four (24) hours per event, when wind events remove the covering.
2.	a. Cover dry separated solids outside the pens with a weatherproof covering from October through May, except for times, not to exceed twenty-four (24) hours per event, when wind events remove the covering.
3.	a. Remove manure from the facility within seventy-two (72) hours of removal from the pens or corrals.
4.	a. Remove separated solids from the facility within seventy-two (72) hours of separation with a solid separation system, or b. Store no separated solids outside of anaerobic digesters or aerobic digesters.
5.	a. Implement an alternative mitigation measure(s), not listed above.
Class Two Mitigation Measures	
6.	a. Compost manure removed from pens with an aerated static pile vented to a VOC control device with an overall VOC capture and VOC control efficiency of at least 80%.
7.	a. Store all removed manure in an enclosure vented to a VOC control device with an overall VOC capture and VOC control efficiency of at least 80%.
8.	a. Send at least 51% of the manure removed from animal housing to a digester, with a VOC control device with an overall VOC capture and VOC control efficiency of at least 80%.
G. Owners/operators that handle manure in a liquid form shall incorporate at least one (1) of the following mitigation measures:	
Class One Mitigation Measures	
1.	a. Manage the facility such that there are no lagoons, as defined in Section 3.35, at the facility.
2.	a. Use phototropic lagoon, or b. Use an anaerobic treatment lagoon that is not mechanically aerated.
3.	a. Remove solids from the waste system with a solid separator system, prior to the waste entering the lagoon.
4.	a. Maintain lagoon pH between 6.5 and 7.5.
5.	a. Implement an alternative mitigation measure(s), not listed above.

Table 3.1 – Large Dairy CAF Phase I Mitigation Measures Requirements (continued)	
Class Two Mitigation Measures	
6.	a. Use an aerobic lagoon, or b. Use an anaerobic treatment lagoon that is mechanically aerated.
7.	a. Maintain organic loading in the lagoon such that the total solids is less than 3.5 mg (dry weight)/mL, or total volatile solids is less than 3.5 mg/mL.
8.	a. Use additional non-standard equipment or chemicals on the solid separator system, such as roller or screw presses or chemical coagulants and flocculants, that increase the percent of solid separation achieved by the separator and that is approved by the APCO, ARB, and EPA.
9.	a. Cover the lagoon or storage pond and vent to a VOC control device with an overall VOC capture and VOC control efficiency of at least 80%.
H. Owners/operators who land apply dry or liquid manure to crop land on the facility shall incorporate at least two (2) of the following mitigation measures:	
Class One Mitigation Measures	
1.	a. Land incorporate all solid manure within seventy-two (72) hours of removal from animal housing.
2.	a. Only apply solid or liquid manure that has been treated with an anaerobic or aerobic lagoon or digester system.
3.	a. Allow liquid manure to stand in the fields no more than twenty-four (24) hours after irrigation, or b. Apply no liquid manure.
4.	a. Apply no solid manure with a moisture content of more than 50%, or b. Apply no solid manure.
5.	a. Implement an alternative mitigation measure(s), not listed above.

5.5.2 Beef Feedlots: Owners/operators of a large CAF that is a Beef Feedlot shall comply with the Phase I requirements in Table 3.2:

Table 3.2 – Beef Feedlot Phase I Mitigation Measure Requirements	
A. Owners/operators shall incorporate at least five (5) of the following feed mitigation measures:	
Class One Mitigation Measures	
1.	a. Feed according to National Research Council (NRC) guidelines.
2.	a. Feed animals with 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.
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) hour 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.
B. Owners/operators shall incorporate at least one (1) of the following feed mitigation measures:	
1.	a. Cover the horizontal surface of silage piles, except for the area where feed is being removed from the pile.
2.	a. Collect leachate from the silage piles and send it to a waste treatment system, such as a lagoon, at least once every twenty-four (24) hours.
3.	a. Implement an alternative mitigation measure(s) not listed above.
Class Two Mitigation Measures	
4.	a. Enclose silage in a bag and vent to a VOC control device with a combined VOC capture and VOC control efficiency of at least 80%, or b. Enclose silage in a weatherproof structure and vent to a VOC control device with a combined VOC capture and VOC control efficiency of at least 80%, or c. Eliminate silage from animal diet.
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Table 3.2 – Beef Feedlot Phase I Mitigation Measure Requirements (continued)	
C. Owners/operators shall incorporate at least seven (7) of the following mitigation measures in each of the animal housing structures (e.g. each corral, pen, etc.):	
Class One Mitigation Measures	
1.	a. Clean manure from pens at least once between April and July and at least once between October and December of each year.
2.	a. Manage pens such that the manure depth in the pen does not exceed eighteen (18) inches at any time or point, except for in-corral mounds.
3.	a. Knockdown fence line manure build-up prior to it exceeding a height of twelve (12) inches at any time or point.
4.	a. Slope the surface of the pens at least 3% where the available space for each animal is 400 square feet or less. Slope the surface of the pens at least 1.5% where the available space for each animal is more than 400 square feet per animal.
5.	a. Maintain pens to ensure drainage and prevent water from standing more than forty-eight (48) hours after a storm, or b. Prior to placing cattle in pens, scrape or smooth the pen floors such that there are not indentions where puddles may form and remain for more than forty-eight (48) hours.
6.	a. Install floats on the troughs or use another method approved by the APCO, ARB, and EPA to ensure that the water in the troughs does not intentionally or unintentionally overflow or spill onto an earthen ground.
7.	a. Inspect water pipes and troughs and repair leaks at least once every fourteen (14) days.
8.	a. Harrow, rake, or scrape pens sufficiently to maintain a dry surface, unless the corrals have not held animals in the last thirty (30) days.
9.	a. Clean the area where the animals stand to consume feed such that the depth of manure in this area does not exceed twelve (12) inches at any time or point.
10.	a. Use a dry manure handling system, such as scraping, instead of a liquid manure handling system, such as a flush system.
11.	a. Install no shade structures in the corrals, or b. Install shade structures such that they are constructed with a light permeable roofing material, or c. Install shade structures such that situated so that they are uphill of any slope in the corral.
12.	a. Implement an alternative mitigation measure(s), not listed above.
Class Two Mitigation Measures	
13.	a. Use lime or a similar absorbent material in the pens according to the manufacturer's recommendation to minimize moisture in the pens, or b. Apply thymol to the feedlot soil in accordance with the manufacturer's recommendation.
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Table 3.2 – Beef Feedlot Phase I Mitigation Measure Requirements (continued)	
D. Owners/operators that handle or store solid manure or separated solids outside the animal housing shall incorporate at least one (1) of the following mitigation measures:	
Class One Mitigation Measures	
1.	a. Cover dry manure piles outside the pens with a weatherproof covering from October through May, except for times, not to exceed twenty-four (24) hours per event, when wind events remove the covering, or b. Store no dry manure piles outside the pens from October through May.
2.	a. Remove manure from the facility within seventy-two (72) hours of removal from the pens.
3.	a. Implement an alternative mitigation measure(s), not listed above.
Class Two Mitigation Measures	
4.	a. Compost manure removed from pens with an aerated static pile vented to a VOC control device with an overall VOC capture and VOC control efficiency of at least 80%.
5.	a. Store all removed manure in an enclosure vented to a VOC control device with an overall VOC capture and VOC control efficiency of at least 80%.
6.	a. Send at least 51% of the manure removed from the animal housing to a digester, with a VOC control device with an overall VOC capture and VOC control efficiency of at least 80%.
7.	a. Use a slatted floor system (slatted floors over deep pits or shallow flush alleys), with daily manure removal.
E. Owners/operators that handle manure in a liquid form shall incorporate at least one (1) of the following mitigation measures:	
Class One Mitigation Measures	
1.	a. Manage the facility such that there are no lagoons, as defined in Section 3.35, at the facility.
2.	a. Use phototropic lagoon, or b. Use an anaerobic treatment lagoon that is not mechanically aerated.
3.	a. Remove solids from the waste system with a solid separator system, prior to the waste stream entering the lagoon.
4.	a. Maintain lagoon pH between 6.5 and 7.5.
5.	a. Implement an alternative mitigation measure(s), not listed above.
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Table 3.2 – Beef Feedlot Phase I Mitigation Measure Requirements (continued)	
Class Two Mitigation Measures	
6.	a. Use an aerobic lagoon, or b. Use an anaerobic treatment lagoon that is mechanically aerated.
7.	a. Maintain organic loading in the lagoon that is less than 3.5 mg (dry weight)/mL, or total volatile solids is less than 3.5 mg/mL.
8.	a. Use additional non-standard equipment or chemicals on the solid separator system, such as roller or screw presses or chemical coagulants and flocculants, that increase the percent of solid separation achieved by the separator and that is approved by the APCO, ARB, and EPA.
9.	a. Cover the lagoon and vent to a VOC control device with an overall VOC capture and VOC control efficiency of at least 80%.
F. Owners/operators who land apply dry or liquid manure to crop land on the facility shall incorporate at least (2) two of the following mitigation measures:	
Class One Mitigation Measures	
1.	a. Land incorporate all manure within seventy-two (72) hours of removal from animal housing.
2.	a. Only apply solid or liquid manure that has been treated with an anaerobic or aerobic lagoon or digester system.
3.	a. Allow liquid manure to stand in the fields no more than twenty-four (24) hours after irrigation, or b. Apply no liquid manure.
4.	a. Apply no solid manure with a moisture content of more than 50%, or b. Apply no solid manure.
5.	a. Implement an alternative mitigation measure(s), not listed above.

5.5.3 Other Cattle CAF: Owners/operators of a large CAF that is an Other Cattle Facility shall comply with the Phase I requirements in Table 3.3:

Table 3.3 – Other Cattle Phase I Mitigation Measure Requirements	
A. Owners/operators shall incorporate at least five (5) of the following feed and silage 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 with 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) hour 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.
B. Owners/operators shall incorporate at least one (1) of the following feed mitigation measures:	
Class One Mitigation Measures	
1.	a. Cover the horizontal surface of silage piles, except for the area where feed is being removed from the pile.
2.	a. Collect leachate from the silage piles and send it to a waste treatment system such as a lagoon at least once every twenty-four (24) hours.
3.	a. Implement an alternative mitigation measure(s), not listed above.
Class Two Mitigation Measures	
4.	a. Enclose silage in a bag and vent to a VOC control device with a combined VOC capture and VOC control efficiency of at least 80%, or b. Enclose silage in a weatherproof structure and vent to a VOC control device with a combined VOC capture and VOC control efficiency of at least 80%, or c. Eliminate silage from animal diet.
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Table 3.3 – Other Cattle Phase I Mitigation Measure Requirements (continued)	
C. Owners/operators shall incorporate at least seven (7) of the following mitigation measures in each animal housing structure (e.g. corral, freestalls, pens, etc.):	
Class One Mitigation Measures	
1.	a. Vacuum, scrape, or flush freestalls at least once every fourteen (14) days (only applies to facilities with freestalls).
2.	a. Inspect water pipes and troughs and repair leaks at least once every fourteen (14) days.
3.	a. Use non-manure-based bedding and non-separated solids based bedding for at least 90% of the bedding material, by weight, for freestalls (e.g. rubber mats, almond hulls, sand, or waterbeds).
4.	a. Remove manure that is not dry from individual cow freestall beds daily (only applies to facilities with freestalls).
5.	a. Rake, harrow, scrape, or grade bedding in freestalls at least once every fourteen (14) days (only applies to facilities with freestalls).
6.	a. Use a dry manure handling system, such as scraping, instead of a liquid manure handling system such as flushing.
7.	a. Have no animals in exercise pens, corrals, or drylots at any time.
8.	a. Clean manure from corrals and pens at least once between April and July and at least once between October and December of each year.
9.	a. Manage pens such that the manure depth in the pen does not exceed eighteen (18) inches at any time or point, except for in-corral mounds.
10.	a. Knockdown fence line manure build-up prior to it exceeding a height of twelve (12) inches at any time or point.
11.	a. Scrape or flush feed aprons in all corrals at least once every seven (7) days.
12.	a. Slope the surface of the pens at least 3% where the available space for each animal is 400 square feet or less. Slope the surface of the pens at least 1.5% where the available space for each animal is more than 400 square feet per animal.
13.	a. Maintain pens and corrals to ensure drainage and prevent water from standing more than forty-eight (48) hours after a storm, or b. Prior to placing cattle in pens or corrals, scrape or smooth the pen floors such that there are not indentions where puddles may form and remain for over forty-eight (48) hours.
14.	a. Install floats on the troughs or use another method approved by the APCO, ARB, and EPA to ensure that the water in the troughs does not intentionally or unintentionally overflow or spill onto the earthen ground.
15.	a. Harrow, rake, or scrape pens and corrals sufficiently to maintain a dry surface, unless the pens have not held animals in the last thirty (30) days.
Continues on the next page	

Table 3.3 – Other Cattle Phase I Mitigation Measure Requirements (continued)	
16.	a. Clean the area where the animals stand to consume feed such that the depth of manure does not exceed twelve (12) inches at any time or point.
17.	a. Use a dry manure handling system, such as scraping, instead of a liquid manure handling system such as a flush system.
18.	a. Install no shade structures in the corrals, or b. Install shade structures such that they are constructed with a light permeable roofing material, or c. Install shade structures such that situated so that they are uphill of any slope in the corral.
19.	a. Implement an alternative mitigation measure(s), not listed above.
Class Two Mitigation Measures	
20.	a. Vacuum manure instead of flushing or scraping and apply manure directly to land either through injection or incorporation.
21.	a. Use lime or a similar absorbent material in the pens and corrals according to the manufacturer's recommendations to minimize moisture in the pens, or b. Apply thymol to the pen and corral soil in accordance with the manufacturer's recommendation.
22.	a. House animals in an enclosure vented to a VOC control device with a combined VOC capture and VOC control efficiency of at least 80 %.
D. Owners/operators that handle or store solid manure or separated solids outside the animal housing shall incorporate at least one (1) of the following mitigation measures:	
Class One Mitigation Measures	
1.	a. Cover dry manure piles outside the pens with a weatherproof covering from October through May, except for times, not to exceed twenty-four (24) hours per event, when wind events remove the covering, or b. Store no dry manure piles outside of animal housing from October through May.
2.	a. Remove manure from the facility within seventy-two (72) hours of removal from the pens.
3.	a. Implement an alternative mitigation measure(s), not listed above.
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Table 3.3 – Other Cattle Phase I Mitigation Measure Requirements (continued)	
Class Two Mitigation Measures	
4.	a. Compost manure removed from pens with an aerated static pile vented to a VOC control device with an overall VOC capture and VOC control efficiency of at least 80%.
5.	a. Store all removed manure in an enclosure vented to a VOC control device with an overall VOC capture and VOC control efficiency of at least 80%.
6.	a. Send at least 51% of the manure removed from the animal housing to a digester with a VOC control device with an overall VOC capture and VOC control efficiency of at least 80%.
7.	a. Use a slatted floor system (slatted floors over deep pits or shallow flush alleys), with daily manure removal.
E. Owners/operators that handle manure in a liquid form shall incorporate at least one (1) of the following mitigation measures:	
Class One Mitigation Measures	
1.	a. Manage the facility such that there are no lagoons, as defined in Section 3.35, at the facility.
2.	a. Use phototropic lagoon, or b. Use an anaerobic treatment lagoon that is not mechanically aerated.
3.	a. Remove solids from the waste system with a solid separator separation system.
4.	a. Maintain lagoon pH between 6.5 and 7.5.
5.	a. Implement an alternative mitigation measure(s), not listed above.
Class Two Mitigation Measures	
6.	a. Use an aerobic lagoon, or b. Use an anaerobic treatment lagoon that is mechanically aerated.
7.	a. Maintain organic loading in the lagoon that is less than 3.5 mg (dry weight)/mL, or total volatile solids is less than 3.5 mg/mL.
8.	a. Use additional non-standard equipment or chemicals on the solid separator system, such as roller or screw presses or chemical coagulants and flocculants, that increase the percent of solid separation achieved by the separator and that is approved by the APCO, ARB, and EPA.
9.	a. Cover the lagoon and vent to a VOC control device with an overall VOC capture and VOC control efficiency of at least 80%.
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Table 3.3 – Other Cattle Phase I Mitigation Measure Requirements (continued)	
F. Owners/operators who land apply dry or liquid manure to crop land on the facility shall incorporate at least (2) two of the following mitigation measures:	
Class One Mitigation Measures	
1.	a. Land incorporate all manure within seventy-two (72) hours of removal from animal housing.
2.	a. Only apply manure that has been treated with an anaerobic or aerobic lagoon or digester system.
3.	a. Allow liquid manure to stand in the fields no more than twenty-four (24) hours after irrigation, or b. Apply no liquid manure.
4.	a. Apply no solid manure with a moisture content of more than 50%, or b. Apply no solid manure.
5.	a. Implement an alternative mitigation measure(s), not listed above.

5.5.4 Swine CAF: Owners/operators of a Large CAF that is a Swine Facility shall comply with the Phase I requirements in Table 3.4:

Table 3.4 – Swine Phase I Mitigation Measure Requirements	
A. Owners/operators shall incorporate at least five (5) of the following feed and silage mitigation measures:	
Class One Mitigation Measures	
1.	a. Feed according to National Research Council (NRC) guidelines.
2.	a. Feed animals probiotics designed to improve digestion according to manufacturer recommendations.
3.	a. Feed animals at least 5% cellulose.
4.	a. Feed animals a casein based diet.
5.	a. Feed animals an amino acid-supplemented diet with 2% sucrose thermal oligosaccharide caramel.
6.	a. Feed animals a diet with no more than ten percent (10%) crude protein with supplemented lysine, threonine, tryptophan, and methionine.
7.	a. Feed animals 10 ppm anthraquinone.
8.	a. Remove spilled from the facility at least once every fourteen (14) days.
9.	a. Remove uneaten wet feed from the housing within twenty-four (24) hours of a rain event.
10.	a. Feed or dispose of rations within forty-eight (48) hour of grinding and mixing rations.
11.	a. Store grain in a weatherproof storage structure from October through May.
12.	a. Implement an alternative mitigation measure(s), not listed above.
B. Owners/operators shall incorporate at least five (5) of the following mitigation measures in each animal housing unit:	
Class One Mitigation Measures	
1.	a. Clean manure from the housing at least twice every fourteen (14) days.
2.	a. Manage pens such that the manure depth in the pen does not exceed eighteen (18) inches at any time or point.
3.	a. Slope the surface of the pens at least 3% where the available space for each animal is 400 square feet or less. Slope the surface of the pens at least 1.5% where the available space for each animal is more than 400 square feet per animal.
4.	a. Install floats on the troughs or use drinkers that do not drip or another method approved by the APCO, ARB, and EPA to ensure that the water in the troughs does not intentionally or unintentionally overflow or spill onto an earthen ground.
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Table 3.4 – Swine Phase I Mitigation Measure Requirements (continued)	
5.	a. Inspect water pipes and troughs and repair leaks at least once every fourteen (14) days.
6.	a. Use a slatted floor system (slatted floors over deep pits or shallow flush alleys), with daily manure removal.
7.	a. Implement an alternative mitigation measure(s), not listed above.
Class Two Mitigation Measures	
8.	a. Use lime or a similar absorbent material in the pens according to the manufacturer's recommendations to minimize moisture in the pens.
9.	a. House animals in an enclosure vented to a VOC control device with a combined VOC capture and VOC control efficiency of at least 80%
10.	a. House animals in a tunnel ventilated house with mechanical ventilation.
C. Owners/operators that handle or store solid manure or separated solids outside the animal housing shall incorporate at least one (1) of the following mitigation measures:	
Class One Mitigation Measures	
1.	a. Cover dry manure and separated solids outside the pens with a weatherproof covering from October through May except for times, not to exceed twenty-four (24) hours per event, when wind events remove the covering.
2.	a. Remove manure from the facility within seventy-two (72) hours of removal from the pens or corrals.
3.	a. Use a dry manure handling system, such as stockpiles or solid land application, instead of a liquid system such as a flush system.
4.	a. Implement an alternative mitigation measure(s), not listed above.
Class Two Mitigation Measures	
5.	a. Compost manure removed from pens with an aerated static pile vented to a VOC control device with an overall VOC capture and VOC control efficiency of at least 80%.
6.	a. Store all removed manure in an enclosure vented to a VOC control device with an overall VOC capture and VOC control efficiency of at least 80%.
7.	a. Send at least 51% of the manure removed from site to a digester with a VOC control device with an overall VOC capture and VOC control efficiency of at least 80% control efficiency.
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Table 3.4 – Swine Phase I Mitigation Measure Requirements (continued)	
D. Owners/operators that handle manure in a liquid form shall incorporate at least one (1) of the following mitigation measures:	
Class One Mitigation Measures	
1.	a. Manage the facility such that there are no lagoons, as defined in Section 3.35, at the facility.
2.	a. Use phototropic lagoon, or b. Use an anaerobic treatment lagoon.
3.	a. Remove solids from the waste system with a solid separator system, prior to the waste entering the lagoon.
4.	a. Maintain lagoon pH between 6.5 and 7.5.
5.	a. Implement an alternative mitigation measure(s), not listed above.
Class Two Mitigation Measures	
6.	a. Use an aerobic lagoon, or b. Use a mechanically aerated lagoon.
7.	a. Maintain organic loading in the lagoon that is less than 3.5 mg (dry weight)/mL, or total volatile solids is less than 3.5 mg/mL.
8.	a. Use additional non-standard equipment or chemicals on the solid separator system, such as roller or screw presses or chemical coagulants and flocculants, that increase the percent of solid separation achieved by the separator and that is approved by the APCO, ARB, and EPA.
9.	a. Cover the lagoon and vent to a VOC control device with an overall VOC capture and VOC control efficiency of at least 80%.
E. Owners/operators who land apply dry or liquid manure to crop land on the facility shall incorporate at least (2) two of the following mitigation measures:	
Class One Mitigation Measures	
1.	a. Land incorporate all solid manure within seventy-two (72) hours of removal from animal housing, or
2.	a. Only apply manure that has been treated with an anaerobic or aerobic lagoon or digester system.
3.	a. Allow liquid manure to stand in the fields no more than twenty-four (24) hours after irrigation, or b. Apply no liquid manure.
4.	a. Apply no solid manure with a moisture content of more than 50%, or b. Apply no solid manure.
5.	a. Implement an alternative mitigation measure(s), not listed above.

5.5.5 Poultry CAF: Owners/operators of a large CAF that is a Poultry Facility shall comply with the Phase I requirements in Table 3.5:

Table 3.5 – Poultry Phase I Mitigation Measure Requirements	
A. Owners/operators shall incorporate at least five (5) of the following feed mitigation measures:	
Class One Mitigation Measures	
1.	a. Feed according to NRC guidelines.
2.	a. Feed animals probiotics designed to improve digestion according to manufacturer recommendations, or
3.	a. Feed animals an amino acid-supplemented diet to meet their nutrient requirements, or
4.	a. Feed animals feed additives such as amylase, xylanase, and protease, designed to maximize digestive efficiency according to manufacturer recommendations.
5.	a. Remove spilled feed from housing at least once every seven (7) days.
6.	a. Enclose grain in a weatherproof storage structure from October through May.
7.	a. Feed or dispose of feed within forty-eight (48) hour of grinding and mixing feed.
8.	a. Use feed additives designed to reduce feed decomposition or oxidization (the process were one or more electrons are removed from a molecule).
9.	a. Remove uneaten wet feed from the housing within twenty-four (24) hours of a rain event.
10.	a. Implement an alternative mitigation measure(s), not listed above.
B. Each poultry house shall incorporate at least four (4) of the following mitigation measures:	
Class One Mitigation Measures	
1.	a. Remove caked manure/litter at least once every fourteen (14) days.
2.	a. Clean under poultry cages at least once every fourteen (14) days.
3.	a. Use poultry litter additives designed to reduce air emissions or moisture content in litter, such as aluminum sulfate or sodium bisulfate, according to manufacturer recommendations.
4.	a. Use a dry housing cleaning method at all times, except when a wet cleaning method is required for animal health or biosecurity issues.
5.	a. Use drinkers that do not drip.
6.	a. Adjust the height, volume, and location of drinkers at least once every fourteen (14) days.
7.	a. Use no foggers in the house.
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Table 3.5 – Poultry Phase I Mitigation Measure Requirements (continued)	
8.	a. Only use fogger systems designed, operated and maintained according to manufacturer recommendations that provide water droplets with an average size of 50 microns or less.
9.	a. Slope the surface of the house at least 3% where the available space for each animal is 400 square feet or less. Slope the surface of the house at least 1.5% where the available space for each animal is more than 400 square feet per animal.
10.	a. Install mounds or berms up gradient to prevent the runoff of stormwater into pens (only an option for animals allowed to freely move between indoor housing structures and outdoor pens).
11.	a. Inspect water pipes and drinkers and repair leaks at least once every fourteen (14) days.
12.	a. Maintain the roof structure and manage roof runoff in accordance with the applicable standards in NRCS Field Office Technical Guide Code 558 or other applicable standards approved by the APCO, ARB, and EPA
13.	a. Implement an alternative mitigation measure(s), not listed above.
Class Two Mitigation Measures	
14.	a. Vent housing to a VOC control device with an overall VOC capture and VOC control efficiency of at least 80%.
15.	a. Use a belt litter removal system that dries the litter.
16.	a. House animals in a tunnel ventilated houses with mechanical ventilation.
17.	a. Use a litter drying system, such as a flat bed drying system.
C. Owners/operators that handle or store solid manure/litter or separated solids outside the animal housing shall incorporate at least one (1) of the following mitigation measures:	
Class One Mitigation Measures	
1.	a. Remove all manure/litter from the facility within seventy-two (72) hours of removal from housing, or b. Send all manure/litter to a lagoon within seventy-two (72) hours of removal from housing.
2.	a. Cover manure/litter outside the housing with a weatherproof covering from October through May, except for times, not to exceed twenty-four (24) hours per event, when wind events remove the covering.
3.	a. Use a solid manure/litter handling system in housing, such as stockpiles, solid land application, or a thin bed manure/litter drying system, instead of a liquid system such as flushing, manure/litter storage ponds, or manure/litter treatment lagoons.
4.	a. Implement an alternative mitigation measure(s), not listed above.
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Table 3.5 – Poultry Phase I Mitigation Measure Requirements (continued)	
Class Two Mitigation Measures	
5.	a. Send at least 51 % of the manure/litter removed from site to a digester, with a VOC control device with an overall VOC capture and VOC control efficiency of at least 80 %.
6.	a. Compost manure/litter removed from the housing with an aerated static pile vented to a VOC control device with an overall VOC capture and VOC control efficiency of at least 80 %.
D. Owners/operators that handle manure/litter in a liquid form shall incorporate at least one (1) of the following mitigation measures:	
Class One Mitigation Measures	
1.	a. Manage the facility such that there are no lagoons, as defined in Section 3.35, at the facility.
2.	a. Use phototropic lagoon, or b. Use an anaerobic treatment lagoon.
3.	a. Remove solids from the waste system with a solid separator system, prior to the waste entering the lagoon.
4.	a. Maintain lagoon pH between 6.5 and 7.5.
5.	a. Implement an alternative mitigation measure(s), not listed above.
Class Two Mitigation Measures	
6.	a. Use an aerobic lagoon, or b. Use a mechanically aerated lagoon.
7.	a. Maintain organic loading in the lagoon that is less than 3.5 mg (dry weight)/mL, or total volatile solids is less than 3.5 mg/mL.
8.	a. Use additional non-standard equipment or chemicals on the solid separator system, such as roller or screw presses or chemical coagulants and flocculants, that increase the percent of solid separation achieved by the separator and is approved by the APCO, ARB, and EPA.
9.	a. Cover the lagoon or storage pond and vent to a VOC control device with an overall VOC capture and VOC control efficiency of at least 80 %.

5.6 Phase II Mitigation Measures: Owners/operators of CAFs subject to the regulatory threshold in Table 2 shall comply with all applicable Phase II Mitigation Measures in accordance with the compliance schedule in Section 8.0.

5.6.1 Dairy CAF: An owner/operator of a medium or large Dairy CAF shall comply with the Phase II mitigation measures in Table 4.1.

Table 4.1 – Dairy CAF Phase II Mitigation Measure Requirements	
A. Feed: An owner/operator of a dairy CAF shall implement mitigation measures 1, 2, 3, and 4 and at least one (1) additional mitigation measure:	
1.	Feed according to National Research Council (NRC) guidelines.
2.	Push feed so that it is within three (3) feet of feedlane fence within two hours of putting out the feed or use a feed trough or other feeding structure designed to maintain feed within reach of the cows.
3.	Begin feeding total mixed rations within two (2) hours of grinding and mixing rations.
4.	Store grain in a weatherproof storage structure or under a weatherproof covering from October through May.
5.	Feed steam-flaked, dry rolled, cracked or ground corn or other steam-flaked, dry rolled, cracked or ground cereal grains.
6.	Remove uneaten wet feed from feed bunks within twenty-four (24) hours after the end of a rain event.
7.	For total mixed rations that contain at least 30% by weight of silage, feed animals total mixed rations that contain at least 45% moisture.
8.	Implement an alternative mitigation measure(s), not listed above.
B. Silage: An owner/operator of a dairy CAF that feeds silage shall implement at least one (1) of the following silage mitigation measures:	
1.	Operators selecting this option must choose mitigation measure 1a plus one (1) from mitigation measures 1b, 1c, 1d plus two (2) from mitigation measures 1e, 1f, 1g: <ul style="list-style-type: none"> a. Cover the surface of silage piles, except for the area where feed is being removed from the pile, with a plastic tarp that is at least five (5) mils thick (0.005 inches), multiple plastic tarps with a cumulative thickness of at least 5 mils (0.005 inches), or an oxygen barrier film covered with a UV resistant material, within seventy-two (72) hours of last delivery of material to the pile.
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Table 4.1 – Dairy CAF Phase II Mitigation Measure Requirements (continued)

Choose one of the following:

- b. Build silage piles such that the average bulk density of silage piles is at least 44 lb/cu ft for corn silage and 40 lb/cu ft for other silage types, as measured in accordance with Section 7.11; or
- c. When creating a silage pile, adjust filling parameters to assure a calculated average bulk density of at least 44 lb/cu ft for corn silage and at least 40 lb/cu ft for other silage types, using a spreadsheet approved by the District; or
- d. Incorporate all of the following practices when creating silage piles:
 - i. Harvest silage crop at $\geq 65\%$ moisture for corn; and $\geq 60\%$ moisture for alfalfa/grass and other silage crops; and
 - ii. Incorporate the following parameters for Theoretical Length of Chop (TLC) and roller opening, as applicable, for the crop being harvested.

Crop Harvested	TLC (inches)	Roller Opening (mm)
Corn with no processing	$\leq 1/2$ in	N/A
Processed Corn <35% dry matter	$\leq 3/4$ in	1 - 4 mm
Alfalfa/Grass	≤ 1.0 in	N/A
Wheat/Cereal Grains/Other	$\leq 1/2$ in	N/A

- iii. Manage silage material delivery such that no more than six (6) inches of material are un-compacted on top of the pile.

Choose two of the following:

- e. Manage exposed silage (select one of the following):
 - i. Manage silage piles such that only one silage pile has an uncovered face and the uncovered face has a total exposed surface area of less than 2,150 square feet; or
 - ii. Manage multiple uncovered silage piles such that the total exposed surface area of all uncovered silage piles is less than 4,300 square feet.

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Table 4.1 – Dairy CAF Phase II Mitigation Measure Requirements (continued)	
	<ul style="list-style-type: none"> f. Maintain silage working face (select one of the following): <ul style="list-style-type: none"> i. Use a shaver/facer to remove silage from the silage pile; or ii. Maintain a smooth vertical surface on the working face of the silage pile. g. Silage Additives (select one of the following): <ul style="list-style-type: none"> i. Inoculate silage with homolactic lactic acid bacteria in accordance with manufacturer recommendations to achieve a concentration of at least 100,000 colony forming units per gram of wet forage; or ii. Apply propionic acid, benzoic acid, sorbic acid, sodium benzoate, or potassium sorbate at a rate specified by the manufacturer to reduce yeast counts when forming silage pile; or iii. Apply other additives at specified rates that have been demonstrated to reduce alcohol concentrations in silage and/or VOC emissions from silage and have been approved by the District and EPA.
2.	Utilize a sealed feed storage system (e.g., Ag-Bag) for silage.
3.	Implement an alternative mitigation measure(s), not listed above.
C. Milking Parlor: An owner/operator of a dairy CAF shall implement at least one (1) of the following mitigation measures in each milking parlor:	
1.	Flush or hose milking parlor immediately prior to, immediately after, or during each milking.
2.	Implement an alternative mitigation measure(s), not listed above.
D. Freestall Barn: An owner/operator of a dairy CAF that houses animals in freestalls shall implement mitigation measures 1 and 2 and at least one (1) additional mitigation measure in each freestall barn:	
1.	Pave feedlanes, where present, for a width of at least eight (8) feet along the corral side of the feedlane fence for milk and dry cows and at least six (6) feet along the corral side of the feedlane for heifers.
2.	Choose one of the following: <ul style="list-style-type: none"> a. Flush, scrape, or vacuum freestall flush lanes immediately prior to, immediately after, or during each milking; or b. Flush or scrape freestall flush lanes at least three (3) times per day.
3.	Use non-manure-based bedding and non-separated solids based bedding for at least 90% of the bedding material, by weight, for freestalls (e.g. rubber mats, almond shells, sand, or waterbeds).
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Table 4.1 – Dairy CAF Phase II Mitigation Measure Requirements (continued)	
4.	<p>For a large dairy CAF, remove manure that is not dry from individual cow freestall beds or rake, harrow, scrape, or grade freestall bedding at least once every seven (7) days.</p> <p>For a medium dairy CAF, remove manure that is not dry from individual cow freestall beds or rake, harrow, scrape, or grade freestall bedding at least once every fourteen (14) days.</p>
5.	Have no animals in exercise pens or corrals at any time.
6.	Implement an alternative mitigation measure(s), not listed above.
E. Corrals:	
An owner/operator of a dairy CAF that houses animals in corrals shall implement mitigation measures 1, 2, 3, 4, 5, and 6 and at least one (1) additional mitigation measure in each corral where animals have been housed in the last thirty (30) days:	
1.	Pave feedlanes, where present, for a width of at least 8 feet along the corral side of the feedlane fence for milk and dry cows and at least 6 feet along the corral side of the feedlane for heifers.–
2.	<p>Choose one of the following:</p> <p>a. Clean manure from corrals at least four (4) times per year with at least sixty (60) days between cleaning; or</p> <p>b. Clean corrals at least once between April and July and at least once between September and December.–</p>
3.	<p>Choose one of the following:</p> <p>a. Scrape, vacuum, or flush concrete lanes in corrals at least once every day for mature cows and every seven (7) days for support stock; or</p> <p>b. Clean concrete lanes such that the depth of manure does not exceed twelve (12) inches at any point or time.</p>
4.	Inspect water pipes and troughs and repair leaks at least once every seven (7) days.
5.	<p>Choose one of the following:</p> <p>a. Slope the surface of the corrals at least 3% where the available space for each animal is 400 square feet or less. Slope the surface of the corrals at least 1.5% where the available space for each animal is more than 400 square feet per animal; or</p> <p>b. Maintain corrals to ensure proper drainage preventing water from standing more than forty-eight (48) hours; or</p> <p>c. Harrow, rake, or scrape corrals sufficiently to maintain a dry surface.</p>
6.	<p>If the CAF has shade structures, they must choose one of the following:</p> <p>a. Install shade structures such that they are constructed with a light permeable roofing material; or</p> <p>b. Install all shade structures uphill of any slope in the corral; or</p> <p>c. Clean manure from under corral shades at least once every fourteen (14) days, when weather permits access into the corral; or</p> <p>d. Install shade structure so that the structure has a North/South orientation.</p>
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Table 4.1 – Dairy CAF Phase II Mitigation Measure Requirements (continued)	
7.	Manage corrals such that the manure depth in the corral does not exceed twelve (12) inches at any time or point, except for in-corral mounding. Manure depth may exceed 12 inches when corrals become inaccessible due to rain events. The facility must resume management of the manure depth of 12 inches or lower immediately upon the corral becoming accessible.
8.	Knockdown fence line manure build-up prior to it exceeding a height of twelve (12) inches at any time or point. Manure depth may exceed 12 inches when corrals become inaccessible due to rain events. The facility must resume management of the manure depth of 12 inches or lower immediately upon the corral becoming accessible.
9.	Choose one of the following: a. Use lime or a similar absorbent material in the corrals according to the manufacturer's recommendation; or b. Apply thymol to the feedlot soil in accordance with the manufacturer's recommendation.
10.	Implement an alternative mitigation measure(s), not listed above.
F. Solid Manure/Separated Solids: Owners/operators of a large dairy CAF that handle or store solid manure or separated solids outside the animal housing shall implement at least one (1) of the following mitigation measures:	
1.	Within seventy-two (72) hours of removal from housing, either: a. Remove dry manure from the facility; or b. Cover dry manure outside the housing with a weatherproof covering from October through May, except for times when wind events remove the covering, not to exceed twenty-four (24) hours per event.
2.	Within seventy-two (72) hours of removal from the drying process, either: a. Remove separated solids from the facility; or b. Cover separated solids outside the housing with a weatherproof covering from October through May, except for times when wind events remove the covering, not to exceed twenty-four (24) hours per event.
3.	Implement an alternative mitigation measure(s), not listed above.
G. Liquid Manure: An owner/operator of a dairy CAF that handles manure in a liquid form shall implement at least one (1) of the following mitigation measures:	
1.	Use a phototropic lagoon.
2.	Use an anaerobic treatment lagoon designed in accordance with NRCS Guideline No. 359.
3.	Remove solids from the waste system with a solid separator system, prior to the waste entering the lagoon.
4.	Maintain lagoon pH between 6.5 and 7.5.
5.	Implement an alternative mitigation measure(s), not listed above.
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Table 4.1 – Dairy CAF Phase II Mitigation Measure Requirements (continued)	
H.	<p>Land Application:</p> <p>An owner/operator of a dairy CAF who land applies manure to crop land on the facility shall implement the following applicable mitigation measures:</p>
1.	<p>If the CAF applies solid manure, choose one of the following:</p> <ul style="list-style-type: none"> a. Incorporate all solid manure within seventy-two (72) hours of land application; or b. Only apply solid manure that has been treated with an anaerobic treatment lagoon, aerobic lagoon, or digester system; or c. Apply no solid manure with a moisture content of more than 50%; or d. Implement an alternative mitigation measure(s), not listed above.
2.	<p>If the CAF applies liquid manure, choose one of the following:</p> <ul style="list-style-type: none"> a. Only apply liquid manure that has been treated with an anaerobic treatment lagoon, aerobic lagoon, or digester system; or b. Allow liquid manure to stand in the fields for no more than twenty-four (24) hours after irrigation; or c. Apply liquid/slurry manure via injection with drag hose or similar apparatus; or d. Implement an alternative mitigation measure(s), not listed above.

5.6.2 Beef Feedlots: Owners/operators of a beef feedlot CAF shall comply with the Phase II mitigation measures in Table 4.2.

Table 4.2 – Beef Feedlot Phase II Mitigation Measure Requirements	
A. Feed: An owner/operator of a beef feedlot CAF shall implement at least two (2) of the following feed mitigation measures:	
1.	Feed according to National Research Council (NRC) guidelines.
2.	Feed steam-flaked, dry rolled, cracked or ground corn or other steam-flaked, dry rolled, cracked or ground cereal grains.
3.	Remove uneaten wet feed from feed bunks within twenty-four (24) hours after the end of a rain event.
4.	Implement an alternative mitigation measure(s), not listed above.
B. Silage: An owner/operator of a beef feedlot CAF that feeds silage shall implement at least one (1) of the following silage mitigation measures:	
1.	Operators selecting this option must choose mitigation measure 1a plus one (1) from mitigation measures 1b, 1c, 1d plus two (2) from mitigation measures 1e, 1f, 1g: <ul style="list-style-type: none"> a. Cover the surface of silage piles, except for the area where feed is being removed from the pile, with a plastic tarp that is at least five (5) mils thick (0.005 inches), multiple plastic tarps with a cumulative thickness of at least 5 mils (0.005 inches), or an oxygen barrier film covered with a UV resistant material, within seventy-two (72) hours of last delivery of material to the pile.
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Table 4.2 – Beef Feedlot Phase II Mitigation Measure Requirements (continued)

Choose one of the following:

- b. Build silage piles such that the average bulk density of silage piles is at least 44 lb/cu ft for corn silage and 40 lb/cu ft for other silage types, as measured in accordance with Section 7.11; or
- c. When creating a silage pile, adjust filling parameters to assure a calculated average bulk density of at least 44 lb/cu ft for corn silage and at least 40 lb/cu ft for other silage types, using a spreadsheet approved by the District; or
- d. Incorporate all of the following practices when creating silage piles:
 - i. Harvest silage crop at $\geq 65\%$ moisture for corn; and $\geq 60\%$ moisture for alfalfa/grass and other silage crops; and
 - ii. Incorporate the following parameters for Theoretical Length of Chop (TLC) and roller opening, as applicable, for the crop being harvested.

Crop Harvested	TLC (inches)	Roller Opening (mm)
Corn with no processing	$\leq 1/2$ in	N/A
Processed Corn < 35% dry matter	$\leq 3/4$ in	1 - 4 mm
Alfalfa/Grass	≤ 1.0 in	N/A
Wheat/Cereal Grains/Other	$\leq 1/2$ in	N/A

- iii. Manage silage material delivery such that no more than six (6) inches of material are un-compacted on top of the pile.

Choose two of the following:

- e. Manage exposed silage (select one of the following):
 - i. Manage silage piles such that only one silage pile has an uncovered face and the uncovered face has a total exposed surface area of less than 2,150 square feet; or
 - ii. Manage multiple uncovered silage piles such that the total exposed surface area of all uncovered silage piles is less than 4,300 square feet.

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Table 4.2 – Beef Feedlot Phase II Mitigation Measure Requirements (continued)

	<p>f. Maintain silage working face (select one of the following):</p> <ul style="list-style-type: none"> i. Use a shaver/facer to remove silage from the silage pile; or ii. Maintain a smooth vertical surface on the working face of the silage pile. <p>g. Silage Additives (select one of the following):</p> <ul style="list-style-type: none"> i. Inoculate silage with homolactic lactic acid bacteria in accordance with manufacturer recommendations to achieve a concentration of at least 100,000 colony forming units per gram of wet forage; or ii. Apply propionic acid, benzoic acid, sorbic acid, sodium benzoate, or potassium sorbate at a rate specified by the manufacturer to reduce yeast counts when forming silage pile; or iii. Apply other additives at specified rates that have been demonstrated to reduce alcohol concentrations in silage and/or VOC emissions from silage and have been approved by the District and EPA.
2.	Utilize a sealed feed storage system (e.g., Ag-Bag) for silage.
3.	Implement an alternative mitigation measure(s), not listed above.
C. Housing:	
An owner/operator of a beef feedlot CAF shall implement mitigation measures 1, 2, 3, and 4 and at least one (1) additional mitigation measure in each of the animal housing structures (e.g. each corral, etc.):	
1.	Scrape corrals twice a year with at least ninety (90) days between cleanings, excluding the removal of in-corral mounds.
2.	Inspect water pipes and troughs and repair leaks at least once every seven (7) days.
3.	<p>Choose one of the following:</p> <ul style="list-style-type: none"> a. Slope the surface of the corrals at least 3% where the available space for each animal is 400 square feet or less. Slope the surface of the corrals at least 1.5% where the available space for each animal is more than 400 square feet per animal. b. Maintain corrals to ensure proper drainage preventing water from standing more than forty-eight (48) hours; or c. Harrow, rake, or scrape corrals sufficiently to maintain a dry surface, unless the corrals have not held animals in the last thirty (30) days.
4.	<p>If the CAF has shade structures, they must choose with one of the following:</p> <ul style="list-style-type: none"> a. Install shade structures such that they are constructed with a light permeable roofing material; or b. Install all shade structures uphill of any slope in the corral; or c. Install shade structure so that the structure has a North/South orientation.
5.	Manage corrals and concrete lanes such that the dry manure depth in the pen does not exceed twelve (12) inches at any time or point, except for in-corral mounds. Manure depth may exceed twelve (12) inches when corrals become inaccessible due to rain events. The facility must resume management of the manure depth of twelve (12) inches or lower immediately upon the corral becoming accessible.
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Table 4.2 – Beef Feedlot Phase II Mitigation Measure Requirements (continued)	
6.	Knockdown fence line manure build-up prior to it exceeding a height of twelve (12) inches at any time or point. Manure depth may exceed twelve (12) inches when corrals become inaccessible due to rain events. The facility must resume management of the manure depth of twelve (12) inches or lower immediately upon the corral becoming accessible.
7.	Implement an alternative mitigation measure(s), not listed above.
D. Solid Manure/Separated Solids: An owner/operator of a beef feedlot CAF that handles or stores solid manure or separated solids outside the animal housing shall implement at least one (1) of the following mitigation measures:	
1.	Choose one of the following: a. Within 72 hours of removal from animal housing, either remove dry manure from the facility or, during the months of October through May, cover dry manure pile with a weatherproof covering, except for times, not to exceed twenty-four (24) hours per event, when wind events remove the covering.; or b. Manage moisture content of manure to less than 50%.
2.	Implement an alternative mitigation measure(s), not listed above.
E. Liquid Manure: An owner/operator of a beef feedlot CAF that handles manure in a liquid form shall implement at least one (1) of the following mitigation measures:	
1.	Use a phototropic lagoon.
2.	Use an anaerobic treatment lagoon designed in accordance with NRCS Guideline No. 359.
3.	Remove solids from the waste system with a solid separator system, prior to the waste entering the lagoon.
4.	Maintain lagoon pH between 6.5 and 7.5.
5.	Implement an alternative mitigation measure(s), not listed above.
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Table 4.2 – Beef Feedlot Phase II Mitigation Measure Requirements (continued)	
<p>F. Land Application: An owner operator of a beef feedlot CAF who land applies manure to crop land on the facility shall implement the following applicable mitigation measures:</p>	
1.	<p>If the CAF applies solid manure, choose one of the following:</p> <ul style="list-style-type: none"> a. Incorporate all solid manure within seventy-two (72) hours of land application; or b. Only apply solid manure that has been treated with an anaerobic treatment lagoon, aerobic lagoon, or digester system; or c. Apply no solid manure with a moisture content of more than 50%; or d. Implement an alternative mitigation measure(s), not listed above.
2.	<p>If the CAF applies liquid manure, choose one of the following:</p> <ul style="list-style-type: none"> a. Only apply liquid manure that has been treated with an anaerobic treatment lagoon, aerobic lagoon, or digester system; or b. Allow liquid manure to stand in the fields for no more than twenty-four (24) hours after irrigation; or c. Apply liquid/slurry manure via injection with drag hose or similar apparatus; or d. Implement an alternative mitigation measure(s), not listed above.

5.6.3 Other Cattle CAF: Owners/operators of an other cattle CAF shall comply with the Phase II mitigation measures in Table 4.3.

Table 4.3 – Other Cattle Phase II Mitigation Measure Requirements	
A. Feed: An owner/operator of an other cattle CAF shall implement at least two (2) of the following feed mitigation measures:	
1.	Feed according to National Research Council (NRC) guidelines.
2.	Feed steam-flaked, dry rolled, cracked or ground corn or other steam-flaked, dry rolled, cracked or ground cereal grains.
3.	Remove uneaten wet feed from feed bunks within twenty-four (24) hours after the end of a rain event.
4.	Implement an alternative mitigation measure(s), not listed above.
B. Silage: An owner/operator of an other cattle CAF that feeds silage shall implement at least one (1) of the following silage mitigation measures:	
1.	Operators selecting this option must choose mitigation measure 1a plus one (1) from mitigation measures 1b, 1c, 1d plus two (2) from mitigation measures 1e, 1f, 1g: <ul style="list-style-type: none"> a. Cover the surface of silage piles, except for the area where feed is being removed from the pile, with a plastic tarp that is at least five (5) mils thick (0.005 inches), multiple plastic tarps with a cumulative thickness of at least 5 mils (0.005 inches), or an oxygen barrier film covered with a UV resistant material, within seventy-two (72) hours of last delivery of material to the pile.
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Table 4.3 – Other Cattle Phase II Mitigation Measure Requirements

Choose one of the following:

- b. Build silage piles such that the average bulk density of silage piles is at least 44 lb/cu ft for corn silage and 40 lb/cu ft for other silage types as measured in accordance with Section 7.11; or
- c. When creating a silage pile, adjust filling parameters to assure a calculated average bulk density of at least 44 lb/cu ft. for corn silage and at least 40 lb/cu ft for other silage types using a spreadsheet approved by the District; or
- d. Incorporate all of the following practices when creating silage piles:
 - i. Harvest silage crop at $\geq 65\%$ moisture for corn; and $\geq 60\%$ moisture for alfalfa/grass and other silage crops; and
 - ii. Incorporate the following parameters for Theoretical Length of Chop (TLC) and roller opening, as applicable, for the crop being harvested.

Crop Harvested	TLC (inches)	Roller Opening (mm)
Corn with no processing	$\leq 1/2$ in	N/A
Processed Corn <35% dry matter	$\leq 3/4$ in	1 - 4 mm
Alfalfa/Grass	≤ 1.0 in	N/A
Wheat/Cereal Grains/Other	$\leq 1/2$ in	N/A

- iii. Manage silage material delivery such that no more than six (6) inches of material are un-compacted on top of the pile.

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Table 4.3 – Other Cattle Phase II Mitigation Measure Requirements (continued)

	<p>Choose one of the following:</p> <ul style="list-style-type: none"> e. Manage exposed silage (select one of the following): <ul style="list-style-type: none"> i. Manage silage piles such that only one silage pile has an uncovered face and the uncovered face has a total exposed surface area of less than 2,150 square feet; or ii. Manage multiple uncovered silage piles such that the total exposed surface area of all uncovered silage piles is less than 4,300 square feet. f. Maintain silage working face (select one of the following): <ul style="list-style-type: none"> i. Use a shaver/facer to remove silage from the silage pile; or ii. Maintain a smooth vertical surface on the working face of the silage pile. g. Silage Additives (select one of the following): <ul style="list-style-type: none"> i. Inoculate silage with homolactic lactic acid bacteria in accordance with manufacturer recommendations to achieve a concentration of at least 100,000 colony forming units per gram of wet forage; or ii. Apply propionic acid, benzoic acid, sorbic acid, sodium benzoate, or potassium sorbate at a rate specified by the manufacturer to reduce yeast counts when forming silage pile; or iii. Apply other additives at specified rates that have been demonstrated to reduce alcohol concentrations in silage and/or VOC emissions from silage and have been approved by the District and EPA.
2.	Utilize a sealed feed storage system (e.g., Ag-Bag) for silage.
3.	Implement an alternative mitigation measure(s), not listed above.
C.	<p>Freestalls:</p> <p>An owner/operator of an other cattle CAF that houses animals in freestalls shall implement mitigation measures 1 and 2 and at least one (1) additional mitigation measure in each freestall barn:</p>
1.	Vacuum, scrape, or flush freestalls at least once every seven (7) days.
2.	Pave feedlanes, where present, for a width of at least six (6) feet along the corral side of the feedlane.
3.	Use non-manure-based bedding and non-separated solids based bedding for at least 90% of the bedding material, by weight, for freestalls (e.g. rubber mats, almond shells, sand, or waterbeds).
4.	Remove manure that is not dry from individual cow freestall beds or rake, harrow, scrape, or grade bedding in freestalls at least once every seven (7) days.
5.	Implement an alternative mitigation measure(s), not listed above.
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Table 4.3 – Other Cattle Phase II Mitigation Measure Requirements (continued)

D. Corrals: An owner/operator of a other cattle CAF that houses animals in corrals shall implement mitigation measures 1, 2, 3, 4, and 5 and at least one (1) additional mitigation measure in each corral where animals have been housed in the last thirty (30) days:	
1.	Scrape corrals twice a year with at least 90 days between cleanings, excluding in-corral mounds.
2.	Choose one of the following: a. Scrape, vacuum, or flush concrete lanes in corrals at least once every seven (7) days; or b. Clean concrete lanes such that the depth of manure does not exceed twelve (12) inches at any point or time.
3.	Inspect water pipes and troughs and repair leaks at least once every seven (7) days.
4.	Choose one of the following: a. Slope the surface of the corrals at least 3% where the available space for each animal is 400 square feet or less. Slope the surface of the corrals at least 1.5% where the available space for each animal is more than 400 square feet per animal. b. Maintain corrals to ensure proper drainage preventing water from standing more than forty-eight (48) hours; or c. Harrow, rake, or scrape corrals and corrals sufficiently to maintain a dry surface, unless the corrals have not held animals in the last thirty (30) days.
5.	If the CAF has shade structures, they must choose one of the following: a. Install shade structures such that they are constructed with a light permeable roofing material; or b. Install all shade structures uphill of any slope in the corral; or c. Install shade structure so that the structure has a North/South orientation.
6.	Manage corrals and concrete lanes such that the dry manure depth in the pen does not exceed twelve (12) inches at any time or point, except for in-corral mounds. Manure depth may exceed twelve (12) inches when corrals become inaccessible due to rain events. The facility must resume management of the manure depth of twelve (12) inches or lower immediately upon the corral becoming accessible.
7.	Knockdown fence line manure build-up prior to it exceeding a height of twelve (12) inches at any time or point. Manure depth may exceed twelve (12) inches when corrals become inaccessible due to rain events. The facility must resume management of the manure depth of twelve (12) inches or lower immediately upon the corral becoming accessible.
8.	Choose one of the following: a. Use lime or a similar absorbent material in the corrals according to the manufacturer's recommendation; or b. Apply thymol to the feedlot soil in accordance with the manufacturer's recommendation.
9.	Implement an alternative mitigation measure(s), not listed above.
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Table 4.3 – Other Cattle Phase II Mitigation Measure Requirements (continued)	
E. Solid Manure/Separated Solids: An owner operator of an other cattle CAF that handles or stores solid manure or separated solids outside the animal housing shall implement at least one (1) of the following mitigation measures:	
1.	Within seventy-two (72) hours of removal from housing, either: <ol style="list-style-type: none"> Remove dry manure from the facility; or Cover dry manure outside the housing with a weatherproof covering from October through May, except for times when wind events remove the covering, not to exceed twenty-four (24) hours per event.
2.	Within seventy-two (72) hours of removal from the drying process, either: <ol style="list-style-type: none"> Remove separated solids from the facility; or Cover separated solids outside the housing with a weatherproof covering from October through May, except for times when wind events remove the covering, not to exceed twenty-four (24) hours per event.
3.	Implement an alternative mitigation measure(s), not listed above.
F. Liquid Manure: An owner/operator of an other cattle CAF that handles manure in a liquid form shall implement at least one (1) of the following mitigation measures:	
1.	Use a phototropic lagoon.
2.	Use an anaerobic treatment lagoon designed in accordance with NRCS Guideline No. 359.
3.	Remove solids from the waste system with a solid separator separation system.
4.	Maintain lagoon pH between 6.5 and 7.5.
5.	Implement an alternative mitigation measure(s), not listed above.
G. Land Application: An owner/operator of an other cattle CAF who land applies manure to crop land on the facility shall implement the following applicable mitigation measures:	
1.	If the CAF applies solid manure, choose one of the following: <ol style="list-style-type: none"> Incorporate all solid manure within seventy-two (72) hours of land application; or Only apply solid manure that has been treated with an anaerobic treatment lagoon, aerobic lagoon, or digester system; or Apply no solid manure with a moisture content of more than 50%; or Implement an alternative mitigation measure(s), not listed above.
2.	If the CAF applies liquid manure, choose one of the following: <ol style="list-style-type: none"> Only apply liquid manure that has been treated with an anaerobic treatment lagoon, aerobic lagoon, or digester system; or Allow liquid manure to stand in the fields for no more than twenty-four (24) hours after irrigation; or Apply liquid/slurry manure via injection with drag hose or similar apparatus; or Implement an alternative mitigation measure(s), not listed above.

5.6.4 Swine CAF: An owner/operator of a swine CAF shall comply with the Phase II mitigation measures in Table 4.4.

Table 4.4 – Swine Phase II Mitigation Measure Requirements	
A. Feed: Owners/operators of a swine CAF shall implement at least two (2) of the following feed mitigation measures:	
1.	Use grain with an average particle size diameter between 300-800 microns.
2.	Utilize phase feeding and split-sex feeding programs to more closely match the nutrient requirements of animals.
3.	Implement an alternative mitigation measure(s), not listed above.
B. Housing: Owners/operators of a swine CAF shall implement at least three (3) of the following mitigation measures in each animal housing unit:	
1.	Use a slatted floor system (slatted floors over deep pits or shallow flush alleys), with daily manure removal for shallow flush alleys and weekly removal from deep pits.
2.	Manage pens such that the manure depth in the pen does not exceed twelve (12) inches at any time or point.
3.	Inspect water pipes and troughs and repair leaks at least once every seven (7) days.
4.	Implement an alternative mitigation measure(s), not listed above.
C. Liquid Manure: Owners/operators of a swine CAF that handle manure in a liquid form shall implement at least one (1) of the following mitigation measures:	
1.	Use a phototropic lagoon.
2.	Use an anaerobic treatment lagoon designed in accordance with NRCS Guideline No. 359.
3.	Maintain lagoon pH between 6.5 and 7.5.
4.	Implement an alternative mitigation measure(s), not listed above.
D. Land Application: Owners/operators of a swine CAF who land apply liquid manure to crop land on the facility shall implement one (1) of the following mitigation measures:	
1.	Allow liquid manure to stand in the fields for no more than twenty-four (24) hours after irrigation.
2.	Implement an alternative mitigation measure(s), not listed above.

5.6.5 Layer CAF: An owner/operator of a layer CAF shall comply with the Phase II mitigation measures in Table 4.5.

Table 4.5 – Layer Phase II Mitigation Measure Requirements	
A. Feed: Owners/operators of a layer CAF shall implement at least one (1) of the following feed mitigation measures:	
1.	Choose one of the following: <ol style="list-style-type: none"> Feed according to NRC guidelines; or Feed animals probiotics designed to improve digestion according to manufacturer recommendations; or Feed animals an amino acid supplemented diet to meet their nutrient requirements; or Feed animals feed additives such as amylase, xylanase, and protease, designed to maximize digestive efficiency according to manufacturer recommendations.
2.	Implement an alternative mitigation measure(s), not listed above.
B. Housing: Owners/operators of a layer CAF shall implement at least two (2) of the following housing mitigation measures:	
1.	Use drinkers that do not drip continuously.
2.	Inspect water pipes and drinkers and repair leaks daily.
3.	Implement an alternative mitigation measure(s), not listed above.
C. Solid Manure/Separated Solids: Owners/operators of a layer CAF that handle or store solid litter/manure or separated solids outside the animal housing shall implement at least one (1) of the following mitigation measures:	
1.	Within seventy-two (72) hours of removal from housing, either: <ol style="list-style-type: none"> Remove all litter/manure from the facility; or Cover litter/manure outside the housing with a weatherproof covering from October through May, except for times when wind events remove the covering, not to exceed twenty-four (24) hours per event.
2.	Implement an alternative mitigation measure(s), not listed above.
D. Liquid Manure: Owners/operators of a layer CAF that handle manure in a liquid form shall implement at least one (1) of the following mitigation measures:	
1.	Use a phototropic lagoon.
2.	Use an anaerobic treatment lagoon designed in accordance with NRCS Guideline No. 359.
3.	Maintain lagoon pH between 6.5 and 7.5.
4.	Implement an alternative mitigation measure(s), not listed above.

5.6.6 Broiler, Duck, or Turkey CAF: An owner/operator of a chicken broiler, duck, or turkey CAF shall comply with the Phase II mitigation measures in Table 4.6.

Table 4.6 – Broiler, Duck, or Turkey Phase II Mitigation Measure Requirements	
A. Feed: Owners/operators of a broiler, duck, or turkey CAF shall implement at least one (1) of the following feed mitigation measures:	
1.	Choose one of the following: a. Feed according to NRC guidelines; or b. Feed animals probiotics designed to improve digestion according to manufacturer recommendations; or c. Feed animals an amino acid supplemented diet to meet their nutrient requirements; or d. Feed animals feed additives such as amylase, xylanase, and protease, designed to maximize digestive efficiency according to manufacturer recommendations.
2.	Implement an alternative mitigation measure(s), not listed above.
B. Housing: Owners/operators of a broiler or duck CAF shall implement at least four (4) of the following housing mitigation measures: Owners/operators of a turkey CAF shall implement at least five (5) of the following housing mitigation measures:	
1.	Use a dry housing cleaning method at all times, except when a wet cleaning method is required for animal health or biosecurity issues, pursuant to Section 5.4.
2.	Use drinkers that do not drip continuously.
3.	Inspect drinkers at least once every seven (7) days and adjust the height, volume, and location of drinkers if necessary.
4.	Inspect water pipes and drinkers and repair leaks daily.
5.	If the facility houses turkeys in pens, install mounds or berms up gradient to prevent the runoff of storm water into pens.
6.	Implement an alternative mitigation measure(s), not listed above.
Continues on the next page	

Table 4.6 – Broiler, Duck, or Turkey Phase II Mitigation Measure Requirements (continued)

C. Solid Manure/Separated Solids: Owners/operators of a broiler, duck, or turkey CAF that handles or stores solid litter/manure or separated solids outside the animal housing shall implement at least one (1) of the following mitigation measures:	
1.	Within seventy-two (72) hours of removal from housing, either: a. Remove all litter/manure from the facility; or b. Cover litter/manure outside the housing with a weatherproof covering from October through May, except for times when wind events remove the covering, not to exceed twenty-four (24) hours per event.
2.	Implement an alternative mitigation measure(s), not listed above.
D. Liquid Manure: Owners/operators of a broiler, duck, or turkey CAF that handles manure in a liquid form shall implement at least one (1) of the following mitigation measures:	
1.	Use a phototropic lagoon.
2.	Use an anaerobic treatment lagoon designed in accordance with NRCS Guideline No. 359.
3.	Maintain lagoon pH between 6.5 and 7.5.
4.	Implement an alternative mitigation measure(s), not listed above.

6.0 Monitoring Requirements

Owners/operators shall comply with the requirements of Section 6.1 when implementing all applicable Phase II Mitigation Measures in Section 5.6.

6.1 Lagoon Monitoring

Owners/operators using a mitigation measure for a lagoon in their approved emission mitigation plan shall monitor the lagoon for the required parameter(s), as determined by the APCO and EPA, at least once every calendar quarter, with at least 30 days between monitoring tests.

7.0 Administrative Requirements

7.1 Records for Exempt CAFs

An owner/operator claiming exemption pursuant to Section 4.0 shall maintain records on a quarterly basis of the number and type of animals and production group at the facility. Examples of records that may be used to show proof of exemption include, but are not limited to, Dairy Herd Improvement Association records and animal inventories maintained for financial purposes.

7.2 General Records for CAFs Subject to Section 5.0 Requirements

7.2.1 Permits: Owners/operators shall maintain copies of all facility permits.

7.2.2 Number of Animals: Owner/operators shall maintain records of the number of animals of each species and production group at the facility on a quarterly basis. Examples of records that may be used include, but are not limited to, Dairy Herd Improvement Association records and animal inventories done for financial purposes.

7.2.3 Owner/operators shall maintain records sufficient to demonstrate compliance with all applicable mitigation measures.

7.3 Records for Feed and Silage Mitigation Measures

7.3.1 Feed Content/Feed Additive: Records of feed content, formulation, and quantity of feed additive utilized, sufficient to verify compliance with approved feed content and feed additive mitigation measures. Records may include laboratory test results and other test results.

7.3.2 Feed Processing: Records sufficient to verify that feed was given to animals (for example, put in feed bunks) or disposed of within the time allowed by the approved mitigation measure.

7.3.3 Feed Removal: Records demonstrating that feed is removed within the specified time period.

7.3.4 Feed Storage: Records demonstrating that feed was kept in weatherproof storage for the required period. Records for feed storage shall be required when implementing the Phase II mitigation measures.

7.3.5 Feed Moisture Content: Records for annual testing to determine moisture content of mixed ration food that contains at least 30% by weight of silage. Records for feed moisture content shall be required when implementing the Phase II mitigation measures.

7.3.6 Silage Covers: Records demonstrating that silage was covered, including the thickness of the cover, in compliance with any silage mitigation measures chosen. Examples of records that show compliance include, but are not limited to, invoices demonstrating that silage covers were installed and maintained at the facility, cover thickness, records demonstrating the thickness of the silage cover, and maintenance records for repair or replacement of damaged covers.

- 7.3.7 Silage Pile Bulk Density at Pile Formation: Records of required practices used to ensure adequate bulk density of silage piles and/or measured bulk density of silage piles. Records for silage bulk density shall be required when implementing the Phase II mitigation measures.
- 7.3.8 Silage Pile Formation: Records demonstrating that silage piles were formed in compliance with any silage mitigation measures chosen. Examples of records that show compliance include, but are not limited to, moisture content of silage pile material, records of the length of cut for the crop being harvested, records of silage material delivery date, records that there are no more than six inches of material un-compacted on top of the pile of silage piles. Records for silage pile formation shall be required when implementing the Phase II mitigation measures.
- 7.3.9 Silage Leachate: Records demonstrating that the leachate was collected either by an active or passive system and the system was maintained in a manner approved by the APCO and EPA. Examples of records that show compliance include, but are not limited to, design specification for the system and a maintenance checklist for inspections and repairs.
- 7.3.10 Exposed Silage: Records demonstrating that silage piles are managed such that exposed surface area is in compliance with any silage mitigation measures chosen. Records for exposed silage shall be required when implementing the Phase II mitigation measures.
- 7.3.11 Silage Inoculation: Records demonstrating silage inoculation with either homolactic lactic acid bacteria, propionic acid, benzoic acid, sorbic acid sodium benzoate, or potassium sorbate. Records shall include rate specified by manufacturer and rate applied by operator/owner, date of inoculation and date of silage pile formation completion. Records for silage inoculation shall be required when implementing the Phase II mitigation measures.
- 7.3.12 VOC Emission Control Systems: Source test results, monitoring/inspection logs and maintenance logs.
- 7.3.13 Weatherproof Coverings: Records verifying that any covers used are installed, used, and maintained in accordance with manufacturer recommendations and any applicable standard approved by the APCO and EPA. For covers removed by wind events, an estimate of when the cover was removed and documentation of when the cover was replaced.
- 7.3.14 Alternative Feed or Silage Mitigation Measures: Records sufficient to verify compliance with each approved alternative mitigation measure to the satisfaction of the APCO and EPA.

7.4 Records for Milking Parlor Mitigation Measures

Records verifying that the milking parlor was flushed or hosed immediately prior to, immediately after, or during each milking.

7.5 Records for Freestall/Corral/Animal Housing

7.5.1 Bedding Material: Records of the material(s) used for animal bedding, including the percentage of non-manure. Records for bedding material shall be required when implementing the Phase II mitigation measures.

7.5.2 Clean/Scrape/Flush/Vacuum: Records sufficient to demonstrate that the removal of manure/bedding was performed as required in the approved mitigation measure. This may be a log when owners/operators initial that they performed all applicable practices.

7.5.3 Depth of Manure: Records demonstrating the measurement of the manure depth and measures taken to remove material greater than the amount allowed by the mitigation measure.

7.5.4 Foggers: Records, such as design specifications, demonstrating that foggers used to comply with rule requirements meet the required standards.

7.5.5 Lime, Thymol, and Eugenol: Records of the quantity of material applied and the area over which it was applied. Owners/operators shall also maintain manufacturer's product application recommendations to demonstrate compliance with the recommendations.

7.5.6 Litter Additives: Records, including a copy of the manufacturer's recommendations, which demonstrate litter additives used to comply with rule requirements are administered in accordance with manufacturer's specifications.

7.5.7 Roof Structure/Runoff: Records such as design specifications and maintenance logs demonstrating that any roof runoff structures used to comply with rule are in compliance with applicable standards in NRCS Field Office Technical Guide Code 558 or other applicable standards approved by the APCO and EPA.

7.5.8 Shade Structures: Records, such as design specifications, demonstrating that any shade structures used to comply with rule requirements meet the required standards.

- 7.5.9 Slope/Drainage: Records sufficient to verify that harrowing and sloping of corrals used to comply with rule requirements are implemented as required in the rule.
- 7.5.10 Vacuum/Land Apply Cattle Waste: Records showing time of vacuuming and time of land application of the vacuumed solids.
- 7.5.11 VOC Emission Control Systems: Source test results, monitoring/inspection logs and maintenance logs.
- 7.5.12 Water Pipes, Drinkers, and Water Troughs: Records of inspections performed and repairs completed.
- 7.5.13 Wet Feed Removal: Records verifying that animal housing was inspected for wet feed after a rain event/inspection and that the wet feed was removed.
- 7.5.14 Alternative Freestall/Corral/Animal Housing Mitigation Measure: Records that demonstrate compliance with each approved alternative mitigation measure to the satisfaction of the APCO and EPA.
- 7.6 Records for Solid Manure/Separated Solids Outside of Animal Housing
 - 7.6.1 Aerated Static Pile: Records of monitoring/inspection logs and maintenance logs.
 - 7.6.2 Removal of Manure/Separated Solids: Records sufficient to verify when the waste was removed from freestall/corral/animal housing and when the waste was either removed from the facility or land incorporated.
 - 7.6.3 Storage of Manure/Separated Solids in an Aerobic/Anaerobic Digester
 - 7.6.3.1 Records, such as design specifications and maintenance logs, demonstrating that any aerobic/anaerobic digesters used to comply with rule requirements meets the standards in NRCS Field Office Technical Guide Code 366 or 365 or other applicable standards approved by the APCO and EPA.
 - 7.6.3.2 Records of the quantity of manure/separated solids, as needed, to comply with the approved Phase II mitigation measure.
 - 7.6.4 VOC Emission Control Systems: Source test results, monitoring/inspection logs and maintenance logs.

- 7.6.5 Weatherproof Coverings: Records verifying that any covers used are installed, used, and maintained in accordance with manufacturer recommendations and any applicable standard approved by the APCO and EPA. For covers removed by wind events, an estimate of when the cover was removed and documentation of when the manure/separated solid piles were re-covered.
- 7.6.6 Alternative Solid Manure/Separated Solids Mitigation Measure: Records that demonstrate compliance with each approved alternative mitigation measure to the satisfaction of the APCO and EPA.

7.7 Records for Liquid Manure

7.7.1 Lagoons

- 7.7.1.1 Test results of the approved monitoring parameter and records of measures taken to bring the parameter within specified limits.
- 7.7.1.2 Design specifications demonstrating that the lagoon meets the requirements listed in the NRCS Field Office Technical Guide for the lagoon type or other applicable standards approved by the APCO and EPA.

7.7.2 Solids Separator System

- 7.7.2.1 Records, such as design specifications and maintenance logs, demonstrating that the solids separator system meets the approved mitigation measure specifications and is operated and maintained as recommended by the manufacturer.
 - 7.7.2.2 Non-Standard Chemicals: Record the quantity of material used. Owners/operators shall also maintain manufacturer's product usage recommendations to demonstrate compliance with the manufacturer's recommendations.
 - 7.7.2.3 Non-Standard Equipment for Solid Separator System: Records, such as design specifications and maintenance logs, demonstrating that the solids separator equipment meets the approved mitigation measure specifications and is operated and maintained as recommended by the manufacturer.
- 7.7.3 VOC Emission Control Systems, including biofilters and other VOC emission control systems: Source test results, monitoring/inspection logs and maintenance logs.

7.7.4 Alternative Liquid Manure Mitigation Measures: Records that demonstrate compliance with the approved alternative mitigation measure, to the satisfaction of the APCO and EPA.

7.8 Records for Land Application of Manure

7.8.1 Time to Incorporate Manure: Records indicating the time the manure was applied and when the waste was incorporated into the soil.

7.8.2 Lagoon-Treated or Digester-Treated Manure: Records that demonstrate that the applied manure came from an aerobic lagoon, an anaerobic treatment lagoon or a digester system.

7.8.3 Liquid Waste Standing in Field: Records that demonstrate that liquid manure does not remain in the field for longer than twenty-four (24) hours after application.

7.8.4 Moisture Content of Solid Manure: Records of the moisture content of applied solid manure.

7.9 Records Retention

Owners/operators of a CAF subject to the requirements of Section 5.0 shall keep and maintain the required in Sections 7.1 through 7.8.4, as applicable, for a minimum of five (5) years and the records shall be made available to the APCO and EPA upon request.

7.10 Source Testing Requirements

7.10.1 Owners/operators shall conduct an initial source test of all VOC control devices and aerated static piles used to comply with rule requirements not later than six (6) months after the date of installation, and at least once every twelve (12) months thereafter unless the APCO, ARB, and EPA determines more frequent testing is required to demonstrate compliance with rule requirements.

7.10.2 Owners/operators using phototropic lagoons as a mitigation measure in their emission mitigation plan shall test lagoons for bacteria concentration, bacteriochlorophyll concentration, or a surrogate parameter determined by the APCO, ARB, and EPA not later than six (6) months after the date of issuance of the permit, and least once every twelve (12) months thereafter unless the APCO, ARB, and EPA determines more frequent testing is required to demonstrate compliance with rule requirements.

- 7.10.3 Owners/operators using aerobic lagoons as a mitigation measure in their emission mitigation plan shall test lagoons for dissolved oxygen content not later than six (6) months after the date of issuance of the permit, and at least once every twelve (12) months thereafter, unless the APCO, ARB, and EPA determines more frequent testing is required to demonstrate compliance with rule requirements.
- 7.10.4 Owners/operators using mechanically aerated lagoons as a mitigation measure in their emission mitigation plan shall test lagoons for biological oxygen demand within six (6) months after the date of issuance of the permit, and at least once every twelve (12) months thereafter, unless the APCO, ARB, and EPA determines more frequent testing is required to demonstrate compliance with rule requirements.
- 7.10.5 Owners/operators using lagoon pH as a mitigation measure in their emission mitigation plan shall test lagoons for pH within six (6) months after the date of issuance of the permit, and at least once every twelve (12) months thereafter, unless the APCO, ARB, and EPA determines more frequent testing is required to demonstrate compliance with rule requirements.
- 7.10.6 Owners/operators shall test any other parameters determined necessary by the APCO, ARB, and EPA to demonstrate compliance with rule requirements as frequently as determined necessary by the APCO, ARB, and EPA.

7.11 Test Methods

Owners/operators shall conduct applicable testing using the following methods or any other alternative test method approved by the APCO and EPA. Test methods referenced shall be the latest approved version.

- 7.11.1 Bacterial Concentration – ASTM D4454 - 85(2009) Standard Test Method for Simultaneous Enumeration of Total and Respiring Bacteria in Aquatic Systems by Microscopy or ASTM D4455 - 85(2009) Standard Test Method for Enumeration of Aquatic Bacteria by Epifluorescence Microscopy Counting Procedure.
- 7.11.2 Bacteriochlorophyll a Concentration – ASTM D3731 – 87 (2004) Standard Practices for Measurement of Chlorophyll Content of Algae in Surface Waters.
- 7.11.3 Biological Oxygen Demand – EPA Method 405.1 (Biochemical Oxygen Demand (5 days, 20°C)).

- 7.11.4 Bulk Packing Density of Silage Piles – Remove representative samples of known volume using a forage probe or other instrument and weighing the samples. Bulk density is the weight of the sample divided by the volume of material removed from the pile. The bulk density shall be determined as the average of at least three representative samples per silage pile.
- 7.11.5 Biofilter Control Efficiency – The control efficiency of a biofilter shall be determined using SCAQMD Method 25.3 (Determination of Low Concentration Non-Methane Non-Ethane Organic Compound Emissions from Clean Fueled Combustion Sources). The SCAQMD Method 25.3 apparatus should be connected to sample directly inside the flux chamber or duct as applicable. Compost emissions are considered as water-soluble sources where the 50 ppm applicability limit of Method 25.3 does not apply. Samples from more than one location may be combined (composited) per SCAQMD Rule 1133.2 Attachment A Section 8.
- 7.11.6 Non-Biofilter Control Efficiency – The control efficiency of a VOC emission control system that is not a biofilter shall be determined using:
- 7.11.6.1 EPA Methods 2 (Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot Tube)), 2A (Volume Meters), or 2D (Rate Meters) for measuring flow rates.
- 7.11.6.2 EPA Methods 25, 25A, or 25B for measuring total gaseous organic concentrations at the inlet and outlet of the control device.
- 7.11.6.3 EPA Method 18 or ARB Method 422 shall be used to determine the emissions of exempt compounds.
- 7.11.7 Dissolved Oxygen – EPA Method 360.1 (Oxygen, Dissolved (Membrane Electrode)) or 360.2 (Oxygen, Dissolved (Modified Winkler, Full-Bottle Technique)).
- 7.11.8 Moisture Content for Biofilters – Test Methods for the Examination of Compost and Composting (TMECC) Method 3.09 (Total Solids and Moisture at 70 ± 5 degrees Centigrade).
- 7.11.9 Moisture Content for Silage – Soil, Plant and Water Reference Methods for the Western Region [Third Edition, 2005] Test Method P1.10 (Dry Matter Content - Gravimetric), or American Association of Agricultural and Biological Engineers (ASABE) Standard S358.2, National Forage Testing Association (NFTA) Methods 2.1.3 and 2.1.4, AOAC Methods: 930.15, 934.01, 991.01, and 2001.12.

- 7.11.10 Organic Loading - Standard Methods of the Examination of Water and Wastewater Method 2540 G – Solids.
- 7.11.11 pH – EPA Method 150.2 (pH, Electrometric) or TMECC Method 04.11-A (1:5 Slurry pH)
- 7.11.12 Temperature – EPA Method 170.1 (Temperature – Thermometric)
- 7.11.13 Alternative Test Methods – An operator may use an alternative test method to those listed in Sections 7.11.1 through 7.11.13 for which written approval of the APCO and EPA has been obtained.

8.0 Compliance Schedule

- 8.1 Owners/operators of facilities subject to the Regulatory Threshold requirements of this rule under Table 2 shall submit a complete Permit-to-Operate or Authority-to-Construct application for the Phase II requirements in Section 5.6 by April 21, 2011 that complies with all applicable provisions of this rule.
 - 8.1.1 Owners/operators shall comply with all provisions of Phase II requirements on and after 365 days from the Authority-to-Construct or Permit-to-Operate issuance date, whichever is earlier.
 - 8.1.2 Owners/operators of Large CAFs shall comply with the Phase I requirements in Section 5.5 until demonstrating full compliance with Phase II requirements in Section 5.6.
- 8.2 Owners/operators of new or modified facilities that become subject to the Regulatory Threshold requirements of this rule under Table 2 shall comply with the Phase II requirements of Section 5.6.

6. Regulation VIII: PM10 Requirements

Table 6-2
Regulation VIII Control Measures for Construction Emissions of PM-10

Regulation VIII Control Measures. - The following controls are required to be implemented at all construction sites. (Includes changes effective May 15, 2002)

- . All disturbed areas, including storage piles, which are not being actively utilized for construction purposes, shall be effectively stabilized of dust emissions using water, chemical stabilizer/suppressant, covered with a tarp or other suitable cover or vegetative ground cover.
- . All on-site unpaved roads and off-site unpaved access roads shall be effectively stabilized of dust emissions using water or chemical stabilizer/suppressant.
- . All land clearing, grubbing, scraping, excavation, land leveling, grading, cut & fill, and demolition activities shall be effectively controlled of fugitive dust emissions utilizing application of water or by presoaking.
- . With the demolition of buildings up to six stories in height, all exterior surfaces of the building shall be wetted during demolition.
- . When materials are transported off-site, all material shall be covered, or effectively wetted to limit visible dust emissions, and at least six inches of freeboard space from the top of the container shall be maintained.
- . All operations shall limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets at the end of each workday. *(The use of dry rotary brushes is expressly prohibited except where preceded or accompanied by sufficient wetting to limit the visible dust emissions.) (Use of blower devices is expressly forbidden.)*
- . Following the addition of materials to, or the removal of materials from, the surface of outdoor storage piles, said piles shall be effectively stabilized of fugitive dust emissions utilizing sufficient water or chemical stabilizer/suppressant.
- . Within urban areas, trackout shall be immediately removed when it extends 50 or more feet from the site and at the end of each workday.
- . Any site with 150 or more vehicle trips per day shall prevent carryout and trackout.

Table 6-3
Enhanced and Additional Control Measures for Construction Emissions of PM-10

Enhanced Control Measures. - The following measures should be implemented at construction sites when required to mitigate significant PM-10 impacts (note, these measures are to be implemented in addition to Regulation VIII requirements):

- . Limit traffic speeds on unpaved roads to 15 mph; and
- . Install sandbags or other erosion control measures to prevent silt runoff to public roadways from sites with a slope greater than one percent.

Additional Control Measures. - The following control measures are strongly encouraged at construction sites that are large in area, located near sensitive receptors, or which for any other reason warrant additional emissions reductions:

- . Install wheel washers for all exiting trucks, or wash off all trucks and equipment leaving the site;
 - . Install wind breaks at windward side(s) of construction areas;
 - . Suspend excavation and grading activity when winds exceed 20 mph; and*
 - . Limit area subject to excavation, grading, and other construction activity at any one time.
- * Regardless of windspeed, an owner/operator must comply with Regulation VIII's 20 percent opacity limitation.

RULE 8021 CONSTRUCTION, DEMOLITION, EXCAVATION, EXTRACTION, AND OTHER EARTHMOVING ACTIVITIES (Adopted November 15, 2001; Amended August 19, 2004)

1.0 Purpose

The purpose of this rule is to limit fugitive dust emissions from construction, demolition, excavation, extraction, and other earthmoving activities.

2.0 Applicability

This rule 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. This rule also applies to the construction of new landfill disposal sites or modification to existing landfill disposal sites prior to commencement of landfilling activities. The provisions of this rule adopted on November 15, 2001 shall remain in effect until October 1, 2004 at which time the amendments adopted on August 19, 2004 shall take effect.

3.0 Definitions

The definitions of terms in Rule 8011 (General Requirements) shall apply to this rule.

4.0 Exemptions

In addition to the exemptions established in Rule 8011, the activities listed in Sections 4.1 through 4.5 are exempt from this rule. However, carryout and trackout materials as a result of activities exempted in Sections 4.1 through 4.5 of this rule must be removed from any paved public roads pursuant to Rule 8041 (Carryout and Trackout):

4.1 Blasting activities that have been permitted by the California Division of Industrial Safety. Other activities performed in conjunction with blasting are not exempt from complying with the provisions of other applicable rules under Regulation VIII (Fugitive PM₁₀ Prohibitions).

4.2 Maintenance or remodeling of existing buildings and additions to existing buildings where total building area is not increased by more than fifty percent, or 10,000 square feet, whichever is less; but not including ancillary construction such as expanding parking lots.

4.3 All additions to existing single family residential buildings.

4.4 Disking of weeds and dried vegetation related to fire prevention required by a Federal, State or local agency on a site less than one-half (1/2) acre. Activities

performed in conjunction with disking are not exempt from complying with the provisions of other applicable rules under Regulation VIII.

- 4.5 The spreading of landfill daily cover necessary to cover garbage/rubbish in order to preserve public health and safety and to comply with the requirements of the California Integrated Waste Management Board during wind conditions which would generate fugitive dust.

5.0 Requirements

No person shall perform any construction, demolition, excavation, extraction, or other earthmoving activities unless the appropriate requirements in sections 5.1 through 5.5 are sufficiently implemented to limit VDE to 20% opacity and comply with the conditions for a stabilized surface area when applicable. In addition to the requirements of this rule, a person shall comply with all other applicable requirements of Regulation VIII.

- 5.1 A person shall implement the requirements specified below when using wrecking balls or other wrecking equipment to raze or demolish buildings.
 - 5.1.1 Apply sufficient water to building exterior surfaces, unpaved surface areas where equipment will operate, and razed building materials to limit VDE to 20% opacity throughout the duration of razing and demolition activities.
 - 5.1.2 Apply sufficient dust suppressants to unpaved surface areas within 100 feet where materials from razing or demolition activities will fall in order to limit VDE to 20% opacity.
 - 5.1.3 Apply sufficient dust suppressants to unpaved surface areas where wrecking or hauling equipment will be operated in order to limit VDE to 20% opacity
 - 5.1.4 Handling, storage, and transport of bulk materials on-site or off-site resulting from the demolition or razing of buildings shall comply with the requirements specified in Rule 8031 (Bulk Materials)
 - 5.1.5 Apply water within 1 hour of demolition to unpaved surfaces within 100 feet of the demolished structure.
 - 5.1.6 Prevention and removal of carryout or trackout on paved public access roads from demolition operations shall be performed in accordance with Rule 8041 (Carryout and Trackout).
- 5.2 A person shall control the fugitive dust emissions to meet the requirements in Table 8021-1.

Table 8021-1 – CONTROL MEASURE OPTIONS FOR CONSTRUCTION, EXCAVATION, EXTRACTION, AND OTHER EARTHMOVING ACTIVITIES	
A.	PRE-ACTIVITY: A1 Pre-water site sufficient to limit VDE to 20% opacity, and A2 Phase work to reduce the amount of disturbed surface area at any one time.
B.	DURING ACTIVE OPERATIONS: B1 Apply water or chemical/organic stabilizers/suppressants sufficient to limit VDE to 20% opacity; or B2 Construct and maintain wind barriers sufficient to limit VDE to 20% opacity. If utilizing wind barriers, control measure B1 above shall also be implemented. B3 Apply water or chemical/organic stabilizers/suppressants to unpaved haul/access roads and unpaved vehicle/equipment traffic areas sufficient to limit VDE to 20% opacity and meet the conditions of a stabilized unpaved road surface.
C.	TEMPORARY STABILIZATION DURING PERIODS OF INACTIVITY: C1 Restrict vehicular access to the area; and C2 Apply water or chemical/organic stabilizers/suppressants, sufficient to comply with the conditions of a stabilized surface. If an area having 0.5 acres or more of disturbed surface area remains unused for seven or more days, the area must comply with the conditions for a stabilized surface area as defined in section 3.58 of Rule 8011.

5.3 Speed Limitations and Posting of Speed Limit Signs on Uncontrolled Unpaved Access/Haul Roads on Construction Sites

5.3.1. An owner/operator shall limit the speed of vehicles traveling on uncontrolled unpaved access/haul roads within construction sites to a maximum of 15 miles per hour.

5.3.2. An owner/operator shall post speed limit signs that meet State and Federal Department of Transportation standards at each construction site's uncontrolled unpaved access/haul road entrance. At a minimum, speed limit signs shall also be posted at least every 500 feet and shall be readable in both directions of travel along uncontrolled unpaved access/haul roads.

5.4 Wind Generated Fugitive Dust Requirements

5.4.1 Cease outdoor construction, excavation, extraction, and other earthmoving activities that disturb the soil whenever VDE exceeds 20% opacity. Indoor activities such as electrical, plumbing, dry wall installation, painting, and any other activity that does not cause any disturbances to the soil are not subject to this requirement.

- 5.4.2 Continue operation of water trucks/devices when outdoor construction excavation, extraction, and other earthmoving activities cease, unless unsafe to do so.

6.0 Administrative Requirements

6.1 Test Methods

The applicable test methods specified in Rule 8011 shall be used to determine compliance with this rule.

6.2 Recordkeeping

An owner/operator shall comply with the recordkeeping requirements specified in Rule 8011.

6.3 Dust Control Plan

- 6.3.1 An owner/operator shall submit a Dust Control Plan to the APCO prior to the start of any construction activity on any site that will include 10 acres or more of disturbed surface area for residential developments, or 5 acres or more of disturbed surface area for non-residential development, or will include moving, depositing, or relocating more than 2,500 cubic yards per day of bulk materials on at least three days. Construction activities shall not commence until the APCO has approved or conditionally approved the Dust Control Plan. An owner/operator shall provide written notification to the APCO within 10 days prior to the commencement of earthmoving activities via fax or mail. The requirement to submit a dust control plan shall apply to all such activities conducted for residential and non-residential (e.g., commercial, industrial, or institutional) purposes or conducted by any governmental entity.
- 6.3.2 An owner/operator may submit one Dust Control Plan covering multiple projects at different sites where construction will commence within the next 12 months provided the plan includes each project size and location, types of activities to be performed. The Dust Control Plan shall specify the expected start and completion date of each project.
- 6.3.3 The Dust Control Plan shall describe all fugitive dust control measures to be implemented before, during, and after any dust generating activity.

- 6.3.4 A Dust Control Plan shall contain all the information described in Section 6.3.6 of this rule. The APCO shall approve, disapprove, or conditionally approve the Dust Control Plan within 30 days of plan submittal. A Dust Control Plan is deemed automatically approved if, after 30 days following receipt by the District, the District does not provide any comments to the owner/operator regarding the Dust Control Plan.
- 6.3.5 An owner/operator shall retain a copy of an approved Dust Control Plan at the project site. The approved Dust Control Plan shall remain valid until the termination of all dust generating activities. Failure to comply with the provisions of an approved Dust Control Plan is deemed to be a violation of this rule. Regardless of whether an approved Dust Control Plan is in place or not, or even when the owner/operator responsible for the plan is complying with an approved Dust Control Plan, the owner/operator is still subject to comply with all requirements of the applicable rules under Regulation VIII at all times.
- 6.3.6 A Dust Control Plan shall contain all of the following information:
- 6.3.6.1 Name(s), address(es), and phone number(s) of person(s) and owner(s)/operator(s) responsible for the preparation, submittal, and implementation of the Dust Control Plan and responsible for the dust generating operation and the application of dust control measures.
 - 6.3.6.2 A plot plan which shows the type and location of each project.
 - 6.3.6.3 The total area of land surface to be disturbed, daily throughput volume of earthmoving in cubic yards, and total area in acres of the entire project site.
 - 6.3.6.4 The expected start and completion dates of dust generating and soil disturbance activities to be performed on the site.
 - 6.3.6.5 The actual and potential sources of fugitive dust emissions on the site and the location of bulk material handling and storage areas, paved and unpaved roads; entrances and exits where carryout/trackout may occur; and traffic areas.
 - 6.3.6.6 Dust suppressants to be applied, including: product specifications; manufacturer's usage instructions (method, frequency, and intensity of application); type, number, and

capacity of application equipment; and information on environmental impacts and approvals or certifications related to appropriate and safe use for ground application.

6.3.6.7 Specific surface treatment(s) and/or control measures utilized to control material carryout, trackout, and sedimentation where unpaved and/or access points join paved public access roads.

6.3.6.8 At least one key individual representing the owner/operator or any person who prepares a Dust Control Plan must complete a Dust Control Training Class conducted by the District. The District will conduct Dust Control Training Classes on an as needed basis.

6.4 District Notification of Earthmoving Activities on Smaller Construction Sites

6.4.1 On residential development construction sites ranging from 1.0 to less than 10.0 acres in area, an owner/operator shall provide written notification to the District at least 48 hours prior to his/her intent to commence any earthmoving activities.

6.4.2 On non-residential development construction sites ranging from 1.0 to less than 5.0 acres in area, an owner/operator shall provide written notification to the District at least 48 hours prior to his/her intent to commence any earthmoving activities.

Appendix E

- 1. Dairy Cattle Emissions Update**
- 2. Air Quality Methodology and Assumptions**

1. Dairy Cattle Emissions Update



5500 Ming Ave | Suite 140 | Bakersfield, CA 93309 | P (661) 282-2200 | F (661) 282-2204
trinityconsultants.com



October 19, 2015

Mr. Roger Richards
Senior Planner
Quad Knopf
901 East Main Street
Visalia, CA 93278

Subject: **Letter Report – Revised Draft Environmental Impact Report for the
Animal Confinement Facilities Plan and Ordinance Amendment
Dairy Cattle Emissions Update**

Dear Mr. Richards:

This Letter Report discusses the update, requested by Quad Knopf (Quad) and completed by Insight Environmental Consultants, Inc. (Insight), to the air quality report (Castle 2012) prepared by Castle Environmental Consulting, LLC (Castle). This update is required for the Draft Environmental Impact Report (DEIR) for the Animal Confinement Facilities Plan and Ordinance Amendment for Tulare County. A modification of the dairy cattle numbers that were used to determine emission impacts from operations within Tulare County necessitated this update.

Revised dairy cattle numbers were provided by Tulare County Resource Management Agency (RMA) for the baseline years of 2011, 2012 and 2013 (Spata personal communications 2014a). Additionally, Quad instructed Insight to project the cumulative future cattle numbers, for the year 2023, based on two alternative growth rates of 1.5% and 1% from the 2011 cattle number (Richards personal communications 2015).

Most of the cattle head counts received from the RMA were separated into six categories, milk cows, bulls, dry cows, heifers (1-2 years old), heifers (3 months - 1 year old), and calves. However, emission factors for cattle are typically defined as milk cows, dry cows, heifers (15 – 24 months), heifers (7-14 months), heifers (3-6 months), and calves. After discussions with both Quad and the RMA it was concluded that the head counts for the heifers would have a ratio applied based on the number of months in each category. For example the total heifer count would have 22 months (3-24 months) and heifers (3-6 months) would have 4 months, therefore, the total heifer number would be multiplied by 0.181 ($4 \div 22$) to calculate the total heifer (3-6 months) for that operating year. Additionally, some dairies and feed lots were not separated into any categories. The RMA instructed Insight to use an agreed upon 0.75 ratio between cows and heifers (Spata personal communications 2014b). The same heifer ratios discussed

above were then used to breakdown the heifer categories. The cows were then broken down based on the ratio of 0.853 between milk cows and dry cows at existing dairies that had separated categories. Insight reviewed Castle's report and determined that emission calculations in Tables 1-24 and 31-34 would need to be updated based on the modified dairy cattle numbers. Per Quad's instructions, Insight followed Castle's methodology for emissions estimation and updated these tables based on the new and modified cattle head counts provided. These tables can be found in **Attachment A** of this Letter Report. A summary of the updated calculated emissions can be found in the tables below along with the corresponding location these numbers are found in the Castle report.

MANURE DECOMPOSITION AND ENTERIC FERMENTATION

Section 2.1 of the Castle report discusses volatile organic compounds (VOC), Ammonia (NH₃), and greenhouse gas (GHG) emissions from manure decomposition and enteric fermentation. The GHG emissions were reported in the form of carbon dioxide equivalent (CO₂e). These emissions are calculated based on SJVAPCD emission factors and cattle head count, therefore, the emissions have been updated.

TABLE 1 – MANURE DECOMPOSITION AND ENTERIC FERMENTATION UNMITIGATED EMISSIONS

	Original Emissions			Updated Emissions ⁴		
	VOC ¹ (tons/yr)	NH ₃ ¹ (tons/yr)	CO ₂ e ² (MT/yr)	VOC (tons/yr)	NH ₃ (tons/yr)	CO ₂ e (MT/yr)
2011 Emissions (Project Level)	-	-	-	4,745	23,648	5,951,968
2012 Emissions (Project Level)	5,313	26,344	6,600,368	4,687	23,359	5,882,655
2013 Emissions (Project Level)	-	-	-	4,570	22,731	5,730,828
Cumulative Level Alternative 1 ³	6,470	32,084	8,038,363	5,512	27,475	6,915,200
Cumulative Level Alternative 2 ³	6,470	32,084	8,038,363	5,244	26,135	6,577,942
Program Level (Alternative 1 - 2011)	-	-	-	767	3,827	963,232
Program Level (Alternative 2 - 2011)	-	-	-	499	2,487	625,974
Program Level (Alternative 1 - 2012)	1,157	5,740	1,437,995	825	4,116	1,032,545
Program Level (Alternative 2 - 2012)	1,157	5,740	1,437,995	557	2,776	695,287
Program Level (Alternative 1 - 2013)	-	-	-	942	4,744	1,184,372
Program Level (Alternative 2 - 2013)	-	-	-	674	3,404	847,114
¹ The original numbers can be found on page 6 of the Castle report. ² The original numbers can be found on page 8 of the Castle report. ³ The original Cumulative Emissions were estimated for the year 2022 and the Updated Cumulative Emissions are estimated for year 2023. ⁴ Updated emissions can be found in Tables 11, 12, 23 and 24 in Attachment A.						

Section 2.1 of the Castle report also discusses VOC emissions from animal feed. The emissions from the animal feed storage piles are calculated based on SJVAPCD emission factors and cattle head count, therefore, the emissions have been updated.

TABLE 2 – ANIMAL FEED UNMITIGATED EMISSIONS

	Original Emissions	Updated Emissions ³
	VOC ¹	VOC
	(tons/yr)	(tons/yr)
2011 Emissions (Project Level)	-	6,005
2012 Emissions (Project Level)	6,249	5,974
2013 Emissions (Project Level)	-	5,896
Cumulative Level Alternative 1 ²	7,610	7,183
Cumulative Level Alternative 2 ²	7,610	7,050
Program Level (Alternative 1 - 2011)	-	1,178
Program Level (Alternative 2 - 2011)	-	1,045
Program Level (Alternative 1 - 2012)	1,361	1,208
Program Level (Alternative 2 - 2012)	1,361	1,076
Program Level (Alternative 1 - 2013)	-	1,286
Program Level (Alternative 2 - 2013)	-	1,154
¹ The original numbers can be found on page 6 of the Castle report. ² The original Cumulative Emissions were estimated for the year 2022 and the Updated Cumulative Emissions are estimated for year 2023. ³ Updated emissions can be found in Tables 13 and 14 in Attachment A.		

CATTLE HOUSING FUGITIVE DUST

Section 2.2 of the Castle report discusses fugitive dust emissions (particulate matter with diameter less than 10 microns (PM₁₀)) from cattle housing. These emissions are calculated based on SJVAPCD emission factors and cattle head count, therefore, the emissions have been updated and summarized below. Section 2.3 of the Castle report discusses the methodologies that were used to calculate particulate matter with diameter less than 2.5 microns (PM_{2.5}) emissions. While the PM_{2.5} emissions were not reported in this section, they were calculated in the attachment tables and have also been updated and summarized below.

TABLE 3 – CATTLE HOUSING FUGITIVE DUST EMISSIONS

	Original Emissions (tons/yr)				Updated Emissions (tons/yr) ⁴			
	Unmitigated		Mitigated		Unmitigated		Mitigated	
	PM ₁₀ ¹	PM _{2.5}	PM ₁₀ ¹	PM _{2.5}	PM ₁₀	PM _{2.5}	PM ₁₀	PM _{2.5}
2011 Emissions (Project Level)	-	-	-	-	2,352	269	1,900	219
2012 Emissions (Project Level)	3,048	348	2,438	278	2,375	271	1,915	221
2013 Emissions (Project Level)	-	-	-	-	2,411	275	1,939	224
Cumulative Alt. 1 Level (2011) ^{2,3}	-	-	-	-	2,733	312	2,097	242
Cumulative Alt. 2 Level (2011) ^{2,3}					2,599	297	2,028	234
Cumulative Alt. 1 Level (2012) ^{2,3}	3,713	424	2,776	317	2,733	312	2,105	243
Cumulative Alt. 2 Level (2012) ^{2,3}	3,713	424	2,776	317	2,599	297	2,036	235
Cumulative Alt. 1 Level (2013) ^{2,3}	-	-	-	-	2,733	312	2,117	245
Cumulative Alt. 2 Level (2013) ^{2,3}	-	-	-	-	2,599	297	2,048	236
Program Level (Alternative 1 - 2011)	-	-	-	-	381	43	197	23
Program Level (Alternative 2 - 2011)	-	-	-	-	247	28	128	15
Program Level (Alternative 1 - 2012)	664	76	338	39	358	41	190	22
Program Level (Alternative 2 - 2012)	664	76	338	39	224	26	121	14
Program Level (Alternative 1 - 2013)	-	-	-	-	322	37	178	21
Program Level (Alternative 2 - 2013)	-	-	-	-	188	22	109	12

1 The original numbers can be found on pages 8 and 9 of the Castle report.

2 The original Cumulative Emissions were estimated for the year 2022 and the Updated Cumulative Emissions are estimated for year 2023.

3 Mitigated Cumulative Level Emissions will vary depending on which Project Level Year they are being compared to since the mitigation controls are mitigate the existing facilities and new facilities at different rates. For example Updated Emissions for Cumulative Level (2011) corresponds to the mitigated 2023 Cumulative Emissions when being compared with 2011 Project level emissions for mitigation purposes.

4 Updated emissions can be found in Tables 15, 17, 18 and 20 in Attachment A.

DIESEL POWERED DAIRY EQUIPMENT

Section 2.4 of the Castle report discusses nitrogen oxide (NO_x), carbon monoxide (CO), sulfur oxide (SO_x), VOC, PM₁₀, PM_{2.5}, and CO_{2e} emissions from diesel powered dairy equipment. These emissions are not a function of cattle head counts, therefore, they did not need to be updated.

TRUCK AND AUTOMOBILE TRIPS

Section 2.5 of the Castle report discusses NO_x, CO, SO_x, VOC, PM₁₀, PM_{2.5}, and CO_{2e} emissions from truck and automobile trips. These emissions are not a function of cattle head counts, therefore, they did not need to be updated.

UNPAVED ROAD DUST AT THE DAIRY FACILITIES

Section 2.6 of the Castle report discusses PM₁₀ emissions from unpaved road fugitive dust. These emissions are calculated based on emission factors (Western Governors' Association 2006) and cattle head count, therefore, the emissions have been updated and summarized below. Section 2.3 of the Castle report discusses the methodologies that were used to calculate PM_{2.5} emissions. While the

PM_{2.5} emissions were not reported in this section, they were calculated in the attachment tables and have also been updated. Therefore, the updated PM_{2.5} emissions are summarized below.

TABLE 4 – UNPAVED ROAD DUST UNMITIGATED EMISSIONS

	Original Emissions		Updated Emissions ³	
	PM ₁₀ ¹ (tons/yr)	PM _{2.5} (tons/yr)	PM ₁₀ (tons/yr)	PM _{2.5} (tons/yr)
2011 Emissions (Project Level)	-	-	94	9
2012 Emissions (Project Level)	104	10	93	9
2013 Emissions (Project Level)	-	-	90	9
Cumulative Level Alternative 1 ²	126	13	109	11
Cumulative Level Alternative 2 ²	126	13	104	10
Program Level (Alternative 1 - 2011)	-	-	15	2
Program Level (Alternative 2 - 2011)	-	-	11	1
Program Level (Alternative 1 - 2012)	23	3	16	2
Program Level (Alternative 2 - 2012)	23	3	11	1
Program Level (Alternative 1 - 2013)	-	-	19	2
Program Level (Alternative 2 - 2013)	-	-	14	1
¹ The original numbers can be found on page 14 of the Castle report. ² The original Cumulative Emissions were estimated for the year 2022 and the Updated Cumulative Emissions are estimated for year 2023. ³ Updated emissions can be found in Table 31 in Attachment A.				

DAIRY ELECTRICITY CONSUMPTION

Section 2.7 of the Castle report discusses GHG emissions from dairy electricity consumption. The GHG emissions were calculated as carbon monoxide (CO), methane (CH₄), and nitrous oxide (N₂O) but reported in the form of carbon dioxide equivalent (CO₂e). These emissions are calculated based on the Climate Registry (2012) factors, SJVAPCD electricity usage rates which were derived from California Department of Food and Agriculture (2001) and the California Energy Commission (2001), and cattle head count, therefore, the emissions have been updated.

TABLE 5 – DAIRY ELECTRICITY CONSUMPTION UNMITIGATED EMISSIONS

	Original Emissions	Updated Emissions ³
	CO₂e ¹ (tons/yr)	CO₂e (tons/yr)
2011 Emissions (Project Level)	-	147,660
2012 Emissions (Project Level)	173,188	147,064
2013 Emissions (Project Level)	-	145,327
Cumulative Level Alternative 1 ²	210,919	171,557
Cumulative Level Alternative 2 ²	210,919	163,190
Program Level (Alternative 1 - 2011)	-	23,897
Program Level (Alternative 2 - 2011)	-	15,530
Program Level (Alternative 1 - 2012)	37,732	24,493
Program Level (Alternative 2 - 2012)	37,732	16,126
Program Level (Alternative 1 - 2013)	-	26,230
Program Level (Alternative 2 - 2013)	-	17,863
¹ The original numbers can be found on page 14 of the Castle report. ² The original Cumulative Emissions were estimated for the year 2022 and the Updated Cumulative Emissions are estimated for year 2023. ³ Updated emissions can be found in Table 34 in Attachment A.		

DAIRY REFRIGERATION

Section 2.8 of the Castle report discusses GHG emissions from dairy refrigeration equipment. These emissions are not a function of cattle head counts, therefore, they did not need to be updated.

SUPPORT CROP EMISSIONS

Sections 2.9 through 2.13 of the Castle report discusses NO_x, CO, SO_x, VOC, PM₁₀, PM_{2.5}, and GHG emissions for various emitting sources from support crop activities. None of these emissions are a function of cattle head counts, therefore, they did not need to be updated.

CONSTRUCTION

Section 3 of the Castle report discusses NO_x, CO, SO_x, VOC, PM₁₀, PM_{2.5}, and GHG emissions from construction activities. Construction emissions are not a function of cattle head counts, therefore, they did not need to be updated.

All emission estimates found in this Letter Report and Attachment A were calculated using the updated dairy cattle numbers provided by the RMA and Quad with the methodologies described and discussed in the Castle report. Should you have any questions or concerns regarding this Letter Report or the information provided within, please contact Ron Hunter or the undersigned at 661-282-2200 or by email at mdaniel@insenv.com.

Sincerely,

A handwritten signature in dark ink, appearing to read "Matthew T. Daniel". The signature is written in a cursive, flowing style with a long, sweeping underline.

Matthew T. Daniel
Senior Consultant

Attachment

REFERENCES

California Department of Food and Agriculture. Dairy Statistics Annual. 2011.

California Energy Commission. Agricultural Electricity Rates in California. June 2001.

Castle Environmental Consulting, LLC., Air Quality Methodology and Assumptions – Tulare County ACFP Update EIR, March 29, 2012.

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-----, 2014b. Director, Tulare County Resource Management Agency. Email communications with Matt Daniel of Insight Environmental Consultants. Subject: RE: Final Updated Excel Spreadsheets. November 19, 2014.

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Western Governors' Association, Western Regional Air Partnership (WRAP) Fugitive Dust Handbook. September 7, 2006.

ATTACHMENT A

Air Quality Calculation Worksheets

**Table 1. Tulare County Dairy Animal Population -
Project Level (Existing Facilities)**

Animal Type	No. of Head	No. of Head	No. of Head
	2011	2012	2013
Milk Cows	509,550	502,825	485,785
Dry Cows & Springers (Inc. Bulls)	96,866	93,471	89,519
Heifers (15-24 Months)	166,090	168,910	173,261
Heifers (7-14 months)	132,871	135,128	138,609
Heifers (3-6 months)	66,071	67,193	68,923
Calves (0-2 months)	65,689	49,493	49,593
Total	1,037,137	1,017,020	1,005,690

Note: 5 percent of the heifers and 95 percent of the calves listed in this table are assumed to be located in heifer and calf ranches.

**Table 2. Tulare County Dairy Animal Population -
Cumulative (Year = 2023)**

Animal Type	No. of Head	No. of Head
	Alternative 1	Alternative 2
	Growth Rate = 1.5%	Growth Rate = 1%
Milk Cows	592,013	563,140
Dry Cows & Springers	112,542	107,053
Heifers (15-24 Months)	192,969	183,558
Heifers (7-14 months)	154,374	146,845
Heifers (3-6 months)	76,764	73,020
Calves (0-2 months)	76,320	72,598
Total	1,204,981	1,146,214

Note: 5 percent of the heifers and 95 percent of the calves listed in this table are assumed to be located in heifer and calf ranches.

Table 3. Derivation of VOC Emission Factors for Milk Cows at Dairies Subject to Rule 4570 v. 2010

Emission Source Description	Milk Cow Uncontrolled VOC Emission Factor	Feed					Silage					Milking Parlor	Freestalls	Corrals							Solid Manure	Liquid Manure	Land Application	Milk Cow Controlled VOC Emission Factor
		Feed according to NRC Guideline	Push feed to within 3 feet of feed bunk fence/line	Feed high moisture corn or steam-flaked corn	Store grain in weatherproof structure October-May	Feed/dispose rations within 48 hours	Cover silage pile	Density: high moisture harvest, ≤ 1/2" chop, ≤ 6" uncompacted top, cover within 72 hrs	Total exposed surface area of all silage piles < 4,300 feet	Silage inoculation	Flush parlor after each milking	Flush, scrape, or vacuum freestall flush lanes with each milking	Rate, harrow, scrape, or grade freestall bedding ≤ 14 days	Clean corrals at least once April-July and October-December	Clean corral lanes daily for mature cows, weekly for support stock	Depth of waste not exceed 12" in corral	Maintain corrals to ensure proper drainage	Inspect & repair water pipes & trough every 14 days	Install shades uphill of corrals	Cover dry animal waste piles October-May	Remove solids with separator	Incorporate solid manure within 72 hours of land application	Don't allow liquid manure to stand in field > 24 hours	
Implemented Control Measures:		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Dairy (excluding feed)	(lb/hd-yr)	Emission Factor Multipliers																				(lb/hd-yr)		
Enteric Emissions	4.32	0.9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3.89	
Milking Parlor	0.04	0.9	1	1	1	1	1	1	1	1	0.9	1	1	1	1	1	1	1	1	1	1	1	0.03	
Freestall Lanes	0.84	0.9	1	1	1	1	1	1	1	1	1	0.9	1	1	1	1	1	1	1	1	1	1	0.68	
Freestall Beds	1.05	0.9	1	1	1	1	1	1	1	1	1	1	0.9	1	1	1	1	1	1	1	1	1	0.85	
Corrals/Pens	10.00	0.9	1	1	1	1	1	1	1	1	1	1	0.9	0.9	0.9	0.9	0.9	0.935	1	1	1	1	4.97	
Liquid Manure Handling	1.52	0.9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	1	1	1.23	
Liquid Manure Land Application	1.64	0.9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	1.33	
Solid Manure Land Application	0.39	0.9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	1	0.32	
Separated Solid Piles	0.06	0.9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.05	
Solid Manure Storage	0.16	0.9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	1	1	1	0.13	
Dairy (excluding feed)	20.0																					13.5		
Animal Feed	(ug/m ² -min)	Emission Factor Multipliers																				(ug/m ² -min)		
Silage Pile - Corn	38,534	1	1	1	1	1	0.9	0.75	0.9	0.9	1	1	1	1	1	1	1	1	1	1	1	1	21,068	
Silage Pile - Alfalfa	19,398	1	1	1	1	1	0.9	0.75	0.9	0.9	1	1	1	1	1	1	1	1	1	1	1	1	10,606	
Silage Pile - Wheat	48,716	1	1	1	1	1	0.9	0.75	0.9	0.9	1	1	1	1	1	1	1	1	1	1	1	1	26,635	
Total Mixed Rations (TMR)	14,507	1	0.9	0.9	1	0.9	1	0.9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	9,518	

Notes:

1. This table represents dairies subject to the 2010 version of SJVAPCD Rule 4570 (Confined Animal Facilities). This includes dairies with 500 milk cows or greater.
2. Source for table: SJVAPCD, Final Draft Staff Report with Appendices for Amended Revised Proposed Amendments to Rule 4570. Appendix B: Baseline Emission Inventory and Emission Reductions. October 21,2010.
3. The SJVAPCD assumes only a portion of the dairies will have this control measure (Install Shades Uphill of Corrals).

Table 4. Summary of VOC Emission Factors by Animal Type and Animal Feed				
Emission Source	Manure Production Rate	VOC Emission Factors		
		Uncontrolled Dairies	Dairies Subject to Rule 4570 v. 2006	Dairies Subject to Rule 4570 v. 2010
Dairy (excluding feed)	(lb/day/hd)	(lb/hd-yr)	(lb/hd-yr)	(lb/hd-yr)
Milk Cows	150	20.0	15.8	13.5
Dry Cows & Springers	83	11.1	8.7	7.5
Heifers (15-24 Months)	55	7.3	5.8	5.0
Heifers (7-14 months)	38	5.1	4.0	3.4
Heifers (3-6 months)	21	2.8	2.2	1.9
Calves (0-2 months)	12	1.6	1.3	1.1
Animal Feed		(ug/m²-min)	(ug/m²-min)	(ug/m²-min)
Silage Pile - Corn		38,534	34,681	21,068
Silage Pile - Alfalfa		19,398	17,458	10,606
Silage Pile - Wheat		48,716	43,844	26,635
Total Mixed Rations (TMR)		14,507	13,056	9,518

Note:

1. Source for Manure Production Rates: SJVAPCD, personal communication with Ramon Norman, 2/27/2012
2. Emission factors for support stock are scaled from the milk cow emission factors according to manure production rates.
3. Assumes animals are Holsteins (1,400 lb mature weight).

Table 5. San Joaquin Valley Dairy Animal Population Percentages by Dairy Size Category

Animal Type	Dairy Size Category (No. Milk Cows)			
	< 300	300-499	500-999	≥ 1000
Milk Cows	2.7%	6.9%	20.4%	70.0%
Dry Cows & Springers	2.6%	6.8%	20.3%	70.3%
Heifers (15-24 Months)	2.4%	6.4%	19.5%	71.6%
Heifers (7-14 months)	2.5%	6.5%	19.8%	71.2%
Heifers (4-6 months)	2.8%	6.3%	19.5%	71.4%
Calves (<3 months)	2.6%	6.6%	19.6%	71.2%

Source: SJVAPCD, Final Draft Staff Report with Appendices for Amended Revised Proposed Amendments to Rule 4570. Appendix B: Baseline Emission Inventory and Emission Reductions. October 21, 2010. Table 4.

Table 6. Derivation of Consolidated VOC Emission Factors for Manure Decomposition and Enteric Fermentation

Animal Type	Conditions During Rule 4570 v. 2006		Conditions During Rule 4570 v. 2010	
	Percent of Animals in SJV Dairies Subject to Rule 4570 v. 2006	Consolidated VOC Emission Factor (lb/hd/yr)	Percent of Animals in SJV Dairies Subject to Rule 4570 v. 2010	Consolidated VOC Emission Factor (lb/hd/yr)
Milk Cows	70.0%	17.1	90.4%	14.1
Dry Cows & Springers	70.3%	9.4	90.5%	7.8
Heifers (15-24 Months)	71.6%	6.2	91.2%	5.2
Heifers (7-14 months)	71.2%	4.3	91.0%	3.6
Heifers (4-6 months)	71.4%	2.4	90.9%	2.0
Calves (<3 months)	71.2%	1.4	90.8%	1.1

Note: The consolidated VOC emission factors assume that Rule 4570 v. 2006 applies to dairies with ≥ 1000 milk cows, and Rule 4570 v. 2010 applies to dairies with ≥ 500 milk cows. Dairies not subject to Rule 4570 are assumed to be uncontrolled.

Table 7. San Joaquin Valley Dairy Silage Pile Surface Area by Dairy Size Category

Dairy Size Category (No. Milk Cows)	Percentage of Dairies	Size of Silage Pile - Corn (m ² /dairy)	Size of Silage Pile - Alfalfa (m ² /dairy)	Size of Silage Pile - Wheat (m ² /dairy)
< 300	14%	44.59	0	0
300-499	18%	102	24	102
500-999	31%	102	24	102
≥ 1000	37%	225	24	225

Source: SJVAPCD, Final Draft Staff Report with Appendices for Amended Revised Proposed Amendments to Rule 4570. Appendix B: Baseline Emission Inventory and Emission Reductions. October 21, 2010. Pages B-7 and B-8.

Table 8. Derivation of Consolidated VOC Emission Factors for Silage Piles Conditions During Rule 4570 v. 2010

Dairy Size Category (No. Milk Cows)	VOC Emission Factor (ug/m ² -min)			VOC Emission Factor (lb/yr/dairy)				Consolidated VOC Emission Factor (lb/yr/milk cow)
	Corn	Alfalfa	Wheat	Corn	Alfalfa	Wheat	Total	
< 300	38,534	19,398	48,716	1,991	-	-	1,991	2.07
300-499	38,534	19,398	48,716	4,554	539	5,758	10,852	11.30
500-999	21,068	10,606	26,635	2,490	295	3,148	5,933	6.18
≥ 1000	21,068	10,606	26,635	5,493	295	6,944	12,732	13.26
San Joaquin Valley Average (weighted by percent of dairies in each category)							8,797	9.16

Notes:

1. The VOC emission factors assume that Rule 4570 v. 2010 applies to dairies with ≥ 500 milk cows, and all other dairies are uncontrolled.
2. The VOC emission factor (per dairy) was converted to (per milk cow) by multiplying by the ratio of the number of dairies (1,331) to milk cows (1,277,678) in the San Joaquin Valley in 2008

Source: SJVAPCD, Final Draft Staff Report with Appendices for Amended Revised Proposed Amendments to Rule 4570. Appendix B: Baseline Emission Inventory and Emission Reductions. October 21, 2010. Pages B-7 and B-8.

Table 9. Surface Area Factors for Total Mixed Rations (TMR)

Animal Type	Surface Area Factor (m ² /hd)
Milk Cows	0.658
Dry Cows & Springers	0.658
Heifers (15-24 Months)	0.658
Heifers (7-14 months)	0.282
Heifers (4-6 months)	0.125
Calves (<3 months)	0.000

Source for surface area factors: SJVAPCD, Personal communication with Ramon Norman. 10/28/2010

Table 10. Derivation of Consolidated VOC Emission Factors for Total Mixed Rations (TMR)

Animal Type	Conditions During Rule 4570 v. 2006		Conditions During Rule 4570 v. 2010	
	Percent of Animals in SJV Dairies Subject to Rule 4570 v. 2006	Consolidated VOC Emission Factor (ug/m ² - min)	Percent of Animals in SJV Dairies Subject to Rule 4570 v. 2010	Consolidated VOC Emission Factor (ug/m ² - min)
Milk Cows	70.0%	13,491	90.4%	9,997
Dry Cows & Springers	70.3%	13,487	90.5%	9,992
Heifers (15-24 Months)	71.6%	13,468	91.2%	9,957
Heifers (7-14 months)	71.2%	13,474	91.0%	9,967
Heifers (4-6 months)	71.4%	13,471	90.9%	9,972
Calves (<3 months)	71.2%	13,474	90.8%	9,977

Note: The consolidated VOC emission factors assume that Rule 4570 v. 2006 applies to dairies with ≥ 1000 milk cows, and Rule 4570 v. 2010 applies to dairies with ≥ 500 milk cows. Dairies not subject to Rule 4570 are assumed to be uncontrolled.

**Table 11. VOC and NH3 Emissions Associated with Manure Decomposition and Enteric Fermentation
Project Level (Existing Facilities)**

Animal Type	No. of Animals	VOC Emission Factor (lb/hd/yr)	NH ₃ Emission Factor (lb/hd/yr)	Annual Emissions (ton/yr)	
				VOC	NH3
2011					
Milk Cows	509,550	14.1	74.0	3,598	18,853
Dry Cows & Springers	96,866	7.8	37.4	378	1,811
Heifers (15-24 Months)	166,090	5.2	19.4	428	1,611
Heifers (7-14 months)	132,871	3.6	13.9	237	923
Heifers (4-6 months)	66,071	2.0	10.5	65	347
Calves (<3 months)	65,689	1.1	3.1	37	102
2011 Total	1,037,137			4,745	23,648
2012					
Milk Cows	502,825	14.1	74.0	3,551	18,605
Dry Cows & Springers	93,471	7.8	37.4	365	1,748
Heifers (15-24 Months)	168,910	5.2	19.4	436	1,638
Heifers (7-14 months)	135,128	3.6	13.9	241	939
Heifers (4-6 months)	67,193	2.0	10.5	66	353
Calves (<3 months)	49,493	1.1	3.1	28	77
2012 Total	1,017,020			4,687	23,359
2013					
Milk Cows	485,785	14.1	74.0	3,431	17,974
Dry Cows & Springers	89,519	7.8	37.4	350	1,674
Heifers (15-24 Months)	173,261	5.2	19.4	447	1,681
Heifers (7-14 months)	138,609	3.6	13.9	247	963
Heifers (4-6 months)	68,923	2.0	10.5	68	362
Calves (<3 months)	49,593	1.1	3.1	28	77
2013 Total	1,005,690			4,570	22,731

Notes:

1. Dairies with ≥ 500 milk cows are assumed to be in compliance with SJVAPCD Rule 4570 v. 2010, and all other dairies are assumed to be uncontrolled. This assumption is conservative in that it maximizes the program level impacts (i.e., future cumulative emissions minus existing project level emissions).
2. Source for NH₃ emission factors: SJVAPCD, personal communication with Ramon Norman, 2/27/2012

**Table 12. VOC and NH₃ Emissions Associated with Manure Decomposition and Enteric Fermentation
Cumulative (Year = 2023)**

Animal Type	No. of Animals	VOC Emission Factor (lb/hd/yr)	NH ₃ Emission Factor (lb/hd/yr)	Annual Emissions (ton/yr)	
				VOC	NH3
Alternative 1 (Growth Rate = 1.5%)					
Milk Cows	592,013	14.1	74.0	4,181	21,904
Dry Cows & Springers	112,542	7.8	37.4	440	2,105
Heifers (15-24 Months)	192,969	5.2	19.4	498	1,872
Heifers (7-14 months)	154,374	3.6	13.9	275	1,073
Heifers (4-6 months)	76,764	2.0	10.5	76	403
Calves (<3 months)	76,320	1.1	3.1	43	118
2023 Total	1,204,981			5,512	27,475
Alternative 2 (Growth Rate = 1%)					
Milk Cows	563,140	14.1	74.0	3,977	20,836
Dry Cows & Springers	107,053	7.8	37.4	418	2,002
Heifers (15-24 Months)	183,558	5.2	19.4	474	1,781
Heifers (7-14 months)	146,845	3.6	13.9	262	1,021
Heifers (4-6 months)	73,020	2.0	10.5	72	383
Calves (<3 months)	72,598	1.1	3.1	41	113
2023 Total	1,146,214			5,244	26,135

Notes:

1. Dairies with ≥ 500 milk cows are assumed to be in compliance with SJVAPCD Rule 4570 v. 2010, and all other dairies are assumed to be uncontrolled.
2. Source for NH₃ emission factors: SJVAPCD, personal communication with Ramon Norman, 2/27/2012

**Table 13. VOC Emissions Associated with Animal Feed
Project Level (Existing Facilities)**

Animal Type	No. of Animals	Total mixed Rations Surface Area (m ²)	VOC Emission Factor		Annual Emissions (ton/yr)		
			Silage Piles (lb/yr/milk cow)	Total Mixed Rations (ug/m ² -min)	Silage Piles	Total Mixed Rations	Total
2011							
Milk Cows	509,550	370,201	9.16	9,997	2,335	2,144	4,479
Dry Cows & Springers	96,866	55,317	-	9,992	-	320	320
Heifers (15-24 Months)	166,090	147,295	-	9,957	-	850	850
Heifers (7-14 months)	132,871	50,501	-	9,967	-	292	292
Heifers (4-6 months)	66,071	11,193	-	9,972	-	65	65
Calves (<3 months)	65,689	-	-	9,977	-	-	-
2011 Total	1,037,137	634,507			2,335	3,670	6,005
2012							
Milk Cows	502,825	370,201	9.16	9,997	2,304	2,144	4,448
Dry Cows & Springers	93,471	55,317	-	9,992	-	320	320
Heifers (15-24 Months)	168,910	147,295	-	9,957	-	850	850
Heifers (7-14 months)	135,128	50,501	-	9,967	-	292	292
Heifers (4-6 months)	67,193	11,193	-	9,972	-	65	65
Calves (<3 months)	49,493	-	-	9,977	-	-	-
2012 Total	1,017,020	634,507			2,304	3,670	5,974
2013							
Milk Cows	485,785	370,201	9.16	9,997	2,226	2,144	4,370
Dry Cows & Springers	89,519	55,317	-	9,992	-	320	320
Heifers (15-24 Months)	173,261	147,295	-	9,957	-	850	850
Heifers (7-14 months)	138,609	50,501	-	9,967	-	292	292
Heifers (4-6 months)	68,923	11,193	-	9,972	-	65	65
Calves (<3 months)	49,593	-	-	9,977	-	-	-
2013 Total	1,005,690	634,507			2,226	3,670	5,896

Notes:

1. Dairies with ≥ 500 milk cows are assumed to be in compliance with SJVAPCD Rule 4570 v. 2010, and all other dairies are assumed to be uncontrolled. This assumption is conservative in that it maximizes the program level impacts (i.e., future cumulative emissions minus existing project level emissions).
2. The emission factor for milk cows for silage piles is inclusive of all animal types

**Table 14. VOC Emissions Associated with Animal Feed
Cumulative (2023)**

Animal Type	No. of Animals	Total mixed Rations Surface Area (m ²)	VOC Emission Factor		Annual Emissions (ton/yr)		
			Silage Piles (lb/yr/milk cow)	Total Mixed Rations (ug/m ² -min)	Silage Piles	Total Mixed Rations	Total
Alternative 1 (Growth Rate = 1.5%)							
Milk Cows	592,013	450,856	9.16	9,997	2,713	2,611	5,324
Dry Cows & Springers	112,542	67,369	-	9,992	-	390	390
Heifers (15-24 Months)	192,969	179,385	-	9,957	-	1,035	1,035
Heifers (7-14 months)	154,374	61,504	-	9,967	-	355	355
Heifers (4-6 months)	76,764	13,631	-	9,972	-	79	79
Calves (<3 months)	76,320	-	-	9,977	-	-	-
2023 Total	1,204,981	772,745			2,713	4,470	7,183
Alternative 2 (Growth Rate = 1%)							
Milk Cows	563,140	450,856	9.16	9,997	2,580	2,611	5,192
Dry Cows & Springers	107,053	67,369	-	9,992	-	390	390
Heifers (15-24 Months)	183,558	179,385	-	9,957	-	1,035	1,035
Heifers (7-14 months)	146,845	61,504	-	9,967	-	355	355
Heifers (4-6 months)	73,020	13,631	-	9,972	-	79	79
Calves (<3 months)	72,598	-	-	9,977	-	-	-
2023 Total	1,146,214	772,745			2,580	4,470	7,050

Notes:

1. Dairies with ≥ 500 milk cows are assumed to be in compliance with SJVAPCD Rule 4570 v. 2010, and all other dairies are assumed to be uncontrolled.
2. The emission factor for milk cows for silage piles is inclusive of all animal types

Table 15. Uncontrolled Cattle Dust Emissions
Project Level (Existing Facilities)

Animal Type	Type of Housing ^a	No. of Animals	PM ₁₀ Emission Factor (lb/hd/yr) ^b	PM _{2.5} Emission Factor (lb/hd/yr) ^d	Annual Emissions (tons/yr)	
					PM ₁₀	PM _{2.5}
2011						
Milk Cows & Dry Cows	Freestall with exercise pens	606,416	1.37	0.16	415	49
Milk Cows & Dry Cows	Open corrals with no shade structure		5.46	0.62	0	0
Heifers	Open corrals with no shade structure	365,032	10.55	1.20	1,926	219
Calves (<3 months)	Open corrals with no shade structure		1.37	0.16	0	0
Calves (<3 months)	Calf hutches - ground based ^c	65,689	0.34	0.039	11	1
Calves (<3 months)	Calf hutches - grates and flushed ^c		0.069	0.0078	0	0
2011 Total		1,037,137			2,352	269
2012						
Milk Cows & Dry Cows	Freestall with exercise pens	596,296	1.37	0.16	408	48
Milk Cows & Dry Cows	Open corrals with no shade structure		5.46	0.62	0	0
Heifers	Open corrals with no shade structure	371,231	10.55	1.20	1,958	223
Calves (<3 months)	Open corrals with no shade structure		1.37	0.16	0	0
Calves (<3 months)	Calf hutches - ground based ^c	49,493	0.34	0.039	8	1
Calves (<3 months)	Calf hutches - grates and flushed ^c		0.069	0.0078	0	0
2012 Total		1,017,020			2,375	271
2013						
Milk Cows & Dry Cows	Freestall with exercise pens	575,304	1.37	0.16	394	46
Milk Cows & Dry Cows	Open corrals with no shade structure		5.46	0.62	0	0
Heifers	Open corrals with no shade structure	380,793	10.55	1.20	2,009	228
Calves (<3 months)	Open corrals with no shade structure		1.37	0.16	0	0
Calves (<3 months)	Calf hutches - ground based ^c	49,593	0.34	0.039	8	1
Calves (<3 months)	Calf hutches - grates and flushed ^c		0.069	0.0078	0	0
2013 Total		1,005,690			2,411	275

^a The types of housing listed in this table represents the types for which the SJVAPCD provides uncontrolled (worst case) PM₁₀ emission factors.

^b Source: SJVAPCD, "Dairy and Feedlot PM₁₀ Emissions Factors." Office Memo. April 12, 2006.

^c Source: SJVAPCD, "Dairy/Feedlot PM₁₀ Mitigation Practices and their Control Efficiencies." Office Memo from Sheraz Gill to Permit Services Staff.

April 18, 2006. Calf hutch control efficiencies of 75% for ground based and 95% for grated flushed were applied to the emission factor for open corrals.

^d The PM_{2.5} emission factor is scaled from the PM₁₀ factor according to the relative emission rate for livestock operations as reported in CARB, *California Emission Inventory and Reporting System (CEIDARS)*, 2009.

**Table 16. PM10 Mitigated Measures Applied to Cattle Dust Emissions
Project Level (Existing Facilities)**

Animal Type	Type of Housing	No. of Animals	Control Measure Effectiveness ^{a,b}			Annual PM10 Emission Reductions (ton/yr)
			Frequent Scraping in a.m.	Feed Young Stock Near Dusk	Total - All Measures Combined	
2011						
Milk Cows & Dry Cows	Freestalls	606,416			0.0%	0
Milk Cows & Dry Cows	Open corrals	0	15%		15.0%	0
Heifers	Open corrals	365,032	15%	10%	23.5%	-453
Calves (<3 months)	Open corrals	0	15%	10%	23.5%	0
Calves (<3 months)	Calf hutches - ground	65,689			0.0%	0
Calves (<3 months)	Calf hutches - grates	0			0.0%	0
2011 Total		1,037,137				-453
2012						
Milk Cows & Dry Cows	Freestalls	596,296			0.0%	0
Milk Cows & Dry Cows	Open corrals	0	15%		15.0%	0
Heifers	Open corrals	371,231	15%	10%	23.5%	-460
Calves (<3 months)	Open corrals	0	15%	10%	23.5%	0
Calves (<3 months)	Calf hutches - ground	49,493			0.0%	0
Calves (<3 months)	Calf hutches - grates	0			0.0%	0
2012 Total		1,017,020				-460
2013						
Milk Cows & Dry Cows	Freestalls	575,304			0.0%	0
Milk Cows & Dry Cows	Open corrals	0	15%		15.0%	0
Heifers	Open corrals	380,793	15%	10%	23.5%	-472
Calves (<3 months)	Open corrals	0	15%	10%	23.5%	0
Calves (<3 months)	Calf hutches - ground	49,593			0.0%	0
Calves (<3 months)	Calf hutches - grates	0			0.0%	0
2013 Total		1,005,690				-472

^a Source: SJVAPCD, "Dairy/Feedlot PM₁₀ Mitigation Practices and their Control Efficiencies."

Office Memo from Sheraz Gill to Permit Services Staff. April 18, 2006.

^b The mitigation measures would be applied to all existing dairies.

**Table 17. Mitigated Cattle Dust Emissions
Project Level (Existing Facilities)**

Animal Type	Type of Housing	Annual PM ₁₀ Emissions (tons/yr)			Annual PM _{2.5} Emissions (tons/yr)		
		Before Controls	Control Measure Reductions	After Controls	Before Controls	Control Measure Reductions	After Controls
2011							
Milk Cows & Dry Cows	Freestalls	415	0	415	49	0	49
Milk Cows & Dry Cows	Open corrals	0	0	0	0	0	0
Heifers	Open corrals	1,926	-453	1473	219	-50	169
Calves (<3 months)	Open corrals	0	0	0	0	0	0
Calves (<3 months)	Calf hutches - ground	11	0	11	1	0	1
Calves (<3 months)	Calf hutches - grates	0	0	0	0	0	0
2011 Total		2,352	-453	1,900	269	-50	219
2012							
Milk Cows & Dry Cows	Freestalls	408	0	408	48	0	48
Milk Cows & Dry Cows	Open corrals	0	0	0	0	0	0
Heifers	Open corrals	1,958	-460	1498	223	-51	172
Calves (<3 months)	Open corrals	0	0	0	0	0	0
Calves (<3 months)	Calf hutches - ground	8	0	8	1	0	1
Calves (<3 months)	Calf hutches - grates	0	0	0	0	0	0
2012 Total		2,375	-460	1,915	271	-51	221
2013							
Milk Cows & Dry Cows	Freestalls	394	0	394	46	0	46
Milk Cows & Dry Cows	Open corrals	0	0	0	0	0	0
Heifers	Open corrals	2,009	-472	1537	228	-52	177
Calves (<3 months)	Open corrals	0	0	0	0	0	0
Calves (<3 months)	Calf hutches - ground	8	0	8	1	0	1
Calves (<3 months)	Calf hutches - grates	0	0	0	0	0	0
2013 Total		2,411	-472	1,939	275	-52	224

**Table 18. Uncontrolled Cattle Dust Emissions
Cumulative (2023)**

Animal Type	Type of Housing ^a	No. of Animals	PM ₁₀ Emission Factor (lb/hd/yr) ^b	PM _{2.5} Emission Factor (lb/hd/yr) ^d	Annual Emissions (tons/yr)	
					PM ₁₀	PM _{2.5}
Alternative 1 (Growth Rate = 1.5%)						
Milk Cows & Dry Cows	Freestall with exercise pens	704,555	1.37	0.16	483	56
Milk Cows & Dry Cows	Open corrals with no shade structure		5.46	0.62	0	0
Heifers	Open corrals with no shade structure	424,107	10.55	1.20	2,237	254
Calves (<3 months)	Open corrals with no shade structure		1.37	0.16	0	0
Calves (<3 months)	Calf hutches - ground based ^c	76,320	0.34	0.039	13	1
Calves (<3 months)	Calf hutches - grates and flushed ^c		0.069	0.0078	0	0
2023 Total		1,204,981			2,733	312
Alternative 2 (Growth Rate = 1%)						
Milk Cows & Dry Cows	Freestall with exercise pens	670,193	1.37	0.16	459	54
Milk Cows & Dry Cows	Open corrals with no shade structure		5.46	0.62	0	0
Heifers	Open corrals with no shade structure	403,423	10.55	1.20	2,128	242
Calves (<3 months)	Open corrals with no shade structure		1.37	0.16	0	0
Calves (<3 months)	Calf hutches - ground based ^c	72,598	0.34	0.039	12	1
Calves (<3 months)	Calf hutches - grates and flushed ^c		0.069	0.0078	0	0
2023 Total		1,146,214			2,599	297

^a The types of housing listed in this table represents the types for which the SJVAPCD provides uncontrolled (worst case) PM₁₀ emission factors.

^b Source: SJVAPCD, "Dairy and Feedlot PM₁₀ Emissions Factors." Office Memo. April 12, 2006.

^c Source: SJVAPCD, "Dairy/Feedlot PM₁₀ Mitigation Practices and their Control Efficiencies." Office Memo from Sheraz Gill to Permit Services Staff.

April 18, 2006. Calf hutch control efficiencies of 75% for ground based and 95% for grated flushed were applied to the emission factor for open corrals.

^d The PM_{2.5} emission factor is scaled from the PM₁₀ factor according to the relative emission rate for livestock operations as reported in CARB, *California Emission Inventory and Reporting System (CEIDARS)*, 2009.

Table 19. PM10 Mitigated Measures Applied to Cattle Dust Emissions - New and Expanded Facilities

Animal Type	Type of Housing	Additional No. of Animals Relative to Existing Conditions	Control Measure Effectiveness ^{a,b}						Additional Annual PM10 Emission Reductions Relative to Mitigated Existing Conditions (ton/yr)
			Frequent Scraping in a.m.	Feed Young Stock Near Dusk	Corral Shades	Downwind & Upwind Shelterbelts	Corral Sprinkling	Total - All Measures Combined	
2011/2023 (Alternative 1)									
Milk Cows & Dry Cows	Freestalls	98,139				22.5%		22.5%	-15
Milk Cows & Dry Cows	Open corrals	0	15%		16.7%	22.5%	15%	53.4%	0
Heifers	Open corrals	59,075	15%	10%	8.3%	22.5%	15%	53.8%	-168
Calves (<3 months)	Open corrals	0	15%	10%	8.3%	22.5%	15%	53.8%	0
Calves (<3 months)	Calf hutches - ground	10,631				22.5%		22.5%	0
Calves (<3 months)	Calf hutches - grates	0				22.5%		22.5%	0
2011/2023 (Alternative 1) Total		167,844							-183
2011/2023 (Alternative 2)									
Milk Cows & Dry Cows	Freestalls	63,777				22.5%		22.5%	-10
Milk Cows & Dry Cows	Open corrals	0	15%		16.7%	22.5%	15%	53.4%	0
Heifers	Open corrals	38,391	15%	10%	8.3%	22.5%	15%	53.8%	-109
Calves (<3 months)	Open corrals	0	15%	10%	8.3%	22.5%	15%	53.8%	0
Calves (<3 months)	Calf hutches - ground	6,909				22.5%		22.5%	0
Calves (<3 months)	Calf hutches - grates	0				22.5%		22.5%	0
2011/2023 (Alternative 1) Total		109,077							-119
2012/2023 (Alternative 1)									
Milk Cows & Dry Cows	Freestalls	108,259				22.5%		22.5%	-17
Milk Cows & Dry Cows	Open corrals	0	15%		16.7%	22.5%	15%	53.4%	0
Heifers	Open corrals	52,876	15%	10%	8.3%	22.5%	15%	53.8%	-150
Calves (<3 months)	Open corrals	0	15%	10%	8.3%	22.5%	15%	53.8%	0
Calves (<3 months)	Calf hutches - ground	26,827				22.5%		22.5%	-1
Calves (<3 months)	Calf hutches - grates	0				22.5%		22.5%	0
2012/2023 (Alternative 1) Total		187,961							-168
2012/2023 (Alternative 2)									
Milk Cows & Dry Cows	Freestalls	73,897				22.5%		22.5%	-11
Milk Cows & Dry Cows	Open corrals	0	15%		16.7%	22.5%	15%	53.4%	0
Heifers	Open corrals	32,192	15%	10%	8.3%	22.5%	15%	53.8%	-91
Calves (<3 months)	Open corrals	0	15%	10%	8.3%	22.5%	15%	53.8%	0
Calves (<3 months)	Calf hutches - ground	23,105				22.5%		22.5%	-1
Calves (<3 months)	Calf hutches - grates	0				22.5%		22.5%	0
2012/2023 (Alternative 2) Total		129,194							-104
2013/2023 (Alternative 1)									
Milk Cows & Dry Cows	Freestalls	129,251				22.5%		22.5%	-20
Milk Cows & Dry Cows	Open corrals	0	15%		16.7%	22.5%	15%	53.4%	0
Heifers	Open corrals	43,314	15%	10%	8.3%	22.5%	15%	53.8%	-123
Calves (<3 months)	Open corrals	0	15%	10%	8.3%	22.5%	15%	53.8%	0
Calves (<3 months)	Calf hutches - ground	26,727				22.5%		22.5%	-1
Calves (<3 months)	Calf hutches - grates	0				22.5%		22.5%	0
2013/2023 (Alternative 1) Total		199,291							-144
2013/2023 (Alternative 2)									
Milk Cows & Dry Cows	Freestalls	94,889				22.5%		22.5%	-15
Milk Cows & Dry Cows	Open corrals	0	15%		16.7%	22.5%	15%	53.4%	0
Heifers	Open corrals	22,630	15%	10%	8.3%	22.5%	15%	53.8%	-64
Calves (<3 months)	Open corrals	0	15%	10%	8.3%	22.5%	15%	53.8%	0
Calves (<3 months)	Calf hutches - ground	23,005				22.5%		22.5%	-1
Calves (<3 months)	Calf hutches - grates	0				22.5%		22.5%	0
2013/2023 (Alternative 2) Total		140,524							-80

^a Source: SJVAPCD, "Dairy/Feedlot PM₁₀ Mitigation Practices and their Control Efficiencies."

Office Memo from Sheraz Gill to Permit Services Staff. April 18, 2006.

^b The first two mitigation measures (frequent scraping in the a.m. and feed young stock near dusk) would be applied to all dairies, including existing dairies. The remaining three mitigation measures (corral shades, downwind and upwind shelterbelts, and corral sprinkling) would be applied only to new or expanded dairies. The emission reductions in this table conservatively assume that all new animals (relative to existing conditions) would be in new dairies rather than expanded dairies. The emission reductions would be greater than what is shown in this table if some of the new animals would be in expanded dairies, because the mitigation measures would be applied to the entire expanded dairies and therefore would also reduce emissions from the existing animal population in addition to the new animals.

**Table 20. Mitigated Cattle Dust Emissions
Cumulative (2023)**

Animal Type	Type of Housing	Annual PM ₁₀ Emissions (tons/yr)			Annual PM _{2.5} Emissions (tons/yr)		
		Before Controls	Control Measure Reductions	After Controls	Before Controls	Control Measure Reductions	After Controls
2011/2023 (Alternative 1)							
Milk Cows & Dry Cows	Freestalls	483	-15	467	56	-2	55
Milk Cows & Dry Cows	Open corrals	0	0	0	0	0	0
Heifers	Open corrals	2,237	-620	1617	254	-68	186
Calves (<3 months)	Open corrals	0	0	0	0	0	0
Calves (<3 months)	Calf hutches - ground	13	0	13	1	0	1
Calves (<3 months)	Calf hutches - grates	0	0	0	0	0	0
2011/2023 (Alternative 1) Total		2,733	-636	2,097	312	-70	242
2011/2023 (Alternative 2)							
Milk Cows & Dry Cows	Freestalls	459	-10	449	54	-1	53
Milk Cows & Dry Cows	Open corrals	0	0	0	0	0	0
Heifers	Open corrals	2,128	-561	1567	242	-62	180
Calves (<3 months)	Open corrals	0	0	0	0	0	0
Calves (<3 months)	Calf hutches - ground	12	0	12	1	0	1
Calves (<3 months)	Calf hutches - grates	0	0	0	0	0	0
2011/2023 (Alternative 2) Total		2,599	-572	2,028	297	-63	234
2012/2023 (Alternative 1)							
Milk Cows & Dry Cows	Freestalls	483	-17	466	56	-2	55
Milk Cows & Dry Cows	Open corrals	0	0	0	0	0	0
Heifers	Open corrals	2,237	-610	1627	254	-67	187
Calves (<3 months)	Open corrals	0	0	0	0	0	0
Calves (<3 months)	Calf hutches - ground	13	-1	12	1	0	1
Calves (<3 months)	Calf hutches - grates	0	0	0	0	0	0
2012/2023 (Alternative 1) Total		2,733	-628	2,105	312	-69	243
2012/2023 (Alternative 2)							
Milk Cows & Dry Cows	Freestalls	459	-11	448	54	-1	52
Milk Cows & Dry Cows	Open corrals	0	0	0	0	0	0
Heifers	Open corrals	2,128	-552	1577	242	-61	181
Calves (<3 months)	Open corrals	0	0	0	0	0	0
Calves (<3 months)	Calf hutches - ground	12	-1	11	1	0	1
Calves (<3 months)	Calf hutches - grates	0	0	0	0	0	0
2012/2023 (Alternative 2) Total		2,599	-564	2,036	297	-62	235
2013/2023 (Alternative 1)							
Milk Cows & Dry Cows	Freestalls	483	-20	463	56	-2	54
Milk Cows & Dry Cows	Open corrals	0	0	0	0	0	0
Heifers	Open corrals	2,237	-595	1642	254	-65	189
Calves (<3 months)	Open corrals	0	0	0	0	0	0
Calves (<3 months)	Calf hutches - ground	13	-1	12	1	0	1
Calves (<3 months)	Calf hutches - grates	0	0	0	0	0	0
2013/2023 (Alternative 1) Total		2,733	-616	2,117	312	-68	245
2013/2023 (Alternative 2)							
Milk Cows & Dry Cows	Freestalls	459	-15	444	54	-2	52
Milk Cows & Dry Cows	Open corrals	0	0	0	0	0	0
Heifers	Open corrals	2,128	-536	1592	242	-59	183
Calves (<3 months)	Open corrals	0	0	0	0	0	0
Calves (<3 months)	Calf hutches - ground	12	-1	11	1	0	1
Calves (<3 months)	Calf hutches - grates	0	0	0	0	0	0
2013/2023 (Alternative 2) Total		2,599	-552	2,048	297	-61	236

Note: The control measure reductions include the reductions resulting from mitigating the existing dairies plus the reductions from mitigating the new dairies.

Table 21. Factors for Converting PM₁₀ to PM_{2.5}

Emission Source	PM Profile Name	CARB Profile ID	PM ₁₀ Fraction	PM _{2.5} Fraction	PM _{2.5} / PM ₁₀ Fraction
Land Preparation	Agricultural Tilling	417	0.454	0.068	0.15
Crop Harvesting	Agricultural Tilling	417	0.454	0.068	0.15
Windblown Dust - Farm	Windblown Dust - Agric. Lands	418	0.454	0.079	0.17
Cattle in Corrals	Livestock Operations Dust	423	0.482	0.055	0.11
Unpaved Road Dust	Unpaved Road Dust	470	0.594	0.059	0.10
Paved Road Dust	Paved Road Dust	471	0.457	0.069	0.15
Windblown Dust - Dairy	Dust - Unpaved Areas	416	0.594	0.079	0.13
Truck Exhausts	Diesel Vehicle Exhaust	425	1.000	0.920	0.92
Employee Travel	Gasoline Vehicles - Catalyst	400	0.970	0.900	0.93
ICE - Digester Gas	Stationary IC Engine - Gas	123	0.994	0.992	0.998

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." July 28, 2009.

Table 22. GHG Emission Factors for Manure Decomposition and Enteric Fermentation

Animal Type	Uncontrolled GHG Emission Factors ¹								
	CH4 (Anaerobic Treatment Lagoon) lb/hd/yr	CH4 (Lagoon) ² lb/hd/yr	CH4 (Manure Spreading) lb/hd/yr	CH4 (Solid Manure Storage) ⁵ lb/hd/yr	CH4 (Enteric) lb/hd/yr	N2O (Anaerobic Treatment Lagoon) lb/hd/yr	N2O (Manure Spreading) lb/hd/yr	N2O (Solid Manure Storage) ⁵ lb/hd/yr	N2O (Enteric) lb/hd/yr
Milk Cows	513.0	307.8	3.5	27.7	271.5	1.5	0	2.6	0
Dry Cows ³	513.0	307.8	3.5	27.7	271.5	1.5	0	2.6	0
Heifers (15-24 mo) ⁴	110.4	110.4	1.6	-	151.6	1.4	0	-	0
Heifers (7-14 mo)	110.4	110.4	1.6	-	100.5	1.4	0	-	0
Heifers (4-6 mo)	110.4	110.4	1.6	-	100.5	1.4	0	-	0
Calves (under 3 mo) ⁵	-	-	-	-	-	-	0	-	0
Bulls ⁴	110.4	110.4	1.6	-	116.6	1.4	0	-	0

Source for table: SJVAPCD, personal communication with Sheraz Gill. February 28, 2012

1. GHG Emission Factors were obtained from the latest values (year 2007) given ARB's document entitled "Draft Documentation of California's Greenhouse Gas Inventory" http://www.arb.ca.gov/cc/inventory/doc/doc_index.php.
2. The ARB methane Emission Factor of 513.0 lbs-CH₄/yr will be reduced by 40%, due to higher volatile solids in standard anaerobic lagoons. Standard lagoons are not properly designed for treatment and as such can be overloaded. Due to the lagoons being overloaded, the bacteria is not able to convert the manure to methane by methanogenic bacteria. Lagoons that are properly designed have the potential of emitting large amount of VOC emissions but inhibit methane production.
3. Dry Cow EF was assumed to be similar to milk cows.
4. CH₄ and N₂O for heifers and bull manure in anaerobic treatment lagoons and lagoons based on liquid/slurry manure values for heifers since there were no values given for anaerobic lagoons.
5. No emissions were available for calves and are expected to be minimal. In addition no data was available for values that are not present on this table and will be tabulated at this time.

**Table 23. GHG Emissions Associated with Mannure Decomposition and Enteric Fermentation
Project Level (Existing Facilities)**

Animal Type	No. of Animals	Annual GHG Emissions (metric ton/yr)										
		Lagoon		Manure Spreading		Solid Manure Storage		Enteric		Total		
		CH ₄	N ₂ O	CH ₄	N ₂ O	CH ₄	N ₂ O	CH ₄	N ₂ O	CH ₄	N ₂ O	CO ₂ e
2011												
Milk Cows	509,550	118,548	347	809	0	6,401	601	62,741	0	188,499	947	4,252,189
Dry Cows & Springers (Inc Bulls)	96,866	22,536	66	154	0	1,217	114	11,927	0	35,834	180	808,346
Heifers (15-24 mo)	166,090	8,316	105	121	0	0	0	11,419	0	19,855	105	449,656
Heifers (7-14 mo)	132,871	6,653	84	96	0	0	0	6,056	0	12,805	84	295,058
Heifers (4-6 mo)	66,071	3,308	42	48	0	0	0	3,011	0	6,367	42	146,720
Calves (under 3 mo)	65,689	0	0	0	0	0	0	0	0	0	0	0
2011 Total	1,037,137	159,361	644	1,227	0	7,618	715	95,154	0	263,361	1,359	5,951,968
2012												
Milk Cows	502,825	116,984	342	798	0	6,317	593	61,912	0	186,011	935	4,196,069
Dry Cows & Springers (Inc Bulls)	93,471	21,746	64	148	0	1,174	110	11,509	0	34,578	174	780,014
Heifers (15-24 mo)	168,910	8,457	107	123	0	0	0	11,613	0	20,193	107	457,290
Heifers (7-14 mo)	135,128	6,766	86	98	0	0	0	6,159	0	13,023	86	300,070
Heifers (4-6 mo)	67,193	3,364	43	49	0	0	0	3,063	0	6,476	43	149,211
Calves (under 3 mo)	49,493	0	0	0	0	0	0	0	0	0	0	0
2012 Total	1,017,020	157,317	641	1,216	0	7,491	703	94,256	0	260,280	1,344	5,882,655
2013												
Milk Cows	485,785	113,019	330	771	0	6,103	573	59,814	0	179,707	903	4,053,870
Dry Cows & Springers (Inc Bulls)	89,519	20,827	61	142	0	1,125	106	11,022	0	33,116	166	747,035
Heifers (15-24 mo)	173,261	8,675	110	126	0	0	0	11,912	0	20,713	110	469,070
Heifers (7-14 mo)	138,609	6,940	88	101	0	0	0	6,318	0	13,358	88	307,800
Heifers (4-6 mo)	68,923	3,451	44	50	0	0	0	3,141	0	6,642	44	153,053
Calves (under 3 mo)	49,593	0	0	0	0	0	0	0	0	0	0	0
2013 Total	1,005,690	152,912	633	1,189	0	7,227	678	92,208	0	253,536	1,311	5,730,828

Notes:

1. Metric Ton = 1,000 kg = 1.1 short tons = 2,205 lbs.
2. CO₂e = carbon dioxide equivalent emissions, which is the sum of all emissions after multiplying by their global warming potentials. GWPs are 1 for CO₂, 21 for CH₄, 310 for N₂O, and 11,700 for HFC-23. Source: The Climate Registry. General Reporting Protocol. Version 1.1. May 2008. Table B-1.
3. The most conservative emission factor for lagoons (anaerobic) was used for CH₄ emissions.

**Table 24. GHG Emissions Associated with Mannure Decomposition and Enteric Fermentation
Cumulative (Year = 2023)**

Animal Type	No. of Animals	Annual GHG Emissions (metric ton/yr)										
		Lagoon		Manure Spreading		Solid Manure Storage		Enteric		Total		
		CH ₄	N ₂ O	CH ₄	N ₂ O	CH ₄	N ₂ O	CH ₄	N ₂ O	CH ₄	N ₂ O	CO ₂ e
2023 (Alternative 1)												
Milk Cows	592,013	137,734	403	940	0	7,437	698	72,894	0	219,004	1,101	4,940,339
Dry Cows & Springers (Inc Bulls)	112,542	26,183	77	179	0	1,414	133	13,857	0	41,633	209	939,164
Heifers (15-24 mo)	192,969	9,662	123	140	0	0	0	13,267	0	23,069	123	522,425
Heifers (7-14 mo)	154,374	7,729	98	112	0	0	0	7,036	0	14,877	98	342,808
Heifers (4-6 mo)	76,764	3,843	49	56	0	0	0	3,499	0	7,398	49	170,464
Calves (under 3 mo)	76,320	0	0	0	0	0	0	0	0	0	0	0
2023 Total	1,204,981	185,151	749	1,426	0	8,851	831	110,553	0	305,981	1,579	6,915,200
2023 (Alternative 2)												
Milk Cows	563,140	131,016	383	894	0	7,074	664	69,339	0	208,323	1,047	4,699,396
Dry Cows & Springers (Inc Bulls)	107,053	24,906	73	170	0	1,345	126	13,181	0	39,603	199	893,360
Heifers (15-24 mo)	183,558	9,190	117	133	0	0	0	12,620	0	21,944	117	496,946
Heifers (7-14 mo)	146,845	7,352	93	107	0	0	0	6,693	0	14,152	93	326,090
Heifers (4-6 mo)	73,020	3,656	46	53	0	0	0	3,328	0	7,037	46	162,150
Calves (under 3 mo)	72,598	0	0	0	0	0	0	0	0	0	0	0
2023 Total	1,146,214	176,121	712	1,357	0	8,419	790	105,162	0	291,058	1,502	6,577,942

Notes:

1. Metric Ton = 1,000 kg = 1.1 short tons = 2,205 lbs.
2. CO₂e = carbon dioxide equivalent emissions, which is the sum of all emissions after multiplying by their global warming potentials. GWPs are 1 for CO₂, 21 for CH₄, 310 for N₂O, and 11,700 for HFC-23. Source: The Climate Registry. General Reporting Protocol. Version 1.1. May 2008. Table B-1.
3. The most conservative emission factor for lagoons (anaerobic) was used for CH₄ emissions.

**Table 31. Uncontrolled Emissions Associated with Unpaved Road Dust at the Dairies
Proposed Project**

Project Scenario	Milk Cow Population	PM ₁₀ Emission Factor (lb/head/yr) ^a	PM _{2.5} Emission Factor (lb/head/yr) ^b	Annual Emissions (tons/yr)	
				PM ₁₀	PM _{2.5}
Project Level (Existing - 2011)	509,550	0.369	0.037	94	9
Project Level (Existing - 2012)	502,825	0.369	0.037	93	9
Project Level (Existing - 2013)	485,785	0.369	0.037	90	9
Cumulative (Horizon - 2023 Alternative 1)	592,013	0.369	0.037	109	11
Cumulative (Horizon - 2023 Alternative 2)	563,140	0.369	0.037	104	10

^a Source: Western Governors' Association. Western Regional Air Partnership (WRAP) Fugitive Dust Handbook. 9/7/06.

Table 13-1. The emission factor applies to the number of milk cows; support animals are already included in the factor.

^b The PM_{2.5} emission factor is scaled from the PM₁₀ factor according to the relative emission rate for unpaved road dust as reported in CARB, California Emissions Inventory and Reporting System (CEIDARS), 2009.

Table 32. Dairy Cow Population in the San Joaquin Valley - Year 2000

San Joaquin Valley County	Dairy Cow Population ^a
Fresno	79,296
Kern	65,074
Kings	120,088
Madera	40,624
Merced	203,647
San Joaquin	97,849
Stanislaus	158,087
Tulare	357,950
Total - San Joaquin Valley	1,122,615

^a Source: California Department of Food and Agriculture. Dairy Statistics Annual 2001. Table 1. Data are for year 2000, milk cows plus heifers.

Table 33. Electricity usage for Dairies in the San Joaquin Valley

Dairy Cow Population (Milk Cows and Heifers)	Total Dairy Electricity Usage (MWh/yr) ^a	Dairy Electricity Usage per Cow (MWh/cow/yr) ^b
1,122,615	550,464	0.490

^a Source: California Energy Commission, Agricultural Electricity Rates in California. June 2001. Derived from Tables 2.1.2 and 2.1.3. Data representative of 1996-1998.

^b Cows represent milk cows plus heifers.

Table 34. GHG Emissions Associated with Dairy Electricity Use

Project Scenario	Cow Population (Milk Cows and Heifers)	Electricity Usage (MWh/yr)	Emission Factor (lb/MWh) ^a			Annual Emissions (metric ton/yr)			
			CO ₂	CH ₄	N ₂ O	CO ₂	CH ₄	N ₂ O	CO ₂ e
Project Level (Existing - 2011)	971,448	476,341	681.01	0.0283	0.0062	147,117	6.114	1.339	147,660
Project Level (Existing - 2012)	967,527	474,418	681.01	0.0283	0.0062	146,523	6.089	1.334	147,064
Project Level (Existing - 2013)	956,097	468,813	681.01	0.0283	0.0062	144,792	6.017	1.318	145,327
Cumulative (Horizon - 2023 Alternative 1)	1,128,662	553,429	681.01	0.0283	0.0062	170,925	7.103	1.556	171,557
Cumulative (Horizon - 2023 Alternative 2)	1,073,616	526,438	681.01	0.0283	0.0062	162,589	6.757	1.480	163,190

^a Source: The Climate Registry. 2012 Climate Registry Default Emission Factors. January 6, 2012. Table 14.1.

2. Air Quality Methodology and Assumptions

Air Quality Methodology and Assumptions

Tulare County ACFP Update EIR

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1. Introduction

This technical appendix discusses the methodology, assumptions, and results of an air quality emissions study to support the Tulare County ACFP Update EIR. The quantified emissions include:

- Criteria pollutants, including volatile organic compounds (VOC), carbon monoxide (CO), sulfur oxides (SO_x), nitrogen oxides (NO_x), particulate matter with diameter less than 10 microns (PM₁₀), and particulate matter with diameter less than 2.5 microns (PM_{2.5});
- Ammonia (NH₃); and
- Greenhouse gases (GHGs), including carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), and Hydrofluorocarbons (HFCs).

In this report, GHG emissions are presented as a carbon dioxide equivalent (CO₂e). The CO₂e is calculated by multiplying the emission of each gas by its global warming potential (GWP), and adding the results together to produce a single, combined emission rate representing all GHGs. By convention, carbon dioxide is assigned a GWP of 1. By comparison, methane has a GWP of 21, which means that it has 21 times the global warming effect as carbon dioxide on an equal-mass basis. Nitrous oxide has a GWP of 310, which means that it has 310 times the global warming effect as carbon dioxide on an equal-mass basis. HFCs are potent GHGs, with GWPs ranging from 140 to 11,700 (The Climate Registry, 2008). The GHG emissions in this report are reported in units of metric tons, which are equivalent to 1.1 U.S. (short) tons or 2,205 pounds.

Project level emissions were calculated for the existing dairy animal population and associated facility operations in Tulare County. As shown in Table 1 of Attachment 1, the existing population consists of approximately 562,600 milk cows, 84,100 dry cows, and 537,200 support stock (heifers and calves) on 336 dairies. A portion of the heifers and calves reside on heifer and calf ranches.¹ To assess project level impacts, project level emissions are compared to a zero baseline in the EIR.

Cumulative emissions were calculated for the total proposed dairy animal population and associated facility operations in Tulare County at a 10 year planning horizon, assumed in this report to be 2022. Construction emissions associated with new and expanded dairies over this 10-year period are also estimated. As shown in Table 2 of Attachment 1, the cumulative animal population consists of approximately 685,200 milk cows, 102,400 dry cows, and 654,300 support stock (heifers and calves). The cumulative animal population represents a 22 percent increase over the existing population. To assess cumulative impacts, cumulative emissions are compared to a zero baseline in the EIR.

Program level emissions represent the net change in emissions associated with a 22 percent increase in the dairy animal population over the 10 year future planning horizon. The program

¹ The same emission factors used for dairy cattle were also used for heifers and calves on ranches because they are raised as dairy cattle.

level animal population consists of an additional 122,600 milk cows, 18,300 dry cows, and 117,000 support stock (heifers and calves) above the project level (existing) population. Program level emissions were not directly calculated in this report. Instead, they were determined by subtracting the project level emissions from the cumulative emissions. In other words, program level emissions represent the net change in cumulative emissions relative to the existing baseline emissions (i.e., project level emissions).

Methods of estimating dairy source emissions vary by emission source and pollutant. Because of the predominance of motor vehicle emissions in California, methodologies for estimating mobile source emissions are well-documented. The State of California has developed computer programs, able to estimate mobile source emissions for on-road vehicles, that are flexible and adaptable to a wide variety of vehicle types, climates, and operating conditions.

The state of knowledge of other emission sources associated with dairies is far more variable. Some methods of estimating emissions are well-established, while others are new and developing as basic research is being conducted. All emission factors used in this study are current best estimates subject to future revision.

The uncertainty inherent in the calculation of dairy emissions varies with the type of emissions. For example, the emission calculations for non-criteria pollutants such as ammonia (NH_3) and methane (CH_4) have a much greater uncertainty than other pollutants because of their relatively recent identification as pollutants of concern.

This appendix identifies each dairy emission source, and describes the methodology used to estimate the emissions. Attachment 1 contains the detailed calculation worksheets for each emission source. Attachment 2 contains a prior construction emissions study used as the basis for the construction emission calculations.

2. Operational Emissions

2.1 Manure Decomposition and Enteric Fermentation

VOC Emissions

Emission factors compiled by the SJVAPCD (2010) during the 2010 update to Rule 4570 (Confined Animal Facilities) were used to estimate VOC emissions from manure decomposition and enteric fermentation. The VOC uncontrolled and controlled emission factors for manure decomposition and enteric fermentation are developed in Tables 3 and 4 of Attachment 1, and are summarized here:

<u>Dairy (Excluding Feed)</u>	<u>VOC – Uncontrolled (lb/head/year)</u>	<u>VOC – Controlled (lb/head/year)</u>
Milk cows	20.0	13.5
Dry cows	11.1	7.5
Heifers 15-24 months	7.3	5.0
Heifers 7-14 months	5.1	3.4
Heifers 4-6 months	2.8	1.9
Calves <3 months	1.6	1.1
<u>Animal Feed</u>	<u>($\mu\text{g}/\text{m}^2/\text{min}$)</u>	<u>($\mu\text{g}/\text{m}^2/\text{min}$)</u>
Silage Pile – Corn	38,534	21,068
Silage Pile – Alfalfa	19,398	10,606
Silage Pile – Wheat	48,716	26,635
Total Mixed Rations (TMR)	14,507	9,518

The uncontrolled VOC emission factors shown above apply to dairies with fewer than 500 milking cows, and heifer or calf ranches with fewer than 7,500 cattle, in accordance with the current (2010) version of Rule 4570. The controlled VOC emission factors apply to dairies with 500 milk cows or greater, and on heifer or calf ranches with 7,500 cattle or greater. The controlled VOC emission factors assume implementation of the following control measures in accordance with Rule 4570 (SJVACPD, 2010):

Feed

- Feed according to NRC Guidelines
- Push feed to within 3 feet of feed bunk fenceline
- Feed high moisture corn or steam-flaked corn
- Store grain in weatherproof structure October-May
- Feed/ dispose rations within 48 hours

Silage

- Cover silage pile
- Density: high moisture harvest, $\leq 1/2$ " chop, ≤ 6 " uncompacted top, cover within 72 hrs
- Total exposed surface area of all silage piles $< 4,300$ feet
- Silage inoculation

Milking Parlor

- Flush parlor after each milking

Freestalls

- Flush, scrape, or vacuum freestall flush lanes with each milking
- Rake, harrow, scrape, or grade freestall bedding ≤ 14 days

Corrals

- Clean corrals at least once April-July and October-December
- Clean corral lanes daily for mature cows, weekly for support stock
- Depth of waste not exceed 12" in corral
- Maintain corrals to ensure proper drainage
- Inspect & repair water pipes & trough every 14 days
- Install shades uphill of corrals (partial compliance is assumed by the SJVAPCD)

Solid Manure

- Cover dry animal waste piles October-May

Liquid Manure

- Remove solids with separator

Land Application

- Incorporate solid manure within 72 hours of land application
- Don't allow liquid manure to stand in field >24 hours

The SJVAPCD assumed in its emission factor development that full compliance with the current (2010) version of Rule 4570 would occur by 2012. Therefore, the VOC emission factors representative of the 2010 version of Rule 4570 were used in the emission calculations for the cumulative and program level conditions, both of which would occur at the 10 year horizon, 2022. By contrast, project level conditions represent the existing dairy facilities in 2009, when the prior (2006) version of Rule 4570 was in effect. As shown in Table 4 of Attachment 1, the 2006 version of Rule 4570 was less stringent and therefore had higher VOC emission factors than the 2010 version of Rule 4570. However, it is actually more conservative to use the 2010 VOC emission factors for project level emissions because project level emissions are subtracted from the cumulative emissions to obtain the program level emissions (i.e., project level emissions serve as the baseline emissions for evaluating program level emissions). In other words, the program level impacts are higher when the project level emissions are lower. Therefore, the VOC emission factors representative of the 2010 version of Rule 4570 were also used in the emission calculations for the project level conditions.

The SJVAPCD (2010) provided estimates of the percentage of dairy cattle in the San Joaquin Valley that reside on dairies with 500 milk cows or greater, and therefore would have controlled VOC emissions in accordance with Rule 4570. These percentages were assumed to apply to the project level, program level, and cumulative dairy facilities in the emission calculations. Uncontrolled VOC emission factors were used for cattle on dairies with fewer than 500 milk cows. Tables 5 and 6 of Attachment 1 show how these percentages were applied to the controlled and uncontrolled VOC emission factors to generate consolidated VOC emission factors used in the emission calculations.

The SJVAPCD (2010; 2010b) also provided general assumptions for the surface area of silage piles and total mixed rations, as shown in Tables 7 and 9 of Attachment 1. These assumptions

were used to generate consolidated VOC emission factors for animal feed used in the emission calculations, as shown in Tables 8 and 10 of Attachment 1.

Multiplying the consolidated emission factors (excluding animal feed) by the corresponding cattle populations yields unmitigated annual VOC emission rates of 5,313 tons per year for the project level facilities, 6,470 tons per year for the cumulative facilities, and 1,157 tons per year for the program level facilities (cumulative minus project level).² Tables 11 and 12 of Attachment 1 show the calculation of VOC emissions (excluding animal feed) for the project level and cumulative facilities, respectively.

Similarly, multiplying the consolidated emission factors for animal feed by the exposed surface areas of the silage piles and total mixed rations yields unmitigated annual VOC emission rates of 6,249 tons per year for the project level facilities, 7,610 tons per year for the cumulative facilities, and 1,361 tons per year for the program level facilities (cumulative minus project level). Tables 13 and 14 of Attachment 1 show the calculation of VOC emissions from animal feed for the project level and cumulative facilities, respectively.

NH₃ Emissions

Ammonia emissions from manure decomposition and enteric fermentation were estimated using emission factors by animal type, as provided by the SJVAPCD (2012). The ammonia emission factors are:

	<u>NH₃</u> <u>(lb/head/year)</u>
Milk cows	74.0
Dry cows	37.4
Heifers 15-24 months	19.4
Heifers 7-14 months	13.9
Heifers 4-6 months	10.5
Calves <3 months	3.1

Multiplying these factors by the corresponding animal populations yields unmitigated annual ammonia emission rates of 26,344 tons per year for the project level facilities, 32,084 tons per year for the cumulative facilities, and 5,740 tons per year for the program level facilities (cumulative minus project level). Tables 11 and 12 of Attachment 1 show the calculation of ammonia emissions associated with manure decomposition and enteric fermentation for the project level and cumulative facilities, respectively.

GHG Emissions

Emissions of CH₄ and N₂O from manure decomposition and enteric fermentation were calculated using emission factors provided by the SJVAPCD (2012b). The SJVAPCD derived the emissions factors from the California Air Resources Board's 2000-2008 GHG inventory

² The VOC emissions are considered unmitigated because the control measures assumed in the calculations would be required by SJVAPCD Rule 4570 rather than by CEQA mitigation.

documentation (CARB, 2010). The emission factors are segregated into general categories of manure handling. The emission factors for anaerobic treatment lagoons are:

	<u>CH₄</u> <u>(lb/head/year)</u>	<u>N₂O</u> <u>(lb/head/year)</u>
Milk cows	513.0	1.5
Dry cows	513.0	1.5
Heifers 15-24 months	110.4	1.4
Heifers 7-14 months	110.4	1.4
Heifers 4-6 months	110.4	1.4
Calves <3 months	0.0	0.0

The SJVAPCD also provided GHG emission factors for aerobic lagoons. However, the emission factors for anaerobic treatment lagoons were conservatively used in this study because they are greater than or equal to the aerobic lagoon emission factors for all animal sizes.

The emission factors for manure spreading are:

	<u>CH₄</u> <u>(lb/head/year)</u>	<u>N₂O</u> <u>(lb/head/year)</u>
Milk cows	3.5	0
Dry cows	3.5	0
Heifers 15-24 months	1.6	0
Heifers 7-14 months	1.6	0
Heifers 4-6 months	1.6	0
Calves <3 months	0.0	0

The emission factors for solid manure storage are:

	<u>CH₄</u> <u>(lb/head/year)</u>	<u>N₂O</u> <u>(lb/head/year)</u>
Milk cows	27.7	2.6
Dry cows	27.7	2.6
Heifers 15-24 months	-	-
Heifers 7-14 months	-	-
Heifers 4-6 months	-	-
Calves <3 months	-	-

The emission factors for enteric fermentation are:

	CH ₄ (lb/head/year)	N ₂ O (lb/head/year)
Milk cows	271.5	0
Dry cows	271.5	0
Heifers 15-24 months	151.6	0
Heifers 7-14 months	100.5	0
Heifers 4-6 months	100.5	0
Calves <3 months	0.0	0

The GHG emission factors listed above are summarized in Table 22 of Attachment 1, along with footnotes documenting assumptions made by the SJVAPCD in their development.

Multiplying the CH₄ and N₂O emission factors for manure decomposition and enteric fermentation by the corresponding animal populations and converting to CO₂-equivalent emissions provides unmitigated annual CO₂e emission rates of 6,600,368 metric tons/yr for project level facilities, 8,038,363 metric tons/yr for cumulative facilities, and 1,437,995 metric tons/yr for program level facilities (cumulative minus project level). Tables 23 and 24 of Attachment 1 present the calculation of CH₄ and N₂O emissions from manure decomposition and enteric fermentation for the project level and cumulative facilities, respectively.

2.2 Cattle Housing Fugitive Dust

Unmitigated Emissions

The movement of dairy animals generates fugitive dust emissions. Emissions from animal movement were estimated using emission factors compiled by the San Joaquin Valley Air Pollution Control District (SJVAPCD, 2006). The uncontrolled PM₁₀ emission factors for dairy cattle are:

Milk or Dry Cow – Freestall with Exercise Pens	1.37 lb/head/yr
Milk or Dry Cow – Open Corrals with No Shade Structure	5.46 lb/head/yr
Heifers – Open Corrals with No Shade Structure	10.55 lb/head/yr
Calves – Individual Pens or Open Corrals	1.37 lb/head/yr
Calves – Ground Based Calf Hutches	0.34 lb/head/yr ³

Multiplying the uncontrolled emission factors by the corresponding animal populations yields unmitigated annual PM₁₀ emission rates of 3,048 tons per year for project level facilities, 3,713 tons per year for cumulative facilities, and 664 tons per year for program level facilities (cumulative minus project level). Tables 15 and 18 of Attachment 1 present the calculation of PM₁₀ emissions from cattle housing for the project level and cumulative facilities, respectively.

³ The emission factor for ground based calf hutches assumes a 75 percent reduction in the emission factor for calves in open corrals with no shade structure (SJVAPCD, 2006b).

Mitigated Emissions

The following PM₁₀ mitigation measures would apply to all project level (existing), program level, and cumulative facilities:

- AQ-1: Frequent scraping and/or manure removal using pull type manure harvesting equipment in the morning hours when moisture is in the air (15 percent PM₁₀ reduction for animals in open corrals).
- AQ-2: Feeding young stock (heifers and calves) near dusk (10 percent PM₁₀ reduction for heifers and calves in open corrals)

In addition to the above two measures, the following PM₁₀ mitigation measures would also apply to all program level and cumulative facilities (that is, all new or expanded facilities):

- AQ-3: Shaded areas in open corrals (16.7 percent PM₁₀ reduction for dry cows, and 8.3 percent PM₁₀ reduction for heifers).
- AQ-4: Downwind and upwind shelterbelts (22.5 percent PM₁₀ reduction for all animals).
- AQ-5: Sprinkling of open corrals at least once on a daily basis during the dry months (April through October) (15 percent PM₁₀ reduction for animals in open corrals).

The estimates of mitigation measure effectiveness were provided by the SJVAPCD (2006b).

Mitigation measures AQ-1 and AQ-2 would reduce project level PM₁₀ emissions by 610 tons per year compared to the unmitigated project level emissions. As a result, the mitigated annual PM₁₀ emission rate for project level facilities would be 2,438 tons per year. Tables 16 and 17 of Attachment 1 show the calculation of mitigated PM₁₀ emissions for the project level facilities.

Mitigation measures AQ-1 through AQ-5 would reduce cumulative PM₁₀ emissions by 937 tons per year compared to the unmitigated cumulative emissions. This reduction consists of a 610 ton/year reduction from the existing facilities (subject to mitigation measures AQ-1 and AQ-2) plus an additional 327 ton/year reduction from new or expanded facilities (subject to mitigation measures AQ-1 through AQ-5). The 327 ton/year reduction from new or expanded facilities conservatively assumes that all additional dairy cattle (above the existing population) would be in new facilities. If some of the additional dairy cattle would be in expanded facilities instead of new facilities, the reduction would be greater than 327 ton/year because the additional mitigation measures AQ-3 through AQ-5 would be applied to the entire expanded dairies, including the existing animals at the dairies. In summary, the mitigated annual PM₁₀ emission rate for cumulative facilities would be 2,776 tons per year. Tables 19 and 20 of Attachment 1 show the calculation of mitigated PM₁₀ emissions for the cumulative facilities.

With the implementation of mitigation measures AQ-1 through AQ-5, mitigated program level PM₁₀ emissions would be 338 tons per year, determined by subtracting the mitigated project level emissions from the mitigated cumulative emissions. This total represents a 327 ton/year reduction compared to unmitigated program level emissions.

2.3 PM_{2.5} Emission Estimates

Particulate emission factors are generally provided for total suspended particulate or PM₁₀. The establishment of state and national ambient air quality standards for PM_{2.5} has resulted in increased efforts to develop both emission factors and emission inventories for this portion of the particulate matter spectrum. Both the State of California and U.S. EPA have developed some methods and techniques to address PM_{2.5} emissions, but the state of knowledge regarding emission factors for this pollutant trails that of PM₁₀ by several years.

PM_{2.5} emissions were directly calculated for truck and automobile exhaust, tire wear, and brake wear, because the EMFAC2011 program generates PM_{2.5} emission factors for these sources. PM_{2.5} emissions were also directly calculated for support crop tilling and harvesting dust because the California Air Resources Board emission inventory, upon which the emissions were based, included PM_{2.5}. For all other emission sources, PM_{2.5} emissions were calculated by scaling from PM₁₀ emissions. The fractions of PM₁₀ and PM_{2.5} in particulate matter speciation profiles contained in the *California Emission Inventory and Reporting System* (CEIDARS) were used to develop factors that allow estimated PM_{2.5} emissions to be calculated from PM₁₀ emissions (CARB, 2009). The factors vary by source type, as each source has a unique particulate matter profile. Table 21 of Attachment 1 summarizes the calculation of the PM_{2.5}/PM₁₀ ratio for each source type.

2.4 Diesel Powered Dairy Equipment

During dairy operations, diesel-powered mobile equipment would be used to perform routine tasks at the dairy such as distribution of cattle feed and corral scraping. Annual usage by general equipment type was estimated based on the average usage per animal unit in several recent dairy projects in the San Joaquin Valley.⁴ The following diesel-powered dairy equipment usages were assumed in this study:

	Project Level (thousand hp-hr/yr)	Cumulative (thousand hp-hr/yr)
Dairy Tractor (51-120 hp)	80,653	98,224
Loader (121-175 hp)	54,730	66,654
Feed Mixer Truck (251-500 hp)	87,599	106,684
Standby Generator (251-500 hp)	34	41

Diesel exhaust emission factors for dairy equipment in the San Joaquin Valley Air Basin were derived from the CARB's OFFROAD2007 program (CARB, 2006), and are summarized in Table 25 of Attachment 1. The emission factors are specific to equipment type (e.g., agricultural tractor) and engine size category (e.g., 121-175 hp). Project level emissions were calculated using 2011 emission factors. The use of 2011 emission factors (instead of 2009 emission factors) for project level emissions results in a conservative estimate of program level emissions. Using 2011 emission factors results in slightly lower project level emissions, which in turn results in slightly higher program level emissions (since project level emissions are subtracted from the

⁴ The dairy projects included the Dykstra, Bosman, Hynes, Pinheiro, Rijlaarsdam, Chroman, Kuiper, Lerda Farms, Blanco, and Buena Vista dairies.

cumulative emissions to obtain the program level emissions). Cumulative emissions were calculated using 2022 emission factors.

Multiplying the emission factors by the equipment usage rates and converting to tons/year or metric tons per year provides the following unmitigated emission estimates for the project level facilities:

VOC	183 tons/year
CO	682 tons/year
SO _x	1.5 tons/year
NO _x	1,365 tons/year
PM ₁₀	84 tons/year
PM _{2.5}	77 tons/year
CO ₂ e	127,057 metric tons/year

Similarly, the following unmitigated emissions were estimated for the cumulative facilities:

VOC	97 tons/year
CO	752 tons/year
SO _x	1.8 tons/year
NO _x	596 tons/year
PM ₁₀	30 tons/year
PM _{2.5}	27 tons/year
CO ₂ e	154,522 metric tons/year

Unmitigated program level emissions were estimated by subtracting the project level emissions from the cumulative emissions:

VOC	-86 tons/year
CO	70 tons/year
SO _x	0.3 tons/year
NO _x	-769 tons/year
PM ₁₀	-55 tons/year
PM _{2.5}	-50 tons/year
CO ₂ e	27,465 tons/year

As shown in the above totals, despite the increased usage in dairy equipment associated with the program level facilities, there would be a net reduction in VOC, NO_x, PM₁₀, and PM_{2.5} emissions. The reduction in emissions is due to the declining trend in emission factors in the future due to the gradual replacement of older, dirtier equipment with newer, cleaner equipment over time (fleet turnover).

Tables 26 and 27 in Attachment 1 show the calculation of dairy equipment emissions for the project level and cumulative facilities, respectively.

2.5 Truck and Automobile Trips

Operation of the project dairies and associated cattle ranches would generate a variety of truck trips, including silage trucks, hay trucks, concentrated feed trucks, calf milk replacer trucks, and cattle trucks. In general, the trucks would span two size classifications: medium heavy-duty trucks (14,000-33,000 lbs gross vehicle weight rating [GVWR]) and heavy heavy-duty trucks (33,000-60,000 lbs GVWR). In addition, the dairies would attract light vehicle trips from employees and visitors (veterinarian, breeder, sales, delivery). All employee and visitor trips were conservatively assumed to be light duty trucks ($\leq 5,750$ lbs).

The following vehicle trips and associated vehicle miles travelled (VMT) were estimated for the project level facilities:

	Round Trips (thousand trips/year)	Vehicle Miles Travelled (thousand miles/year)
Medium heavy-duty trucks	629	3,070
Heavy heavy-duty trucks	336	10,890
Light duty trucks	1,511	33,445

The following vehicle trips and associated VMT were estimated for the cumulative facilities:

	Round Trips (thousand trips/year)	Vehicle Miles Travelled (thousand miles/year)
Medium heavy-duty trucks	766	3,738
Heavy heavy-duty trucks	409	13,262
Light duty trucks	1,840	40,732

The EMFAC2011 mobile source emission factor program (CARB, 2012) was used to generate truck and automobile emission factors used in this study. EMFAC2011 is the latest emissions program for California on-road vehicles developed by the California Air Resources Board. Per-mile emission factors for light-duty trucks and heavy-duty agriculture trucks were obtained for a Tulare County representative vehicle fleet. The emission factors are presented in Table 28 of Attachment 1.

All of the emission factors generated by EMFAC2011 include contributions from running exhaust, idle exhaust, and starting exhaust. VOC emission factors also include diurnal, hot soak, and resting losses. PM_{10} and $PM_{2.5}$ emission factors also include tire wear, brake wear, and off-site paved road dust. The off-site paved road dust component is not calculated by EMFAC2011. Instead, Section 13.2.1 of the U.S. EPA's AP-42 document (U.S. EPA, 2011) was used to calculate paved road dust emission factors of 0.73 grams per mile for PM_{10} and 0.18 grams per mile for $PM_{2.5}$. These emission factors are based on an assumed roadway silt loading of 0.2 grams per square meter, which is representative of collector roads (500-5,000 average daily traffic volumes). EMFAC2011 also does not generate emission factors for CH_4 or N_2O . Therefore, emission factors for these pollutants were obtained from Table 13.5 of The Climate Registry's 2012 *Climate Registry Default Emission Factors* (The Climate Registry, 2012).

Project level emissions were calculated using year 2011 emission factors. The use of 2011 emission factors (instead of 2009) for project level emissions results in a conservative estimate of program level emissions. Using 2011 emission factors results in slightly lower project level emissions, which in turn results in slightly higher program level emissions (since project level emissions are subtracted from the cumulative emissions to obtain the program level emissions). Cumulative emissions were calculated using 2022 emission factors.

Multiplying the emission factors by the VMT and converting to tons/year or metric tons per year provides the following unmitigated emission estimates for the project level facilities:

	Heavy Duty <u>Trucks</u>	Employees and <u>Visitors</u>
VOC (tons/year)	14	25
CO (tons/year)	60	211
SO _x (tons/year)	0.2	0.2
NO _x (tons/year)	233	22
PM ₁₀ (tons/year)	22	29
PM _{2.5} (tons/year)	12	8
CO ₂ e (metric tons/year)	23,160	16,012

Similarly, the following unmitigated emissions were estimated for the cumulative facilities:

	Heavy Duty <u>Trucks</u>	Employees and <u>Visitors</u>
VOC (tons/year)	7	10
CO (tons/year)	29	66
SO _x (tons/year)	0.3	0.2
NO _x (tons/year)	75	7
PM ₁₀ (tons/year)	18	35
PM _{2.5} (tons/year)	6	9
CO ₂ e (metric tons/year)	25,365	14,441

Unmitigated program level emissions were estimated by subtracting the project level emissions from the cumulative emissions:

	Heavy Duty <u>Trucks</u>	Employees and <u>Visitors</u>
VOC (tons/year)	-7	-15
CO (tons/year)	-30	-145
SO _x (tons/year)	0.1	0.03
NO _x (tons/year)	-158	-15
PM ₁₀ (tons/year)	-4	6
PM _{2.5} (tons/year)	-6	2
CO ₂ e (metric tons/year)	2,205	-1,571

As shown in the above totals, despite the increased number of trips and VMT associated with the program level facilities, there would be a net reduction in VOC, CO, NO_x, PM₁₀, and PM_{2.5} emissions from heavy duty trucks; and a net reduction in VOC, CO, NO_x, and CO_{2e} emissions from employee and visitor trips. The reduction in emissions is due to the declining trend in emission factors in the future due to the gradual replacement of older, dirtier vehicles with newer, cleaner vehicles meeting stricter emission standards (fleet turnover).

Tables 29 and 30 in Attachment 1 show the calculation of vehicle emissions for the project level and cumulative facilities, respectively.

2.6 Unpaved Road Dust at the Dairy Facilities

During dairy operations, fugitive dust emissions would occur from the movement of vehicles over unpaved roads at the dairies. A PM₁₀ emission factor of 0.369 lb/year per milk cow was obtained from Table 13-1 of the Western Governors' Association's *Western Regional Air Partnership (WRAP) Fugitive Dust Handbook* (Western Governors' Association, 2006).

Multiplying the emission factor by the respective milk cow population yields unmitigated annual PM₁₀ emission rates of 104 tons per year for the project level facilities, 126 tons per year for the cumulative facilities, and 23 tons per year for the program level facilities (cumulative minus project level). Table 31 of Attachment 1 shows the calculation of PM₁₀ emissions from unpaved dairy road dust.

2.7 Dairy Electricity Consumption

Electricity is used at dairies for lighting, operation of the milking equipment, operation of electric pumps for water supply, and other uses. The use of electricity by dairy facilities generates indirect GHG emissions from regional power plants burning fossil fuels. The Climate Registry (2012) provides the following emission factors for electricity consumption in California:

CO ₂	681.01 lb per megawatt-hour (lb/MWh)
CH ₄	0.0283 lb/MWh
N ₂ O	0.0062 lb/MWh

The average electricity usage rate for dairies in the San Joaquin Valley is estimated to be 0.49 MWh/cow/yr, where "cows" in this case include milk cows, dry cows, and heifers. This factor was derived from statistics published by the California Department of Food and Agriculture (2001) and California Energy Commission (2001). Using this factor, the dairy electricity usage is estimated to be 558,577 MWh/yr for project level facilities and 680,271 MWh/yr for cumulative facilities. Multiplying the dairy electricity usage by the above emission factors and converting to CO₂-equivalent emissions provides unmitigated annual CO_{2e} emission rates of 173,188 metric tons/yr for project level facilities, 210,919 metric tons/yr for cumulative facilities, and 37,732 metric tons/yr for program level facilities (cumulative minus project level).

Tables 32 and 33 of Attachment 1 present the derivation of the average electricity usage rate for dairies in the San Joaquin Valley. Table 34 presents the calculation of GHG emissions from dairy electricity use.

2.8 Dairy Refrigeration

The project dairies would refrigerate milk prior to pickup by milk trucks. According to the California Climate Action Registry (CCAR 2009), HFC-23 and HFC-134a are commonly used in industrial refrigerants. Of the two refrigerants, HFC-23 has the higher global warming potential of 11,700 and was therefore used in the emission calculations to be conservative. By comparison, HFC-134a has a global warming potential of 1,300.

The Climate Registry (2008) lists a default upper bound annual refrigerant loss rate of 25 percent for industrial refrigeration. The total refrigerant charge was estimated to be 48,072 lb for the project level facilities and 58,545 lb for the cumulative facilities, assuming the same ratio of refrigerant charge to milk cow herd size from a representative dairy in the San Joaquin Valley (Provost & Pritchard, 2008). Multiplying the refrigerant charge by the annual loss rate and converting to CO₂e produces unmitigated annual CO₂e emission rates of 63,780 metric tons/year for the project level facilities, 77,676 metric tons/year for the cumulative facilities, and 13,896 metric tons/year for the program level facilities (cumulative minus project level).

Table 35 of Attachment 1 presents the calculation of GHG emissions from milk refrigeration.

2.9 Support Crop Farm Equipment

The emission calculations for farm equipment exhaust were based on general emission factors for agricultural equipment in Tulare County. To derive the general emission factors, the California Air Resources board emission factor program, OFFROAD2007, was used to calculate annual emission inventories for all agricultural equipment in Tulare County (CARB, 2006). The county-wide emission inventories were then divided by the most recent estimate of the harvested agricultural acreage in Tulare County, as provided by the U.S. Department of Agriculture (USDA, 2009), to produce the emission factors in terms of lb/year per acre of agricultural land. Tables 36 and 37 of Attachment 1 show the development of the general emission factors for farm equipment in Tulare County.

Project level emissions were calculated using 2011 emission factors. The use of 2011 emission factors (instead of 2009 emission factors) for project level emissions results in a conservative estimate of program level emissions. Using 2011 emission factors results in slightly lower project level emissions, which in turn results in slightly higher program level emissions (since project level emissions are subtracted from the cumulative emissions to obtain the program level emissions). Cumulative emissions were calculated using 2022 emission factors.

Multiplying the emission factors by an estimated support crop area of 160,839 acres and converting to tons/year or metric tons per year provides the following unmitigated emission rates for the project level facilities:

VOC	40 tons/year
CO	166 tons/year
SO _x	0.5 tons/year
NO _x	403 tons/year
PM ₁₀	16 tons/year
PM _{2.5}	15 tons/year
CO ₂ e	38,137 metric tons/year

Multiplying the emission factors by an estimated support crop area of 195,880 acres and converting to tons/year or metric tons per year provides the following unmitigated emission rates for the cumulative facilities:

VOC	21 tons/year
CO	182 tons/year
SO _x	0.6 tons/year
NO _x	157 tons/year
PM ₁₀	6 tons/year
PM _{2.5}	6 tons/year
CO ₂ e	46,414 metric tons/year

Unmitigated program level emissions were estimated by subtracting the project level emissions from the cumulative emissions:

VOC	-19 tons/year
CO	17 tons/year
SO _x	0.1 tons/year
NO _x	-245 tons/year
PM ₁₀	-10 tons/year
PM _{2.5}	-9 tons/year
CO ₂ e	8,278 metric tons/year

As shown in the above totals, despite the 35,041 additional acres of support crops associated with the program level facilities, there would be an overall net reduction in VOC, NO_x, PM₁₀, and PM_{2.5} emissions. The reduction in emissions is due to the declining trend in emission factors in the future due to the gradual replacement of older, dirtier equipment with newer, cleaner equipment over time (fleet turnover).

Table 38 of Attachment 1 shows the calculation of farm equipment emissions associated with dairy support crops.

2.10 Support Crop Fugitive Dust from Tilling and Harvesting

The PM₁₀ and PM_{2.5} emission calculations from tilling and harvesting of dairy support crops were based on general emission factors for Tulare County. To derive the general emission factors, the county-wide emissions from tilling and harvesting in Tulare County were obtained from the California Air Resources Board emission inventory data (CARB, 2009b). The county-wide emission inventories were then divided by the most recent estimate of the harvested

agricultural acreage in Tulare County, as provided by the U.S. Department of Agriculture (USDA, 2009), to produce the emission factors in terms of lb/year per acre of agricultural land. The resulting emission factors for tilling are 4.51 lb/yr/acre for PM₁₀ and 0.68 lb/yr/acre for PM_{2.5}. The resulting emission factors for harvesting are 3.74 lb/yr/acre for PM₁₀ and 0.56 lb/yr/acre for PM_{2.5}. Table 39 of Attachment 1 shows the development of the general emission factors for tilling and harvesting in Tulare County.

Multiplying the emission factors by an estimated support crop area of 160,839 acres and converting to tons/year provides the following unmitigated emission rates (tilling plus harvesting) for the project level facilities:

PM ₁₀	663 tons/year
PM _{2.5}	99 tons/year

Multiplying the emission factors by an estimated support crop area of 195,880 acres and converting to tons/year provides the following unmitigated emission rates (tilling plus harvesting) for the cumulative facilities:

PM ₁₀	808 tons/year
PM _{2.5}	121 tons/year

Unmitigated program level emissions were estimated by subtracting the project level emissions from the cumulative emissions:

PM ₁₀	145 tons/year
PM _{2.5}	22 tons/year

Table 40 of Attachment 1 shows the calculation of tilling and harvesting emissions from dairy support crops.

2.11 Support Crop Wind Erosion

Wind blowing across exposed farmland results in particulate matter emissions. The methodology used to estimate emissions was developed by the California Air Resources Board as part of the statewide emissions inventory (CARB, 1997b). PM₁₀ emissions from windblown dust were calculated by multiplying the number of support crop acres by an emission factor of 0.002347 tons/acre/year for non-pasture agricultural lands in Tulare County. Multiplying the emission factor by the corresponding support crop acreages provides unmitigated PM₁₀ emission rates of 377 tons per year for the project level facilities, 460 tons per year for the cumulative facilities, and 82 tons per year for the program level facilities (cumulative minus project level).

Table 41 of Attachment 1 shows the calculation of wind erosion emissions from support crops.

2.12 Support Crop Unpaved Road Dust

Unpaved road dust emissions from support crops were estimated using methodology developed by the California Air Resources Board as part of the statewide emissions inventory (CARB,

1997). The method utilizes an assumed mileage accrual rate of 4.38 vehicle miles traveled (VMT) per acre per year for agricultural lands, and a PM₁₀ emission factor of 2.27 lb/VMT to estimate annual emissions. The resulting unmitigated PM₁₀ emission rates are 799 tons per year for the project level facilities, 973 tons per year for the cumulative facilities, and 174 tons per year for the program level facilities (cumulative minus project level).

Table 42 of Attachment 1 shows the calculation of unpaved road dust emissions from support crops.

2.13 Support Crop GHG Emissions from Agricultural Soil

Various agricultural soil management practices contribute to greenhouse gas emissions. The use of synthetic and organic fertilizers adds nitrogen to soils, thereby increasing natural emissions of N₂O. Emissions of N₂O from support crop agricultural soil were calculated using an equation developed by the United Nations Framework Convention on Climate Change (UNFCCC, 2006). The equation estimates N₂O emissions due to direct emissions from soils, indirect emissions from runoff, and indirect emissions from volatilization and subsequent conversion to N₂O.

For the purpose of calculating N₂O emissions, all support crop acreage (160,839 acres for project level facilities and 195,880 acres for cumulative facilities) was assumed to accommodate two summer crops of corn silage and one winter crop of alfalfa. This assumption is conservative because either fewer summer crops or another type of winter crop (such as wheat silage) would require less nitrogen and therefore produce fewer N₂O emissions. Based on the support crop acreages and assumed crop types, the project level support crops would require 78,811 ton/yr of nitrogen in fertilizer, and the cumulative support crops would require 95,981 ton/yr of nitrogen in fertilizer. Applying these nitrogen quantities to the UNFCCC equation and converting to CO₂-equivalent emissions provides unmitigated CO₂e emission rates of 844,615 metric tons/yr for the project level facilities, 1,028,627 metric tons/yr for the cumulative facilities, and 184,013 metric tons/yr for the program level facilities (cumulative minus project level).

Tables 43 and 44 of Attachment 1 present the calculation of GHG emissions from support crop agricultural soil.

2.14 Support Crop Electricity Consumption

The use of electricity by agricultural irrigation pumps for support crops generates indirect GHG emissions from regional power plants burning fossil fuels. The Climate Registry (2012) provides the following emission factors for electricity consumption in California:

CO ₂	681.01 lb per megawatt-hour (lb/MWh)
CH ₄	0.0283 lb/MWh
N ₂ O	0.0062 lb/MWh

The average electricity usage rate for agricultural irrigation pumps in the San Joaquin Valley is estimated to be 1.59 MWh/acre/yr. This factor was derived from statistics published by the USDA (2002), California Energy Commission (2001), and CARB (2003). Using this factor, the

electricity usage for farmland irrigation is estimated to be 256,086 MWh/yr for project level facilities and 311,879 MWh/yr for cumulative facilities.

Multiplying the farmland electricity usage by the above emission factors and converting to CO₂-equivalent emissions provides unmitigated CO₂e emission rates of 79,400 metric tons/yr for project level facilities, 96,698 metric tons/yr for cumulative facilities, and 17,299 metric tons/yr for program level facilities (cumulative minus project level).

Tables 45 and 46 of Attachment 1 present the derivation of the average electricity usage rate for irrigation pumps in the San Joaquin Valley. Table 47 presents the calculation of GHG emissions from farmland irrigation.

3. Construction Emissions

Construction of the new and expanded dairies associated with the program level facilities would generate emissions from off-road construction equipment, on-road trucks and worker vehicles, and fugitive dust during grading. These emissions would occur over a 10-year planning horizon, ending in 2022.

Vehicle exhaust emissions during construction were estimated based on prior construction emission calculations that were conducted for the proposed FM Jerseys Dairy in Tulare County. The 2008 technical report is provided in Attachment 2. The emission factors for on-road and off-road construction vehicles in the FM Jerseys study were generated by the Urbemis 2007 program (Rimpo and Associates, 2008) and are representative of year 2007. Therefore, the use of this study to estimate future construction emissions, up to year 2022, is conservative because vehicle emission factors will gradually decrease over time due to normal vehicle fleet turnover.

Fugitive dust emissions from site grading were estimated using an emission factor of 0.11 tons/acre per month, from the *WRAP Fugitive Dust Handbook* (Western Governors' Association, 2006). Grading was assumed to occur over 5 acres of actively disturbed land each day for six months for a single new or expanded dairy project.

Based on the emission estimates described above, the total unmitigated construction emissions for a single new or expanded dairy project were assumed to be:

VOC	0.8 tons per dairy
CO	3.8 tons per dairy
SO _x	0.0 tons per dairy
NO _x	7.2 tons per dairy
PM ₁₀	3.7 tons per dairy
PM _{2.5}	0.8 tons per dairy
CO ₂ e	597 metric tons per dairy

According to the project level (existing) facility data used in this study, there is an average of 1,674 milk cows per dairy in Tulare County (562,616 milk cows in 336 existing dairies). Therefore, the above construction emissions were assumed to occur the equivalent of once for every 1,674 new milk cows associated with the program level cattle population. Scaling to the

additional 122,575 milk cows assumed for the program level facilities, and averaging over a 10 year planning horizon, gives the following unmitigated annual construction emissions:

VOC	6 tons per year
CO	27 tons per year
SO _x	0 tons per year
NO _x	52 tons per year
PM ₁₀	27 tons per year
PM _{2.5}	6 tons per year
CO _{2e}	4,370 tons per year

These construction emissions are assumed to occur every year for 10 years as the program level facilities would be constructed.

The derivation of the average annual construction emissions for program level facilities is summarized in Table 48 of Attachment 1.

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Attachment 1

Air Quality Calculation Worksheets Tables 1 through 48

Table 1. Tulare County Dairy Animal Population - Project Level (Existing Facilities)

Animal Type	No. of Head
Milk Cows	562,616
Dry Cows & Springers	84,069
Heifers (15-24 months)	223,852
Heifers (7-14 months)	179,082
Heifers (3-6 months)	89,541
Calves (0-2 months)	44,770
Total	1,183,930

Note: 5 percent of the heifers and 95 percent of the calves listed in this table are assumed to be located in heifer and calf ranches.

Table 2. Tulare County Dairy Animal Population - Cumulative (10 Year Horizon)

Animal Type	No. of Head
Milk Cows	685,191
Dry Cows & Springers	102,385
Heifers (15-24 months)	272,622
Heifers (7-14 months)	218,098
Heifers (3-6 months)	109,049
Calves (0-2 months)	54,524
Total	1,441,868

Note: 5 percent of the heifers and 95 percent of the calves listed in this table are assumed to be located in heifer and calf ranches.

Table 3. Derivation of VOC Emission Factors for Milk Cows at Dairies Subject to Rule 4570 v. 2010

Emission Source Description	Milk Cow Uncontrolled VOC Emission Factor	Feed					Silage				Milking Parlor	Freestalls		Corrals							Solid Manure	Liquid Manure	Land Application		Milk Cow Controlled VOC Emission Factor
		Feed according to NRC Guidelines	Push feed to within 3 feet of feed bunk fence line	Feed high moisture corn or steam-flaked corn	Store grain in weatherproof structure October-May	Feed/ dispose rations within 48 hours	Cover silage pile	Density: high moisture harvest, ≤1/2" chop, 56" uncompacted top, cover within 72 hrs	Total exposed surface area of all silage piles <4,300 feet	Silage inoculation	Flush parlor after each milking	FURST, scrape, or vacuum freestall flush lanes with each milking	Rate, harrow, scrape, or grade freestall bedding ≤14 days	Clean corrals at least once April-July and October-December	Clean corrals at least once for mature cows, weekly for support stock	Depth of waste not exceed 12" in corral	Maintain corrals to ensure proper drainage	Inspect & repair water pipes & trough every 14 days	Install shades uphill of corrals	Cover dry animal waste piles October-May	Remove solids with separator	Incorporate solid manure within 72 hours of land application	Don't allow liquid manure to stand in field >24 hours		
Implemented Control Measures:		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes ³	Yes	Yes	Yes	Yes			
Dairy (excluding feed)		(lb/hd-yr)	Emission Factor Multipliers																				(lb/hd-yr)		
Enteric Emissions		4.32	0.9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3.89	
Milking Parlor		0.04	0.9	1	1	1	1	1	1	1	0.9	1	1	1	1	1	1	1	1	1	1	1	1	0.03	
Freestall Lanes		0.84	0.9	1	1	1	1	1	1	1	0.9	1	1	1	1	1	1	1	1	1	1	1	1	0.68	
Freestall Beds		1.05	0.9	1	1	1	1	1	1	1	1	0.9	1	1	1	1	1	1	1	1	1	1	1	0.85	
Corrals/Pens		10.00	0.9	1	1	1	1	1	1	1	1	1	1	0.9	0.9	0.9	0.9	0.9	0.935	1	1	1	1	4.97	
Liquid Manure Handling		1.52	0.9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	1	1	1.23	
Liquid Manure Land Application		1.64	0.9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	1	1.33	
Solid Manure Land Application		0.39	0.9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	1	0.32	
Separated Solids Piles		0.06	0.9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.05	
Solid Manure Storage		0.16	0.9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	1	1	1	0.13	
Total, Dairy (excluding feed)		20.0																					13.5		
Animal Feed		(µg/m ² -min)	Emission Factor Multipliers																				(µg/m ² -min)		
Silage Pile - Corn		38,534	1	1	1	1	1	0.9	0.75	0.9	0.9	1	1	1	1	1	1	1	1	1	1	1	1	21,068	
Silage Pile - Alfalfa		19,398	1	1	1	1	1	0.9	0.75	0.9	0.9	1	1	1	1	1	1	1	1	1	1	1	1	10,606	
Silage Pile - Wheat		48,716	1	1	1	1	1	0.9	0.75	0.9	0.9	1	1	1	1	1	1	1	1	1	1	1	1	26,635	
Total Mixed Rations (TMR)		14,507	1	0.9	0.9	1	0.9	1	0.9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	9,518	

Notes:

1. This table represents dairies subject to the 2010 version of SJVACPD Rule 4570 (Confined Animal Facilities). This includes dairies with 500 milk cows or greater.
2. Source for table: SJVAPCD, *Final Draft Staff Report with Appendices for Amended Revised Proposed Amendments to Rule 4570. Appendix B: Baseline Emission Inventory and Emission Reductions*. October 21, 2010.
3. The SJVAPCD assumes only a portion of the dairies will have this control measure (Install Shades Uphill of Corrals).

Table 4. Summary of VOC Emission Factors by Animal Type and Animal Feed

Emission Source	Manure Production Rate	VOC Emission Factors		
		Uncontrolled Dairies	Dairies Subject to Rule 4570 v. 2006	Dairies Subject to Rule 4570 v. 2010
Dairy (excluding feed)	(lb/day/hd)	(lb/hd-yr)	(lb/hd-yr)	(lb/hd-yr)
Milk Cows	150	20.0	15.8	13.5
Dry Cows & Springers	83	11.1	8.7	7.5
Heifers (15-24 months)	55	7.3	5.8	5.0
Heifers (7-14 months)	38	5.1	4.0	3.4
Heifers (4-6 months)	21	2.8	2.2	1.9
Calves (<3 months)	12	1.6	1.3	1.1
Animal Feed		($\mu\text{g}/\text{m}^2\text{-min}$)	($\mu\text{g}/\text{m}^2\text{-min}$)	($\mu\text{g}/\text{m}^2\text{-min}$)
Silage Pile - Corn		38,534	34,681	21,068
Silage Pile - Alfalfa		19,398	17,458	10,606
Silage Pile - Wheat		48,716	43,844	26,635
Total Mixed Rations (TMR)		14,507	13,056	9,518

Notes:

1. Source for Manure Production Rates: SJVAPCD, personal communication with Ramon Norman, 2/27/2012.
2. Emission factors for support stock are scaled from the milk cow emission factors according to manure production rates.
3. Assumes animals are Holsteins (1,400 lb mature weight).

Table 5. San Joaquin Valley Dairy Animal Population Percentages by Dairy Size Category

Animal Type	Dairy Size Category (No. Milk Cows)			
	< 300	300-499	500-999	≥ 1000
Milk Cows	2.7%	6.9%	20.4%	70.0%
Dry Cows & Springers	2.6%	6.8%	20.3%	70.3%
Heifers (15-24 months)	2.4%	6.4%	19.5%	71.6%
Heifers (7-14 months)	2.5%	6.5%	19.8%	71.2%
Heifers (4-6 months)	2.8%	6.3%	19.5%	71.4%
Calves (<3 months)	2.6%	6.6%	19.6%	71.2%

Source: SJVAPCD, *Final Draft Staff Report with Appendices for Amended Revised Proposed Amendments to Rule 4570. Appendix B: Baseline Emission Inventory and Emission Reductions*. October 21, 2010. Table 4.

Table 6. Derivation of Consolidated VOC Emission Factors for Manure Decomposition and Enteric Fermentation

Animal Type	Conditions During Rule 4570 v. 2006		Conditions During Rule 4570 v. 2010	
	Percent of Animals in SJV Dairies Subject to Rule 4570 v. 2006	Consolidated VOC Emission Factor (lb/hd/yr)	Percent of Animals in SJV Dairies Subject to Rule 4570 v. 2010	Consolidated VOC Emission Factor (lb/hd/yr)
Milk Cows	70.0%	17.1	90.4%	14.1
Dry Cows & Springers	70.3%	9.4	90.5%	7.8
Heifers (15-24 months)	71.6%	6.2	91.2%	5.2
Heifers (7-14 months)	71.2%	4.3	91.0%	3.6
Heifers (4-6 months)	71.4%	2.4	90.9%	2.0
Calves (<3 months)	71.2%	1.4	90.8%	1.1

Note: The consolidated VOC emission factors assume that Rule 4570 v. 2006 applies to dairies with ≥1000 milk cows, and Rule 4570 v. 2010 applies to dairies with ≥ 500 milk cows. Dairies not subject to Rule 4570 are assumed to be uncontrolled.

Table 7. San Joaquin Valley Dairy Silage Pile Surface Area by Dairy Size Category

Dairy Size Category (No. Milk Cows)	Percentage of Dairies	Size of Silage Pile - Corn (m2/dairy)	Size of Silage Pile - Alfalfa (m2/dairy)	Size of Silage Pile - Wheat (m2/dairy)
< 300	14%	44.59	0	0
300-499	18%	102	24	102
500-999	31%	102	24	102
≥ 1000	37%	225	24	225

Source: SJVAPCD, *Final Draft Staff Report with Appendices for Amended Revised Proposed Amendments to Rule 4570. Appendix B: Baseline Emission Inventory and Emission Reductions*. October 21, 2010. Pages B-7 and B-8.

Table 8. Derivation of Consolidated VOC Emission Factor for Silage Piles Conditions During Rule 4570 v. 2010

Dairy Size Category (No. Milk Cows)	VOC Emission Factor ($\mu\text{g}/\text{m}^2\text{-min}$)			VOC Emission Factor (lb/yr/dairy)				Consolidated VOC Emission Factor (lb/yr/milk cow)
	Corn	Alfalfa	Wheat	Corn	Alfalfa	Wheat	Total	
< 300	38,534	19,398	48,716	1,991	0	0	1,991	2.07
300-499	38,534	19,398	48,716	4,554	539	5,758	10,852	11.30
500-999	21,068	10,606	26,635	2,490	295	3,148	5,933	6.18
≥ 1000	21,068	10,606	26,635	5,493	295	6,944	12,732	13.26
San Joaquin Valley Average (weighted by percent of dairies in each size category)							8,797	9.16

Notes:

1. The VOC emission factors assume that Rule 4570 v. 2010 applies to dairies with ≥500 milk cows, and all other dairies are uncontrolled.
2. The VOC emission factor (per dairy) was converted to (per milk cow) by multiplying by the ratio of the number of dairies (1,331) to milk cows (1,277,678) in the San Joaquin Valley in 2008. Source: SJVAPCD, *Final Draft Staff Report with Appendices for Amended Revised Proposed Amendments to Rule 4570. Appendix B: Baseline Emission Inventory and Emission Reductions*. October 21, 2010. Pages B-5 and B-7. As a result, the consolidated VOC emission factor per milk cow is inclusive of all animal types.

Table 9. Surface Area Factors for Total Mixed Rations (TMR)

Animal Type	Surface Area Factor (m ² /hd)
Milk Cows	0.658
Dry Cows & Springers	0.658
Heifers (15-24 months)	0.658
Heifers (7-14 months)	0.282
Heifers (4-6 months)	0.125
Calves (<3 months)	0.000

Source for surface area factors: SJVAPCD, Personal communication with Ramon Norman. 10/28/2010.

Table 10. Derivation of Consolidated VOC Emission Factors for Total Mixed Rations (TMR)

Animal Type	Conditions During Rule 4570 v. 2006		Conditions During Rule 4570 v. 2010	
	Percent of Animals in SJV Dairies Subject to Rule 4570 v. 2006	Consolidated VOC Emission Factor (µg/m ² -min)	Percent of Animals in SJV Dairies Subject to Rule 4570 v. 2010	Consolidated VOC Emission Factor (µg/m ² -min)
Milk Cows	70.0%	13,491	90.4%	9,998
Dry Cows & Springers	70.3%	13,487	90.5%	9,991
Heifers (15-24 months)	71.6%	13,468	91.2%	9,959
Heifers (7-14 months)	71.2%	13,474	91.0%	9,968
Heifers (4-6 months)	71.4%	13,472	90.9%	9,972
Calves (<3 months)	71.2%	13,474	90.8%	9,976

Note: The consolidated VOC emission factors assume that Rule 4570 v. 2006 applies to dairies with ≥1000 milk cows, and Rule 4570 v. 2010 applies to dairies with ≥ 500 milk cows. Dairies not subject to Rule 4570 are assumed to be uncontrolled.

**Table 11. VOC and NH₃ Emissions Associated with Manure Decomposition and Enteric Fermentation
Project Level (Existing Facilities)**

Animal Type	No. of Animals	VOC Emission Factor (lb/hd/yr)	NH ₃ Emission Factor (lb/hd/yr)	Annual Emissions (ton/yr)	
				VOC	NH ₃
Milk Cows	562,616	14.1	74.0	3,974	20,817
Dry Cows & Springers	84,069	7.8	37.4	328	1,572
Heifers (15-24 months)	223,852	5.2	19.4	578	2,171
Heifers (7-14 months)	179,082	3.6	13.9	320	1,245
Heifers (4-6 months)	89,541	2.0	10.5	88	470
Calves (<3 months)	44,770	1.1	3.1	25	69
Total	1,183,930			5,313	26,344

Notes:

1. Dairies with ≥500 milk cows are assumed to be in compliance with SJVAPCD Rule 4570 v. 2010, and all other dairies are assumed to be uncontrolled. This assumption is conservative in that it maximizes the program level impacts (i.e., future cumulative emissions minus existing project level emissions).
2. Source for NH₃ emission factors: SJVAPCD, personal communication with Ramon Norman, 2/27/2012.

**Table 12. VOC and NH₃ Emissions Associated with Manure Decomposition and Enteric Fermentation
Cumulative (10 Year Horizon)**

Animal Type	No. of Animals	VOC Emission Factor (lb/hd/yr)	NH ₃ Emission Factor (lb/hd/yr)	Annual Emissions (ton/yr)	
				VOC	NH ₃
Milk Cows	685,191	14.1	74.0	4,839	25,352
Dry Cows & Springers	102,385	7.8	37.4	400	1,915
Heifers (15-24 months)	272,622	5.2	19.4	703	2,644
Heifers (7-14 months)	218,098	3.6	13.9	389	1,516
Heifers (4-6 months)	109,049	2.0	10.5	108	573
Calves (<3 months)	54,524	1.1	3.1	31	85
Total	1,441,868			6,470	32,084

Notes:

1. Future conditions assume that dairies with ≥ 500 milk cows would be subject to Rule 4570 v. 2010, and all other dairies would be uncontrolled.
2. Source for NH₃ emission factors: SJVAPCD, personal communication with Ramon Norman, 2/27/2012.

**Table 13. VOC Emissions Associated with Animal Feed
Project Level (Existing Facilities)**

Animal Type	No. of Animals	Total Mixed Rations Surface Area (m2)	VOC Emission Factor		Annual Emissions (ton/yr)		
			Silage Piles (lb/yr/milk cow)	Total Mixed Rations (µg/m2- min)	Silage Piles	Total Mixed Rations	Total
Milk Cows	562,616	370,201	9.16	9,998	2,578	2,144	4,722
Dry Cows & Springers	84,069	55,317	--	9,991	--	320	320
Heifers (15-24 months)	223,852	147,295	--	9,959	--	850	850
Heifers (7-14 months)	179,082	50,501	--	9,968	--	292	292
Heifers (4-6 months)	89,541	11,193	--	9,972	--	65	65
Calves (<3 months)	44,770	0	--	9,976	--	0	0
Total	1,183,930	634,507			2,578	3,671	6,249

Notes:

1. Dairies with ≥500 milk cows are assumed to be in compliance with SJVAPCD Rule 4570 v. 2010, and all other dairies are assumed to be uncontrolled. This assumption is conservative in that it maximizes the program level impacts (i.e., future cumulative emissions minus existing project level emissions).
2. The emission factor for milk cows for silage piles is inclusive of all animal types.

**Table 14. VOC Emissions Associated with Animal Feed
Cumulative (10 Year Horizon)**

Animal Type	No. of Animals	Total Mixed Rations Surface Area (m2)	VOC Emission Factor		Annual Emissions (ton/yr)		
			Silage Piles (lb/yr/milk cow)	Total Mixed Rations (µg/m2- min)	Silage Piles	Total Mixed Rations	Total
Milk Cows	685,191	450,856	9.16	9,998	3,140	2,612	5,751
Dry Cows & Springers	102,385	67,369	--	9,991	--	390	390
Heifers (15-24 months)	272,622	179,385	--	9,959	--	1,035	1,035
Heifers (7-14 months)	218,098	61,504	--	9,968	--	355	355
Heifers (4-6 months)	109,049	13,631	--	9,972	--	79	79
Calves (<3 months)	54,524	0	--	9,976	--	0	0
Total	1,441,868	772,745			3,140	4,471	7,610

Notes:

1. Future conditions assume that dairies with ≥ 500 milk cows would be subject to Rule 4570 v. 2010, and all other dairies would be uncontrolled.
2. The emission factor for milk cows for silage piles is inclusive of all animal types.

**Table 15. Uncontrolled Cattle Dust Emissions
Project Level (Existing Facilities)**

Animal Type	Type of Housing ^a	No. of Animals	PM ₁₀ Emission Factor (lb/hd/yr) ^b	PM _{2.5} Emission Factor (lb/hd/yr) ^d	Annual Emissions (ton/yr)	
					PM ₁₀	PM _{2.5}
Milk & Dry Cows	Freestall with exercise pens	646,685	1.37	0.16	443	51
Milk & Dry Cows	Open corrals with no shade structure		5.46	0.62	0	0
Heifers	Open corrals with no shade structure	492,475	10.55	1.20	2,598	297
Calves (<3 mos.)	Open corrals with no shade structure		1.37	0.16	0	0
Calves (<3 mos.)	Calf hutches - ground based ^c	44,770	0.34	0.039	8	1
Calves (<3 mos.)	Calf hutches - grates and flushed ^c		0.069	0.0078	0	0
Total		1,183,930			3,048	348

^a The types of housing listed in this table represent the types for which the SJVAPCD provides uncontrolled (worst case) PM₁₀ emission factors.

^b Source: SJVAPCD, "Dairy and Feedlot PM₁₀ Emissions Factors." Office Memo. April 12, 2006.

^c Source: SJVAPCD, "Dairy/Feedlot PM10 Mitigation Practices and their Control Efficiencies." Office Memo from Sheraz Gill to Permit Services Staff. April 18, 2006. Calf hutch control efficiencies of 75% for ground based and 95% for grated flushed were applied to the emission factor for open corrals.

^d The PM_{2.5} emission factor is scaled from the PM₁₀ factor according to the relative emission rate for livestock operations as reported in CARB, *California Emission Inventory and Reporting System (CEIDARS)*, 2009.

Table 16. PM10 Mitigation Measures Applied to Cattle Dust Emissions - Project Level (Existing Facilities)

Animal Type	Type of Housing	No. of Animals	Control Measure Effectiveness ^{a,b}						Annual PM10 Emission Reductions (ton/yr)
			Frequent Scraping in a.m.	Feed Young Stock Near Dusk				Total - All Measures Combined	
Milk & Dry Cows	Freestalls	646,685						0.0%	0
Milk & Dry Cows	Open corrals	0	15%					15.0%	0
Heifers	Open corrals	492,475	15%	10%				23.5%	-610
Calves	Open corrals	0	15%	10%				23.5%	0
Calves	Calf hutches - ground	44,770						0.0%	0
Calves	Calf hutches - grates	0						0.0%	0
Total		1,183,930							-610

^a Source: SJVAPCD, "Dairy/Feedlot PM10 Mitigation Practices and their Control Efficiencies." Office

Memo from Sheraz Gill to Permit Services Staff. April 18, 2006.

^b The mitigation measures would be applied to all existing dairies.

**Table 17. Mitigated Cattle Dust Emissions
Project Level (Existing Facilities)**

Animal Type	Type of Housing	Annual PM10 Emissions (ton/yr)			Annual PM2.5 Emissions (ton/yr)		
		Before Controls	Control Measure Reductions	After Controls	Before Controls	Control Measure Reductions	After Controls
Milk & Dry Cows	Freestalls	443	0	443	51	0	51
Milk & Dry Cows	Open corrals	0	0	0	0	0	0
Heifers	Open corrals	2,598	-610	1,987	297	-70	227
Calves	Open corrals	0	0	0	0	0	0
Calves	Calf hutches - ground	8	0	8	1	0	1
Calves	Calf hutches - grates	0	0	0	0	0	0
Total		3,048	-610	2,438	348	-70	278

**Table 18. Uncontrolled Cattle Dust Emissions
Cumulative (10 Year Horizon)**

Animal Type	Type of Housing ^a	No. of Animals	PM ₁₀ Emission Factor (lb/hd/yr) ^b	PM _{2.5} Emission Factor (lb/hd/yr) ^d	Annual Emissions (ton/yr)	
					PM ₁₀	PM _{2.5}
Milk & Dry Cows	Freestall with exercise pens	787,576	1.37	0.16	539	62
Milk & Dry Cows	Open corrals with no shade structure		5.46	0.62	0	0
Heifers	Open corrals with no shade structure	599,768	10.55	1.20	3,164	361
Calves (<3 mos.)	Open corrals with no shade structure		1.37	0.16	0	0
Calves (<3 mos.)	Calf hutches - ground based ^c	54,524	0.34	0.039	9	1
Calves (<3 mos.)	Calf hutches - grates and flushed ^c		0.069	0.0078	0	0
Total		1,441,868			3,713	424

^a The types of housing listed in this table represent the types for which the SJVAPCD provides uncontrolled (worst case) PM₁₀ emission factors.

^b Source: SJVAPCD, "Dairy and Feedlot PM₁₀ Emissions Factors." Office Memo. April 12, 2006.

^c Source: SJVAPCD, "Dairy/Feedlot PM10 Mitigation Practices and their Control Efficiencies." Office Memo from Sheraz Gill to Permit Services Staff. April 18, 2006. Calf hutch control efficiencies of 75% for ground based and 95% for grated flushed were applied to the emission factor for open corrals.

^d The PM_{2.5} emission factor is scaled from the PM₁₀ factor according to the relative emission rate for livestock operations as reported in CARB, *California Emission Inventory and Reporting System (CEIDARS)*, 2009.

Table 19. PM₁₀ Mitigation Measures Applied to Cattle Dust Emissions - New and Expanded Facilities

Animal Type	Type of Housing	Additional No. of Animals Relative to Existing Conditions	Control Measure Effectiveness ^{a,b}						Additional Annual PM10 Emission Reductions Relative to Mitigated Existing Conditions (ton/yr)
			Frequent Scraping in a.m.	Feed Young Stock Near Dusk	Corral Shades	Downwind & Upwind Shelterbelts	Corral Sprinkling	Total - All Measures Combined	
Milk & Dry Cows	Freestalls	140,891				22.5%		22.5%	-22
Milk & Dry Cows	Open corrals	0	15%		16.7%	22.5%	15%	53.4%	0
Heifers	Open corrals	107,293	15%	10%	8.3%	22.5%	15%	53.8%	-304
Calves	Open corrals	0	15%	10%	8.3%	22.5%	15%	53.8%	0
Calves	Calf hutches - ground	9,754				22.5%		22.5%	0
Calves	Calf hutches - grates	0				22.5%		22.5%	0
Total		257,938							-327

^a Source: SJVAPCD, "Dairy/Feedlot PM10 Mitigation Practices and their Control Efficiencies." Office

Memo from Sheraz Gill to Permit Services Staff. April 18, 2006.

^b The first two mitigation measures (frequent scraping in the a.m. and feed young stock near dusk) would be applied to all dairies, including existing dairies. The remaining three mitigation measures (corral shades, downwind and upwind shelterbelts, and corral sprinkling) would be applied only to new or expanded dairies. The emission reductions in this table conservatively assume that all new animals (relative to existing conditions) would be in new dairies rather than expanded dairies. The emission reductions would be greater than what is shown in this table if some of the new animals would be in expanded dairies, because the mitigation measures would be applied to the entire expanded dairies and therefore would also reduce emissions from the existing animal population in addition to the new animals.

**Table 20. Mitigated Cattle Dust Emissions
Cumulative (10 Year Horizon)**

Animal Type	Type of Housing	Annual PM10 Emissions (ton/yr)			Annual PM2.5 Emissions (ton/yr)		
		Before Controls	Control Measure Reductions	After Controls	Before Controls	Control Measure Reductions	After Controls
Milk & Dry Cows	Freestalls	539	-22	518	62	-2	59
Milk & Dry Cows	Open corrals	0	0	0	0	0	0
Heifers	Open corrals	3,164	-915	2,249	361	-104	257
Calves	Open corrals	0	0	0	0	0	0
Calves	Calf hutches - ground	9	0	9	1	0	1
Calves	Calf hutches - grates	0	0	0	0	0	0
Total		3,713	-937	2,776	424	-107	317

Note: The control measure reductions include the reductions resulting from mitigating the existing dairies plus the reductions from mitigating the new dairies.

Table 21. Factors for Converting PM₁₀ to PM_{2.5}

Emission Source	PM Profile Name	CARB Profile ID	PM₁₀ Fraction	PM_{2.5} Fraction	PM2.5/ PM10 Factor
Land Preparation	Agricultural Tilling	417	0.454	0.068	0.15
Crop Harvesting	Agricultural Tilling	417	0.454	0.068	0.15
Windblown Dust - Farm	Windblown Dust-Agric. Lands	418	0.454	0.079	0.17
Cattle in Corrals	Livestock Operations Dust	423	0.482	0.055	0.11
Unpaved Road Dust	Unpaved Road Dust	470	0.594	0.059	0.10
Paved Road Dust	Paved Road Dust	471	0.457	0.069	0.15
Windblown Dust - Dairy	Dust - Unpaved Areas	416	0.594	0.079	0.13
Truck Exhausts	Diesel Vehicle Exhaust	425	1.000	0.920	0.92
Employee Travel	Gasoline Vehicles-Catalyst	400	0.970	0.900	0.93
ICE - Digester Gas	Stationary IC Engine - Gas	123	0.994	0.992	0.998

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." July 28, 2009.

Table 22. GHG Emission Factors for Manure Decomposition and Enteric Fermentation

Animal Type	Uncontrolled GHG Emission Factors ¹								
	CH4 (Anaerobic Treatment Lagoon) lb/hd/yr	CH4 (Lagoon) lb/hd/yr ²	CH4 (manure spreading) lb/hd/yr	CH4 (Solid Manure Storage) lb/hd/yr ⁵	CH4 (Enteric) lb/hd/yr	N2O (Anaerobic Treatment Lagoon) lb/hd/yr	N2O (Manure Spreading) lb/hd/yr	N2O (Solid Manure Storage) lb/hd/yr ⁵	N2O (Enteric) lb/hd/yr
Milk Cows	513.0	307.8	3.5	27.7	271.5	1.5	0	2.6	0
Dry Cows ³	513.0	307.8	3.5	27.7	271.5	1.5	0	2.6	0
Heifers (15-24 mo) ⁴	110.4	110.4	1.6	-	151.6	1.4	0	-	0
Heifers (7-14 mo)	110.4	110.4	1.6	-	100.5	1.4	0	-	0
Heifers (4-6 mo)	110.4	110.4	1.6	-	100.5	1.4	0	-	0
Calves (under 3 mo) ⁵	-	-	-	-	-	-	0	-	0
Bulls ⁴	110.4	110.4	1.6	-	116.6	1.4	0	-	0

Source for table: SJVAPCD, personal communication with Sheraz Gill. February 28, 2012.

¹ GHG Emission Factors were obtained from the latest values (year 2007) given ARB's document entitled "Draft Documentation of California's Greenhouse Gas Inventory" http://www.arb.ca.gov/cc/inventory/doc/doc_index.php.

² The ARB methane Emission Factor of 513.0 lbs-CH₄/yr will be reduced by 40%, due to higher volatile solids in standard anaerobic lagoons. Standard lagoons are not properly designed for treatment and as such can be overloaded. Due to the lagoons being overloaded, the bacteria is not able to convert the manure 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 Dry Cow EF was assumed to be similar to milk cows.

⁴ CH₄ and N₂O for heifers and bull manure in anaerobic treatment lagoons and lagoons based on liquid/slurry manure values for heifers since there were no values given for anaerobic lagoons.

⁵ No emissions were available for calves and are expected to be minimal. In addition no data was available for values that are not present on this table and will be tabulated at this time.

**Table 23. GHG Emissions Associated with Manure Decomposition and Enteric Fermentation
Project Level (Existing Facilities)**

Animal Type	No. of Animals	Annual GHG Emissions (metric ton/yr)										
		Lagoon		Manure Spreading		Solid Manure Storage		Enteric		Total		
		CH ₄	N ₂ O	CH ₄	N ₂ O	CH ₄	N ₂ O	CH ₄	N ₂ O	CH ₄	N ₂ O	CO ₂ e
Milk Cows	562,616	130,919	383	893	0	7,069	664	69,288	0	208,169	1,046	4,695,907
Dry Cows & Springers	84,069	19,563	57	133	0	1,056	99	10,353	0	31,106	156	701,687
Heifers (15-24 months)	223,852	11,210	142	162	0	0	0	15,393	0	26,766	142	606,149
Heifers (7-14 months)	179,082	8,968	114	130	0	0	0	8,164	0	17,262	114	397,751
Heifers (4-6 months)	89,541	4,484	57	65	0	0	0	4,082	0	8,631	57	198,875
Calves (<3 months)	44,770	0	0	0	0	0	0	0	0	0	0	0
Total	1,183,930	175,143	753	1,384	0	8,125	763	107,280	0	291,933	1,515	6,600,368

Notes:

1. Metric Ton = 1,000 kg = 1.1 short tons = 2,205 lbs.
2. CO₂e = carbon dioxide equivalent emissions, which is the sum of all emissions after multiplying by their global warming potentials. GWPs are 1 for CO₂, 21 for CH₄, 310 for N₂O, and 11,700 for HFC-23. Source: The Climate Registry. *General Reporting Protocol*. Version 1.1. May 2008. Table B-1.
3. The most conservative emission factor for lagoons (anaerobic) was used for CH₄ emissions.

**Table 24. GHG Emissions Associated with Manure Decomposition and Enteric Fermentation
Cumulative (10 Year Horizon)**

Animal Type	No. of Animals	Annual GHG Emissions (metric ton/yr)										
		Lagoon		Manure Spreading		Solid Manure Storage		Enteric		Total		
		CH ₄	N ₂ O	CH ₄	N ₂ O	CH ₄	N ₂ O	CH ₄	N ₂ O	CH ₄	N ₂ O	CO ₂ e
Milk Cows	685,191	159,442	466	1,088	0	8,609	808	84,383	0	253,522	1,274	5,718,984
Dry Cows & Springers	102,385	23,825	70	163	0	1,286	121	12,609	0	37,883	190	854,560
Heifers (15-24 months)	272,622	13,652	173	198	0	0	0	18,747	0	32,597	173	738,208
Heifers (7-14 months)	218,098	10,922	139	158	0	0	0	9,942	0	21,022	139	484,407
Heifers (4-6 months)	109,049	5,461	69	79	0	0	0	4,971	0	10,511	69	242,203
Calves (<3 months)	54,524	0	0	0	0	0	0	0	0	0	0	0
Total	1,441,868	213,301	917	1,686	0	9,896	929	130,652	0	355,535	1,846	8,038,363

Notes:

1. Metric Ton = 1,000 kg = 1.1 short tons = 2,205 lbs.
2. CO₂e = carbon dioxide equivalent emissions, which is the sum of all emissions after multiplying by their global warming potentials. GWPs are 1 for CO₂, 21 for CH₄, 310 for N₂O, and 11,700 for HFC-23. Source: The Climate Registry. *General Reporting Protocol*. Version 1.1. May 2008. Table B-1.
3. The most conservative emission factor for lagoons (anaerobic) was used for CH₄ emissions.

Table 25. Emission Factors for Diesel Powered Dairy Equipment

Emission Source	Year	Average Load Factor ^a	Diesel Offroad Equipment Emission Factor ^a (g/hp-hr)								
			VOC	CO	SO _x	NO _x	PM ₁₀	PM _{2.5} ^b	CO ₂	CH ₄	N ₂ O
Generator Set 251-500 hp	2007	0.74	0.475	1.888	0.006	5.854	0.183	0.168	568	0.043	0.0
Generator Set 251-500 hp	2008	0.74	0.446	1.747	0.006	5.586	0.173	0.159	568	0.040	0.0
Generator Set 251-500 hp	2009	0.74	0.418	1.618	0.006	5.327	0.164	0.151	568	0.038	0.0
Generator Set 251-500 hp	2010	0.74	0.388	1.493	0.006	5.055	0.155	0.142	568	0.035	0.0
Generator Set 251-500 hp	2011	0.74	0.357	1.373	0.006	4.725	0.141	0.129	568	0.032	0.0
Generator Set 251-500 hp	2012	0.74	0.331	1.287	0.006	4.399	0.129	0.118	568	0.030	0.0
Generator Set 251-500 hp	2013	0.74	0.310	1.223	0.006	4.082	0.118	0.109	568	0.028	0.0
Generator Set 251-500 hp	2022	0.74	0.170	0.993	0.006	1.438	0.045	0.041	568	0.015	0.0
Agricultural Tractor 51-120 hp	2007	0.70	1.285	3.939	0.007	8.004	0.628	0.578	568	0.116	0.0
Agricultural Tractor 51-120 hp	2008	0.70	1.203	3.887	0.007	7.580	0.600	0.552	568	0.109	0.0
Agricultural Tractor 51-120 hp	2009	0.70	1.138	3.850	0.007	7.243	0.579	0.533	568	0.103	0.0
Agricultural Tractor 51-120 hp	2010	0.70	1.090	3.827	0.007	6.978	0.564	0.519	568	0.098	0.0
Agricultural Tractor 51-120 hp	2011	0.70	1.021	3.789	0.007	6.621	0.540	0.497	568	0.092	0.0
Agricultural Tractor 51-120 hp	2012	0.70	0.928	3.734	0.007	6.138	0.498	0.458	568	0.084	0.0
Agricultural Tractor 51-120 hp	2013	0.70	0.836	3.681	0.007	5.670	0.451	0.415	568	0.075	0.0
Agricultural Tractor 51-120 hp	2022	0.70	0.354	3.478	0.007	2.862	0.157	0.144	568	0.032	0.0
Off-Highway Truck 251-500 hp	2007	0.57	0.599	1.974	0.006	5.955	0.219	0.202	568	0.054	0.0
Off-Highway Truck 251-500 hp	2008	0.57	0.569	1.825	0.006	5.551	0.206	0.189	568	0.051	0.0
Off-Highway Truck 251-500 hp	2009	0.57	0.543	1.692	0.006	5.179	0.193	0.178	568	0.049	0.0
Off-Highway Truck 251-500 hp	2010	0.57	0.520	1.575	0.006	4.838	0.182	0.167	568	0.047	0.0
Off-Highway Truck 251-500 hp	2011	0.57	0.495	1.473	0.006	4.431	0.164	0.151	568	0.045	0.0
Off-Highway Truck 251-500 hp	2012	0.57	0.472	1.390	0.006	4.060	0.147	0.135	568	0.043	0.0
Off-Highway Truck 251-500 hp	2013	0.57	0.453	1.328	0.006	3.726	0.132	0.122	568	0.041	0.0
Off-Highway Truck 251-500 hp	2022	0.57	0.281	1.123	0.006	1.195	0.044	0.040	568	0.025	0.0
Rubber Tired Loader 121-175 hp	2007	0.54	0.940	3.435	0.006	7.402	0.411	0.378	568	0.085	0.0
Rubber Tired Loader 121-175 hp	2008	0.54	0.886	3.412	0.006	6.963	0.392	0.360	568	0.080	0.0
Rubber Tired Loader 121-175 hp	2009	0.54	0.836	3.395	0.006	6.546	0.373	0.343	568	0.075	0.0
Rubber Tired Loader 121-175 hp	2010	0.54	0.788	3.381	0.006	6.151	0.355	0.326	568	0.071	0.0
Rubber Tired Loader 121-175 hp	2011	0.54	0.744	3.370	0.006	5.778	0.338	0.311	568	0.067	0.0
Rubber Tired Loader 121-175 hp	2012	0.54	0.701	3.361	0.006	5.414	0.311	0.286	568	0.063	0.0
Rubber Tired Loader 121-175 hp	2013	0.54	0.661	3.353	0.006	5.075	0.286	0.263	568	0.060	0.0
Rubber Tired Loader 121-175 hp	2022	0.54	0.354	3.318	0.006	1.987	0.103	0.095	568	0.032	0.0

^a Source: CARB. Offroad 2007, version 2.0.1.2. <http://www.arb.ca.gov/msei/offroad/offroad.htm>. December 15, 2006. San Joaquin Valley Air Basin. Load and emission factors are for diesel-fueled equipment only.

**Table 26. Emissions Associated with Diesel Powered Dairy Equipment
Project Level (Existing Facilities)**

Emission Source	Year	Load Factor	Equipment Annual Work Done (hp-hr/yr)	Annual Emissions (ton/yr)						Annual Emissions (metric ton/yr)			
				VOC	CO	SO _x	NO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O	CO _{2e}
Dairy Tractor 51-120 hp	2011	0.70	80,652,507	91	337	0.6	589	48	44	45,836	7	0	45,992
Loader 121-175 hp	2011	0.54	54,730,496	45	203	0.4	349	20	19	31,104	4	0	31,181
Feed Mixer Truck 251-500 hp	2011	0.57	87,599,377	48	142	0.5	428	16	15	49,784	4	0	49,866
Standby Generator 251-500 hp	2011	0.74	33,600	0	0	0.0	0	0	0	19	0	0	19
Total				183	682	1.5	1,365	84	77	126,742	15	0	127,057

Notes:

1. Emissions for Project Level (existing facilities) were calculated using 2011 emission factors instead of 2009 emission factors. This assumption is conservative in that it maximizes the program level impacts (i.e., future cumulative emissions minus existing project level emissions).
2. Annual work done and equipment size categories were estimated based on recent EIRs for San Joaquin Valley dairies. Equipment usage is assumed to be proportional to animal units.

**Table 27. Emissions Associated with Diesel Powered Dairy Equipment
Cumulative (10 Year Horizon)**

Emission Source	Year	Load Factor	Equipment Annual Work Done (hp-hr/yr)	Annual Emissions (ton/yr)						Annual Emissions (metric ton/yr)			
				VOC	CO	SO _x	NO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O	CO _{2e}
Dairy Tractor 51-120 hp	2022	0.70	98,223,932	38	377	0.7	310	17	16	55,822	3	0	55,887
Loader 121-175 hp	2022	0.54	66,654,401	26	244	0.5	146	8	7	37,880	2	0	37,925
Feed Mixer Truck 251-500 hp	2022	0.57	106,684,287	33	132	0.7	140	5	5	60,630	3	0	60,687
Standby Generator 251-500 hp	2022	0.74	40,920	0	0	0.0	0	0	0	23	0	0	23
Total				97	752	1.8	596	30	27	154,355	8	0	154,522

Note: Annual work done and equipment size categories were estimated based on recent EIRs for San Joaquin Valley dairies. Equipment usage is assumed to be proportional to animal units.

Table 28. Emission Factors for Vehicle Trips

Vehicle Category	Vehicle ID	Study Year	Composite Emission Factor (g/mile)									Gasoline Use (gal/mi)	Diesel Use (gal/mi)
			VOC	CO	SO _x	NO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O		
Light-Duty Trucks	LDT1-2	2011	0.670	5.712	0.005	0.605	0.777	0.205	445	0.0813	0.1035	0.055	0.00002
	LDT1-2	2022	0.217	1.467	0.004	0.153	0.774	0.202	321	0.0813	0.1035	0.053	0.00002
Medium Heavy-Duty Trucks	T6	2011	0.775	2.254	0.012	10.380	1.355	0.687	1,228	0.0051	0.0048	-	0.122
	T6	2022	0.251	0.860	0.012	2.997	0.978	0.341	1,086	0.0051	0.0048	-	0.120
Heavy Heavy-Duty Trucks	T7	2011	0.950	4.352	0.017	16.448	1.481	0.822	1,779	0.0051	0.0048	-	0.177
	T7	2022	0.378	1.769	0.017	4.269	0.963	0.345	1,604	0.0051	0.0048	-	0.177

Notes:

1. Emission factors are provided by EMFAC2011 (CARB, "Mobile Source Emission Inventory -- Current Methods and Data." Website: http://www.arb.ca.gov/msei/modeling.htm#emfac2011_web_based_data. February 9, 2012). Tulare County, average of all driving speeds.
2. The emission factors for T6 and T7 trucks include only agriculture trucks.
3. VOC emission factors include running, idle, and starting exhaust; and diurnal, hot soak, running, and resting losses.
4. CO, NO_x, SO_x, and CO₂ emission factors include running, idle, and starting exhaust.
5. PM₁₀ and PM_{2.5} emission factors include running, idle, and starting exhaust; and tire wear, brake wear, and paved road dust emissions. The paved road dust emission factors were calculated using AP-42 Section 13.2.1. Collector roads (500-5,000 ADT) with a default silt loading value of 0.2 g/m² were assumed for all travel.
6. Source for CH₄ and N₂O emission factors: The Climate Registry. *2012 Climate Registry Default Emission Factors*. January 6, 2012. Table 13.5. For light duty trucks, the highest emission factors, for model years 1987-1993, were conservatively used.
7. CO₂ emission factors account for the implementation of Light Duty Vehicle GHG Emission Standards for model years 2009-2016 (Pavley I) and the California Low Carbon Fuel Standard (AB 32).

**Table 29. On-Road Vehicle Emissions
Project Level (Existing Facilities)**

Emission Source	Vehicle ID	Year	Round Trips (trips/yr)	One-Way Trip Length (mi/trip)	Annual VMT (mi/yr)	Annual Emissions (ton/yr)						Annual GHG Emissions (metric ton/yr)			
						VOC	CO	SO _x	NO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O	CO ₂ e
Silage Truck 3-axle, 10-ton	T6	2011	573,151	1	1,146,302	1.0	2.8	0.01	13.1	1.7	0.9	1,408	0.006	0.006	1,410
Silage Truck 5-axle, 20-ton	T7	2011	71,644	1	143,288	0.1	0.7	0.00	2.6	0.2	0.1	255	0.001	0.001	255
Hay Truck 3-axle, 10-ton	T6	2011	12,882	2	51,528	0.0	0.1	0.00	0.6	0.1	0.0	63	0.000	0.000	63
Hay Truck 5-axle, 20-ton	T7	2011	57,972	20	2,318,880	2.4	11.1	0.04	42.0	3.8	2.1	4,124	0.012	0.011	4,128
Concentrated Feed Truck 5-axle, 20-ton	T7	2011	202,104	20	8,084,160	8.5	38.8	0.15	146.6	13.2	7.3	14,378	0.041	0.039	14,391
Calf Milk Replacer Truck 2-axle, 10-ton	T6	2011	817	20	32,680	0.0	0.1	0.00	0.4	0.0	0.0	40	0.000	0.000	40
Cattle Truck - baby calves from dairies to calf ranches	T6	2011	12,607	10	252,140	0.2	0.6	0.00	2.9	0.4	0.2	310	0.001	0.001	310
Cattle Truck - weaned heifer calves from calf ranches to dairies	T6	2011	6,380	10	127,600	0.1	0.3	0.00	1.5	0.2	0.1	157	0.001	0.001	157
Cattle Truck - weaned bull calves from calf ranches to foothill pasture	T6	2011	1,418	25	70,900	0.1	0.2	0.00	0.8	0.1	0.1	87	0.000	0.000	87
Cattle Truck - weaned bull calves from calf ranches to background feedlots	T7	2011	1,588	50	158,800	0.2	0.8	0.00	2.9	0.3	0.1	282	0.001	0.001	283
Cattle Truck - other cattle trips from calf ranches	T7	2011	1,418	20	56,720	0.1	0.3	0.00	1.0	0.1	0.1	101	0.000	0.000	101
Cattle Truck - beef cattle from foothill pasture to finishing feedlots	T6	2011	4,721	75	708,150	0.6	1.8	0.01	8.1	1.1	0.5	870	0.004	0.003	871
Cattle Truck - dairies to beef processing facilities - gooseneck trailers	T6	2011	17,008	20	680,320	0.6	1.7	0.01	7.8	1.0	0.5	835	0.003	0.003	837
Cattle Truck - dairies to beef processing facilities - semi tractor/trailers	T7	2011	1,278	50	127,800	0.1	0.6	0.00	2.3	0.2	0.1	227	0.001	0.001	228
Total - Trucks			964,988		13,959,268	14	60	0.2	233	22	12	23,137	0.1	0.1	23,160
Dairy Employee trips	LDT1-2	2011	1,349,040	10	26,980,800	19.9	169.9	0.14	18.0	23.1	6.1	12,005	2.194	2.793	12,917
Dairy Visitor trips (vet, breeder, sales, delivery)	LDT1-2	2011	161,616	20	6,464,640	4.8	40.7	0.03	4.3	5.5	1.5	2,876	0.526	0.669	3,095
Total - Employees and Visitors			1,510,656		33,445,440	25	211	0.2	22	29	8	14,882	2.7	3.5	16,012

Notes:

1. All trucks are assumed to be Medium-Heavy Duty Diesel Agriculture Trucks (T6; 14,000-33,000 lbs GVWR) and Heavy-Heavy Duty Diesel Agriculture Trucks (T7; 33,000-60,000 lbs GVWR). All employees and visitors are conservatively assumed to drive light-duty trucks (LDT1; 0-3,750 lbs and LDT2; 3,751-5,750 lbs).

2. Emission factors are provided by EMFAC2011 (CARB, "Mobile Source Emission Inventory -- Current Methods and Data." Website: http://www.arb.ca.gov/msei/modeling.htm#emfac2011_web_based_data. February 9, 2012). Tulare County, average of all driving speeds.

3. VOC emission factors include running, idle, and starting exhaust; and diurnal, hot soak, running, and resting losses.

4. CO, NO_x, SO_x, and CO₂ emission factors include running, idle, and starting exhaust.

5. PM₁₀ and PM_{2.5} emission factors include running, idle, and starting exhaust; and tire wear, brake wear, and paved road dust emissions. The paved road dust emission factors were calculated using AP-42 Section 13.2.1. Collector roads (500-5,000 ADT) with a default silt loading value of 0.2 g/m² were assumed for all travel.

6. Source for CH₄ and N₂O emission factors: The Climate Registry. 2012 *Climate Registry Default Emission Factors*. January 6, 2012. Table 13.5. For light duty trucks, the highest emission factors, for model years 1987-1993, were conservatively used.

7. CO₂ emission factors account for the implementation of Light Duty Vehicle GHG Emission Standards for model years 2009-2016 (Pavley I) and the California Low Carbon Fuel Standard (AB 32).

**Table 30. On-Road Vehicle Emissions
Cumulative (10 Year Horizon)**

Emission Source	EF ID	Year	Round Trips (trips/yr)	One-Way Trip Length (mi/trip)	Annual VMT (VMT/yr)	Annual Emissions (ton/yr)						Annual GHG Emissions (metric ton/yr)			
						VOC	CO	SO _x	NO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O	CO ₂ e
Silage Truck 3-axle, 10-ton	T6	2022	698,021	1	1,396,042	0.4	1.3	0.02	4.6	1.5	0.5	1,516	0.007	0.007	1,519
Silage Truck 5-axle, 20-ton	T7	2022	87,253	1	174,506	0.1	0.3	0.00	0.8	0.2	0.1	280	0.001	0.001	280
Hay Truck 3-axle, 10-ton	T6	2022	15,689	2	62,754	0.0	0.1	0.00	0.2	0.1	0.0	68	0.000	0.000	68
Hay Truck 5-axle, 20-ton	T7	2022	70,602	20	2,824,085	1.2	5.5	0.05	13.3	3.0	1.1	4,531	0.014	0.014	4,535
Concentrated Feed Truck 5-axle, 20-ton	T7	2022	246,136	20	9,845,422	4.1	19.2	0.18	46.3	10.4	3.7	15,795	0.050	0.047	15,811
Calf Milk Replacer Truck 2-axle, 10-ton	T6	2022	995	20	39,800	0.0	0.0	0.00	0.1	0.0	0.0	43	0.000	0.000	43
Cattle Truck - baby calves from dairies to calf ranches	T6	2022	15,354	10	307,073	0.1	0.3	0.00	1.0	0.3	0.1	334	0.002	0.001	334
Cattle Truck - weaned heifer calves from calf ranches to dairies	T6	2022	7,770	10	155,400	0.0	0.1	0.00	0.5	0.2	0.1	169	0.001	0.001	169
Cattle Truck - weaned bull calves from calf ranches to foothill pasture	T6	2022	1,727	25	86,347	0.0	0.1	0.00	0.3	0.1	0.0	94	0.000	0.000	94
Cattle Truck - weaned bull calves from calf ranches to background feedlots	T7	2022	1,934	50	193,397	0.1	0.4	0.00	0.9	0.2	0.1	310	0.001	0.001	311
Cattle Truck - other cattle trips from calf ranches	T7	2022	1,727	20	69,077	0.0	0.1	0.00	0.3	0.1	0.0	111	0.000	0.000	111
Cattle Truck - beef cattle from foothill pasture to finishing feedlots	T6	2022	5,750	75	862,432	0.2	0.8	0.01	2.8	0.9	0.3	937	0.004	0.004	938
Cattle Truck - dairies to beef processing facilities - gooseneck trailers	T6	2022	20,713	20	828,538	0.2	0.8	0.01	2.7	0.9	0.3	900	0.004	0.004	901
Cattle Truck - dairies to beef processing facilities - semi tractor/trailers	T7	2022	1,556	50	155,643	0.1	0.3	0.00	0.7	0.2	0.1	250	0.001	0.001	250
Total - Trucks			1,175,226		17,000,515	7	29	0.3	75	18	6	25,338	0.1	0.1	25,365
Dairy Employee trips	LDT1-2	2022	1,642,950	10	32,858,994	7.8	53.2	0.16	5.6	28.0	7.3	10,539	2.671	3.401	11,650
Dairy Visitor trips (vet, breeder, sales, delivery)	LDT1-2	2022	196,827	20	7,873,064	1.9	12.7	0.04	1.3	6.7	1.8	2,525	0.640	0.815	2,791
Total - Employees and Visitors			1,839,776		40,732,058	10	66	0.2	7	35	9	13,064	3.3	4.2	14,441

Notes:

1. All trucks are assumed to be Medium-Heavy Duty Diesel Agriculture Trucks (T6; 14,000-33,000 lbs GVWR) and Heavy-Heavy Duty Diesel Agriculture Trucks (T7; 33,000-60,000 lbs GVWR). All employees and visitors are conservatively assumed to drive light-duty trucks (LDT1; 0-3,750 lbs and LDT2; 3,751-5,750 lbs).
2. Emission factors are provided by EMFAC2011 (CARB, "Mobile Source Emission Inventory -- Current Methods and Data." Website: http://www.arb.ca.gov/msei/modeling.htm#emfac2011_web_based_data. February 9, 2012). Tulare County, average of all driving speeds.
3. VOC emission factors include running, idle, and starting exhaust; and diurnal, hot soak, running, and resting losses.
4. CO, NO_x, SO_x, and CO₂ emission factors include running, idle, and starting exhaust.
5. PM₁₀ and PM_{2.5} emission factors include running, idle, and starting exhaust; and tire wear, brake wear, and paved road dust emissions. The paved road dust emission factors were calculated using AP-42 Section 13.2.1. Collector roads (500-5,000 ADT) with a default silt loading value of 0.2 g/m² were assumed for all travel.
6. Source for CH₄ and N₂O emission factors: The Climate Registry. 2012 *Climate Registry Default Emission Factors*. January 6, 2012. Table 13.5. For light duty trucks, the highest emission factors, for model years 1987-1993, were conservatively used.
7. CO₂ emission factors account for the implementation of Light Duty Vehicle GHG Emission Standards for model years 2009-2016 (Pavley I) and the California Low Carbon Fuel Standard (AB 32).

**Table 31. Uncontrolled Emissions Associated with Unpaved Road Dust at the Dairies
Proposed Project**

Project Scenario	Milk Cow Population	PM ₁₀ Emission Factor (lb/head/yr) ^a	PM _{2.5} Emission Factor (lb/head/yr) ^b	Annual Emissions (ton/yr)	
				PM ₁₀	PM _{2.5}
Project Level (Existing Facilities)	562,616	0.369	0.037	104	10
Cumulative (10 Year Horizon)	685,191	0.369	0.037	126	13

^a Source: Western Governors' Association. *Western Regional Air Partnership (WRAP) Fugitive Dust Handbook*. 9/7/06. Table 13-1. The emission factor applies to the number of milk cows; support animals are already included in the factor.

^b The PM_{2.5} emission factor is scaled from the PM₁₀ factor according to the relative emission rate for unpaved road dust as reported in CARB, *California Emission Inventory and Reporting System (CEIDARS)*, 2009.

Table 32. Dairy Cow Population in the San Joaquin Valley - Year 2000

San Joaquin Valley County	Dairy Cow Population ^a
Fresno	79,296
Kern	65,074
Kings	120,088
Madera	40,624
Merced	203,647
San Joaquin	97,849
Stanislaus	158,087
Tulare	357,950
Total - San Joaquin Valley	1,122,615

^a Source: California Department of Food and Agriculture. *Dairy Statistics Annual 2001*. Table 1. Data are for year 2000, milk cows plus heifers.

Table 33. Electricity Usage for Dairies in the San Joaquin Valley

Dairy Cow Population (Milk Cows and Heifers)	Total Dairy Electricity Usage (MWh/yr) ^a	Dairy Electricity Usage per Cow (MWh/cow/yr) ^b
1,122,615	550,464	0.490

^a Source: California Energy Commission, *Agricultural Electricity Rates in California*. June 2001. Derived from Tables 2.1.2 and 2.1.3. Data representative of 1996-1998.

^b Cows represent milk cows plus heifers.

Table 34. GHG Emissions Associated with Dairy Electricity Use

Project Scenario	Cow Population (Milk Cows and Heifers)	Electricity Usage (MWh/yr)	Emission Factor (lb/MWh) ^a			Annual Emissions (metric ton/yr)			
			CO ₂	CH ₄	N ₂ O	CO ₂	CH ₄	N ₂ O	CO ₂ e
Project Level (Existing Facilities)	1,139,160	558,577	681.01	0.0283	0.0062	172,548	7.168	1.578	173,188
Cumulative (10 Year Horizon)	1,387,344	680,271	681.01	0.0283	0.0062	210,140	8.729	1.922	210,919

^a Source: The Climate Registry. *2012 Climate Registry Default Emission Factors*. January 6, 2012. Table 14.1.

Table 35. GHG Emissions Associated with Dairy Refrigeration Equipment

Project Scenario	Refrigerant Charge ^a (lb)	Refrigerant Type ^b	Global Warming Potential ^c	Annual Refrigerant Loss Rate ^d	Annual Emissions (metric ton/yr)	
					Refrigerant	CO ₂ e
Project Level (Existing Facilities)	48,072	HFC-23	11,700	25%	5.45	63,780
Cumulative (10 Year Horizon)	58,545	HFC-23	11,700	25%	6.64	77,676

^a The refrigerant charge was estimated from data from other similar dairies. The charge was assumed to be proportional to the quantity of milk produced, which is proportional to the number of milk cows.

^b HFC-23 was conservatively selected as a worst case refrigerant for industrial refrigeration in terms of its global warming potential.

^c Source: The Climate Registry. *General Reporting Protocol*. Version 1.1. May 2008. Table B-1.

^d Source: The Climate Registry. *General Reporting Protocol*. Version 1.1. May 2008. Table 16.3.

Table 36. County-Wide Diesel and Gasoline Powered Farm Equipment Emissions in Tulare County

Emission Source	Year	Tulare County Farm Equipment Emissions (ton/day) ^a								
		VOC	CO	SO _x	NO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O
Farm Equipment	2009	0.43	1.66	0.004	4.27	0.17	0.16	400	0.038	0.0006
Farm Equipment	2010	0.41	1.63	0.004	4.09	0.17	0.15	400	0.036	0.0005
Farm Equipment	2011	0.38	1.58	0.004	3.84	0.16	0.14	400	0.034	0.0005
Farm Equipment	2012	0.35	1.55	0.004	3.54	0.14	0.13	400	0.031	0.0005
Farm Equipment	2013	0.32	1.52	0.004	3.26	0.13	0.12	400	0.028	0.0005
Farm Equipment	2014	0.30	1.50	0.004	3.00	0.12	0.11	400	0.026	0.0004
Farm Equipment	2015	0.28	1.48	0.004	2.73	0.11	0.10	401	0.024	0.0004
Farm Equipment	2022	0.17	1.43	0.004	1.23	0.05	0.04	401	0.015	0.0002
Farm Equipment	2040	0.09	1.42	0.004	0.21	0.01	0.01	401	0.008	0.0002

^a Source: CARB. Offroad 2007, version 2.0.1.2. Tulare County. Agricultural Equipment. <http://www.arb.ca.gov/msei/offroad/offroad.htm>. December 15, 2006. VOC emissions include both exhaust and evaporative emissions. 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), 2009.

Table 37. Emission Factors for Diesel and Gasoline Powered Farm Equipment in Tulare County

Emission Source	Year	Tulare County Acres Harvested ^a	Derived Emission Factors (lb/acre/year)							
			VOC	CO	SO _x	NO _x	PM ₁₀	PM _{2.5}	CO ₂	N ₂ O
Farm Equipment	2009	560,320	0.56	2.16	0.006	5.56	0.23	0.21	521	0.0007
Farm Equipment	2010	560,320	0.53	2.12	0.006	5.33	0.22	0.20	522	0.0007
Farm Equipment	2011	560,320	0.50	2.06	0.006	5.01	0.20	0.19	522	0.0007
Farm Equipment	2012	560,320	0.46	2.01	0.006	4.61	0.19	0.17	522	0.0007
Farm Equipment	2013	560,320	0.42	1.98	0.006	4.24	0.17	0.15	522	0.0006
Farm Equipment	2014	560,320	0.39	1.95	0.006	3.90	0.15	0.14	522	0.0006
Farm Equipment	2015	560,320	0.36	1.93	0.006	3.56	0.14	0.13	522	0.0005
Farm Equipment	2022	560,320	0.22	1.86	0.006	1.61	0.06	0.06	522	0.0003
Farm Equipment	2040	560,320	0.12	1.86	0.006	0.27	0.01	0.01	522	0.0002

^a Source for acreage: USDA. 2007 Census of Agriculture. Total Cropland - Harvested Cropland. Tulare County.

Table 38. Emissions Associated with Support Crop Farm Equipment

Project Scenario	Year	Cultivated Acres	Annual Emissions (ton/yr)						Annual Emissions (metric ton/yr)			
			VOC	CO	SO _x	NO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O	CO ₂ e
Project Level (Existing Facilities)	2011	160,839	40	166	0.5	403	16	15	38,054	3	0.05	38,137
Cumulative (10 Year Horizon)	2022	195,880	21	182	0.6	157	6	6	46,370	2	0.03	46,414

Note: Emissions for Project Level (existing facilities) were calculated using 2011 emission factors instead of 2009 emission factors. This assumption is conservative in that it maximizes the program level impacts (i.e., future cumulative emissions minus existing project level emissions).

Table 39. Derivation of General Emission Factors for Tilling and Harvesting Dust in Tulare County

Emission Source	County-Wide Emission Rate in 2008 (Ton/Day) ^a		Tulare County Acres Harvested ^b	Derived Emission Factors (lb/acre/year)	
	PM ₁₀	PM _{2.5}		PM ₁₀	PM _{2.5}
Tilling Dust	3.46	0.52	560,320	4.51	0.68
Harvesting Dust	2.87	0.43	560,320	3.74	0.56

^a Source for county-wide emission rate: CARB Emissions Inventory Data. <http://www.arb.ca.gov/ei/emissiondata.htm>. April 21, 2009. Year 2008 was selected as the closest inventory year to the 2007 Census of Agriculture, from which the farmland acreage is obtained.

^b Source for acreage: USDA. *2007 Census of Agriculture*. Total Cropland - Harvested Cropland. Tulare County.

Table 40. Emissions Associated with Tilling and Harvesting of Support Crops

Emission Source	Project Level (Existing Facilities)			Cumulative (10 Year Horizon)		
	Cultivated Acres	Annual Emissions (ton/yr)		Cultivated Acres	Annual Emissions (ton/yr)	
		PM ₁₀	PM _{2.5}		PM ₁₀	PM _{2.5}
Tilling Dust	160,839	363	54	195,880	442	66
Harvesting Dust	160,839	300	45	195,880	366	55
Total		663	99		808	121

Table 41. Emissions Associated with Wind Erosion on Support Crops

Emission Source	Cultivated Acres	PM ₁₀ Emission Factor (ton/acre/yr) ^a	PM _{2.5} Emission Factor (ton/acre/yr) ^b	Annual Emissions (ton/yr)	
				PM ₁₀	PM _{2.5}
Project Level (Existing Facilities)	160,839	0.002347	0.000406	377	65
Cumulative (10 Year Horizon)	195,880	0.002347	0.000406	460	80

^a Source: CARB, *Emission Inventory Procedural Manual Volume III: Methods for Assessing Area Source Emissions*, Section 7.12, updated July 1997. Nonpasture Agricultural Lands. Tulare County.

^b The PM_{2.5} emission factor is scaled from the PM₁₀ factor according to the relative emission rate for windblown dust - agricultural lands as reported in CARB, *California Emission Inventory and Reporting System (CEIDARS)*, 2009.

Table 42. Emissions Associated with Unpaved Road Dust on Support Crops

Emission Source	Cultivated Acres	PM ₁₀ Emission Factor (lb/VMT) ^a	PM _{2.5} Emission Factor (lb/VMT) ^b	Activity Level (VMT/Acre/yr) ^a	Annual Emissions (ton/yr)	
					PM ₁₀	PM _{2.5}
Project Level (Existing Facilities)	160,839	2.27	0.23	4.38	799	80
Cumulative (10 Year Horizon)	195,880	2.27	0.23	4.38	973	97

^a Source: CARB, *Emission Inventory Procedural Manual Volume III: Methods for Assessing Area Source Emissions*, Section 7.11, updated August 1997.

^b The PM_{2.5} emission factor is scaled from the PM₁₀ factor according to the relative emission rate for unpaved road dust as reported in CARB, *California Emission Inventory and Reporting System (CEIDARS)*, 2009.

**Table 43. Emissions of N₂O from Agricultural Soil
Project Level (Existing Facilities)**

Crop Type	Cultivated Acres	Nitrogen Requirement per Crop (lb/acre/yr)	No. of Crops per Year ^d	N _f Nitrogen in Fertilizer (ton/yr)	CF Conversion Factor N2O-N to N2O ^a	N2O Emission Factor (kg N2O-N/kg N) ^b			F _{leach} Fraction of N Lost through Leaching & Runoff ^b	F _{gas} Fraction of N Volatilization as NH3 and NOx ^b	Annual GHG Emissions (metric ton/yr) ^c	
						EF ₁ Direct from Soils	EF ₅ Indirect from Runoff	EF ₄ Indirect from Volatilization			N ₂ O	CO ₂ e
Corn Silage (double)	160,839	250	2	40,210	1.57	0.02	0.0075	0.01	0.3	0.2	1,390	430,926
Corn Silage (single)		290		0	1.57	0.02	0.0075	0.01	0.3	0.2	0	0
Wheat Silage		385		0	1.57	0.02	0.0075	0.01	0.3	0.2	0	0
Cotton		180		0	1.57	0.02	0.0075	0.01	0.3	0.2	0	0
Sudan Grass		160		0	1.57	0.02	0.0075	0.01	0.3	0.2	0	0
Alfalfa	160,839	480	1	38,601	1.57	0.02	0.0075	0.01	0.3	0.2	1,334	413,689
Total				78,811							2,725	844,615

^a Source: ACM0010 (UNFCCC, 2006), Equation 5.

^b Source: 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Chapter 11, Tables 11.1 and 11.3.

^c The N2O emission rate is calculated based on Equations 19, 20, 21, and 22 of ACM0010 (UNFCCC, 2006).

$$\text{Emission Rate} = N_f \times CF \times [EF_1 + (EF_5 \times F_{\text{leach}}) + (EF_4 \times F_{\text{gas}})] \times 0.9072$$

^d Assume the support crop acreage has 2 summer crops of corn and 1 winter crop of alfalfa (alfalfa was conservatively selected over wheat because it has a higher nitrogen requirement).

**Table 44. Emissions of N₂O from Agricultural Soil
Cumulative (10 Year Horizon)**

Crop Type	Cultivated Acres	Nitrogen Requirement per Crop (lb/acre/yr)	No. of Crops per Year ^d	N _f Nitrogen in Fertilizer (ton/yr)	CF Conversion Factor N2O-N to N2O ^a	N2O Emission Factor (kg N2O-N/kg N) ^b			F _{leach} Fraction of N Lost through Leaching & Runoff ^b	F _{gas} Fraction of N Volatilization as NH3 and NOx ^b	Annual GHG Emissions (metric ton/yr) ^c	
						EF ₁ Direct from Soils	EF ₅ Indirect from Runoff	EF ₄ Indirect from Volatilization			N ₂ O	CO ₂ e
Corn Silage (double)	195,880	250	2	48,970	1.57	0.02	0.0075	0.01	0.3	0.2	1,693	524,810
Corn Silage (single)		290		0	1.57	0.02	0.0075	0.01	0.3	0.2	0	0
Wheat Silage		385		0	1.57	0.02	0.0075	0.01	0.3	0.2	0	0
Cotton		180		0	1.57	0.02	0.0075	0.01	0.3	0.2	0	0
Sudan Grass		160		0	1.57	0.02	0.0075	0.01	0.3	0.2	0	0
Alfalfa	195,880	480	1	47,011	1.57	0.02	0.0075	0.01	0.3	0.2	1,625	503,817
Total				95,981							3,318	1,028,627

^a Source: ACM0010 (UNFCCC, 2006), Equation 5.

^b Source: 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Chapter 11, Tables 11.1 and 11.3.

^c The N2O emission rate is calculated based on Equations 19, 20, 21, and 22 of ACM0010 (UNFCCC, 2006).

$$\text{Emission Rate} = N_f \times CF \times [EF_1 + (EF_5 \times F_{\text{leach}}) + (EF_4 \times F_{\text{gas}})] \times 0.9072$$

^d Assume the support crop acreage has 2 summer crops of corn and 1 winter crop of alfalfa (alfalfa was conservatively selected over wheat because it has a higher nitrogen requirement).

Table 45. Total Irrigated Farmland in the San Joaquin Valley

San Joaquin Valley County	Total Irrigated Farmland (acres) ^a
Fresno	1,156,117
Kern	917,003
Kings	423,608
Madera	311,204
Merced	504,771
San Joaquin	528,409
Stanislaus	376,439
Tulare	638,701
Total - San Joaquin Valley	4,856,252

^a Source: USDA, *2002 Census of Agriculture*. County Data. California. Table 10. Irrigated land - 1997.

The 2002 census was used instead of the 2007 census because it more closely aligns with the agricultural electricity usage data period in the following table.

Table 46. Electricity Usage for Farmland Irrigation in the San Joaquin Valley

Total Irrigated Farmland (acres)	Total Electrical Irrigation Pump Usage (MWh/yr) ^a	Total Diesel Irrigation Pump Usage (MWh/yr) ^b	Farmland Irrigated with Electric Pumps (acres)	Electricity Usage for Farmland Irrigated with Electric Pumps (MWh/acre/yr)
4,856,252	7,214,592	517,483	4,531,239	1.59

^a Source: California Energy Commission, *Agricultural Electricity Rates in California*. June 2001. Derived from Tables 2.1.2 and 2.1.3. Data representative of 1996-1998.

^b Source: California Air Resources Board. "ROG and NOx Emissions - Agricultural Irrigation Pumps - San Joaquin Valley." May 20, 2003. Derived from Table 1.

Table 47. GHG Emissions Associated with Support Crop Irrigation

Project Scenario	Cultivated Acres	Electricity Usage (MWh/yr)	Emission Factor (lb/MWh) ^a			Annual Emissions (metric ton/yr)			
			CO ₂	CH ₄	N ₂ O	CO ₂	CH ₄	N ₂ O	CO ₂ e
Project Level (Existing Facilities)	160,839	256,086	681.01	0.0283	0.0062	79,107	3.3	0.7	79,400
Cumulative (10 Year Horizon)	195,880	311,879	681.01	0.0283	0.0062	96,341	4.0	0.9	96,698

^a Source: The Climate Registry. *2012 Climate Registry Default Emission Factors*. January 6, 2012. Table 14.1.

^b Electric irrigation pumps are assumed.

Table 48. Construction Emissions for Program Level Facilities

Emission Source	Total Emissions (tons/dairy)						CO2 Emissions (metric ton/dairy)
	VOC	CO	SO _x	NO _x	PM ₁₀	PM _{2.5}	
Site Grading							
Construction Equipment	0.37	1.53	0	3.25	0.16	0.15	232
Worker Trips	0	0.1	0	0.01	0	0	7
Fugitive Dust	0	0	0	0	3.3	0.49	0
Subtotal - Site Grading	0.38	1.63	0	3.26	3.46	0.64	239
Building Construction							
Construction Equipment	0.43	1.53	0	3.49	0.19	0.17	288
On-Road Trucks	0.02	0.17	0	0.38	0.02	0.01	41
Worker Trips	0.01	0.42	0	0.02	0	0	29
Subtotal - Building Construction	0.47	2.12	0	3.89	0.21	0.19	358
Total - All Phases	0.84	3.75	0	7.15	3.67	0.83	597
Average No. Milk Cows per Dairy	1,674						
Construction Emissions per Milk Cow (lb/milk cow)	1.0	4.5	0.0	8.5	4.4	1.0	786
No. Additional Milk Cows Relative to Existing Facilities	122,575						
Total Construction Emissions to accommodate additional animals relative to existing facilities (tons, metric tons for CO2)	61	275	0	523	269	61	43,702
Average Construction Emissions per Year (ton/yr, metric ton/yr for CO2)	6	27	0	52	27	6	4,370

Notes:

1. Source: Construction emission calculations for FM Jerseys Dairy. September 12, 2008.
2. Emissions were calculated using the Urbemis 2007 program, version 9.2.4 (Rimpo and Associates, 2008).
3. Emission factors represent 2007 conditions; average vehicle emissions after 2007 would be lower due to a newer vehicle fleet and more stringent emission standards.
4. One metric ton equals 1.1 U.S. (short) tons or 2,205 pounds.
5. Grading fugitive dust emissions are based on an emission factor of 0.11 ton/acre/month. Source: Western Governors' Association. Western Regional Air Partnership (WRAP) Fugitive Dust Handbook. 9/7/06. Table 3-2. Grading was assumed to occur over 5 acres of actively disturbed land each day for 6 months.
6. Construction emissions in this table represent new construction beyond the existing facilities. Total emissions were averaged over 10 years to obtain average annual construction emissions.

Attachment 2

Construction Emissions Study for FM Jerseys Dairy

Emission Estimates for Project Construction

Construction of the proposed project would generate emissions of vehicle exhaust from construction equipment, haul trucks, and construction worker trips. The two primary construction activities would be site grading and building construction. The site grading phase would last for about 3 months. The building construction phase, which consists of installation of utilities, finish grading, foundation work, and building of structures, would last for about 6 months. The combined duration of both phases would be about 9 months.

The construction equipment anticipated for the site grading phase includes:

- 1 crawler tractor
- 1 excavator
- 1 grader
- 3 scrapers
- 2 tractors/loaders/backhoes
- 1 water truck

All grading equipment was assumed to operate 8 hours per day, 5 days per week, for 3 months.

The construction equipment anticipated for the building construction phase includes:

- 2 bore/drill rigs
- 1 concrete/industrial saw
- 1 crane
- 1 excavator
- 1 grader
- 1 welder
- 1 paver
- 2 rough-terrain forklifts
- 2 rubber-tired dozers
- 1 scraper
- 2 tractors/loaders/backhoes
- 1 trencher

All building construction equipment except the paver was assumed to operate 4 hours per day, 5 days per week, for 6 months. The paver was assumed to operate for 8 hours per day for 2 weeks (10 work days). Emissions from concrete trucks were based on the assumption that 1,225 concrete truck deliveries would be required. During building construction, it was assumed that construction vendors would average 3 visits or deliveries per day.

Project construction emissions of the criteria pollutants VOC, NO_x, CO, SO₂, PM₁₀, and PM_{2.5} were calculated using the Urbemis 2007 program, version 9.2.4 (Rimpo and Associates, 2008). The total criteria pollutant emissions from vehicle exhaust during project construction are presented in Table 1.

Project construction emission of the greenhouse gas CO₂ were also calculated using Urbemis 2007. The total CO₂ emissions during project construction are presented in Table 2. By convention, the CO₂ emissions are reported in units of metric tons, which are equivalent to 1.1 U.S. (short) tons or 2,205 pounds.

The Urbemis 2007 printouts are included in Appendix A.

Table 1. Total Vehicle Exhaust Criteria Pollutant Emissions Associated with Project Construction

Emission Source	Total Emissions (tons)					
	VOC	NO _x	CO	SO ₂	PM ₁₀	PM _{2.5}
Site Grading						
Construction Equipment	0.37	3.25	1.53	0.00	0.16	0.15
Worker Trips	0.00	0.01	0.10	0.00	0.00	0.00
Subtotal - Site Grading	0.38	3.26	1.63	0.00	0.16	0.15
Building Construction						
Construction Equipment	0.43	3.49	1.53	0.00	0.19	0.17
On-Road Trucks	0.02	0.38	0.17	0.00	0.02	0.01
Worker Trips	0.01	0.02	0.42	0.00	0.00	0.00
Subtotal - Building Construction	0.47	3.89	2.12	0.00	0.21	0.19
Total - All Phases	0.84	7.15	3.75	0.00	0.37	0.34
CEQA Annual Emission Thresholds	10	10	--	--	15	--
Significant?	No	No	--	--	No	--

Table 2. Total CO₂ Emissions Associated with Project Construction

Emission Source	CO ₂ Emissions (metric tons ^a)
Site Grading	
Construction Equipment	232
Worker Trips	7
Subtotal - Site Grading	239
Building Construction	
Construction Equipment	288
On-Road Trucks	41
Worker Trips	29
Subtotal - Building Construction	358
Total - All Phases	597

^a One metric ton equals 1.1 U.S. (short) tons or 2,205 pounds.

References

Rimpo and Associates, 2008. Urbemis 2007 Version 9.2.4. <http://www.urbemis.com>. February.

Appendix A
Urbemis 2007 Output File

Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name: C:\John\Projects\FM Jerseys Dairy\Construction FM Jerseys.urb9

Project Name: FM Jerseys Dairy Construction

Project Location: California State-wide

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

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</u>	<u>PM10 Dust</u>	<u>PM10 Exhaust</u>	<u>PM10</u>	<u>PM2.5 Dust</u>	<u>PM2.5 Exhaust</u>	<u>PM2.5</u>	<u>CO2</u>
2007 TOTALS (tons/year unmitigated)	0.84	7.15	3.75	0.00	0.00	0.36	0.37	0.00	0.33	0.34	658.39

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

	<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</u>	<u>PM10 Dust</u>	<u>PM10 Exhaust</u>	<u>PM10</u>	<u>PM2.5 Dust</u>	<u>PM2.5 Exhaust</u>	<u>PM2.5</u>	<u>CO2</u>
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2007	0.84	7.15	3.75	0.00	0.00	0.36	0.37	0.00	0.33	0.34	658.39
Fine Grading 04/01/2007-06/30/2007	0.38	3.26	1.63	0.00	0.00	0.16	0.16	0.00	0.15	0.15	263.35
Fine Grading Dust	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Off Road Diesel	0.37	3.25	1.53	0.00	0.00	0.16	0.16	0.00	0.15	0.15	255.88
Fine 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
Fine Grading Worker Trips	0.00	0.01	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.47
Asphalt 07/01/2007-07/14/2007	0.02	0.33	0.12	0.00	0.00	0.01	0.02	0.00	0.01	0.01	34.93
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	0.03	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.93
Paving On Road Diesel	0.02	0.29	0.10	0.00	0.00	0.01	0.01	0.00	0.01	0.01	32.88
Paving Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13
Building 07/01/2007-12/31/2007	0.44	3.57	2.00	0.00	0.00	0.19	0.19	0.00	0.17	0.18	360.11
Building Off Road Diesel	0.42	3.46	1.51	0.00	0.00	0.19	0.19	0.00	0.17	0.17	315.31
Building Vendor Trips	0.01	0.08	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.69
Building Worker Trips	0.01	0.02	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	32.11

Phase Assumptions

Phase: Fine Grading 4/1/2007 - 6/30/2007 - Site Grading

Total Acres Disturbed: 0

Maximum Daily Acreage Disturbed: 0

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Crawler Tractors (147 hp) operating at a 0.64 load factor for 8 hours per day

1 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day

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- 1 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day
- 3 Scrapers (313 hp) operating at a 0.72 load factor for 8 hours per day
- 2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day
- 1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Paving 7/1/2007 - 7/14/2007 - Pour Concrete

Acres to be Paved: 60.6

Off-Road Equipment:

- 1 Pavers (100 hp) operating at a 0.62 load factor for 8 hours per day

Phase: Building Construction 7/1/2007 - 12/31/2007 - Build Dairy Facilities

Off-Road Equipment:

- 2 Bore/Drill Rigs (291 hp) operating at a 0.75 load factor for 4 hours per day
- 1 Concrete/Industrial Saws (10 hp) operating at a 0.73 load factor for 4 hours per day
- 1 Cranes (399 hp) operating at a 0.43 load factor for 4 hours per day
- 1 Excavators (168 hp) operating at a 0.57 load factor for 4 hours per day
- 1 Graders (174 hp) operating at a 0.61 load factor for 4 hours per day
- 2 Rough Terrain Forklifts (93 hp) operating at a 0.6 load factor for 4 hours per day
- 2 Rubber Tired Loaders (164 hp) operating at a 0.54 load factor for 4 hours per day
- 1 Scrapers (313 hp) operating at a 0.72 load factor for 4 hours per day
- 2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 4 hours per day
- 1 Trenchers (63 hp) operating at a 0.75 load factor for 4 hours per day
- 1 Welders (45 hp) operating at a 0.45 load factor for 4 hours per day

Appendix F

California Governor's Executive Order B-29-15

Executive Department
State of California

EXECUTIVE ORDER B-29-15

WHEREAS on January 17, 2014, I proclaimed a State of Emergency to exist throughout the State of California due to severe drought conditions; and

WHEREAS on April 25, 2014, I proclaimed a Continued State of Emergency to exist throughout the State of California due to the ongoing drought; and

WHEREAS California's water supplies continue to be severely depleted despite a limited amount of rain and snowfall this winter, with record low snowpack in the Sierra Nevada mountains, decreased water levels in most of California's reservoirs, reduced flows in the state's rivers and shrinking supplies in underground water basins; and

WHEREAS the severe drought conditions continue to present urgent challenges including: drinking water shortages in communities across the state, diminished water for agricultural production, degraded habitat for many fish and wildlife species, increased wildfire risk, and the threat of saltwater contamination to fresh water supplies in the Sacramento-San Joaquin Bay Delta; and

WHEREAS a distinct possibility exists that the current drought will stretch into a fifth straight year in 2016 and beyond; and

WHEREAS new expedited actions are needed to reduce the harmful impacts from water shortages and other impacts of the drought; and

WHEREAS the magnitude of the severe drought conditions continues to present threats beyond the control of the services, personnel, equipment, and facilities of any single local government and require the combined forces of a mutual aid region or regions to combat; and

WHEREAS under the provisions of section 8558(b) of the Government Code, I find that conditions of extreme peril to the safety of persons and property continue to exist in California due to water shortage and drought conditions with which local authority is unable to cope; and

WHEREAS under the provisions of section 8571 of the California Government Code, I find that strict compliance with various statutes and regulations specified in this order would prevent, hinder, or delay the mitigation of the effects of the drought.

NOW, THEREFORE, I, EDMUND G. BROWN JR., Governor of the State of California, in accordance with the authority vested in me by the Constitution and statutes of the State of California, in particular Government Code sections 8567 and 8571 of the California Government Code, do hereby issue this Executive Order, effective immediately.

IT IS HEREBY ORDERED THAT:

1. The orders and provisions contained in my January 17, 2014 Proclamation, my April 25, 2014 Proclamation, and Executive Orders B-26-14 and B-28-14 remain in full force and effect except as modified herein.

SAVE WATER

2. The State Water Resources Control Board (Water Board) shall impose restrictions to achieve a statewide 25% reduction in potable urban water usage through February 28, 2016. These restrictions will require water suppliers to California's cities and towns to reduce usage as compared to the amount used in 2013. These restrictions should consider the relative per capita water usage of each water suppliers' service area, and require that those areas with high per capita use achieve proportionally greater reductions than those with low use. The California Public Utilities Commission is requested to take similar action with respect to investor-owned utilities providing water services.
3. The Department of Water Resources (the Department) shall lead a statewide initiative, in partnership with local agencies, to collectively replace 50 million square feet of lawns and ornamental turf with drought tolerant landscapes. The Department shall provide funding to allow for lawn replacement programs in underserved communities, which will complement local programs already underway across the state.
4. The California Energy Commission, jointly with the Department and the Water Board, shall implement a time-limited statewide appliance rebate program to provide monetary incentives for the replacement of inefficient household devices.
5. The Water Board shall impose restrictions to require that commercial, industrial, and institutional properties, such as campuses, golf courses, and cemeteries, immediately implement water efficiency measures to reduce potable water usage in an amount consistent with the reduction targets mandated by Directive 2 of this Executive Order.
6. The Water Board shall prohibit irrigation with potable water of ornamental turf on public street medians.
7. The Water Board shall prohibit irrigation with potable water outside of newly constructed homes and buildings that is not delivered by drip or microspray systems.

8. The Water Board shall direct urban water suppliers to develop rate structures and other pricing mechanisms, including but not limited to surcharges, fees, and penalties, to maximize water conservation consistent with statewide water restrictions. The Water Board is directed to adopt emergency regulations, as it deems necessary, pursuant to Water Code section 1058.5 to implement this directive. The Water Board is further directed to work with state agencies and water suppliers to identify mechanisms that would encourage and facilitate the adoption of rate structures and other pricing mechanisms that promote water conservation. The California Public Utilities Commission is requested to take similar action with respect to investor-owned utilities providing water services.

INCREASE ENFORCEMENT AGAINST WATER WASTE

9. The Water Board shall require urban water suppliers to provide monthly information on water usage, conservation, and enforcement on a permanent basis.
10. The Water Board shall require frequent reporting of water diversion and use by water right holders, conduct inspections to determine whether illegal diversions or wasteful and unreasonable use of water are occurring, and bring enforcement actions against illegal diverters and those engaging in the wasteful and unreasonable use of water. Pursuant to Government Code sections 8570 and 8627, the Water Board is granted authority to inspect property or diversion facilities to ascertain compliance with water rights laws and regulations where there is cause to believe such laws and regulations have been violated. When access is not granted by a property owner, the Water Board may obtain an inspection warrant pursuant to the procedures set forth in Title 13 (commencing with section 1822.50) of Part 3 of the Code of Civil Procedure for the purposes of conducting an inspection pursuant to this directive.
11. The Department shall update the State Model Water Efficient Landscape Ordinance through expedited regulation. This updated Ordinance shall increase water efficiency standards for new and existing landscapes through more efficient irrigation systems, greywater usage, onsite storm water capture, and by limiting the portion of landscapes that can be covered in turf. It will also require reporting on the implementation and enforcement of local ordinances, with required reports due by December 31, 2015. The Department shall provide information on local compliance to the Water Board, which shall consider adopting regulations or taking appropriate enforcement actions to promote compliance. The Department shall provide technical assistance and give priority in grant funding to public agencies for actions necessary to comply with local ordinances.
12. Agricultural water suppliers that supply water to more than 25,000 acres shall include in their required 2015 Agricultural Water Management Plans a detailed drought management plan that describes the actions and measures the supplier will take to manage water demand during drought. The Department shall require those plans to include quantification of water supplies and demands for 2013, 2014, and 2015 to the extent data is available. The Department will provide technical assistance to water suppliers in preparing the plans.

10. The Water Board shall require frequent reporting of water diversion and use by water right holders, conduct inspections to determine whether illegal diversions or wasteful and unreasonable use of water are occurring, and bring enforcement actions against illegal diverters and those engaging in the wasteful and unreasonable use of water. Pursuant to Government Code sections 8570 and 8627, the Water Board is granted authority to inspect property or diversion facilities to ascertain compliance with water rights laws and regulations where there is cause to believe such laws and regulations have been violated. When access is not granted by a property owner, the Water Board may obtain an inspection warrant pursuant to the procedures set forth in Title 13 (commencing with section 1822.50) of Part 3 of the Code of Civil Procedure for the purposes of conducting an inspection pursuant to this directive.

11. The Department shall update the State Model Water Efficient Landscape Ordinance through expedited regulation. This updated Ordinance shall increase water efficiency standards for new and existing landscapes through more efficient irrigation systems, greywater usage, onsite storm water capture, and by limiting the portion of landscapes that can be covered in turf. It will also require reporting on the implementation and enforcement of local ordinances, with required reports due by December 31, 2015. The Department shall provide information on local compliance to the Water Board, which shall consider adopting regulations or taking appropriate enforcement actions to promote compliance. The Department shall provide technical assistance and give priority in grant funding to public agencies for actions necessary to comply with local ordinances.

12. Agricultural water suppliers that supply water to more than 25,000 acres shall include in their required 2015 Agricultural Water Management Plans a detailed drought management plan that describes the actions and measures the supplier will take to manage water demand during drought. The Department shall require those plans to include quantification of water supplies and demands for 2013, 2014, and 2015 to the extent data is available. The Department will provide technical assistance to water suppliers in preparing the plans.

13. Agricultural water suppliers that supply water to 10,000 to 25,000 acres of irrigated lands shall develop Agricultural Water Management Plans and submit the plans to the Department by July 1, 2016. These plans shall include a detailed drought management plan and quantification of water supplies and demands in 2013, 2014, and 2015, to the extent that data is available. The Department shall give priority in grant funding to agricultural water suppliers that supply water to 10,000 to 25,000 acres of land for development and implementation of Agricultural Water Management Plans.
14. The Department shall report to Water Board on the status of the Agricultural Water Management Plan submittals within one month of receipt of those reports.
15. Local water agencies in high and medium priority groundwater basins shall immediately implement all requirements of the California Statewide Groundwater Elevation Monitoring Program pursuant to Water Code section 10933. The Department shall refer noncompliant local water agencies within high and medium priority groundwater basins to the Water Board by December 31, 2015, which shall consider adopting regulations or taking appropriate enforcement to promote compliance.
16. The California Energy Commission shall adopt emergency regulations establishing standards that improve the efficiency of water appliances, including toilets, urinals, and faucets available for sale and installation in new and existing buildings.

INVEST IN NEW TECHNOLOGIES

17. The California Energy Commission, jointly with the Department and the Water Board, shall implement a Water Energy Technology (WET) program to deploy innovative water management technologies for businesses, residents, industries, and agriculture. This program will achieve water and energy savings and greenhouse gas reductions by accelerating use of cutting-edge technologies such as renewable energy-powered desalination, integrated on-site reuse systems, water-use monitoring software, irrigation system timing and precision technology, and on-farm precision technology.

STREAMLINE GOVERNMENT RESPONSE

18. The Office of Emergency Services and the Department of Housing and Community Development shall work jointly with counties to provide temporary assistance for persons moving from housing units due to a lack of potable water who are served by a private well or water utility with less than 15 connections, and where all reasonable attempts to find a potable water source have been exhausted.
19. State permitting agencies shall prioritize review and approval of water infrastructure projects and programs that increase local water supplies, including water recycling facilities, reservoir improvement projects, surface water treatment plants, desalination plants, stormwater capture, and greywater systems. Agencies shall report to the Governor's Office on applications that have been pending for longer than 90 days.

20. The Department shall take actions required to plan and, if necessary, implement Emergency Drought Salinity Barriers in coordination and consultation with the Water Board and the Department of Fish and Wildlife at locations within the Sacramento - San Joaquin delta estuary. These barriers will be designed to conserve water for use later in the year to meet state and federal Endangered Species Act requirements, preserve to the extent possible water quality in the Delta, and retain water supply for essential human health and safety uses in 2015 and in the future.
21. The Water Board and the Department of Fish and Wildlife shall immediately consider any necessary regulatory approvals for the purpose of installation of the Emergency Drought Salinity Barriers.
22. The Department shall immediately consider voluntary crop idling water transfer and water exchange proposals of one year or less in duration that are initiated by local public agencies and approved in 2015 by the Department subject to the criteria set forth in Water Code section 1810.
23. The Water Board will prioritize new and amended safe drinking water permits that enhance water supply and reliability for community water systems facing water shortages or that expand service connections to include existing residences facing water shortages. As the Department of Public Health's drinking water program was transferred to the Water Board, any reference to the Department of Public Health in any prior Proclamation or Executive Order listed in Paragraph 1 is deemed to refer to the Water Board.
24. The California Department of Forestry and Fire Protection shall launch a public information campaign to educate the public on actions they can take to help to prevent wildfires including the proper treatment of dead and dying trees. Pursuant to Government Code section 8645, \$1.2 million from the State Responsibility Area Fire Prevention Fund (Fund 3063) shall be allocated to the California Department of Forestry and Fire Protection to carry out this directive.
25. The Energy Commission shall expedite the processing of all applications or petitions for amendments to power plant certifications issued by the Energy Commission for the purpose of securing alternate water supply necessary for continued power plant operation. Title 20, section 1769 of the California Code of Regulations is hereby waived for any such petition, and the Energy Commission is authorized to create and implement an alternative process to consider such petitions. This process may delegate amendment approval authority, as appropriate, to the Energy Commission Executive Director. The Energy Commission shall give timely notice to all relevant local, regional, and state agencies of any petition subject to this directive, and shall post on its website any such petition.

26. For purposes of carrying out directives 2-9, 11, 16-17, 20-23, and 25, Division 13 (commencing with section 21000) of the Public Resources Code and regulations adopted pursuant to that Division are hereby suspended. This suspension applies to any actions taken by state agencies, and for actions taken by local agencies where the state agency with primary responsibility for implementing the directive concurs that local action is required, as well as for any necessary permits or approvals required to complete these actions. This suspension, and those specified in paragraph 9 of the January 17, 2014 Proclamation, paragraph 19 of the April 25, 2014 proclamation, and paragraph 4 of Executive Order B-26-14, shall remain in effect until May 31, 2016. Drought relief actions taken pursuant to these paragraphs that are started prior to May 31, 2016, but not completed, shall not be subject to Division 13 (commencing with section 21000) of the Public Resources Code for the time required to complete them.
27. For purposes of carrying out directives 20 and 21, section 13247 and Chapter 3 of Part 3 (commencing with section 85225) of the Water Code are suspended.
28. For actions called for in this proclamation in directive 20, the Department shall exercise any authority vested in the Central Valley Flood Protection Board, as codified in Water Code section 8521, et seq., that is necessary to enable these urgent actions to be taken more quickly than otherwise possible. The Director of the Department of Water Resources is specifically authorized, on behalf of the State of California, to request that the Secretary of the Army, on the recommendation of the Chief of Engineers of the Army Corps of Engineers, grant any permission required pursuant to section 14 of the Rivers and Harbors Act of 1899 and codified in section 48 of title 33 of the United States Code.
29. The Department is directed to enter into agreements with landowners for the purposes of planning and installation of the Emergency Drought Barriers in 2015 to the extent necessary to accommodate access to barrier locations, land-side and water-side construction, and materials staging in proximity to barrier locations. Where the Department is unable to reach an agreement with landowners, the Department may exercise the full authority of Government Code section 8572.
30. For purposes of this Executive Order, chapter 3.5 (commencing with section 11340) of part 1 of division 3 of the Government Code and chapter 5 (commencing with section 25400) of division 15 of the Public Resources Code are suspended for the development and adoption of regulations or guidelines needed to carry out the provisions in this Order. Any entity issuing regulations or guidelines pursuant to this directive shall conduct a public meeting on the regulations and guidelines prior to adopting them.

31. In order to ensure that equipment and services necessary for drought response can be procured quickly, the provisions of the Government Code and the Public Contract Code applicable to state contracts, including, but not limited to, advertising and competitive bidding requirements, are hereby suspended for directives 17, 20, and 24. Approval by the Department of Finance is required prior to the execution of any contract entered into pursuant to these directives.

This Executive Order is not intended to, and does not, create any rights or benefits, substantive or procedural, enforceable at law or in equity, against the State of California, its agencies, departments, entities, officers, employees, or any other person.

I FURTHER DIRECT that as soon as hereafter possible, this Order be filed in the Office of the Secretary of State and that widespread publicity and notice be given to this Order.

IN WITNESS WHEREOF I have
hereunto set my hand and caused the
Great Seal of the State of California to
be affixed this 1st day of April 2015.

EDMUND G. BROWN JR.
Governor of California

ATTEST:

ALEX PADILLA
Secretary of State

Appendix G

Programmatic Water Supply Technical Memorandum

TULARE COUNTY

**TECHNICAL MEMORANDUM:
PROGRAMMATIC WATER
SUPPLY EVALUATION**

**FOR THE
ANIMAL CONFINEMENT
FACILITIES PLAN EIR**

Programmatic Water Supply Evaluation Technical Memorandum

Prepared for the
Tulare County Resource Management Agency

Draft
January 2016

Prepared by:



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SECTION 1 – PROJECT INTRODUCTION

1.1 INTRODUCTION

As the lead agency under the California Environmental Quality Act (“CEQA”), the Tulare County (“County”) Resource Management Agency (“RMA”) is assessing the potential environmental impacts associated with anticipated growth in the dairy and feedlot industry within the County. RMA’s Animal Confinement Facilities Plan and Ordinance Amendment (“ACFP”) contemplates an update to existing ordinances and previously projected industry growth.

To support the ACFP’s planned CEQA analysis, this Programmatic Water Supply Evaluation (PWSE) has been prepared to assess the water demand stemming from anticipated industry-wide growth within the County, and to programmatically evaluate the availability of water resource to meet the expected demand.

This PWSE will be incorporated by the RMA into the Environmental Impact Report (EIR) being prepared for the ACFP.

Relation to Prior EIR

The *Animal Confinement Facilities Plan, Phase I: Dairy/Bovine Animal Confinement Facilities and Program Environmental Impact Report (State Clearinghouse #99031044)* was adopted by the County of Tulare on April 11, 2000.

Phase I of the ACFP document referred to "*dairy and other bovine animal confinement facilities*." Phase II of the ACFP document referred to "*all other livestock (including swine, sheep, rabbit, poultry, ratite, and other bird) raising facilities*." Phase II was not drafted or adopted. The proposed project for which the current ACFP EIR is being prepared is an update to the *Animal Confinement Facilities Plan-Phase I: Dairy/Bovine Animal Confinement Facilities* (“ACF”).

1.2 DOCUMENT ORGANIZATION

This PWSE is organized according to the following sections:

- ◆ **Section 1: Introduction.** This section provides an overview of basis and objective of the PWSE, and a description of the anticipated growth in ACF, especially the elements that will require water service.
- ◆ **Section 2: Estimated ACF Water Demands.** This section describes the methodology used to estimate existing and anticipated future ACF water demands, and provides summaries of the existing and anticipated future water demand.
- ◆ **Section 3: Programmatic Evaluation.** This section evaluates the availability of water to meet the needs of projected ACF expansion within the County.

- ◆ **Section 4: Summary and Conclusions.** This section summarizes the information from the prior sections and provides necessary conclusions for use in the ACFP EIR.

1.3 THE DAIRY/BOVINE ANIMAL CONFINEMENT FACILITIES IN TULARE COUNTY

The dairy/bovine industry in Tulare County is number one in the state and nation in annual milk production, totaling more than \$2.1 billion, according to the 2013 Tulare County Agricultural Crop and Livestock Report.¹ As such, the County recognizes the economic importance of this industry and seeks to continue to support the industry as a vital part of the County’s agricultural fabric.

Existing Conditions

According to information reported to the County by ACFs for the period 2011 through 2013, approximately 330 active ACFs are located within the County.² For 2011 through 2013, an average of 1,020,000 animals were housed at these ACFs, along with supporting facilities and acres of feed crops.³ This is equivalent to an average of approximately 732,000 animal units (“AU”) as defined by the County (see **Appendix A**).⁴ For the analysis in this PWSE, 2011 values are defined as the baseline condition, though are used to represent animal counts in 2013: 1,037,137 animals (741,040 AU).

The summary of 2011 through 2013 data is provided in **Table 1-1**. Existing ACFs and support facilities are spread throughout the valley floor portion of the County, as shown in **Figure 1-1**.

Table 1-1 – Summary of Existing ACF Animals and Animal Units
(source: Tulare County RMA 2011-2013 Compliance Reports)

Year	Dairy		Feedlot		Total	
	Head	AU	Head	AU	Head	AU
2011	928,492	698,359	108,645	42,680	1,037,137	741,040
2012	909,612	691,861	107,408	42,080	1,017,020	733,941
2013	897,920	678,829	107,770	42,238	1,005,690	721,066
Average	912,008	689,683	107,941	42,332	1,019,949	732,016

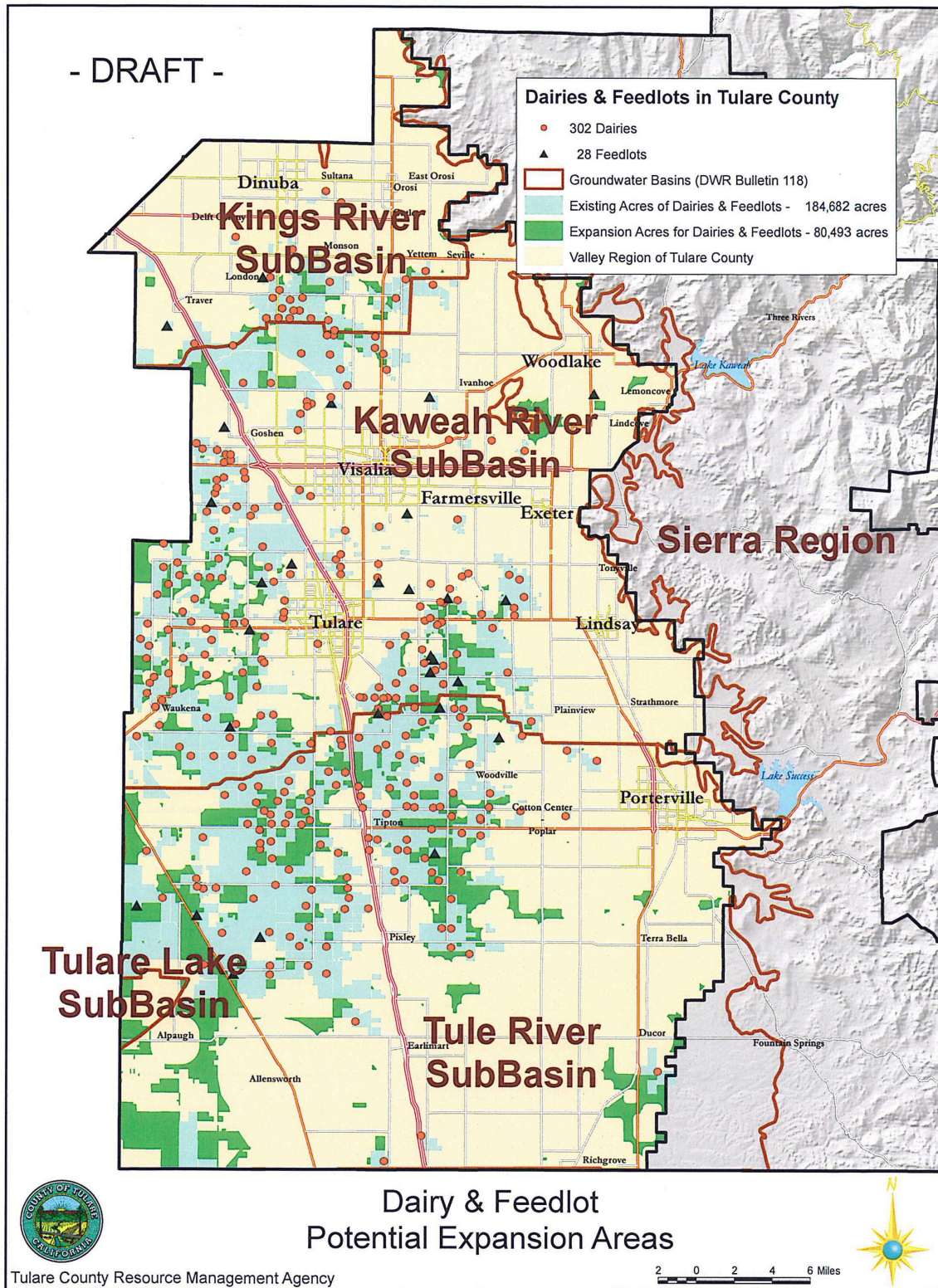
¹ Tulare County Agricultural Commissioner web page. Last accessed 02-09-15.
<http://agcomm.co.tulare.ca.us/default/>

² Animal Confinement Facilities are required to complete annual compliance reports and return them to the County. This information is tabulated by the RMA. The value provided in this document also includes 17 ACFs either not reported in compliance forms or altogether unreported. These 17 values are tracked separately by the RMA.

³ Spreadsheet provide by RMA via email on 11-19-14 “*Final 11-18-14 -- Master Table 2 – List of Individual Dairy and Feedlot AU and Herd Numbers.xls*”

⁴ On average during 2011 through 2013, one AU represents about 72% of an animal head.

Figure 1-1 – Existing and Potential Expansion Areas for Animal Confinement Facilities in Tulare County



Dairy herd sizes range from 200 milking cows, principally older facilities, to 2,000 and more milking cows in newer or expanded facilities. Other supportive, offsite feedlots and calf ranches range from five acres to 80 acres in size with typical animal densities of 25 AU per acre. When milk demand diminishes, increasing numbers of support animals tend to be maintained on dairies and some dairies temporarily convert to feedlot operations. The remainder of this PWSE will present information in terms of Animal Units (“AUs”) to accommodate fluctuations which may switch animals between County-defined categories as industry factors dictate.

Using the 2011 AU count, it is estimated that approximately 29,000 acres are dedicated to ACF – excluding acreage used to produce feed.⁵ As listed in **Figure 1-1**, the ACFs cover approximately 185,000 acres, meaning about 156,000 acres are dedicated to producing on-site feed – or about one acre for every 5 AUs.⁶ On-site feed production does not meet the entire feed requirements for the existing dairies, so this reflects the on-site cropped acreage only.

The additional off-site acreage dedicated to ACF feed production can be estimated by evaluating the entire 2011 feed crop information and subtracting away the portion already reflected on-site. According to the 2011 Tulare County Agricultural Crop and Livestock Report, total harvested acreage for alfalfa hay, corn silage, and small grain silage were 81,400, 156,000, and 175,000 respectively – for a total of 412,400 acres. Though other crops may also support ACFs, these three crops represent the majority of feed crop production, and are conservatively assumed to be delivered and fed within the County only.⁷ As previously represented, baseline on-site feed production is estimated to be 156,000 acres of the 185,000 total ACF acres. Subtracting this results in an estimated 174,000 acres of off-site feed production as the baseline condition. Given the existing number of AUs, this value represents approximately 4 AUs per off-site feed crop acre.

Using the data presented in the legend of **Figure 1-1**, one ACF is about 560 acres.⁸ Using an average herd size of 1,500 AUs, each ACF would have approximately 60 acres dedicated to animal confinement and operations (about 10%), and 500 acres of on-site land dedicated to irrigated lands to produce feed, along with 500 acres of off-site feed crop acreage. This reflects an approximate one-to-one relationship between on-site and off-site feed crop requirements.

These values are estimates to represent average baseline conditions for purposes of determining the increase in total ACFs and associated land under the future conditions.

Future Conditions

The County anticipates the ACF industry will continue to be an important component of the local economy and, as such, anticipates industry growth. Although many factors drive growth of this

⁵ Using the estimate of 25 animal units per acre, the 741,000 AUs would require approximately 29,000 acres.

⁶ The remaining 156,000 acres is assumed to produce feed for the 741,040 AUs at 0.21 acre/AU or 1 acre/5 AU.

⁷ While a small percentage of these crops may cross into adjacent counties or be exported further (e.g. some alfalfa hay), for purposes of the PWSE all of the harvested acres are assumed to be part of the baseline.

⁸ 330 ACF spread over 184,682 acres = 560 acres/ACF.

industry, this WSE uses a growth rate of 1.5% to the year 2023 to evaluate the availability and affects on County water resources. This growth rate uses the 2011 AU values, but assumes those to be the baseline in 2013.⁹ This results in approximately 860,000 AUs – about 1.198 million head. This reflects an additional 119,000 AUs in the County. Accompanying the increased number of AUs will be an increased number of acres dedicated to ACFs – for animal confinement and operations, on-site feed production, and off-site feed production.

Using the same basis of 25 head per acre, on average, the future condition could require as much as 34,400 acres of confinement facilities – an increase of about 5,400 acres over the baseline.¹⁰ The increase will also require an additional 16,000 acres of lands dedicated to supporting on-site feed production.¹¹ And, based upon the estimated relationship between on-site and off-site feed production needs of approximately one-to-one, this growth will result in 16,000 additional acres of lands dedicated to off-site feed production.

Although, as discussed in the following sections, the on-site and offsite feed production acreage may be simply a conversion from growing another irrigated crop to growing an ACF feed crop instead – and not an entirely new irrigated land water demand.

⁹ Table 1-1 shows actual 2013 animal numbers were lower than 2011.

¹⁰ 860,000 AUs divided by 25 AUs/acre equals 34,400 acres. Thus the additional AUs require 5,400 acres above the baseline value.

¹¹ 860,000 AUs divided by 5 AUs per acre of on-site feed production results in 172,000 acres of feed production – an increase of 16,000 acres.

SECTION 2 – ESTIMATED WATER DEMANDS

2.1 INTRODUCTION

This section describes the methodology, provides the supporting evidence, and presents the estimated annual water demands for the existing and future ACF operations.

2.2 DETERMINING UNIT WATER DEMAND FACTORS

As with most ACF operations in the County, water is needed to meet four primary functions:

1. AU consumption – this represents the water a cow drinks on a daily basis to maintain health.
2. Sanitation and manure removal – this represents the water necessary to clean milking parlors and to otherwise maintain sanitary conditions within the confinement facility itself (e.g. water used within the 10% of the ACF operation where animals are confined – see Section 1.3)
3. Cooling – this represents water used to help mitigate for high County temperatures during summer months for milking cows – often via misters or overhead sprinklers
4. Irrigation of feed crops – this represents the water needed to grow on-site feed crops (on the remaining 90% of the typical ACF operation), and off-site feed crops.

The first three functions can be grouped into one category as the water use is generally associated with animal consumption and facility operations where animals are present. Water use in this category can be determined on a per AU basis. The fourth function is kept separate since water use relates to irrigated crop production. The unit water demand factors are discussed in the next subsections.

Use of Animal Units instead of Total Animal Head

This PWSE uses AUs instead of total animal head (“Head”) to estimate water demands to eliminate the challenges of estimating varying water use per Head-type (e.g. calf, dry cow, bull, heifer, etc.). The AU value represents the entire Head population in terms of milking cows. Data discussed later in this section regarding unit water demand factors are derived primarily from studies of milking cows, including cleaning and sanitation needs within milking parlors. The water demands for a calf, for instance would only be the calf’s consumption demands, as most calf operations do not have manure flushing, need the same cooling, or require parlor sanitation. Given the limited availability of water use data by various individual Head-types (e.g. calf, dry cow, etc.) and the annual fluctuations in the number of animals assigned to any given Head-type as a result of industry fluctuations, estimating water demand based upon a unit demand factor for a milking cow is more supportable. Thus, by converting all Head to milking cow equivalent (AUs), one, supportable water demand factor can be used to estimate total water demand from the anticipated maximum increase in animals.

In addition, the use of unit water demand values by Head type as a basis for estimating water demands – if such data were readily available – would likely not result in notable variance (higher or lower) from the water demand estimated using only one the AU water demand factor. Thus, the assessment of water supply availability included in Section 4 would not differ if the total water demand were estimated based on Head instead of AUs.

Animal Consumptions and Confinement Facility Operations

The amount of water necessary for maintaining animal health along with operational and sanitary needs will vary from facility to facility based upon the number of milking and dry cows or heifers, milk production per lactating cow, ambient temperature, milking parlor design, manure management and other practices. However, as an average value for purposes of evaluating the existing versus future water demands for ACFs, a value of 70 gallons per AU per day is assumed for this PWSE. This value is supported by several references including:

1. *Cattle Care Standards: Recommendations for Meeting California Legal Requirements*, Center for Food Animal Health, School of Veterinary Medicine, University of California, June 1, 2012 – This document indicates water intake needs vary from 4 gallons per day (beef calves at 40 degrees ambient) to 48+ gallons per day (90 pounds of milk per day from 1,300 pound lactating cow at 90 degrees), with average uses ranging from 20 to 40 gallons per day.
2. *Fresh Water Needs for Dairy Farms*, Dean E. Falk, Extension Dairy Specialist, University of Idaho (last accessed on December 23, 2014 at <http://www.oneplan.org/Stock/DairyWater.asp>) – This webpage provides example data from sampled Texas dairy facilities concluding: “[t]hus the Texas data average fresh water use per cow per day for sanitation and drinking was 68.3 gallons.” Texas’ climate and ACF industry have many similarities to the County, which allows this information to be usable as a proxy for this PWSE.
3. *California dairy farmers struggling to survive prolonged drought*, Brianna Sacks, Los Angeles Times article, posted Thursday October 9, 2014 – This LA Times article quotes Ms. Tricia Blattler of the Tulare County Farm Bureau who states: “*The average dairy here is 1,800 cows. So a large-scale dairy farmer needs 126,000 gallons of water per day just for cows.*” Using these quoted values provides an average of 70 gallons per cow per day. Though not a university study, it is likely that Ms. Blattler bases her values on information generally referenced by the County’s ACF industry as supported by local conditions. Thus this industry leader’s representation helps support values presented in the prior referenced sources.

Although ACF best management practices continue to seek efficiencies in water use, this PWSE uses a daily value of 70 gallons per AU for its comparative analysis. This reflects a blended water used for “animal unit” as the demands of milking and dry cows, heifers, calves and other animals will vary.

A unique characteristic of this unit water demand is that a significant portion does not leave the ACF. Rather, it is captured as part of the sanitation operations and routed to on-site lagoons. Reference materials indicate that 30% to 40% of this total unit water demand results in a waste stream routed to lagoons.¹² Lagoon water is then combined with other fresh water sources and applied to adjacent fields to grow the associated ACF feed crops. This relationship will be addressed in Section 3.

Irrigation of Feed Crops

Predominant feed crops grown by the County's ACF industry include corn (for grain and silage) alfalfa (for hay and silage), and small grain for silage.¹³ These primary feed crops are used as proxies to estimate the unit water demands for the irrigated acres at each ACF.

As presented previously, each ACF is estimated to have 500 acres of on-site irrigated feed crops and 500 acres off-site. For purposes of this PWSE, acreage is assumed to be evenly split between corn and alfalfa.¹⁴ To determine a blended unit water demand factor, an average between the per-acre irrigation needs of both crops is developed. The following assumptions are used:

1. Depending on irrigation method and other field-specific conditions, alfalfa can have an applied water demand in Tulare County ranging from 57 to 72 inches per year.¹⁵ An average value of 65 inches per year will be used. This value represents the irrigation water applied to satisfy the crop evapotranspiration needs. A portion of this water percolates below the root zone and ultimately returns to underlying aquifers. However, because a portion of the water applied is from manure lagoons, irrigation systems are closely monitored to minimize deep percolation as part of permitted manure lagoon operations.
2. Irrigation of corn varies based upon when the crop is planted and whether it is grown for silage or grain (corn). A 2008 UC Cooperative Extension study evaluating the cost of

¹² *Scientific Data for Developing Water Budgets on a Dairy*, 2013 Western Dairy Management Conference Proceedings (Report accessed here:

<http://wdmc.org/2013/Scientific%20Data%20for%20Developing%20Water%20Budgets%20on%20a%20Dairy.pdf>

¹³ As indicated in the 2013 Tulare County *Annual Crop and Livestock Report*, these two categories ranked #8 and #10 on the list of top commodities in the County. (Report accessed here:

<http://agcomm.co.tulare.ca.us/default/assets/File/2013%20ANNUAL%20CROP%20AND%20LIVESTOCK%20REPORT.pdf>)

¹⁴ Though the Annual Crop Report for 2013 indicates corn (for grain and silage) acres is greater than alfalfa acreage, this PWSE uses a 50/50 split for a more conservative water demand estimation. This is because alfalfa uses more water than corn on an annual basis and thus a 50/50 split will estimate greater water demand for field crops than at a 60/40 split that more closely matches the 2013 Annual Crop Report. This also accommodates the irrigation demand for double cropping demand small grain with corn, as the grain crops are generally grown over winter and utilize natural rainfall, but also require some irrigation. Using a larger percentage of the total demand to meet alfalfa provides a proxy for the double-cropping irrigation demand.

¹⁵ Key Irrigation Management Practices for Alfalfa, Blake Sanden, Blaine Hanson and Khalid Bali, presented at the UC Cooperative Extension Services' 2012 Alfalfa and Forage Conference. Last accessed on 12/24/14 at: <http://cetulare.ucanr.edu/files/187127.pdf>

producing corn used the following to evaluate irrigation needs: “A preirrigation of 8-acre inches is applied in March. The amount of water applied preplant will vary depending on soil type and moisture remaining from winter rains. From May to August, seven irrigations totaling 36 acre-inches (3.0 acre-feet) of water are applied in the furrows.”¹⁶ Combining the pre-irrigation and irrigation events, a total of 42 inches per acre are assumed to be applied to meet corn produced for grain.

Assuming each acre is equally split between these two crops, this PWSE assumes one acre of irrigated land to require 53.5 inches of applied irrigation water.

2.3 ESTIMATING EXISTING AND FUTURE ACF WATER DEMAND

Estimates of existing and future ACF water demand can be made using the unit demand factors developed in the prior subsection coupled with the AU and acreage information presented in Section 1.

Animal Consumptions and Confinement Facility Operations

The following calculations are used:

$$\begin{aligned}\text{Existing AU Water Demand} &= [AU \text{ unit water demand}] \times [\text{existing AU count}] \\ &= [70 \text{ gallons/AU/day}] \times [741,040 \text{ AU}] \\ &= 51,872,800 \text{ gallons/day} \\ &= 58,105 \text{ acre-feet/year} \\ &= 58,100 \text{ acre-feet/year (rounded)}\end{aligned}$$

$$\begin{aligned}\text{Future AU Water Demand} &= [AU \text{ unit water demand}] \times [\text{future AU count}] \\ &= [70 \text{ gallons/AU/day}] \times [860,000 \text{ AU}] \\ &= 60,200,000 \text{ gallons/day} \\ &= 67,430 \text{ acre-feet/year} \\ &= 67,500 \text{ acre-feet/year (rounded)}\end{aligned}$$

Comparing the existing to future water demands demonstrates that anticipated growth in the industry could increase water demands by about 9,400 acre-feet per year to meet the expanded AU facility water demands.

Irrigation of Feed Crops

To determine the water necessary to feed the expanded herds, the following calculations are used:

¹⁶ University of California Cooperative Extension “Sample Costs to Produce Grain Corn – San Joaquin Valley-South” 2008

Existing Crop

$$\begin{aligned}\text{Existing Crop Water Demand} &= [\text{Crop unit water demand}] \times [\text{existing on-site acres}] \\ (\text{on-site}) &= [53.5 \text{ inches/acre/year}] \times [156,000 \text{ acres}] \\ &= 695,500 \text{ acre-feet/year} \\ &= 695,000 \text{ acre-feet/year (rounded)}\end{aligned}$$

$$\begin{aligned}\text{Existing Crop Water Demand} &= [\text{Crop unit water demand}] \times [\text{existing off-site acres}] \\ (\text{off-site}) &= [53.5 \text{ inches/acre/year}] \times [256,400 \text{ acres}] \\ &= 1,143,100 \text{ acre-feet/year} \\ &= 1,150,000 \text{ acre-feet/year (rounded)}\end{aligned}$$

$$\begin{aligned}\text{Total Existing Crop Water Demand} &= 1,845,000 \text{ acre-feet/year} \\ &= 1,850,000 \text{ acre-feet/year (rounded)}\end{aligned}$$

Future Crop

$$\begin{aligned}\text{Future Crop Water Demand} &= [\text{Crop unit water demand}] \times [\text{future on-site acres}] \\ (\text{on-site}) &= [53.5 \text{ inches/acre/year}] \times [172,000 \text{ acres}] \\ &= 766,830 \text{ acre-feet/year} \\ &= 766,800 \text{ acre-feet/year (rounded)}\end{aligned}$$

$$\begin{aligned}\text{Future Crop Water Demand} &= [\text{Crop unit water demand}] \times [\text{future off-site acres}] \\ (\text{off-site}) &= [53.5 \text{ inches/acre/year}] \times [272,400 \text{ acres}] \\ &= 1,214,450 \text{ acre-feet/year} \\ &= 1,214,500 \text{ acre-feet/year (rounded)}\end{aligned}$$

$$\begin{aligned}\text{Total Future Crop Water Demand} &= 1,981,300 \text{ acre-feet/year} \\ &= 1,980,000 \text{ acre-feet/year (rounded)}\end{aligned}$$

Comparing the existing to future values (rounded) demonstrates that anticipated growth in the industry could increase water demands by about 130,000 acre-feet per year.

To put the existing irrigated feed crop estimate in perspective, the value was compared to values in the 2013 Tulare County Annual Crop and Livestock Report (“Annual Report”).¹⁷ According to the Annual Report, there were approximately 730,000 acres of irrigated field crops grown in the County, with alfalfa, corn silage and small grain silage representing more than half of this value – approximately 435,000 acres. As presented in Section 1, the existing ACF are estimated to grow about 156,000 acres of on-site irrigated feed crops and 256,000 acres of off-site crops – using alfalfa, corn and small grains as the proxy crops. The “new acres” presented above, however, may simply be conversion of existing off-site feed crop acres to “on-site” feed crop

¹⁷ As indicated in the 2013 Tulare County *Annual Crop and Livestock Report*. (Report accessed here: <http://agcomm.co.tulare.ca.us/default/assets/File/2013%20ANNUAL%20CROP%20AND%20LIVESTOCK%20REPORT.pdf>)

acres and conversion of off-site non-feed crops to off-site feed crops. The effect on overall future water demands associated with this concept will be discussed further in Section 3.

2.4 SUMMARY OF ESTIMATED ACF GROSS WATER DEMAND

Combined, the water needed to meet the health and sanitary needs at a confinement facility and the water necessary to grow on-site and off-site feed crops result in an increased gross water demand when compared to the 2011 baseline condition. **Table 2-1** provides a summary of the estimated existing and future ACF gross water demands.

Table 2-1 – Summary of Annual ACF Gross Water Demands

Existing (af/year)		Future (af/year)	
AU	Total Crop	AU	Total Crop
58,100	1,850,000	67,500	1,980,000
Total =	1,908,100		2,047,500
Individual Increase =		9,400	130,000
Total Increase =			139,400

The increased water demand of 139,400 acre-feet per year reflects the estimated 119,000 additional AUs and accompanying facilities, as wells as on-site, and off-site feed crops acres. However, it is likely that substantial ACF growth will occur on existing irrigated agricultural lands – resulting in a net water demand significantly different than the gross water demand.¹⁸

2.5 ESTIMATING NET ACF WATER DEMAND

Although the industry has not experience significant growth in the past decade, when new ACFs are constructed, they are often placed on land previously used for irrigated crops. This essentially changes the land use from irrigated agriculture to an ACF, with the prior and new land use both having water demands. For instance, as shown in the aerial images in **Figure 2-1** and **Figure 2-2**, a new ACF appears in the lower image, replacing previously irrigated crop land.

To reflect the potential for some of the industry growth to occur upon currently non-irrigated lands, 20 percent of the total new acreage is conservatively assumed by this PWSE to occur upon non-irrigated lands – creating an entirely new water demand within the County. The remaining 80 percent of the acreage will convert existing irrigated agricultural to ACF categories (facilities for AUs and irrigated land for on-site feed crops). Table 2-2 shows the resulting distribution of estimated growth on irrigated and non-irrigated lands for each water demand category.

¹⁸ For purposes of this PWSE, the “net” water demand represents the quantity of water that may be greater or less than existing water use on the same acreage upon which the ACF growth occurs.

Table 2-2 – Distribution of Acres

Category	Total Acres	On Irrigated Land	On Non-Irrigated Land
ACF	5,400	4,320	1,080
On-site crops	16,000	12,800	3,200
Off-site crops	16,000	12,800	3,200

Figure 2-1 – Example #1 of ACF replacing existing agriculture

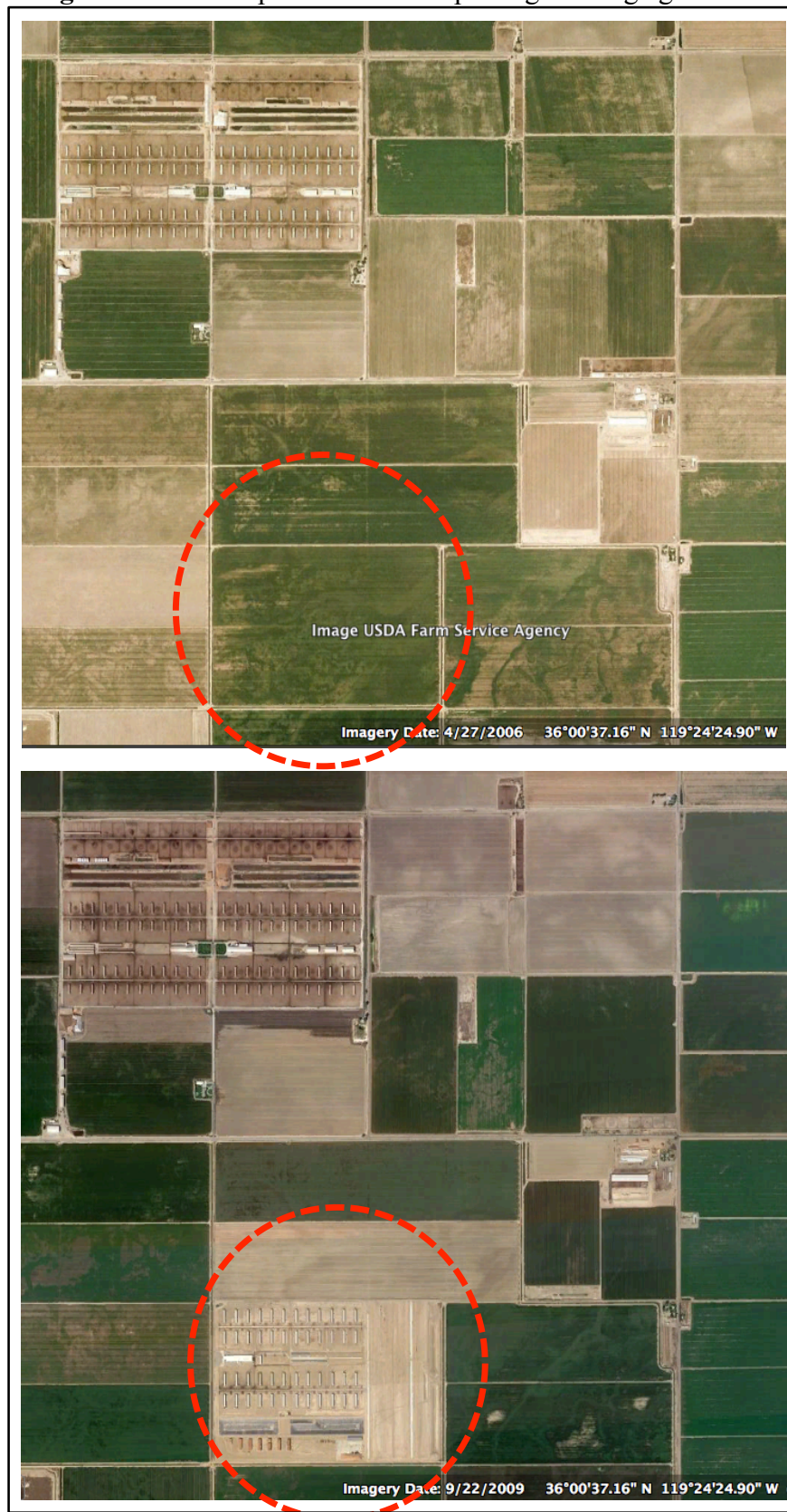


Figure 2-2 – Example #2 of ACF replacing existing agriculture



Net Water Demand Upon Converting Existing Irrigated Lands

For purposes of this PWSE's water availability analysis the average water demand for existing agricultural acreage must be determined. To be consistent with the analysis performed for the Tulare County General Plan 2030 Update Recirculated Draft Environmental Impact Report ("2030 GPU") and documented in Appendix G to the 2030 GPU, the same blended unit water demand values are used: "[t]hus, it is assumed that for each acre of agricultural land that comes out of production within the designated areas of urban growth, there is a reduction in applied water demand of 3.3 acre-feet per year." (2030 GPU, Appendix G, p. 8). This is equivalent to 39.6 inches/acre per year, comparable to the estimated new demand of 53.5 inches/acre per year (see Section 2.2).

Applying this blended water demand to the acreage changing from irrigated agriculture to ACF operations, the following is derived:

$$\begin{aligned}\text{For confinement facilities} &= [\text{acres}] \times [\text{AU demand} - \text{existing applied water}] \\ &= [4,320 \text{ acres}] \times [24 \text{ inches/acre}^{19} - 39.6 \text{ inches/acre}] \\ &= (-67,400) \text{ inches/year} \\ &= (-5,615) \text{ acre-feet/year (note this is a reduction in demand)}\end{aligned}$$

$$\begin{aligned}\text{For on-site crop production} &= [\text{acres}] \times [\text{new applied water} - \text{existing applied water}] \\ &= [12,800 \text{ acres}] \times [53.5 \text{ inches/acre} - 39.6 \text{ inches/acre}] \\ &= 177,920 \text{ inches/year} \\ &= 14,830 \text{ acre-feet/year}\end{aligned}$$

$$\begin{aligned}\text{For off-site crop production} &= [\text{acres}] \times [\text{new applied water} - \text{existing applied water}] \\ &= [12,800 \text{ acres}] \times [53.5 \text{ inches/acre} - 39.6 \text{ inches/acre}] \\ &= 177,920 \text{ inches/year} \\ &= 14,830 \text{ acre-feet/year}\end{aligned}$$

Thus, for the 29,920 acres of land converting from existing irrigated agriculture to new ACFs and supporting off-site crop production, the net water demand is estimated to be 24,045 acre-feet per year.

Net Water Demand Upon Converting Non-Irrigated Lands

Similar to the derivation of net water demand for converting irrigated lands, the net water demand for converting acres of non-irrigated lands is determined by:

$$\begin{aligned}\text{For confinement facilities} &= [\text{acres}] \times [\text{AU demand} - \text{existing applied water}] \\ &= [1,080 \text{ acres}] \times [24 \text{ inches/acre}^{20} - 0 \text{ inches/acre}]\end{aligned}$$

¹⁹ The 24 inches per acre per year value is derived by converting the demand per AU of 70 gallons/day to inches/year, based on 25 AU per acre

²⁰ The 24 inches per acre per year value is derived by converting the demand per AU of 70 gallons/day to inches/year, based on 25 AU per acre

$$= 25,920 \text{ inches/year}$$

$$= 2,160 \text{ acre-feet/year}$$

$$\begin{aligned} \text{For on-site crop production} &= [\text{acres}] \times [\text{new applied water} - \text{existing applied water}] \\ &= [3,200 \text{ acres}] \times [53.5 \text{ inches/acre} - 0 \text{ inches/acre}] \\ &= 171,200 \text{ inches/year} \\ &= 14,267 \text{ acre-feet/year} \end{aligned}$$

$$\begin{aligned} \text{For off-site crop production} &= [\text{acres}] \times [\text{new applied water} - \text{existing applied water}] \\ &= [3,200 \text{ acres}] \times [53.5 \text{ inches/acre} - 0 \text{ inches/acre}] \\ &= 171,200 \text{ inches/year} \\ &= 14,267 \text{ acre-feet/year} \end{aligned}$$

Thus, for the 7,480 acres of land converting from existing non-irrigated agriculture to new ACFs and supporting off-site crop production, the net demand is estimated to be 30,695 acre-feet per.

Total Net Water Use from New ACFs

Adding together the estimated net water demand for both irrigated and non-irrigated lands, the growth in ACFs is expected to have a net increase in demand of:

$$\begin{aligned} \text{Net Water Demand} &= [\text{existing irrigated}] + [\text{existing non-irrigated}] \\ &= [24,045 \text{ acre-feet/year}] + [30,695 \text{ acre-feet/year}] \\ &= 54,740 \text{ acre-feet/year} \\ &= 55,000 \text{ acre-feet/year (rounded)} \end{aligned}$$

However, as discussed previously, a portion of the water associated with AU daily needs is routed to manure lagoons whereupon it is used as a source of irrigation for on-site feed crop production. To be conservative, this PWSE assumes 70 percent of the confinement facility estimated gross water demand is available to meet on-site feed crop production net water demands.²¹ This further reduces the estimated net water associated with anticipated ACF growth as follows:

$$\begin{aligned} \text{Lagoon Water Benefit} &= [\% \text{ benefit}] \times [\text{Increased AU demand (Table 2-1)}] \\ &= [70\%] \times [9,400 \text{ acre-feet/year}] \\ &= 6,580 \text{ acre-feet/year} \\ &= 6,600 \text{ acre-feet/year (rounded)} \end{aligned}$$

For purposes of the analysis in Section 3, the net water demand increase from ACF growth is estimated as follows:

$$\text{Net Water Demand} = 48,400 \text{ acre-feet/year}$$

²¹ To protect receiving waters from quality degradation, dairies are not allowed to discharge water to surface streams nor allow significant deep percolation. Nearly 100% of the water sent to storage lagoons either evaporates or is pumped to irrigate crops.

SECTION 3 – PROGRAMMATIC EVALUATION

This section evaluates the availability of water to meet the needs of projected ACF expansion within the County. Because each specific dairy expansion or related ACF project will require review and approval as specified in existing County ordinances, this section provides a programmatic-level evaluation of water availability. Each permit request will likely need to identify specific water supply sources and needs.

3.1 EXISTING COUNTY WATER USE²²

Existing water demand conditions were estimated based upon planning data available from the California Department of Water Resources (DWR). DWR subdivides California into geographical study areas for planning purposes. Existing Tulare County water demand conditions were calculated based on water demand data provided by DWR at the finest level of detail available – the Detailed Analysis Unit (DAU).

The DAUs included in this water demand analysis are: Alta, Consolidated, Deer Creek, Kaweah Delta, Kaweah River, Kaweah-Tule Interstream, Kings River, Kings-Kaweah Interstream, Northeastern Kern, Orange Cove, Poso Creek, Tulare Lake, Tule Delta, Tule River, and Upper Kern River (see **Figure 3-1**). Where some DAUs straddle the County line, only the portion of the DAU inside the County boundary was considered for purposes of the water demand analysis.

Based upon water demand data developed by DWR for the 2013 California Water Plan Update (“2013 Water Plan”), existing water demand in the County is assumed to be similar to the annual demand for 2010 represented in water budgets developed by DWR for the aforementioned DAUs. DWR has prepared water budgets for the consecutive years 2002 through 2010, where the average applied water estimates for County-wide agricultural and urban uses for this period is closely matched by the 2010 value. Thus, 2010 is used by this PWSE as an “average” condition within the County.²³

For each DAU, DWR calculates *Agricultural*, *Urban* and *Environmental* demands. Within the *Agricultural* demand category, DWR calculates applied water demands for both crop production and conveyance purposes. For the *Urban* demand category, DWR subdivides applied water demands by Large Landscape, Commercial, Industrial, Energy Production, Residential – Interior,

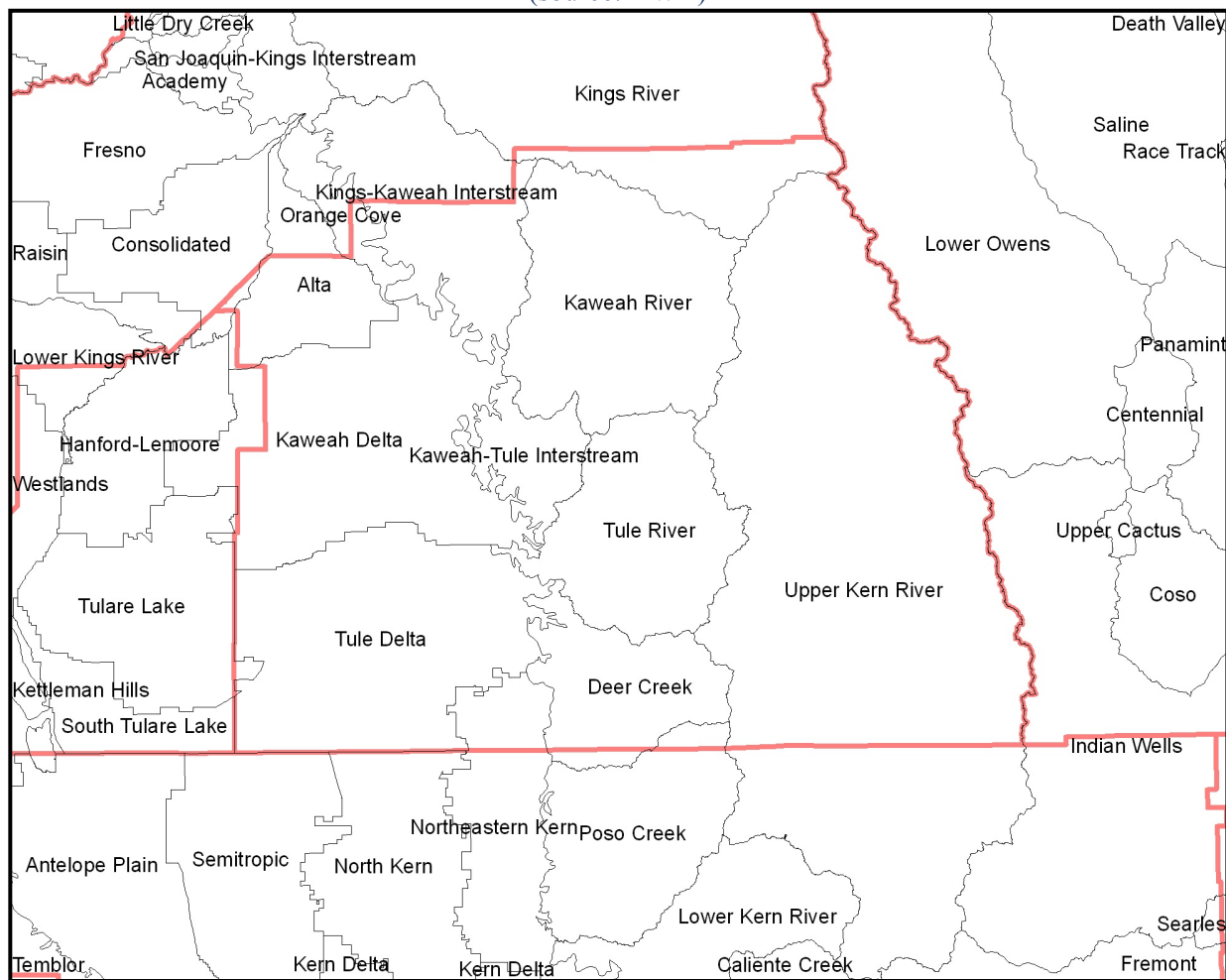
²² The methodology for determining existing County water use in this PWSE mimics the approach used in the *Water Supply Evaluation Technical Appendix* (Appendix G) to the *Tulare County General Plan 2030 Update Recirculated Draft Environmental Impact Report* (February 2010). That report was also prepared by Tully & Young, Inc.

Appendix B to this PWSE provides Tully & Young’s qualifications.

²³ The *Water Supply Evaluation Technical Appendix* (Appendix G) to the *Tulare County General Plan 2030 Update Recirculated Draft Environmental Impact Report* (February 2010) used 2003 as the “average” year based on similar available DWR data for the years 1999, 2002 and 2003. DWR has subsequently created similar water budgets for 2004 through 2010, providing a broader range of years. The 2010 agricultural, urban and environmental “applied water” value is 2,873,800 acre-feet, while the 2002 through 2010 average is 2,833,900 acre-feet (with a maximum of 3,170,400 acre-feet [2009] and a minimum of 2,490,000 acre-feet [2006]). The 2003 value is 2,702,200 acre-feet.

and Residential – Exterior land-use categories. The *Environmental* demands are divided into Instream, Wild and Scenic, Required Delta Outflow, and Managed Wetlands categories. For purposes of this analysis, only the Managed Wetlands demand component will be estimated because it is the only *Environmental* demand category directly related to County land uses.

Figure 3-1 – Map of DWR Detailed Analysis Units
(source: DWR)



Existing water demands are presented by DAU in **Table 3-1** for the entire County. For 2010, total applied water demand for the *Agricultural*, *Urban* and *Environmental* water uses described above, was estimated to be 2,873,800 acre-feet. Notably, 97 percent of total demand was in the three DAUs with the majority of the high quality agricultural land – Alta, Kaweah Delta and Tule Delta. Also, 97 percent of *Urban* demand is within the same three DAUs, as the largest communities in the County are located in and around the prime agricultural land.

Not only are the demands in these three DAUs important for the existing demand calculation but these same DAUs are important for the future condition demand analysis because these represent the areas that will experience the projected growth in ACFs (see Section 2.5).

Table 3-1 – Existing Demand Condition by Detailed Analysis Unit
(Source: California Department of Water Resources – draft water budget data for 2010)

DAU Name: (all values in 1,000 af)	Tulare Lake Tulare Co	Consolidated Tulare Co	Alta Tulare Co	Orange Cove Tulare Co	Kaweah Delta Tulare Co	Tule Delta Tulare Co	Kings River Tulare Co	Kings- Kaweah Interstream Tulare Co	Kaweah River Tulare Co	Kaweah- Tule Interstream Tulare Co	Tule River Tulare Co	Deer Creek Tulare Co	Poso Creek Tulare Co	Upper Kern River Tulare Co	North- eastern Kern Tulare Co	Tulare County Total
DAU #	DAU 24154	DAU 23654	DAU 23954	DAU 24054	DAU 24254	DAU 24354	DAU 22254	DAU 22354	DAU 22454	DAU 22554	DAU 22654	DAU 22754	DAU 22854	DAU 22954	DAU 25754	
Agriculture																
Applied Water Use	0.6	9.7	253.6	32.4	1,011.7	1,261.8	0.0	3.1	0.0	1.3	2.9	0.8	0.0	0.0	36.3	2,614.2
Conveyance Applied Water Use	0.0	0.7	11.5	0.7	61.8	49.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.7	127.9
Urban																
Applied Water Use	0.0	0.3	13.4	0.7	80.3	30.6	0.0	0.1	0.9	0.2	1.7	0.1	0.0	0.0	0.1	128.4
Conveyance Applied Water Use	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Managed Wetlands																
Applied Water Use	0.0	0.0	0.0	0.0	0.0	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.3
Conveyance Applied Water Use	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water Use Totals																
Applied Water Use	0.6	10.7	278.5	33.8	1,153.8	1,345.2	0.0	3.2	0.9	1.5	4.6	0.9	0.0	0.0	40.1	2,873.8

Table 3-2 – Existing Water Supply Sources by Detailed Analysis Unit
(Source: California Department of Water Resources – draft water budget data for 2010)

DAU Name: (all values in 1,000 af)	Tulare Lake Tulare Co	Consolidated Tulare Co	Alta Tulare Co	Orange Cove Tulare Co	Kaweah Delta Tulare Co	Tule Delta Tulare Co	Kings River Tulare Co	Kings- Kaweah Interstream Tulare Co	Kaweah River Tulare Co	Kaweah- Tule Interstream Tulare Co	Tule River Tulare Co	Deer Creek Tulare Co	Poso Creek Tulare Co	Upper Kern River Tulare Co	North- eastern Kern Tulare Co	Tulare County Total
DAU #	DAU 24154	DAU 23654	DAU 23954	DAU 24054	DAU 24254	DAU 24354	DAU 22254	DAU 22354	DAU 22454	DAU 22554	DAU 22654	DAU 22754	DAU 22854	DAU 22954	DAU 25754	
Local Supplies	0.2	8.0	123.4	0.0	455.5	60.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	648.1
CVP Project Deliveries	0.0	0.0	0.0	7.1	214.3	471.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	39.1	732.1
Groundwater Extraction	0.4	2.7	153.7	26.7	466.3	810.2	0.0	3.2	0.9	1.5	4.6	0.9	0.0	0.0	0.6	1,471.7
Total	0.6	10.7	277.1	33.8	1,136.1	1,342.4	0.0	3.2	0.9	1.5	4.6	0.9	0.0	0.0	40.1	2,851.9

3.2 COUNTY WATER SUPPLY CONDITIONS

This subsection provides a discussion of the surface and groundwater resources available within Tulare County. A discussion of potential issues that may constrain these demands in the future is also included. This information is used to determine an existing condition as well as provide an analysis of potential future supply conditions, based upon the land use changes contemplated by the ACFP.

The characterizations below summarizes and updates water supply information described within Appendix G of the 2030 GPU. Although 2011 is the baseline year for the ACFP, data from DWR is available for 2002 through 2010.²⁴ As presented previously, 2010 was chosen to represent “average” applied water demand conditions, so 2010 will also be used to reflect average supply conditions.

2010 Water Supply Characteristics

In 2010, the County’s water supplies to meet agricultural, urban and managed wetland demands were derived from local and imported surface sources and local groundwater, with surface and groundwater sources each providing about 50 percent of the total 2010 supply.²⁵ **Table 3-2** provides DWR’s representation of these three sources by DAU.

Surface water supplies are diverted from local streams and rivers by several different local water purveyors, and imported to the County through federal Central Valley Project (“CVP”) contracts.²⁶

Groundwater is extracted from the underlying Kings, Kaweah, and Tule subbasins, as defined by DWR.²⁷ Groundwater is particularly important as a water source in the County and provided slightly over 50 percent of the water in 2010 – for a total of 1,471,700 acre-feet extracted. A sizable portion of this extraction does return to the basin as deep percolation from applied water (from both applied groundwater and applied surface water), reducing the net groundwater use to approximately 600,000 acre-feet.²⁸

Long-term Average Supply Characteristics

To understand longer term variances in water supply conditions, the range of DWR data provided in water budgets for 2002 through 2010 were summarized. The values are presented in

²⁴ Appendix G of the 2030 Update used 2003 as a baseline.

²⁵ Source: DWR 2010 water budget for Tulare County.

²⁶ The CVP water supplies are provided through the Friant Division, with primary supplies derived from the San Joaquin River. However, through a complex series of conveyance and exchange agreements, water is also “imported” via the Cross Valley Canal where water originates from the Sacramento River.

²⁷ DWR defines these subbasins in its Bulletin 118. Appendix G to the 2030 Update also provided additional details on these subbasins.

²⁸ This does not reflect a 50%+ deep percolation rate of extracted groundwater. The net groundwater use reflects deep percolation of applied surface water in addition to percolation of applied groundwater. The surface water percolation significantly reduces the “net” draw on groundwater resources.

Table 3-3. As expected, total groundwater extracted in a given year varies in relation to the availability of surface supplies, especially local supplies. For instance, in 2005, significant local and CVP surface sources were used to meet applied water demands, limiting groundwater extraction. In contrast, in 2007 and 2008, much less surface water was available and groundwater extractions were significantly higher.²⁹ On average, the County applies over 2,800,000 acre-feet of water annually to demands (see 2010 demand in **Table 3-1** as an example).

Table 3-3 – Average County Water Supply Conditions

(Source: California Department of Water Resources – draft water budget data for 2002-2010)

Category	2002	2003	2004	2005	2006	2007	2008	2009	2010	Average
Groundwater (1,000 acre-feet)										
Total Groundwater Extracted	1,959.5	1,633.2	2,104.7	946.7	1,036.8	2,267.2	2,315.7	2,291.3	1,471.7	1,780.8
Deep Percolation of Applied Water	808.9	765.1	845.1	710.1	700.1	816.7	903.9	924.8	802.0	808.5
Conveyance Deep Percolation	42.7	53.3	41.4	79.5	72.0	26.1	39.5	43.2	68.8	51.8
Net Groundwater Use	1,107.9	814.8	1,218.2	155.5	263.5	1,424.4	1,372.3	1,323.3	600.9	920.1
Surface Water (1,000 acre-feet)										
Local streams/rivers	369.2	496.8	385.4	762.6	746.8	206.4	399.5	379.4	648.1	488.2
Central Valley Project	516.1	560.1	433.9	828.3	695.9	321.1	394.7	488.3	732.1	552.3
Total Supply	2,844.8	2,690.1	2,924.0	2,537.6	2,479.5	2,794.7	3,109.9	3,159.0	2,851.9	2,821.3

3.3 ISSUES AFFECTING SUPPLIES

This subsection describes specific issues affecting surface water and groundwater supplies in Tulare County that could have an impact on land-use planning decisions into the near future. These issues include: Groundwater Overdraft and sustainable management; the San Joaquin River Restoration Settlement; Population Growth within and near Tulare County; Joint Management of Shared Aquifers; Water Transfers and Exchanges; Delta Supply Issues; and Climate Change and Variability.

Groundwater Overdraft and Sustainable Management

The groundwater basin underlying the County has experienced substantial overdraft in many areas – especially as a result of the unprecedented recent drought conditions. In addition to depletion of water faster than it can be naturally or artificially recharged, declining water tables can impact the basin as a resource. Impacts can include (i) increased pumping expenses, (ii) impacts to water quality, and (iii) subsidence that can in some cases permanently decrease the storage capacity of the aquifer. Thus, overdraft itself can have effects beyond depletion of an existing quantity of water, but also can impact the ability to use the basin as a storage facility. The future value of such storage capacity in the County is very high, and should be taken into account in today's groundwater management. It should also be noted that such impacts are not

²⁹ This generalized relationship does not address variances in precipitation, cropping choices, or other factors affecting overall supply and demand conditions in a given year.

limited to the portions of the basin directly underlying the water user responsible for the overdraft, but can impact neighboring users as well.

The issue of overdraft recently took on a new level of importance with the passage of the Sustainable Groundwater Management Act of 2014 (Act). Enacted in October, 2014, the Act applies to all groundwater basins in the state.³⁰ Any local agency that has water supply, water management or land use responsibilities within a groundwater basin may elect to be a “groundwater sustainability agency” for that basin.³¹ Local agencies have until January 1, 2017 to elect to become or form a groundwater sustainability agency. In the event a basin is not within the management area of a groundwater sustainability agency, the county within which the basin is located will be presumed to be the groundwater sustainability agency for the basin.³² By enacting the Act, the legislature intended to provide local agencies with the authority and the technical and financial assistance necessary to sustainably manage groundwater within their jurisdiction.³³

The County will take an active role in implementing the Act over the next several years and will appropriately address concerns regarding specific ACF permit applications that may raise specific concerns about its proposed water use under the to-be-developed basin-wide sustainability plans.

Current Groundwater Conditions

The County is acutely aware of the challenges faced by groundwater users throughout the County whether private domestic pumpers or large agricultural pumpers. But it also recognizes that the situation varies as a result of many factors, including local conjunctive water management programs implemented by various special water districts, near term hydrologic conditions and trends, as well as other drivers.

As shown in **Figure 3-2**, significant reduction in groundwater elevations have occurred in many portions of the County between spring 2009 and spring 2014 (shown as darker red areas). Yet area in the north-eastern portion of the County saw nearly zero change during this same period.

As further example of the local variations that need to be assessed for specific ACF permit applications, **Figure 3-3** shows some areas in the County seeing increased groundwater elevations between spring 2014 and spring 2015 (shown as purple and green) – during a time when heavy pumping was generally occurring. Overall, however, the County’s groundwater elevations remained consistent with 2014.

³⁰ Wat. Code § 10720.3.

³¹ Wat. Code § 10723.

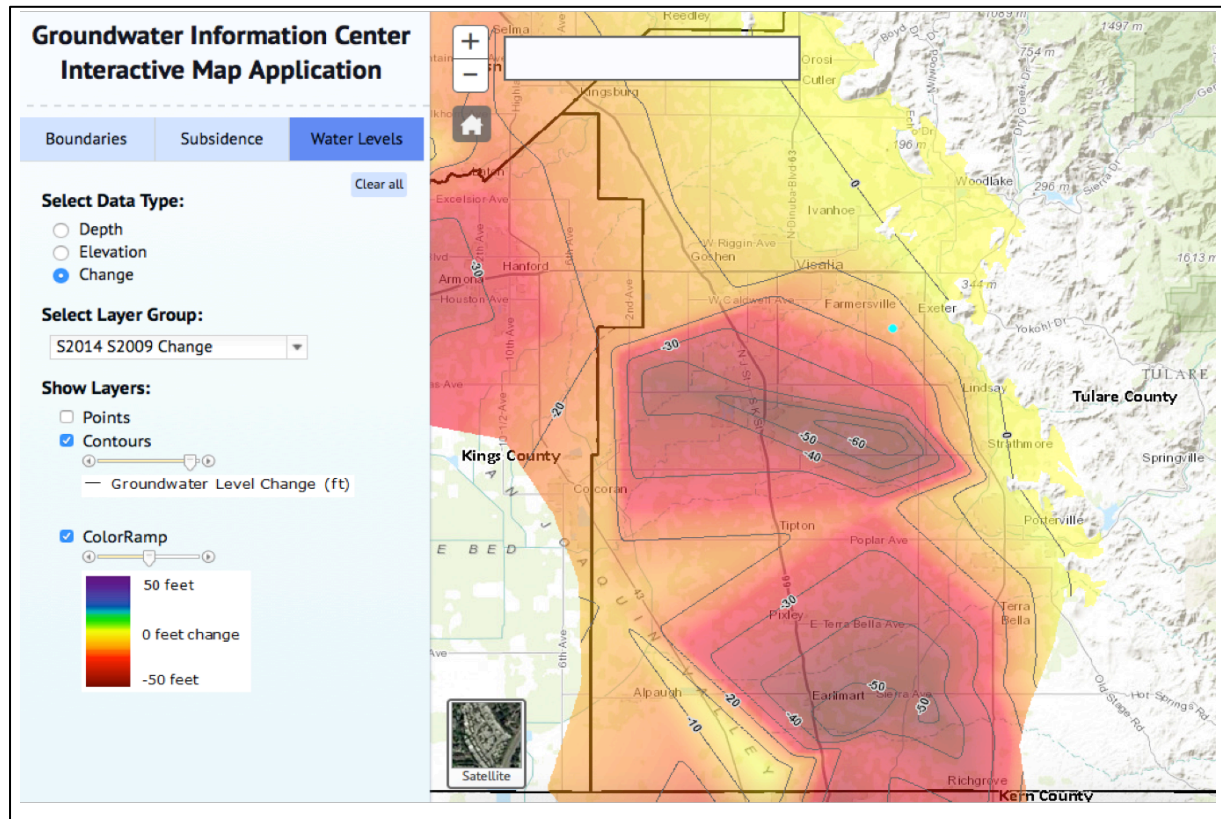
³² Wat. Code § 19724.

³³ Wat. Code § 10720.1.

The availability of surface or groundwater resources will depend on the placement of each new or expanded ACF. This PWSE provides a general overview of conditions, such as groundwater, but does not evaluate site-specific conditions relevant to each future application.

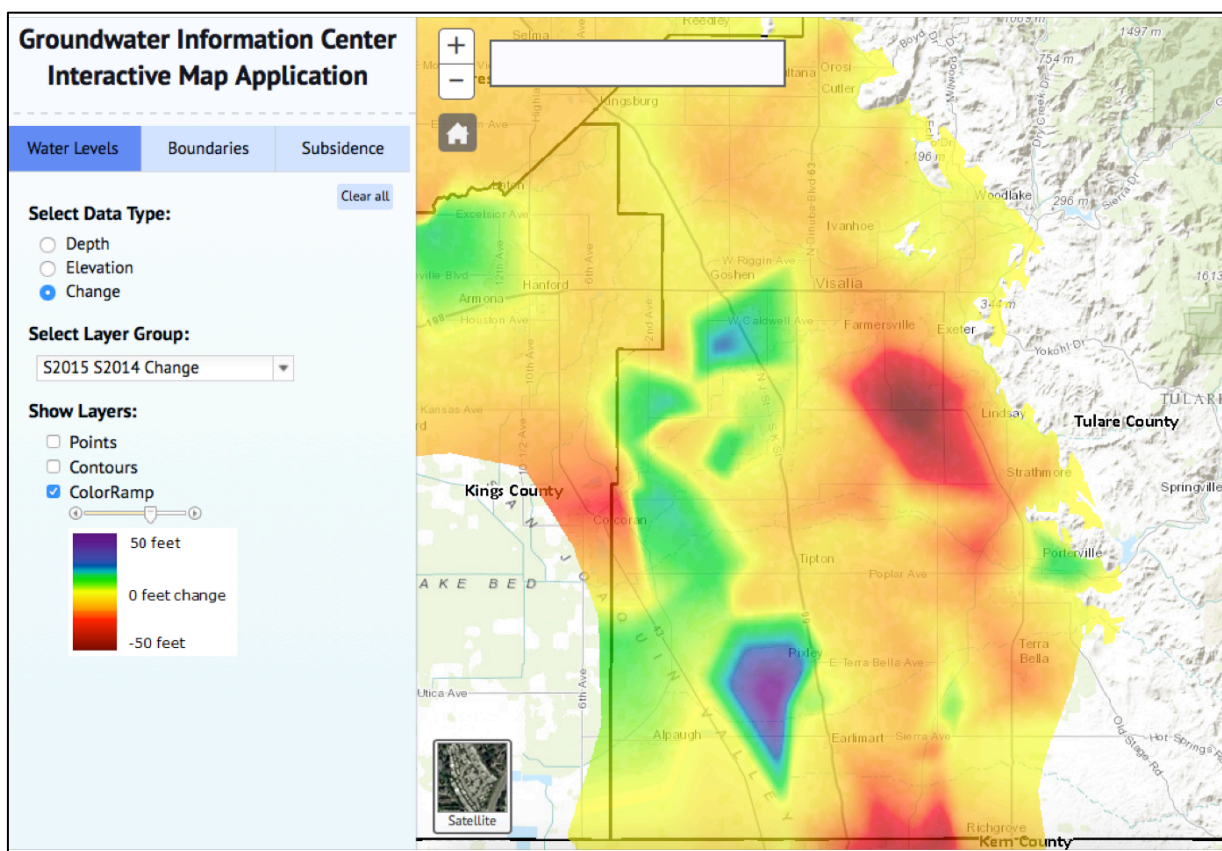
**Figure 3-2 – Representative Groundwater Changes in Tulare County
(Spring 2009 compared to Spring 2014)**

(source: <https://gis.water.ca.gov/app/gicima/> [last accessed 12-12-2015])



**Figure 3-3 – Representative Groundwater Changes in Tulare County
(Spring 2014 compared to Spring 2015)**

(source: <https://gis.water.ca.gov/app/gicima/> [last accessed 12-12-2015])



San Joaquin River Restoration Settlement

The San Joaquin River Restoration Settlement (SJR Settlement) could lead to decreased flows in the Friant-Kern Canal, resulting in reduced imported surface water supplies to some CVP contractors in Tulare County. One of the main purposes of building the Friant-Kern Canal was to reduce groundwater pumping in the southern San Joaquin Valley. As such, to the extent that these surface supply reductions cannot be compensated for by increased water use efficiency, water users may increase groundwater pumping in the region. The result may be exacerbation of existing declining water tables or initiation of overdraft where an aquifer was previously in a general balanced condition – although, the Act, discussed above, will have an affect on the ability to switch to groundwater to offset CVP shortages.

Though the specific impact to Tulare County CVP contractors from the SJR Settlement is not fully understood (e.g. the SJR Settlement calls for mitigation, but will require substantial time and investment), this analysis cannot speculate on any reduction in surface water resources that would be directly attributable to the SJR Settlement.

Population Growth Within and Near Tulare County

Cities in the region, including Visalia, Exeter, Fresno, Bakersfield, and others, rely on groundwater for much or all of their water supply. Increases in urban water demand resulting from population growth may be offset by decreases in other forms of water use (i.e. agricultural water conversion) or increases in water use efficiency. But the nature and extent of agricultural water conversion and water use efficiency measures is not known. Moreover, the hydrogeologic implications of increased localized pumping in groundwater basins (i.e. the potential for cones of depression) are not known. Current regional trends suggest that future urban growth may rely on groundwater supplies to meet demand.

In addition to its increase in demands for groundwater, urbanization may negatively affect groundwater recharge. Urbanization generally reduces the amount of permeable surfaces for percolation of water into underlying basins. Urban planning efforts that include development of permeable surfaces in urban settings, infiltration basins, and other measures for stormwater capture can offset such effects, while providing flood control benefits. Nevertheless, the extent and impacts of future urban growth in Tulare County on natural groundwater recharge is not fully known and should be considered in future planning efforts.

Joint Management of Shared Aquifers

Declining groundwater levels adjacent to Tulare County can affect groundwater yields and sustainability in the County. Any development or management in adjacent counties that overly shared subbasins may adversely impact Tulare County's ability to manage its own groundwater supplies. The Act, discussed previously, does include provisions to protect one basin from adverse impacts from sustainable management planning activities of an adjacent sustainable management agency. This may reduce this area of concern.

The importance of managing groundwater across political boundaries in this region has been recognized. For example, an Integrated Regional Water Management Plan for the Kings River Basin acknowledges the need for collaboration between Fresno, Kings, and Tulare Counties, and includes recharge efforts to help mitigate for historic overdrafting of the basin.

Water Transfers and Exchanges

As patterns of demand change in Tulare County, both spatially and with respect to classes of use, water transfers and exchanges may become increasingly important. As described above, water exchange arrangements already provide some imported water supplies to the County. Short-term transfers negotiated on the spot market currently make up the bulk of water transfers in the state, and can be an effective solution to drought conditions. However, reducing the long-term risk of drought-induced water shortfalls may necessitate the increase of longer-term agreements such as dry-year options that are triggered by specific water conditions. Challenges in water transfers are largely institutional: they include the need for better quantification and monitoring of water rights, the need to document and alleviate third-party impacts, and the need to streamline the water transfer process. Expanding the potential for transfer and exchanges in Tulare County may

expand the portfolio of water supplies available to the County – thereby improving overall water supply reliability when some sources decline. In contrast, if locally generated water resources are allowed to transfer outside of the County, an impact to the overall availability and reliability of water for County needs could result.

Delta Supply Issues

Delta water issues have broad implications throughout the state of California – even to areas that seem far removed from its locale. In Tulare County, water supplies are derived directly from the San Joaquin River via the Friant-Kern Canal and the Sacramento-San Joaquin Delta via the California Aqueduct and Cross Valley Canal through exchange arrangements with State Water Project water users. Any change to the water distribution systems in the Delta has immediate impact on the reliability of surface deliveries in Tulare County. The complex legal framework links deliveries of San Joaquin water directly to deliveries from the Delta.

For instance, the San Joaquin River Basin Exchange Contractors hold contract rights with the United States Bureau of Reclamation (“USBR”) to replace the Contractors’ San Joaquin River water rights with water exported from the Sacramento-San Joaquin Delta in order to build and use Friant Dam. If USBR is unable to deliver Delta water to the Exchange Contractors, the Exchange Contractors may call for the water to be released from Friant Dam under the terms of their contracts, assuring their water supply but impacting Friant Division CVP contractors in Tulare County. Accordingly, issues affecting Delta exports have direct impacts on the water supply reliability issues in Tulare County.

Climate Change and Variability

Climate change will affect California’s water resources through changes in precipitation patterns³⁴ and through temperature warming that will change the seasonal patterns of streamflow around which California’s water resources system has been developed.³⁵ California’s water system depends on the storage of water in three different ways: seasonal snowpack that delays runoff from winter precipitation until later in the water year when demands are higher; surface storage in the form of dams, lakes and reservoirs; and groundwater percolation and storage.

While there is growing consensus among scientists and water managers that climate change will impact water systems, the implications of climate change on these three classes of reservoirs are understood with varying levels of clarity. First, it is understood with high confidence that results of temperature modeling consistently suggest that California’s snowpack will decrease in coming decades, resulting in earlier patterns of runoff.

Second, it is very likely that operations of California’s surface water system will be affected from both the increased difficulty of balancing flood control and water storage, increasing the

³⁴ Seager, R., M. Ting, et al. (2007). "Model Projections of an Imminent Transition to a More Arid Climate in Southwestern North America." *Science* **316**(5828): 1181-1184.

³⁵ Vicuna, S. and J. Dracup (2007). "The evolution of climate change impact studies on hydrology and water resources in California." *Climatic Change* **82**(3): 327-350.

risk of sub-optimal use of storage. Also, increasing demands may be expected based on higher ET requirements or changed cropping patterns.

Third, there are reasons to expect that climate change may impact groundwater even though the direct climate connection is less well-understood.³⁶ For example, changes in patterns of recharge are expected to result from changes in runoff patterns. However, the expected runoff change only increases the flow during existing peak recharge periods, so capturing of the additional runoff may be challenging. Climate change may also alter demands for groundwater indirectly, through changes in demand for and supply of surface water.

3.4 PROGRAMMATIC EVALUATION OF WATER SUPPLY AVAILABILITY

As presented in Section 1, the ACFP anticipates industry growth resulting in another 119,000 AUs added to the County's current herd size. Accompanying this growth will be sizeable areas dedicated to confinement facilities and acres of new on-site feed crop production. Section 2 estimated a gross water demand increase of about 139,400 acre-feet per year as a result. However, when existing water uses are considered, the demand from the ACF growth is reduced to about 48,400 acre-feet annually. When viewing this net water demand in the context of overall County water supply and water demand conditions, it is comparably small – representing a 1.7 percent increase in the overall average demand.

Table 3-4 provides average demand conditions as represented by the DWR water budgets for 2002 through 2010 for the entire County. Note that the three primary DAUs highlighted in Table 3-1 – Alta, Kaweah Delta and Tule Delta – represent at least 97 percent of this annual demand, and these DAUs cover the geographic reach of anticipated growth in ACFs as represented in **Figure 1-1**. These three DAUs represent at least 2.7 million acre-feet of the 2.8 million acre-feet of demand.

Table 3-4 – Average County Water Demand Conditions

(Source: California Department of Water Resources – draft water budget data for 2002-2010)

Category (values in 1,000 acre-feet)	2002	2003	2004	2005	2006	2007	2008	2009	2010	Average
Agricultural	2,721.1	2,551.2	2,780.8	2,416.1	2,352.1	2,662.0	2,980.7	3,029.7	2,742.1	2,692.9
Urban	132.6	147.9	152.3	128.9	134.6	141.0	137.3	137.4	128.4	137.8
Managed Wetlands	3.3	3.1	3.1	2.8	3.3	3.3	3.3	3.3	3.3	3.2
Total Demand	2,857.0	2,702.2	2,936.2	2,547.8	2,490.0	2,806.3	3,121.3	3,170.4	2,873.8	2,833.9

³⁶ Dettinger, M. D. and S. Earman (2007). "Western ground water and climate change—Pivotal to supply sustainability or vulnerable in its own right?" Association of Ground Water Scientists and Engineers Newsletter **June 2007, 4-5**.

SECTION 4 – SUMMARY AND CONCLUSIONS

The analysis detailed in the previous sections provides a basis for determining whether sufficient water supplies exist for the anticipated growth in ACFs. The following summarizes key information and findings presented previously:

- ◆ The ACFP anticipates a 1.5 percent industry growth between 2013 and 2023. This results in approximately 119,000 new Animal Units added to the existing County counts.
- ◆ The additional Animal Units will require an additional 5,400 acres of confinement facilities, 16,000 acres for on-site feed crop production, and 16,000 acres for off-site feed crop production.
- ◆ The additional Animal Units will result in additional annual water demands of 9,400 acre-feet for health and sanitary needs, and 130,000 acre-feet for both on-site and off-site feed crop production. This results in a gross water demand increase of 139,400 acre-feet prior to considering the existing water use on properties that likely will house new ACFs.
- ◆ Because a significant number of new ACFs will occur on existing irrigated agricultural lands, the gross water demand increase is offset by the reduction in existing irrigated agricultural operations. The analysis assumes 80 percent of the new ACFs are constructed on existing irrigated lands, while 20 percent are constructed on non-irrigated lands. Similarly, the additional off-site feed production acreage will generally replace other irrigated crops, resulting in a lower net increased demand for water. The resulting net increase in water demand to meet the anticipated growth is estimated at 48,400 acre-feet annually.
- ◆ Current County water demands average 2,834,000 acre-feet annually. The net demand increase represents about 1.7 percent of the existing County demands.

4.1 CONCLUSION

Water supply issues faced in the County will continue, but the change in land use from existing irrigated agriculture to ACFs on a significant number of acres will not change these circumstances. The County will need to continue to lead on sustainable water management strategies and work with all local surface and groundwater uses – agricultural and urban – to continue to implement long-term management solutions.

However, as the County processes future ACF permit applications it will need to evaluate the local surface and groundwater conditions relevant to the proposed ACF location and whether adequate water supplies are available at that specific location. From this site-specific assessment, the County will understand:

1. Specific water management and water use projections associated with the proposed ACF operations, including liquid manure management, cropping plans, and facility management.
2. Planned water sources to meet projected water needs
3. Local groundwater conditions and sustainable management efforts, if any, as part of the overlying Groundwater Sustainability Agency with jurisdiction.
4. Local surface water reliability and availability conditions in relation to projected water needs.

Based upon the information submitted by the ACF applicant that addresses these factors, the County will be able to assess the local water availability circumstances.

Additional Considerations

When comparing the net increase (see Section 2.5) to the total water demand increase (see **Table 2-1**), only about 35 percent of the water demand accompanying the ACF growth will be a new demand upon County water resources (48,400 acre-feet of the 139,400 acre-feet estimate). However, this is a conservative estimate of water demands and actual net demand may be even less. Key conservative assumptions include:

1. The assumed value of 53.5 inches/acre/year represents a 50/50 blend of alfalfa and corn (grain) where the corn applied water value may be overstated. The evapotranspiration (“ET”) for corn in the County ranges from 23.5 inches to 27.2 inches.³⁷ Using a conservatively low irrigation efficiency of 70% and not accounting for any benefits from rainfall, the applied water value of 53.5 inches/acre/year would translate to an ET value of over 36 inches. Thus, the value of 53.5 may overstate the irrigation demands for corn, but does accommodate irrigation demands for double cropping with small grain silage. But, the 50/50 split between corn and alfalfa acreage further exaggerates the likely irrigation demand for the predominant corn and small grain cropping that historically represents a significant percentage of the County’s harvested feed crop acreage.
2. Twenty percent of the ACF growth is assumed to occur on lands that currently have zero water demand. Though theoretically, ACFs could be placed on lands within the County that currently have no irrigation or other water demands, it is likely that these lands are currently not irrigated due to suitability issues – including soil type and water availability. Example locations include areas west of Highway 43 and north and south of the town of Alpaugh. Several ACFs already exist in these areas and the potential for growth exists, as displayed in Figure 1-1. But, inspection of aerial photography shows many of the available “expansion acres” as constructed wetlands, solar farms and general non-irrigated lands. Thus, if only 5 to 10 percent of the growth occurs on existing non-irrigated lands, then the net demand decreases substantially.

³⁷ Corn ET Estimates; Larry Schwankl - UC Cooperative Extension Irrigation Specialist and Allan Fulton - UC Cooperative Extension Farm Advisor (accessed at <http://ucanr.edu/sites/Drought/files/167003.pdf>)

3. The County's General Plan Update includes several policies that will be considered with anticipated ACF expansion. The following goals, policies and principles will likely be applicable:
 - a. WR-1 – To provide for the current and long-range water needs of the County and for the protection of the quality and quantity of surface and groundwater resources [New Goal].
 - b. WR-3 – To provide a sustainable, long-term supply of water resources to meet domestic, agricultural, industrial, and recreational needs and to assure that new urban development is consistent with available water resources [New Goal].
 - c. AG-1.17Agricultural Water Resources – The County shall seek to protect and enhance surface water and groundwater resources critical to agriculture [New Policy].
 - d. Environmental Component: Concept 5: Water – The long-term strategy for water in Tulare County centers on protecting and conserving existing water supplies and identifying new sources of water. As Tulare County continues to grow, new methods for conserving, treating, and supplying water will enable County residents and farmers to continue to have an adequate supply of quality water that limits long-term impacts on groundwater.

Appendix A

Tulare County Definition of “Animal Unit”

SECTION 2.2: DEFINITIONS PERTAINING TO
ANIMAL CONFINEMENT FACILITIES
(Added by Ord. No. 3285, effective 5-15-03)

For the purpose of the Zoning Ordinance provisions applicable to animal confinement facilities, confined animal feeding operations, bovine dairies and bovine feed lots certain additional words and terms are defined:

ANIMAL UNIT A common animal denominator, based on feed consumption, whereas one mature cow (1,400 pounds) represents one animal unit. An "Animal Unit" is the feed equivalent of one milk cow, as follows:

<u>Classification</u>	<u>Animal Units per Head</u>
Dairy cows in milk and bulls	1.00
Dry cows and heifers more than two yrs. of age	0.75
Heifers one year to two years (beef or dairy)	0.70
Heifers three months to one year (beef or dairy)	0.40
Calves to three months of age	0.17
Beef cows in milk and feed lot steers	0.75

This definition is based upon a large breed dairy cow. Animal Units for other breeds on site will be calculated according to the Tulare County conversion tables issued by the Resource Management Agency Director from time to time.

CROP ACREAGE Irrigable portion of the total/gross subject parcels and/or permitted site, including wastewater conveyance ditches, that is to be used for wastewater discharge and which excludes buildings, corrals and/or pens, feed and/or manure storage areas, lagoons/sumps, canals, waterways, and public road rights of way.

GEOLOGICAL-HYDROLOGICAL (GEO-HYDRO) REPORT A report that discusses the physical and chemical data collected from soil samples and groundwater samples, and includes a study of depth to groundwater, groundwater flow direction, groundwater quality and impacts to soil and groundwater due to extraction and recharge of groundwater.

Appendix B

Tully & Young, Inc. Qualifications

Appendix H

Tulare County Dairy Routes Study

TULARE COUNTY DAIRY ROUTES STUDY

Prepared By:

Tulare County Association of Governments



May 17, 2012

INTRODUCTION:

The dairy industry plays a major part in the economy of Tulare County. According to the Tulare County Ag Commissioner's *2010 Crop Report*, milk (dairy) is the leading agricultural commodity in Tulare County with a total gross value production in 2010 of \$1.6 billion dollars. Hundreds of gallons of milk are produced every day from the over 360 dairies in Tulare County, and all of this milk is transported to processing facilities by truck over county roads. According to Caltrans, a fully loaded dairy truck can weigh up to 80,000 pounds and has the same impact to the roadway as 9,600 passenger cars. Put another way roadways carrying 500 trucks per day (500 TADT) or more would be impacted the same as if 5 million passenger cars per day had traveled that same road!

PURPOSE OF THE STUDY:

The Dairy Roads Study was conducted by staff of the Tulare County Association of Governments with the assistance of other county and local agencies. The purpose of the study was to:

- A) Identify roads within Tulare County that are used to transport milk and other commodities to and from the dairies to milk production plants located in Tulare, Tipton, and other locations, and the most likely routes trucks use to access these facilities.
- B) Determine the overall condition of the roads for possible rehabilitation purposes.
- C) Estimate the cost to rehabilitate the most heavily impacted roads based on road construction, condition, and daily truck use.

STUDY AREA:

The Dairy Roads Study area consisted of the rural agricultural lands of Tulare County, centered primarily on the Tulare/Tipton area (see Maps). The study area covers approximately 1,500 square miles and extends from Avenue 415 in the north to Avenue 24 in the south and Road 28 in the west to Highway 65 in the east.

METHODOLOGY:

The Dairy Roads Study involved a number of different tasks. These tasks are described in detail below, but consisted of collecting field and geographic information data to identify potential dairy roads in the county, then mapping and analyzing the data to assess the potential costs to rehabilitate these roads.

Data Collection:

Data for the Dairy Roads study was collected from different sources. For county geographic information and information on the location of dairies in Tulare County, TCAG staff consulted the Tulare County Resource Management Agency (RMA) Geographic Information System (GIS) Division. Information on the location and operations of regional milk processing facilities and feed producers, such as Land-O-Lakes (LOL), California Dairy Industries (CDI), and J.D. Heiskell was provided by the Tulare County Environmental Health Services (EHS). TCAG staff also contacted local dairy trucking companies for information on trucking routes and schedules.

The RMA Transportation/Engineering Branch provided information on the condition of roadways within the study area through the Tulare County Pavement Management System (PMS). This included Pavement Classification Index (PCI) values for all rural roadways in the study area. The Transportation/Engineering Branch also provided classified traffic count data to help confirm the selection of roads as dairy roads, and assess the number of heavy trucks (Axle Classes 9 through 13) using dairy roads. These counts were supplemented by classified traffic counts taken by TCAG staff.

Data Mapping:

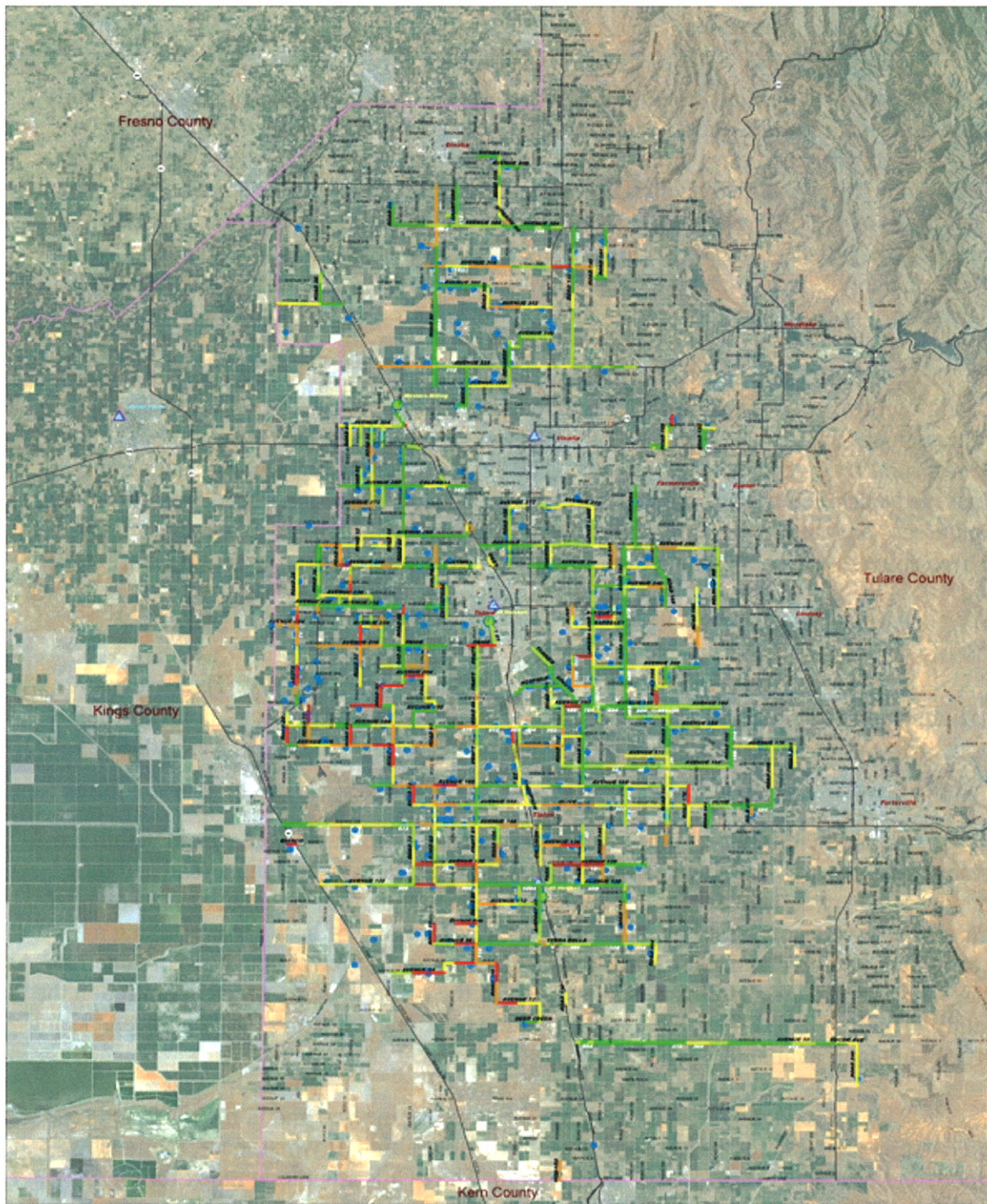
A base map of the project study area was prepared in ArcGIS. The base map included aerial photography coverage of the county upon which county boundaries, the county road system, dairies, dairy production plants and feed facilities were added as layers.

Using the GIS base map, TGAG staff identified potential dairy roads within the study area. Roads were selected based on the number of dairies along a road and its connection between the dairies and milk processing along the state highways. Potential dairy roads were confirmed by examining the total number of heavy trucks using a roadway based on classified traffic counts. Over 280 classified counts were obtained for this study. **Appendix A** provides a list of all of the potential dairy roads identified in the study including their PCI value, type, condition (i.e., engineered vs. non-engineered), and truck counts, if available.

The potential dairy roads were classified as engineered and non-engineered based on existing construction. The roads were further classified as worst, poor, moderate, good, and best using the County's PCI system. The PCI is a numeric index for the assessment of road conditions. The lower the PCI value the worse the pavement condition and greater the need for repairs. Each potential dairy road was color coded based on PCI value:

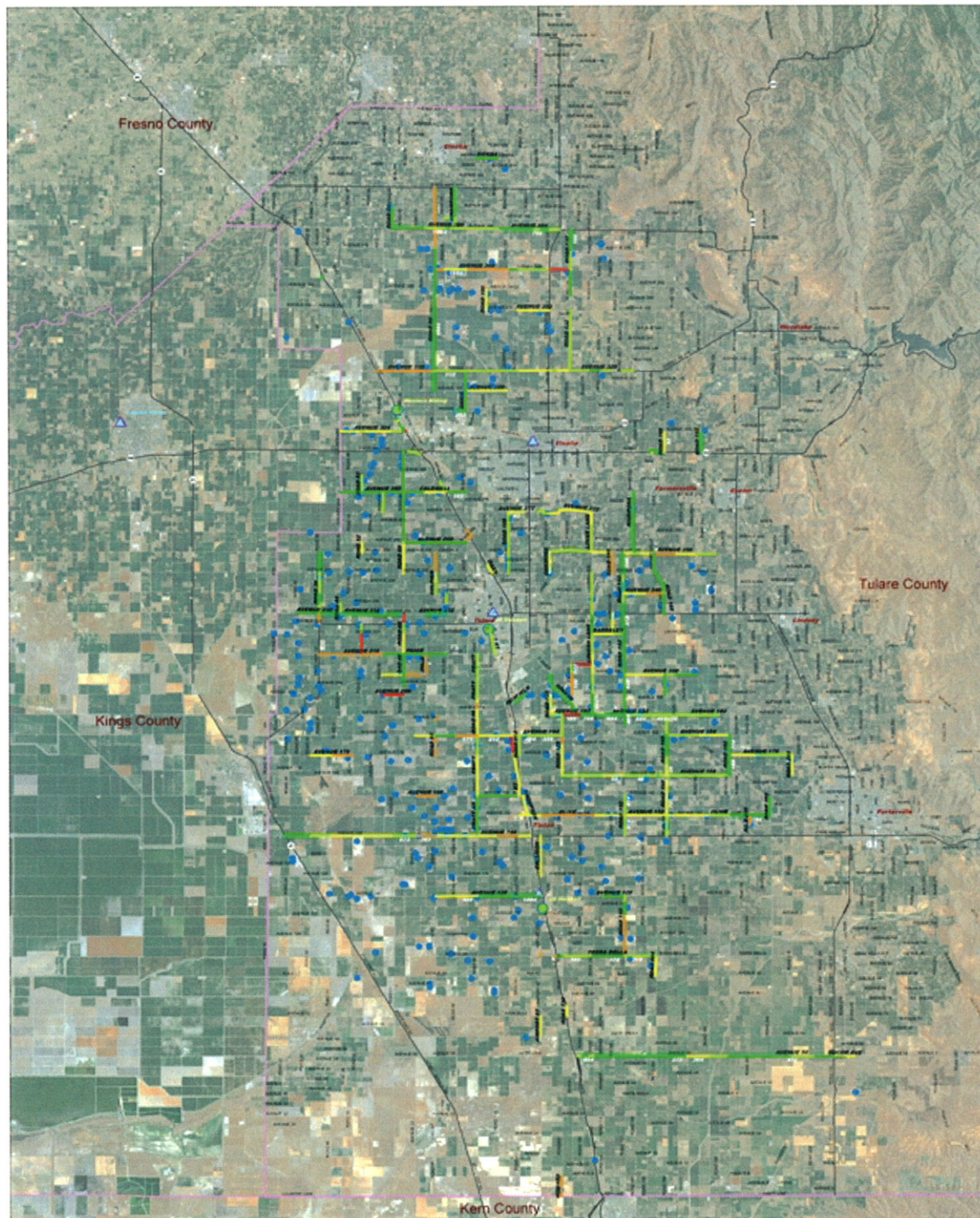
<u><i>Color Code</i></u>	<u><i>Condition</i></u>	<u><i>PCI Value</i></u>
<i>Red</i>	<i>Worst</i>	<i>0-25</i>
<i>Orange</i>	<i>Poor</i>	<i>26-50</i>
<i>Yellow</i>	<i>Moderate</i>	<i>51-70</i>
<i>Light Green</i>	<i>Good</i>	<i>71-90</i>
<i>Green</i>	<i>Best</i>	<i>91-100</i>

(All Dairy Roads)



(Map for illustration purposes only; full size version is available)

Preliminary Dairy Routes for Rehabilitation (Engineered Dairy Roads)



0 1.5 3 6 9 12 Miles



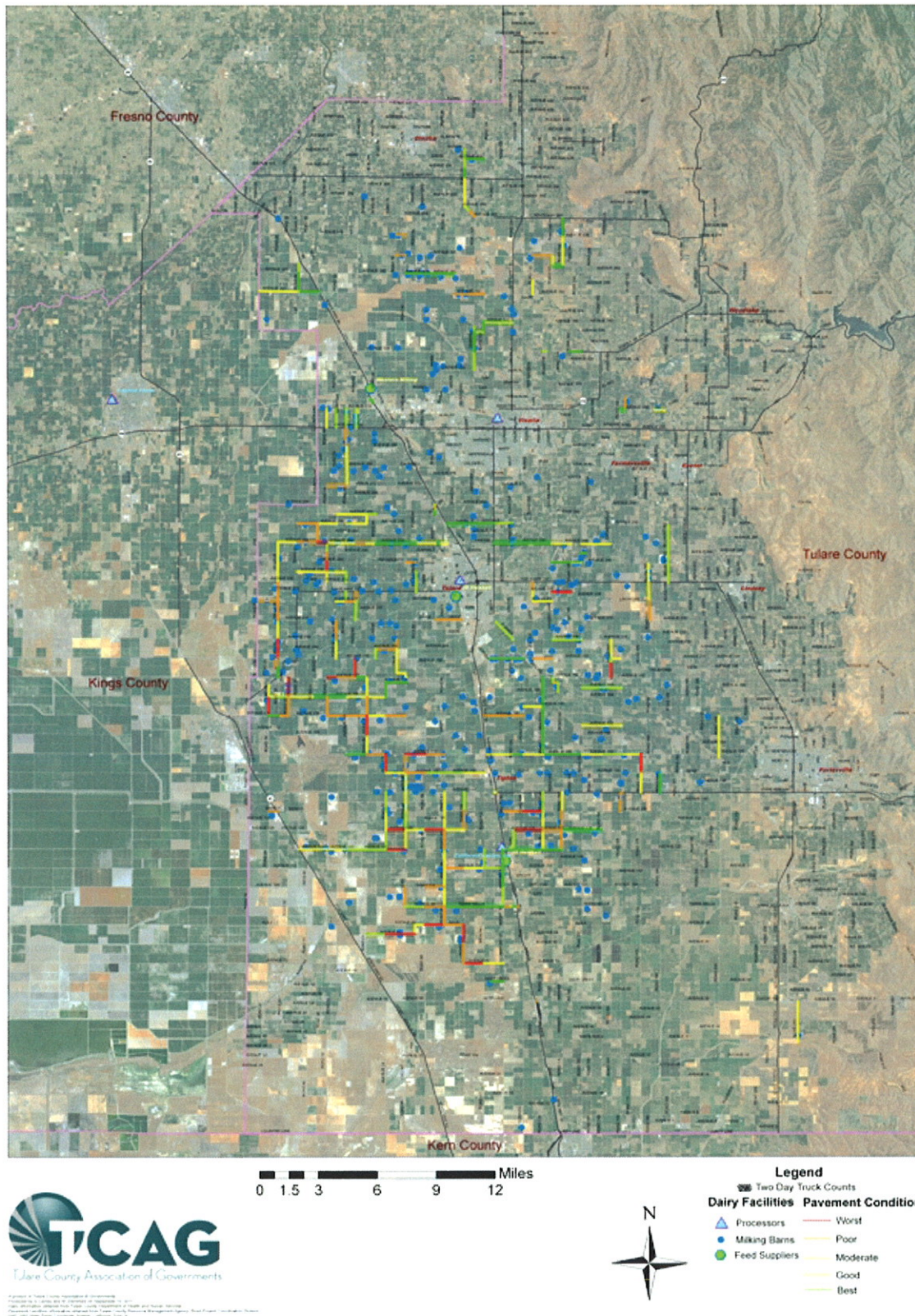
A project of Tulare County Association of Governments
Established in 1965 to serve the region's communities
This effort is a result of the Tulare County Board of Supervisors' commitment to the region's communities
Tulare County Association of Governments, 1000 N. Main Street, Suite 100, Hanford, CA 93230
Phone: (559) 833-1111 Fax: (559) 833-1112 Email: info@tacag.org Website: www.tacag.org



Legend	
	Two Day Truck Counts
Dairy Facilities	
	Processors
	Milking Barns
	Feed Suppliers
Pavement Condition	
	Worst
	Poor
	Moderate
	Good
	Best

(Map for illustration purposes only; full size version is available)

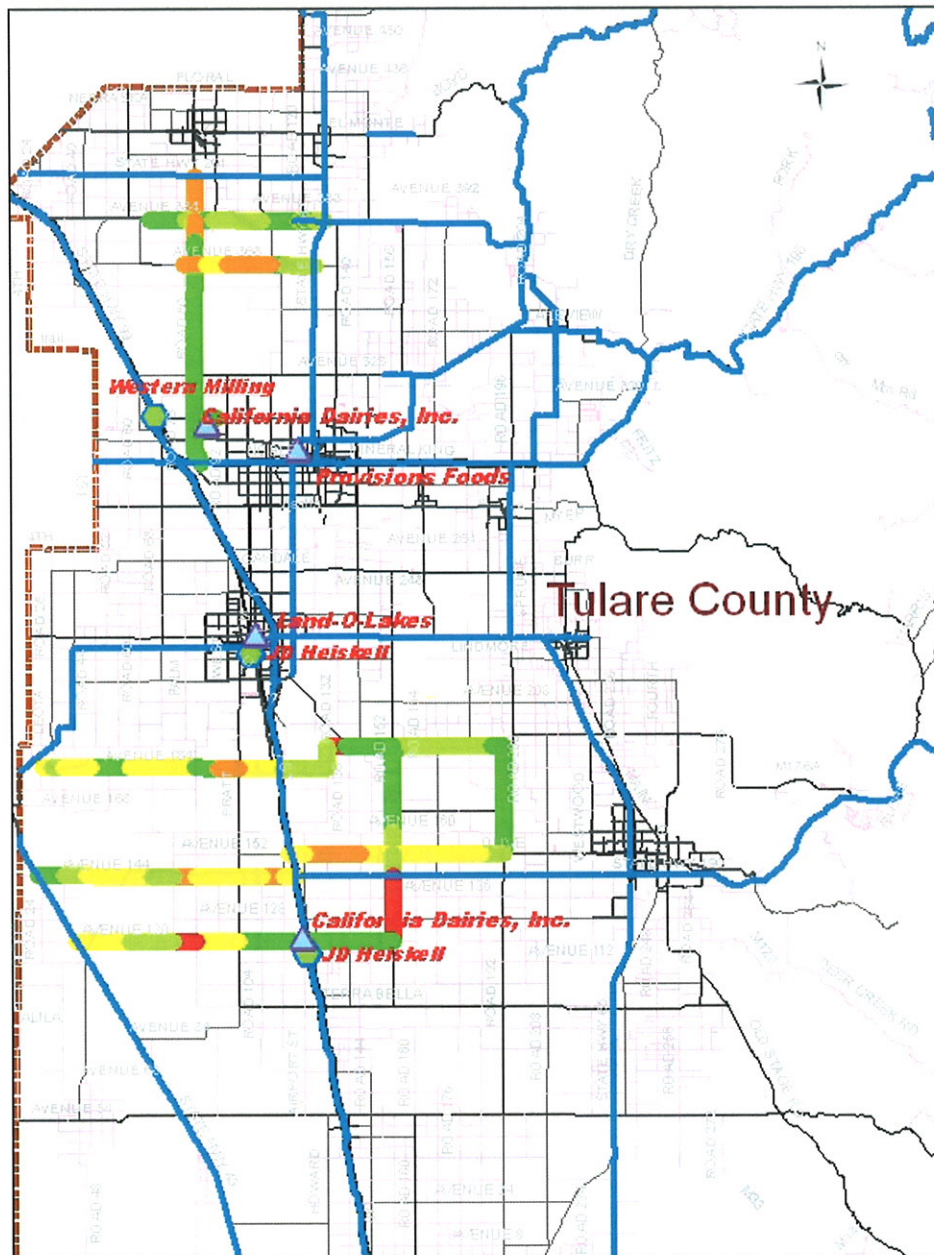
Preliminary Dairy Routes for Rehabilitation (Non-Engineered Dairy Roads)



(Map for illustration purposes only; full size version is available)

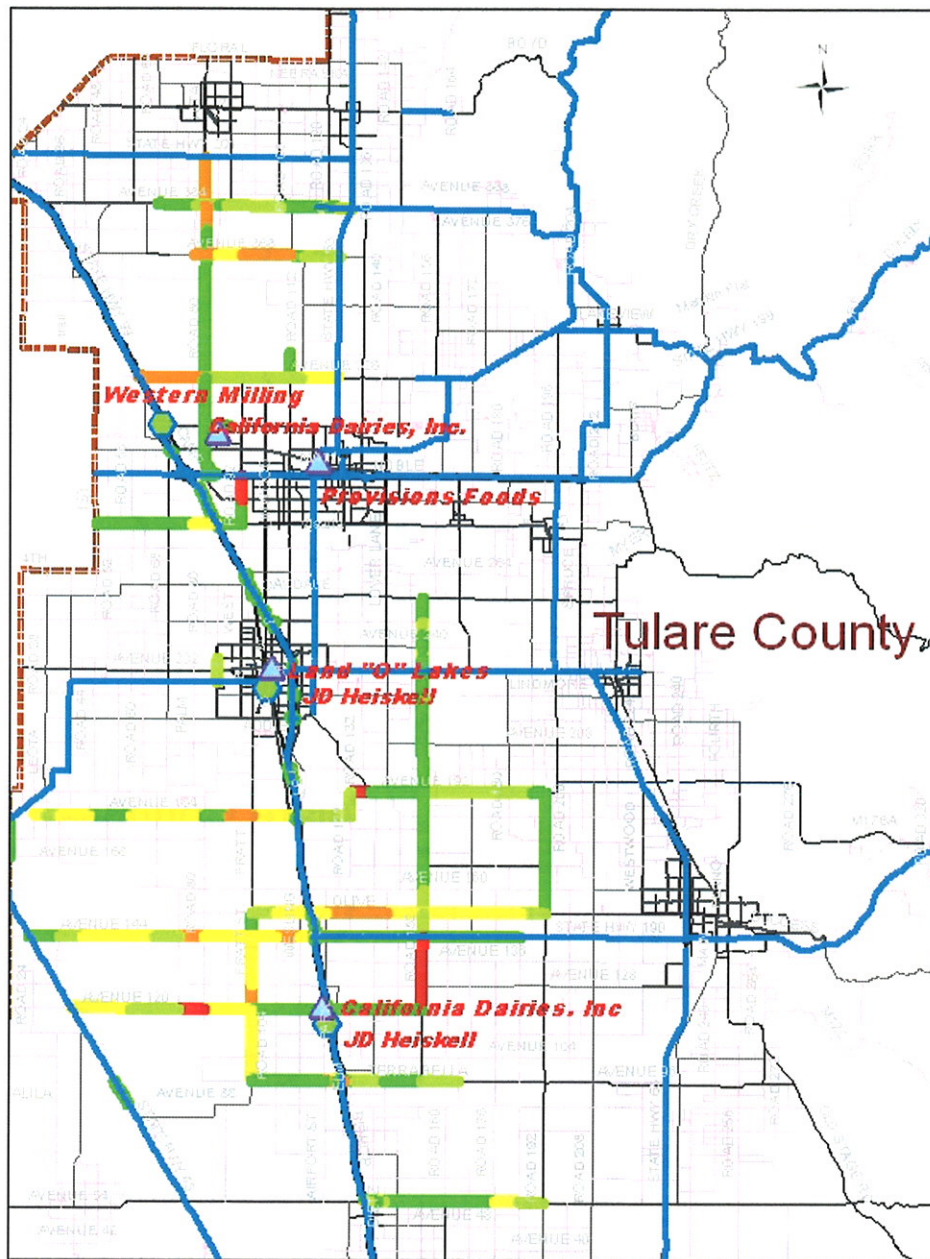
Two additional maps were prepared which show potential dairy roads that have heavy truck counts of 500 truck ADT or greater, and 300 truck ADT or greater (see maps below). The determination of which roads fit these criteria was based on total truck counts along one or more corridor segments and the ability of the corridor to connect dairy truck traffic to state highways and the dairy processing facilities located along them.

Preliminary (Heavy Truck) Agricultural
Routes for Rehabilitation
Dairy Roads with 500 Truck ADT or Greater



500 truck/day represents approximately 5,000,000 auto/day

Preliminary (Heavy Truck) Agricultural
Routes for Rehabilitation
Dairy Roads with 300 Truck ADT or Greater



300 truck/day represents approximately 2,880,000 auto/day



Data Analysis:

Road data was entered into Excel spreadsheets for cost analysis. This data included the name of the road, function, road condition (based on PCI value), the length (in miles), and the number of heavy trucks using the road (based on 48-hour classified traffic counts) if available, for all roads. Truck count data corresponds to vehicle axle classes 9 through 13 for trucks with five or more axles. The dairy road data was analyzed

Under four scenarios: all engineered roads, all non-engineered roads, dairy roads with 500 Truck ADT or greater, and dairy roads with 300 Truck ADT or greater.

The number of road miles in each scenario was totaled, and a cost per mile factor applied to estimate the cost to rehabilitate the road segments. The cost factor included environmental and design and construction administration costs:

County RMA Rehabilitation Cost Factors:

Engineered Dairy Roads							
Road Conditions	Repair Type	Repair Cost	Env/Design		Con Administration		Cost Factor (per mi.)
Worst	Reconstruct	\$800,000	15%	\$120,000	15%	\$120,000	\$1,040,000
Poor	AC Thick Overlay	\$625,000	15%	\$93,750	15%	\$93,750	\$812,500
Moderate	AC Overlay	\$500,000	15%	\$75,000	15%	\$75,000	\$650,000
Good	AC Thin Overlay	\$400,000	10%	\$40,000	15%	\$60,000	\$500,000
Best	Chip Seal	\$15,000	10%	\$1,500	15%	\$2,250	\$18,750

Non-Engineered Dairy Roads							
Road Conditions	Repair Type	Base Con. Cost	Env/Design		Con Administration		Cost Factor (per mi.)
Worst	Reconstruct	\$800,000	10%	\$80,000	15%	\$120,000	\$1,000,000
Poor	0.3 RMAS Overlay	\$245,000	10%	\$24,500	15%	\$36,750	\$306,250
Moderate	0.2 RMAS Overlay	\$185,000	10%	\$18,500	15%	\$27,750	\$231,250
Good	0.1 RMAS Overlay	\$130,000	10%	\$13,000	15%	\$19,500	\$162,500
Best	Chip Seal	\$15,000	10%	\$1,500	15%	\$2,250	\$18,750

** (Data is provided for illustration only; actual costs are subject determination)*

The following data summary tables provide the estimated costs to rehabilitate dairy roads based on the type of road and the condition. Scenarios are also included to rehabilitate roads with truck counts of 500 truck ADT or more and 300 truck ADT or more respectively:

Summary Tables: Potential Rehabilitation Costs:

All Engineered and Non Engineered Dairy Roads:

All Engineered Dairy Roads			
Road Conditions	Miles	Cost Factor (per mi.)	Total
Worst	8.24	\$1,040,000	\$8,572,155
Poor	34.59	\$812,500	\$28,101,885
Moderate	81.05	\$650,000	\$52,679,731
Good	75.97	\$500,000	\$37,985,528
Best	86.62	\$18,750	\$1,624,075
Total	286.46		\$128,963,374

All Non-Engineered Dairy Roads			
Road Conditions	Miles	Cost factor	Total
Worst	24.43	\$1,000,000	\$24,434,111
Poor	51.92	\$306,250	\$15,902,021
Moderate	72.86	\$231,250	\$16,849,265
Good	36.12	\$162,500	\$5,869,308
Best	43.07	\$18,750	\$807,548
Total	228.41		\$63,862,253

Summary Table:

Summary: All Engineered and Non Engineered Dairy Roads		
Road Conditions	Miles	Total
Worst	32.68	\$33,006,265
Poor	86.51	\$44,003,906
Moderate	153.91	\$69,528,996
Good	112.09	\$43,854,837
Best	129.69	\$2,431,623
Total	514.87	\$192,825,627

Summary Tables: Potential Rehabilitation Costs:

All Dairy Roads with 500 Truck ADT or Greater:

Engineered Dairy Roads w/ 500 Trucks ADT or Greater			
Road Conditions	Miles	Cost	Total
Worst	0.00	\$1,040,000	\$0
Poor	10.00	\$812,500	\$8,125,000
Moderate	20.00	\$650,000	\$13,000,000
Good	17.00	\$500,000	\$8,500,000
Best	22.00	\$18,750	\$412,500
Total	69.00		\$30,037,500

Non-Engineered Dairy Roads w/ 500 Trucks ADT or Greater			
Road Conditions	Miles	Cost	Total
Worst	4.00	\$1,000,000	\$4,000,000
Poor	0.50	\$306,250	\$153,125
Moderate	6.00	\$231,250.00	\$1,387,500
Good	3.00	\$162,500.00	\$487,500
Best	15.00	\$18,750.00	\$281,250
Total	28.50		\$6,309,375

Summary Table:

Summary: All Dairy Roads w/ 500 Truck ADT or Greater		
Road Conditions	Miles	Total
Worst	4.00	\$4,000,000
Poor	10.5	\$8,278,125
Moderate	26.00	\$14,387,500
Good	20.00	\$8,987,500
Best	37.00	\$693,750
Total	97.50	\$36,346,875

Note: 500 trucks per day is approximately equal to 5 million passenger vehicles per day in road wear.

Summary Tables: Potential Rehabilitation Costs:

All Dairy Roads with 300 Truck ADT or Greater:

Engineered Dairy Roads w/ 300 Truck ADT or Greater			
Road Conditions	Miles	Cost	Total
Worst	1.00	\$1,040,000	\$1,040,000
Poor	14.00	\$812,500	\$11,375,000
Moderate	24.00	\$650,000	\$15,600,000
Good	26.00	\$500,000	\$13,000,000
Best	42.00	\$18,750	\$787,500
Total	106.00		\$41,802,500

Non-Engineered Dairy Roads w/ 300 Truck ADT or Greater			
Road Conditions	Miles	Cost	Total
Worst	5.00	\$1,000,000	\$5,000,000
Poor	3.00	\$306,250	\$918,750
Moderate	12.00	\$231,250.00	\$2,775,000
Good	5.00	\$162,500.00	\$812,500
Best	35.00	\$18,750.00	\$656,250
Total	60.00		\$10,162,500

Summary Table:

Summary: All Dairy Roads w/ 300 Truck ADT or Greater		
Road Conditions	Miles	Total
Worst	6.00	\$6,040,000
Poor	17.00	\$12,293,750
Moderate	36.00	\$18,375,000
Good	31.00	\$13,812,500
Best	77.00	\$1,443,750
Total	167.00	\$51,965,000

Note: 300 trucks per day is approximately equal to 2.8 million passenger vehicles per day in road wear.

FINDINGS:

The dairy Roads Study produced the following findings:

- Over 500 miles of county roads were identified as potential dairy roads. Approximately 286 miles of road were identified as engineered roads (i.e. roads with a base) and 228 miles were identified as non-engineered road.
- Dairy roads ranged from worst to best condition (based on PCI value). The non-engineered dairy roads were generally found to be in the worst condition, with some roads having little or no asphalt covering.
- Hundreds of trips per day are made by trucks carrying milk products and other commodities to and from dairies to processing plants in Tulare County. The number of truck trips on dairy roads ranged from less than 10 trips per day to well over 1000 trips per day based on traffic count data.
- Dairy and other trucks travel both the engineered and non engineered roads in the county. One loaded milk truck is equivalent to 9,600 passenger cars in regard to the amount of damage done to a roadway over a same given period of time.

CONCLUSIONS:

The Dairy Roads Study provided valuable information on the use, condition, and possible rehabilitation of dairy roads in the county. The study shows that the cost to repair all of the roads identified as potential dairy roads in the county could exceed \$1.9 billion dollars. The study also shows cost to repair the engineered roads would be higher due to increased design and environmental requirements. Many of the roads identified in the study as dairy roads carry large daily volumes of truck traffic. This includes dairy trucks (tankers) and other trucks such as feed and manure trucks. The impact to these roads is substantial, with over 5,000,000 million cars being the equivalent to 500 truck trips per day on the roads.

Though the cost to repair these roads is great, it comes with some very definite advantages. These include a safer and more efficient road system to get dairy products and other goods to market, a safer and more efficient road system for the citizens of Tulare County who rely on these roads to get to and from work and school, and reducing the long term maintenance costs by bringing the roads up to standard at one time, thereby halting their continued deterioration. In addition, repairs to the dairy roads will help to strengthen the economy of the county by creating jobs, fostering local business, and providing better emergency response capability.

RECOMMENDATIONS:

A number of possible rehabilitation scenarios have been identified based on the Dairy Roads study:

Scenario 1: Reconstruct the 7 miles roads classified as worst and rehabilitate the 29 miles of the roads classified as poor. This would consume \$21,100,000 of the available \$30,000,000 budget. This leaves \$8,900,000 to use on rehabilitation of engineered dairy roads classified as moderate with the highest truck counts.

Scenario 2: Rehabilitate the 29 miles of dairy road classified as poor at an approximate cost of \$14,500,000 and use the remaining \$15,500,000 of the budget to rehabilitate the 31 miles of road classified as moderate with the highest truck counts.

Scenario 3: Rehabilitate approximately 60 miles of roads classified as moderate with the highest truck counts for \$30,000,000.

Scenario 4: Rehabilitate approximately 60 miles of road classified as good with the highest truck counts for \$30,000,000.

Scenario 5: Reconstruct or rehabilitate the greatest number of miles possible of engineered dairy roads in any condition for a cost of up to \$30,000,000.

APPENDIX A

List of Potential Dairy Routes

Potential Dairy Roads

ID ¹	NAME	FUNCTION	FROM	TO	LENGTH (MI)	PCI	BASE ²	DAIRY	TRUCKS ³
2591	1st	Local	R112	A177	3.04	57.43	1	LOL	0
2592	1st	Local	A177	A184	3.04	13.7	1	LOL	0
5372	Airport	Local	A104	A106	0.25	99.98	0	CDI	0
5373	Airport	Local	A106	A112	0.75	99.98	0	Hilmar Cheese	0
5374	Airport	uLocal	A112	A120	1.03	99.98	0	CDI	0
5671	Airport	Local	A417W	A417E	0.83	88.36	0	CDI	0
5365	Airport	Local	A64	A72	0.96	65.82	1	CDI	0
5369	Airport	Local	A96	LA96A	0.08	47.7	1	CDI	0
5370	Airport	Local	LA96A	LA97B	0.09	40.22	1	CDI	0
0361	Alila	Local	R96	R104	1.00	36.05	0	CDI	0
0523	Avenue 112	Local	R96	R104	1.00	34.64	0	CDI	0
0524	Avenue 112	Local	R104	R112	1.00	53.9	0	Hilmar Cheese	0
0525	Avenue 112	Local	R112	R120	1.00	72.07	0	Hilmar Cheese	0
0561	Avenue 120	Collector	R120	D122B	0.17	99.98	1	Hilmar Cheese, LOL, CDI	1094
0558	Avenue 120	Collector	R96	R104	1.00	99.98	1	LOL, CDI	0
0559	Avenue 120	Collector	R104	R112	1.00	99.98	1	LOL, CDI	0
0560	Avenue 120	Collector	R112	R120	0.92	99.98	1	Hilmar Cheese, LOL, CDI	1094
0562	Avenue 120	Collector	D122B	R124	0.11	99.98	0	LOL, CDI	0
0562	Avenue 120	Collector	D122B	R124	0.29	99.98	0	LOL, CDI	0
0563	Avenue 120	Collector	R124	R136	1.49	99.83	0	LOL, CDI	0
0564	Avenue 120	Collector	R136	R144	0.99	99.83	0	CDI	458
0565	Avenue 120	Collector	R144	R152	1.01	99.83	1	CDI	0
0551	Avenue 120	Collector	R36	R46	1.16	55.48	0	LOL, CDI	0
0552	Avenue 120	Collector	R46	R56	1.27	57.04	0	LOL, CDI	0
0553	Avenue 120	Collector	R56	R64	0.99	78.25	0	LOL, CDI	0
0554	Avenue 120	Collector	R64	R72	1.00	75.11	0	LOL, CDI	506
0555	Avenue 120	Collector	R72	R80	1.00	12.06	0	LOL, CDI	0
0556	Avenue 120	Collector	R80	R88	1.00	57.81	1	LOL, CDI	0
0557	Avenue 120	Collector	R88	R96	1.00	60.08	1	LOL, CDI	486
0589	Avenue 128	Local	R96	R104	1.00	65.12	0	CDI	0
0593	Avenue 128	Local	R124	R136	1.49	15.87	0	CDI	0
0594	Avenue 128	Local	R136	R144	0.98	25.8	0	CDI	18
0595	Avenue 128	Local	R144	R152	1.01	99.98	0	CDI	0
0596	Avenue 128	Collector	R152	R160	1.00	99.98	0	CDI	0
0586	Avenue 128	Local	R72	R80	1.00	5.89	0	LOL, CDI	0
0587	Avenue 128	Local	R80	R88	1.00	53.48	0	CDI	26
0588	Avenue 128	Local	R88	R96	1.00	12.59	0	CDI	26
0626	Avenue 136	Local	R120	R128	1.00	34.16	0	LOL	0
0627	Avenue 136	Local	R128	R136	1.00	23.76	0	LOL	0
0667	Avenue 14	Collector	R32	R40	1.01	86.23	1	LEP	0
0675	Avenue 144	Collector	R96	R104	1.01	57.81	1	LOL, CDI	0
0676	Avenue 144	Collector	R104	R112	1.00	47.28	1	LEP, CDI	0
0666	Avenue 144	Collector	R23	R32	1.20	91.59	1	LEP	0
0658	Avenue 144	Collector	R40	R48	1.00	55.48	1	LEP	0
0669	Avenue 144	Collector	R48	R56	1.01	59.7	1	LEP	0
0670	Avenue 144	Collector	R56	R64	0.98	61.55	1	LEP	0
0671	Avenue 144	Collector	R64	R72	0.99	77.42	1	LEP	672
0672	Avenue 144	Collector	R72	R80	1.00	40.22	1	LOL, LEP	363
0673	Avenue 144	Collector	R80	R88	1.00	63	1	LOL, LEP, CDI	0
0674	Avenue 144	Collector	R88	R96	0.99	67.86	1	LOL, LEP, CDI	0
0752	Avenue 152	Collector	R96	R104	0.99	77.13	0	SMP, CDI	0
0753	Avenue 152	Collector	R104	R112	1.01	69.18	0	SMP, CDI	0
0765	Avenue 152	Collector	R140	R148	1.00	58.19	1	LOL, SMP, CDI	0
0766	Avenue 152	Collector	R148	R152	0.50	52.28	1	LOL, SMP, CDI	541
0767	Avenue 152	Collector	R152	R160	0.50	60.08	1	LOL, SMP	0
0767	Avenue 152	Collector	R152	R160	0.50	60.08	1	LOL, SMP	0
0768	Avenue 152	Collector	R160	R168	1.00	67.52	1	LOL, SMP	0
0769	Avenue 152	Collector	R168	R176	1.01	66.51	1	LOL, SMP, CDI	0
0770	Avenue 152	Collector	R176	R184	1.00	66.85	1	LOL, CDI	0
0773	Avenue 152	Collector	R200	R208	0.99	99.98	1	LOL, CDI	194
0749	Avenue 152	Local	R72	R80	1.01	59.33	0	LOL, LEP	0

ID ¹	NAME	FUNCTION	FROM	TO	LENGTH (MI)	PCI	BASE ²	DAIRY	TRUCKS ³
0750	Avenue 152	Local	R80	R88	1.01	48.13	0	LOL, LEP, CDI	0
0751	Avenue 152	Local	R88	R96	0.99	84.4	0	LOL, LEP, CDI	0
0817	Avenue 160	Local	R96	R104	1.00	99.83	1	LOL	0
0818	Avenue 160	Local	R104	R112	1.00	99.68	1	LOL	0
0820	Avenue 160	Local	D116B	R120	0.84	58.95	0	CDI	0
0821	Avenue 160	Local	R120	R124	0.50	55.09	0	CDI	0
0822	Avenue 160	Local	R124	R128	0.50	96.57	0	CDI	0
0823	Avenue 160	Local	R128	R136	1.00	54.69	0	CDI	0
0824	Avenue 160	Local	R136	R140	0.50	99.98	0	LOL	0
0825	Avenue 160	Local	R140	R144	0.50	99.98	0	LOL	0
0826	Avenue 160	Local	R144	R152	1.00	99.98	0	LOL	0
0827	Avenue 160	Local	R152	R160	1.00	55.48	0	LOL	0
0828	Avenue 160	Local	R160	R168	1.00	79.88	0	LOL	0
0829	Avenue 160	Local	R168	R176	1.01	65.47	0	LOL	0
0812	Avenue 160	Local	R58	R64	1.01	98.81	0	CDI	0
0813	Avenue 160	Local	R64	R72	0.98	46.85	0	LEP, CDI	0
0814	Avenue 160	Local	R72	R80	1.00	49.39	1	LOL, CDI	0
0815	Avenue 160	Local	R80	R88	0.99	16.41	0	LOL	0
0816	Avenue 160	Local	R88	R96	1.01	46.85	0	LOL	0
0873	Avenue 168	Collector	R164	LR165	0.18	90.51	1	LEP	0
0875	Avenue 168	Collector	R166	LR166B	0.06	87.74	1	LEP	0
0868	Avenue 168	Local	R128	R136	1.00	72.07	1	LOL	0
0869	Avenue 168	Local	R136	R144	1.00	72.38	1	LEP	0
0870	Avenue 168	Local	R144	R152	1.00	58.19	1	LEP	58
0871	Avenue 168	Collector	R152	R160	1.00	80.67	1	LEP	46
0872	Avenue 168	Collector	R160	R164	0.50	89.16	1	LEP	46
0874	Avenue 168	Collector	LR165	R166	0.07	88.97	1	LEP	0
0876	Avenue 168	Collector	LR166B	R167	0.06	86.67	1	LEP	0
0877	Avenue 168	Collector	R167	R168	0.12	89.56	1	LEP	0
0878	Avenue 168	Collector	R168	R180	0.51	83.92	1	LEP	0
0878	Avenue 168	Collector	R168	R180	1.00	83.92	1	LEP	0
0879	Avenue 168	Collector	R180	R192	1.50	85.1	1	LEP	0
0897	Avenue 172	Local	R152	R160	1.01	58.19	0	CDI	0
0898	Avenue 172	Local	R160	R168	0.99	64.07	0	CDI	0
0914	Avenue 176	Local	R112	R120	1.00	37.46	0	CDI	0
0915	Avenue 176	Local	R120	R128	1.02	44.68	0	CDI	0
0917	Avenue 176	Local	R192	R202	0.25	65.47	1	CDI	0
0917	Avenue 176	Local	R192	R202	1.01	65.47	1	CDI	0
0918	Avenue 176	Local	R202	R208	0.73	85.78	1	CDI	0
0919	Avenue 176	Local	R208	R216	1.07	80.67	1	LOL	0
0906	Avenue 176	Local	R24	R28	0.50	99.98	0	LOL	16
0907	Avenue 176	Local	R28	R32	0.50	41.12	0	LOL	0
0908	Avenue 176	Local	R32	R40	1.01	50.64	1	LOL	0
0909	Avenue 176	Local	R40	R48	1.00	42.47	1	LOL, CDI	0
0910	Avenue 176	Local	R48	R56	1.00	39.3	0	CDI	0
0911	Avenue 176	Local	R56	R64	1.00	26.31	0	CDI	0
0912	Avenue 176	Local	R64	R72	0.98	51.46	0	CDI	0
0913	Avenue 176	Local	R72	R80	0.99	35.58	0	CDI	0
0941	Avenue 18	Collector	R48	R56	1.00	99.98	0	LOL, LEP	0
0930	Avenue 180	Local	R128	R136	1.00	59.7	0	LEP	0
0947	Avenue 184	Collector	R96	D112A	1.56	55.48	1	LOL, CDI	512
0948	Avenue 184	Other Arterial	D112A	R112	0.17	55.48	1	LOL, CDI	562
0948	Avenue 184	Other Arterial	D112A	R112	0.09	55.48	1	LOL, SMP, CDI	562
0948	Avenue 184	Other Arterial	D112A	R112	0.11	55.48	1	CDI	562
0948	Avenue 184	Other Arterial	D112A	R112	0.08	55.48	1	SMP, CDI	562
0949	Avenue 184	Collector	R112	R120	1.00	74.81	1	LOL, SMP, LEP, CDI	494
0950	Avenue 184	Collector	R120	R128	1.01	85.55	1	LOL, SMP, LEP, CDI	320
0954	Avenue 184	Local	R168	R180	1.01	81.7	1	LEP	0
0954	Avenue 184	Local	R168	R180	0.50	81.7	1	LEP	0
0955	Avenue 184	Local	R180	R192	0.51	68.52	1	LEP, CDI	0
0955	Avenue 184	Local	R180	R192	0.50	68.52	1	LEP	0
0936	Avenue 184	Collector	R24	R28	0.50	62.64	0	LOL, LEP	0
0937	Avenue 184	Collector	R28	R32	0.50	83.44	0	LOL, LEP	0

ID ¹	NAME	FUNCTION	FROM	TO	LENGTH (MI)	PCI	BASE ²	DAIRY	TRUCKS ³
0938	Avenue 184	Collector	R32	R36	0.50	54.69	0	LOL, LEP	0
0939	Avenue 184	Collector	R36	R42	0.75	51.05	0	LOL, LEP	0
0940	Avenue 184	Collector	R42	R48	0.75	98.48	0	LOL, LEP	0
0942	Avenue 184	Collector	R56	R64	1.01	53.49	0	LOL, LEP	0
0943	Avenue 184	Collector	R64	R72	0.98	58.19	0	LOL	0
0944	Avenue 184	Collector	R72	R80	0.00	66.85	1	LOL	0
0945	Avenue 184	Collector	R80	R88	1.01	99.83	1	LOL, CDI	0
0946	Avenue 184	Collector	R88	R96	1.00	48.13	1	LOL, CDI	571
0975	Avenue 188	Local	R152	R160	0.98	80.67	0	SMP	0
0976	Avenue 188	Local	R160	R168	1.01	82.95	0	SMP	0
0991	Avenue 190	Local	R140	R142	0.25	42.02	0	LOL	0
0990	Avenue 190	Local	R72	R80	1.01	99.79	0	LOL	0
1011	Avenue 192	Collector	R128	D134	0.85	23.76	1	LOL, SMP, LEP, CDI	180
1010	Avenue 192	Local	R124	R128	0.53	81.96	1	LOL	0
1012	Avenue 192	Collector	D134	R136	0.15	99.98	1	SMP, LEP, CDI	0
1013	Avenue 192	Collector	R136	R140N	0.48	99.98	1	LOL, SMP, LEP, CDI	788
1015	Avenue 192	Collector	R140S	R152	1.49	99.98	1	LOL, SMP, LEP, CDI	494
1016	Avenue 192	Collector	R152	R164	0.47	73.91	1	SMP, LEP, CDI	324
1016	Avenue 192	Collector	R152	R164	1.00	73.91	1	LEP, CDI	324
1017	Avenue 192	Collector	R164	R168S	0.51	81.45	1	LEP, CDI	454
1019	Avenue 192	Collector	R168N	R172	1.00	79.88	1	CDI	450
1020	Avenue 192	Collector	R172	R180S	1.00	77.7	1	CDI	0
1022	Avenue 192	Collector	R180N	R188	0.51	70.48	1	CDI	0
1005	Avenue 192	Local	R48	R52	0.43	15.87	0	LOL	0
1006	Avenue 192	Local	R52	R60	0.99	29.3	0	LOL	0
1007	Avenue 192	Local	R60	R64	0.58	99.98	0	LOL	0
1047	Avenue 194	Local	R76	R80	0.43	57.43	0	LOL	0
1063	Avenue 196	Collector	R27	R28	0.06	14.79	0	LOL	0
1115	Avenue 200	Local	R124	D134	0.51	99.98	0	LOL	0
1117	Avenue 200	Local	R132	R140	1.00	41.12	0	CDI	0
1120	Avenue 200	Local	R164	R168N	0.47	64.07	0	CDI	0
1110	Avenue 200	Local	R60	R68	1.01	10.4	1	LOL	0
1147	Avenue 201	Collector	R27	R28	0.07	19.6	0	LOL	0
1150	Avenue 204	Local	R68	R76	1.08	27.81	0	LOL	0
1175	Avenue 208	Collector	R140	R152	1.49	79.88	0	LOL, SMP	0
1176	Avenue 208	Collector	R152	R164	1.51	57.81	1	LOL	0
1177	Avenue 208	Collector	R164	R168	0.47	60.45	1	LOL	0
1178	Avenue 208	Collector	R168	R172	0.51	80.15	1	LOL	0
1179	Avenue 208	Collector	R172	R180	1.01	92.61	1	LOL	0
1170	Avenue 208	Local	R60	R68	1.01	53.49	1	LOL	0
1171	Avenue 208	Local	R68	R76	1.08	33.68	1	CDI	0
1206	Avenue 212	Local	R132	R140	1.00	22.21	1	CDI	0
1217	Avenue 216	Collector	R36	R44	1.00	42.02	1	LOL	0
1218	Avenue 216	Collector	R44	R52	1.00	37.92	1	LOL	0
1219	Avenue 216	Collector	R52	R60	0.50	45.12	1	LOL, CDI	0
1219	Avenue 216	Collector	R52	R60	0.51	45.12	1	LOL, CDI	0
1220	Avenue 216	Collector	R60	R68	1.02	99.68	1	LOL, CDI	0
1271	Avenue 224	Local	R20	R28	1.04	42.02	0	LOL	0
1275	Avenue 224	Local	R52	R56	0.51	63	0	CDI	0
1276	Avenue 224	Local	R56	R60	0.52	46.85	0	CDI	0
1321	Avenue 228	Local	R140	R142	0.30	22.2	0	LOL	0
1340	Avenue 232	Collector	R28	R36	1.00	99.98	1	LOL	0
1341	Avenue 232	Collector	R36	R44	0.50	99.98	1	LOL	0
1343	Avenue 232	Collector	R44	R48	0.50	99.98	1	LOL	0
1344	Avenue 232	Collector	R48	R56	1.01	99.98	1	LOL, CDI	0
1345	Avenue 232	Collector	R56	R60	0.51	99.98	1	LOL, CDI	0
1346	Avenue 232	Collector	R60	R68	1.01	99.98	1	LOL, CDI	0
1348	Avenue 232	Collector	R76	R84	0.98	99.98	1	LOL	0
1366	Avenue 236	Local	R36	R40	0.50	58.95	0	LOL	0
1367	Avenue 236	Local	R40	R44	0.50	66.85	0	LOL	0
1368	Avenue 236	Local	R44	R48	0.50	58.19	0	LOL	0
1369	Avenue 236	Local	R48	R56	1.01	67.19	0	LOL	0
1408	Avenue 240	Collector	R140	R148	0.37	99.94	0	Hilmar Cheese, LOL	0

ID ¹	NAME	FUNCTION	FROM	TO	LENGTH (MI)	PCI	BASE ²	DAIRY	TRUCKS ³
1408	Avenue 240	Collector	R140	R148	0.64	99.94	0	Hilmar Cheese, LOL	0
1409	Avenue 240	Collector	R148	R152	0.49	75.4	0	Hilmar Cheese, LOL	0
1410	Avenue 240	Collector	R152	R164	1.02	67.19	1	CDI	0
1411	Avenue 240	Collector	R164	R168	0.89	34.16	1	CDI	0
1433	Avenue 244	Local	R152	R155	0.24	99.49	0	LOL	0
1465	Avenue 248	Local	R152	D168	1.48	60.45	0	CDI	0
1461	Avenue 248	Local	R124	R132	0.99	99.68	0	Hilmar Cheese, LEP	0
1462	Avenue 248	Local	R132	R140	1.00	99.68	0	Hilmar Cheese, LEP	0
1463	Avenue 248	Local	R140	R148	1.01	67.52	0	LEP	0
1448	Avenue 248	Local	R28	R36	1.01	64.07	0	LOL	0
1449	Avenue 248	Local	R36	R44	1.00	35.11	0	LOL	0
1450	Avenue 248	Local	R44	R48	0.50	21.17	0	LOL, CDI	25
1451	Avenue 248	Local	R48	R60	0.50	57.04	0	LOL	0
1452	Avenue 248	Local	R60	R64	0.51	44.68	0	LOL	0
1453	Avenue 248	Local	R64	R68	0.49	51.46	0	LOL	0
1454	Avenue 248	Collector	R68	R80	1.53	99.98	0	LOL	0
1495	Avenue 256	Collector	R159	LR159	0.08	59.7	1	CDI	0
1489	Avenue 256	Collector	R124	R132	0.99	89.36	1	LOL	0
1490	Avenue 256	Collector	R132	R140	1.00	86.23	1	LOL	0
1491	Avenue 256	Collector	R140	R148	1.00	67.19	1	LEP	0
1493	Avenue 256	Collector	R152	R156	0.50	65.12	1	CDI	0
1494	Avenue 256	Collector	R156	R159	0.38	78.25	1	CDI	0
1496	Avenue 256	Collector	LR159	R164	0.54	66.51	1	CDI	0
1497	Avenue 256	Collector	R164	R172	0.94	45.12	1	CDI	0
1498	Avenue 256	Collector	R172	R180	1.00	60.45	1	CDI	0
1499	Avenue 256	Collector	R180	R188	1.01	75.69	1	CDI	0
1478	Avenue 256	Collector	R36	R44	1.00	47.28	0	LOL	0
1479	Avenue 256	Collector	R44	R52	1.00	67.52	0	CDI	0
1481	Avenue 256	Local	R56	R64	1.00	61.19	0	LOL	0
1510	Avenue 260	Collector	R52	R64	1.00	66.51	0	LOL, CDI	0
1510	Avenue 260	Collector	R52	R64	0.00	66.51	0	CDI	0
1511	Avenue 260	Collector	R64	R68	0.48	80.67	0	LOL, CDI	0
1512	Avenue 260	Collector	R68	R80	1.52	99.83	1	CDI	0
1512	Avenue 260	Collector	R68	R80	1.52	99.83	1	CDI	0
1513	Avenue 260	Collector	R80	R84	0.50	99.83	1	CDI	0
1514	Avenue 260	Collector	R84	R92	1.00	99.83	1	CDI	0
1558	Avenue 271	Local	R122	R124	0.24	74.81	1	LOL, LEP	0
1559	Avenue 271	Local	R124	R128	0.00	55.48	1	LOL, LEP	0
1570	Avenue 272	Local	R108	R114	0.75	64.42	1	LOL	42
1571	Avenue 272	Local	R120	R122	0.25	73	1	LOL, LEP	0
1572	Avenue 272	Local	R128	R132	0.51	63	1	LOL, LEP	0
1573	Avenue 272	Local	R132	R140	1.01	55.09	1	LOL, LEP	0
1561	Avenue 272	Local	R48	R56	0.99	42.92	0	CDI	0
1587	Avenue 280	Collector	R44	R48	0.51	99.94	1	CDI	0
1588	Avenue 280	Collector	R48	R52	0.48	99.94	1	CDI	0
1589	Avenue 280	Collector	R52	R56	0.50	99.94	1	LOL, CDI	0
1590	Avenue 280	Collector	R56	R60	0.50	95.44	1	LOL, CDI	0
1591	Avenue 280	Collector	R60	R68	0.98	99.94	1	LOL, CDI	0
1591	Avenue 280	Collector	R60	R68	0.98	99.94	1	LOL, CDI	0
1592	Avenue 280	Collector	R68	R76	1.00	99.94	1	LOL	0
1639	Avenue 296		R69	R74	0.16	80.41	1	LOL, CDI	0
1675	Avenue 304	Local	R182	D184B	0.55	63	0	CDI	0
1663	Avenue 304	Local	R52	LR53	0.19	73.91	1	Myovich, CDI	0
1672	Avenue 304	Local	R168	R170	0.25	99.79	0	LEP	58
1674	Avenue 304	Local	R180	R182	0.25	40.22	1	CDI	0
1661	Avenue 304	Local	R44	R48	0.50	58.95	1	Myovich, CDI	0
1662	Avenue 304	Local	R48	R52	0.50	57.43	1	Myovich, LEP, CDI	0
1664	Avenue 304	Local	LR53	R56	0.31	57.81	1	Myovich, CDI	0
1665	Avenue 304	Local	R56	R60	0.50	56.65	1	Myovich, LOL, CDI	0
1666	Avenue 304	Local	R60	R64	0.50	59.33	1	Myovich, LOL, CDI	0
1667	Avenue 304	Local	R64	R68	0.50	79.08	1	Myovich, LOL, CDI	0
1754	Avenue 320	Collector	R92	R100	1.00	52.69	1	CDI	0
1755	Avenue 320	Collector	R100	R108	1.00	64.07	1	CDI	0

ID ¹	NAME	FUNCTION	FROM	TO	LENGTH (MI)	PCI	BASE ²	DAIRY	TRUCKS ³
1797	Avenue 328	Collector	R124	LR124A	0.09	99.79	1	Myovich	0
1798	Avenue 328	Collector	LR124A	LR125D	0.10	65.12	1	Myovich, LOL	0
1801	Avenue 328	Collector	R132	LR136C	0.57	82.71	1	Myovich	0
1793	Avenue 328	Collector	R92	R100	2.00	79.08	1	Myovich, LOL, SMP, CDI	0
1794	Avenue 328	Collector	R100	R108	2.00	76.85	1	Myovich, LOL, SMP, CDI	0
1795	Avenue 328	Collector	R108	R112	0.49	78.25	1	Myovich, LOL	0
1796	Avenue 328	Collector	R112	R124	1.49	63	1	Myovich, LOL	0
1799	Avenue 328	Collector	LR125D	R127	0.18	79.08	1	Myovich, LOL	0
1800	Avenue 328	Collector	R127	R132	0.64	53.09	1	Myovich, LOL	0
1802	Avenue 328	Collector	R138	R140	0.25	83.92	1	Myovich	0
1803	Avenue 328	Collector	R140	R144	0.51	91.41	1	Myovich	0
1804	Avenue 328	Collector	R144	R148	0.50	70.8	1	Myovich	0
1805	Avenue 328	Collector	R152	R156	0.50	72.69	1	Myovich	0
1789	Avenue 328	Collector	D60A	R68	2.19	42.47	1	Myovich, LOL, SMP, CDI	0
1790	Avenue 328	Collector	R68	R76	2.19	44.68	1	Myovich, LOL, SMP, CDI	0
1791	Avenue 328	Collector	R76	R80	0.50	45.12	1	Myovich, LOL, SMP, CDI	0
1792	Avenue 328	Collector	R80	R92	1.49	88.97	1	Myovich, LOL, SMP, CDI	112
1842	Avenue 336	Local	R108	R112	0.50	74.51	0	CDI	34
1865	Avenue 340	Local	R112	R124	1.50	80.15	0	CDI	0
1899	Avenue 352	Local	R36	D60C	1.04	99.98	0	LOL	0
1900	Avenue 352	Local	R100	R112	2.52	30.29	0	LOL, CDI	0
1901	Avenue 352	Collector	R112	R124	1.51	54.69	1	LOL, CDI	0
1897	Avenue 352	Local	R20	R28	2.01	53.9	0	LOL	0
1898	Avenue 352	Local	R28	R36	2.01	56.26	0	LOL	0
1931	Avenue 360	Local	R92	R100	2.51	99.83	0	LOL, CDI	0
1930	Avenue 360	Local	R80	R92	2.51	99.83	0	LOL, CDI	0
1941	Avenue 364	Local	R140	R144	0.50	99.68	0	CDI	0
1961	Avenue 368	Collector	R92	R100	3.01	49.81	1	LOL, CDI	0
1962	Avenue 368	Collector	R100	R108	3.01	44.24	1	LOL, CDI	0
1963	Avenue 368	Collector	R108	R112	0.51	99.83	1	LOL	0
1964	Avenue 368	Collector	R112	R124	1.50	89.75	1	LOL	0
1965	Avenue 368	Collector	R124	R132	0.99	22.21	1	LOL, CDI	0
1966	Avenue 368	Local	R132	R140	1.00	34.64	0	CDI	0
1958	Avenue 368	Collector	R76	R80	0.50	44.24	0	LOL	0
1959	Avenue 368	Collector	R80	R84	0.49	45.55	1	LOL, CDI	0
1960	Avenue 368	Collector	R84	R92	3.01	61.55	1	LOL, CDI	1189
1983	Avenue 376	Local	R76	R80	0.49	38.38	0	CDI	0
2035	Avenue 384	Other Arterial	R96S	D104C	0.96	88.36	1	Myovich, LOL, CDI	0
2036	Avenue 384	Other Arterial	R108	R114	0.71	99.94	1	Myovich, LOL, CDI	0
2037	Avenue 384	Other Arterial	R114	R116	0.25	94.9	1	Myovich, LOL, CDI	0
2038	Avenue 384	Other Arterial	R116	R118	0.25	99.94	1	Myovich, LOL, CDI	0
2039	Avenue 384	Other Arterial	R118	R120	0.25	85.33	1	Myovich, LOL, CDI	798
2040	Avenue 384	Other Arterial	R120	R124N	0.50	95.44	1	Myovich, LOL, CDI	0
2041	Avenue 384	Other Arterial	R124N	R124S	0.05	89.36	1	Myovich	0
2042	Avenue 384	Other Arterial	R124S	R128	0.42	89.36	1	Myovich, LOL, CDI	0
2025	Avenue 384	Other Arterial	R64	R68	0.50	99.98	1	LEP	0
2026	Avenue 384	Other Arterial	R68	R74	0.75	99.98	1	LEP	0
2027	Avenue 384	Other Arterial	R74	R76	0.32	99.98	1	LEP	0
2028	Avenue 384	Other Arterial	R76	R80	0.43	80.67	1	LEP	0
2029	Avenue 384	Other Arterial	R80	R84N	0.50	80.67	1	Myovich, LOL, CDI	1084
2030	Avenue 384	Other Arterial	R84N	R84S	0.06	80.67	1	Myovich, CDI	0
2031	Avenue 384	Other Arterial	R84S	R86	0.24	95.17	1	Myovich, LOL, CDI	0
2032	Avenue 384	Other Arterial	R86	R88	0.21	87.74	1	Myovich, LOL, CDI	0
2033	Avenue 384	Other Arterial	R88	R96N	1.00	79.08	1	Myovich, LOL, CDI	0
2034	Avenue 384	Other Arterial	R96N	R96S	0.05	79.08	1	Myovich	0
2049	Avenue 388	Local	R84	R88	0.50	77.7	1	CDI	0
2152	Avenue 408	Collector	R104	R112	0.99	99.79	0	CDI	0
0218	Avenue 56	Collector	R140	R144	0.50	91.24	1	LEP	0
0219	Avenue 56	Collector	R144	R148	0.50	99.79	1	LEP	0
0220	Avenue 56	Collector	R148	R152	0.50	99.98	1	LEP	0
0221	Avenue 56	Collector	R152	R160	0.50	99.98	1	LEP	0
0221	Avenue 56	Collector	R152	R160	0.50	99.98	1	LEP	0
0222	Avenue 56	Collector	R160	R164	0.50	99.98	1	LEP	0

ID ¹	NAME	FUNCTION	FROM	TO	LENGTH (MI)	PCI	BASE ²	DAIRY	TRUCKS ³
0223	Avenue 56	Collector	R164	R168	0.50	99.98	1	LEP	0
0224	Avenue 56	Collector	R168	R176	1.00	99.98	1	LEP	272
0225	Avenue 56	Collector	R176	R184	1.00	67.19	1	LEP	364
0226	Avenue 56	Collector	R184	R192	1.00	79.08	1	LEP	0
0227	Avenue 56	Collector	R192	R200	1.00	99.94	1	LEP	0
0228	Avenue 56	Collector	R200	R208	1.01	99.94	1	LEP	0
0229	Avenue 56	Collector	R208	R216	1.02	94.76	1	LEP	472
0230	Avenue 56	Collector	R216	R224	1.02	86.45	1	LEP	472
0291	Avenue 72	Local	R104	R112	1.02	22.73	0	CDI	0
0292	Avenue 72	Local	R112*	R120	1.03	54.69	0	CDI	0
5146	Avenue 84	Collector	A84	A88	0.50	60.82	0	CDI	0
0341	Avenue 84	Collector	R58	R64	0.74	0	0	CDI	98
0342	Avenue 84	Collector	R64	R72	0.99	75.11	0	CDI	98
0343	Avenue 84	Collector	R72	R84	1.51	19.6	0	CDI	98
0359	Avenue 88	Collector	R84	R88	0.50	53.9	0	CDI	0
0360	Avenue 88	Collector	R88	R96	0.99	24.27	0	CDI	0
0422	Avenue 96	Local	R80	R88	0.99	79.08	0	LOL	0
0423	Avenue 96	Local	R88	R96	1.01	25.8	0	LOL, CDI	0
1289	Bardsley	Collector	R148	R152	0.51	70.8	1	LOL	0
1288	Bardsley	Collector	R140	R148	0.62	60.82	1	LOL	0
1287	Bardsley	Collector	R132	R140	1.00	60.45	0	CDI	0
1288	Bardsley	Collector	R140	R148	0.00	60.82	1	LOL	0
6175	Belmont Rd	Collector	A232	A242	0.96	75.4	0	Hilmar Cheese, CDI	0
6175	Belmont Rd	Collector	A232	A242	0.26	75.4	0	Hilmar Cheese, CDI	0
6176	Belmont Rd	Collector	A242	A248	0.75	83.92	0	CDI	0
6177	Belmont Rd	Collector	A248	A256	1.01	81.19	0	CDI	94
2454	Betty Dr	Major Arterial	D68	D67	0.16	99.98	1	CDI	0
0622	Bianco	Local	R24	R27	0.43	25.28	0	CDI	0
5290	Blackstone	Collector	A249	A252	0.49	77.7	1	LOL, LEP	0
5291	Blackstone	Collector	A252	A256	0.50	77.13	1	LOL, LEP	0
1593	Caldwell	Collector	R76	D88	0.97	67.52	1	LOL	0
1594	Caldwell	Other Arterial	D88	R92	0.86	94.03	1	CDI	382
5375	Callison	Collector	A128	A136	1.00	63	1	CDI	0
1458	Cartmill	Other Arterial	LR94	D99	0.36	60.45	0	LOL, LEP	0
1457	Cartmill	Other Arterial	R92	LR94	0.29	94.33	0	LOL, LEP	0
1459	Cartmill	Other Arterial	R106	R108	0.25	0	0	Hilmar Cheese, LOL, LEP	0
1460	Cartmill	Local	R116	R124	0.95	99.98	0	Hilmar Cheese, LOL, LEP	0
1455	Cartmill	Collector	R80	R84	0.50	99.98	0	LOL, LEP	0
1456	Cartmill	Collector	R84	R92	1.00	67.52	0	LOL, LEP	0
5120	Colpien	Local	A240	A244	0.49	73.61	1	LOL	0
5121	Colpien	Local	A244	A248	0.50	57.81	1	LOL	0
2460	Commercial	uLocal	A304	LA304A	0.18	21.17	1	LOL	0
5178	Crawford	Collector	A384	A388	0.50	84.63	1	CDI	118
5179	Crawford	Collector	A388	A392	0.50	99.94	1	CDI	0
5180	Crawford	Collector	A392	A396	0.50	99.79	1	CDI	0
5181	Crawford	Collector	A396	A400	0.50	99.79	1	CDI	0
0272	Deer Creek	Local	R116	R120	0.63	99.49	0	CDI	0
2488	Drive 85	Local	A280	A287	0.67	75.99	1	CDI	0
0232	Ducor Ave	Collector	R232	LR233D	0.15	81.7	1	LEP	0
0233	Ducor Ave	Collector	LR233D	LR234A	0.09	81.7	1	LEP	0
0234	Ducor Ave	Collector	LR234A	LR235A	0.09	84.16	1	LEP	0
0235	Ducor Ave	Collector	LR235A	LR236A	0.08	84.16	1	LEP	0
0231	Ducor Ave	Collector	R224	R232	0.92	99.83	1	LEP	0
0236	Ducor Ave	Collector	LR236A	R236	0.06	84.16	1	LEP	0
0237	Ducor Ave	Collector	R236	R240	0.50	66.51	1	LEP	0
5154	Enterprise	Other Arterial	A236	A240	0.51	80.15	1	LOL	0
2928	Farmersville	Collector	R164	A248	0.97	99.79	1	CDI	0
5985	Farmersville	Collector	D168	A256	0.97	99.68	1	CDI	0
2458	Frontage	Collector	A308	D66	0.11	63	1	CDI	0
2457	Frontage	Collector	R68	LA306C	0.36	99.98	1	CDI	0
4751	Harmon Road	Collector	A196	A199	0.36	40.22	0	LOL	0
4752	Harmon Road	Collector	A199	A201	0.08	31.75	0	LOL	0
4752	Harmon Road	Collector	A199	A201	0.14	31.75	0	LOL	0

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2575	Hosfield	Local	D113	A200	0.24	99.98	1	LOL	0
2574	Hosfield	uLocal	D109	D113	0.52	99.98	1	LOL	0
1114	Hosfield	Local	D109A	R124	1.20	99.98	0	LOL	0
5495	Howard	Collector	A0	A8	1.00	35.58	1	CDI	0
4757	Leota	Collector	A201	A208	0.92	22.73	0	LOL	0
5700	Lover Lane	Collector	A256	A260	0.54	76.28	1	LOL, LEP	0
5701	Lover Lane	Collector	A260	A264	0.54	77.98	1	LOL, LEP	0
5702	Lover Lane	Collector	A264	A266	0.22	80.15	1	LOL, LEP	0
5703	Lover Lane	Collector	A266	A272E	0.66	68.86	1	LOL, LEP	0
5689	Lovers Lane	Collector	A192	A200	1.00	99.69	1	LOL, SMP, CDI	152
5690	Lovers Lane	Collector	A200	A208	1.00	75.99	1	LOL, SMP	0
5691	Lovers Lane	Collector	A208	A212	0.50	61.92	1	LOL	0
5692	Lovers Lane	Collector	A212	A216	0.50	65.82	1	LOL	0
5693	Lovers Lane	Collector	A216	A220	0.50	80.93	1	LOL	0
5694	Lovers Lane	Collector	A220	A224	0.51	81.7	1	LOL	0
5695	Lovers Lane	Collector	A224	A228	0.50	99.83	1	LOL, CDI	0
5696	Lovers Lane	Collector	A228	A232	0.50	99.83	1	LOL, CDI	0
5697.20	Lovers Lane	Collector	LA233A	A240	1.03	85.1	1	LOL	0
5698	Lovers Lane	Collector	A240	A248	1.01	70.16	1	Hilmar Cheese	0
5697	Lovers Lane	Collector	A232	LA233A	1.03	74.21	1	LOL	0
5871	Mariposa	Local	A256	A264	1.00	99.98	1	CDI	0
5872	Mariposa	Local	A264	A272	2.00	99.98	1	CDI	0
5873	Mariposa	Local	A272	A280	2.00	99.98	1	CDI	0
2410	Merrit	Collector	R36	R37	0.08	99.94	1	LOL	0
1644	Mineral King	Collector	D164	R168	0.58	99.98	1	LEP	0
2570	Monson Dr	Collector	D105C	A388	0.21	81.96	0	LOL	0
2568	Monson Dr	Collector	A384	D104C	0.38	49.81	0	LOL	0
2569	Monson Dr	Collector	D104C	D105C	0.09	77.98	0	LOL	0
2571	Monson Dr	Collector	A388	R104	0.53	85.55	0	LOL	0
1634	Noble	Collector	R147	R152	0.79	0	1	LEP, CDI	0
1485	Oakdale	Collector	R97	R100	0.36	99.94	0	LOL, SMP	0
1486	Oakdale	Collector	R100	R108	1.01	99.94	0	LOL, SMP	0
1487	Oakdale	Collector	R108	R116	1.01	99.98	0	SMP	0
1488	Oakdale	Collector	R116	R124	0.95	89.36	0	SMP	0
5422	Oakmore	Local	A248	A256	1.06	67.52	1	LOL	0
2524	Oaks	Collector	A248	R100	0.58	66.16	1	Hilmar Cheese, LOL, LEP, CDI	0
5579	Olive	Local	A224	A228	0.50	55.09	0	CDI	0
5580	Olive	Local	A228	A232	0.50	36.05	0	CDI	0
0755	Olive	Collector	D99	D101	0.15	55.87	1	SMP, CDI	0
0758	Olive	Collector	SH99	D104A	0.09	68.86	1	LOL, SMP, CDI	0
0759	Olive	Collector	D104A	D105B	0.08	68.86	1	LOL, SMP, CDI	0
0760	Olive	Collector	D105B	D107A	0.18	68.86	1	LOL, SMP, CDI	0
0761	Olive	Collector	D107A	D108A	0.08	54.29	1	LOL, SMP, CDI	0
0756	Olive	Collector	D101	D115A	0.05	68.86	1	SMP, CDI	0
0756	Olive	Collector	D101	D115A	0.06	68.86	1	SMP, CDI	0
0754	Olive	Collector	R112	D99	0.12	69.18	1	SMP, CDI	0
0762	Olive	Collector	D108A	R120	0.17	54.29	1	LOL, SMP, CDI	0
0763	Olive	Collector	R120	R128	1.01	42.47	1	LOL, SMP, CDI	0
0764	Olive	Collector	R128	R140	1.51	40.22	1	LOL, SMP, CDI	0
0771	Olive	Collector	R184	R192	1.00	78.25	1	LOL, CDI	0
0772	Olive	Collector	R192	R200	1.00	99.98	1	LOL, CDI	0
0757	Olive	Collector	D115A	SH99	0.06	68.86	1	SMP, CDI	0
0481	Orrland Ave	Local	R80	R88	1.00	0	0	LEP	0
0482	Orrland Ave	Local	R88	R96	1.00	29.3	0	LEP	0
1393	Prosperity	Local	R80	R84	0.50	31.27	0	LOL	0
1224	Paige	Other Arterial	R96	D112A	0.84	26.31	0	LEP	0
1221	Paige	Collector	R68	R76	1.07	99.98	1	LOL, LEP, CDI	0
1222	Paige	Collector	R76	R84	1.00	99.98	1	LEP, CDI	0
1223	Paige	Other Arterial	R94	R96	0.48	25.8	0	LEP, CDI	0
5630	Palm	Local	A120	A128	0.99	68.52	0	LOL, CDI	0
5631	Palm	Local	A128	A136	0.99	55.09	0	LOL	0
5087	Palm	Local	A194	A204	1.26	52.28	0	LOL	0
5088	Palm	Local	A204	A208	0.49	48.55	0	LOL	0

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5089	Palm	Local	A208	A216	0.99	47.7	1	LOL, CDI	1
5411	Park	Collector	A120	A128	0.99	80.93	0	CDI	0
0677	Poplar	Collector	R112	D115A	0.52	55.48	1	LEP, CDI	0
0678	Poplar	Collector	D115A	R116	0.10	53.9	0	LEP, CDI	0
5211	Pratt	Collector	A120	A128	2.01	50.64	0	LOL, LEP, CDI	0
5212	Pratt	Collector	A128	A136	2.01	50.23	0	LOL, LEP, CDI	0
5216	Pratt	Collector	A160	A169	2.99	53.09	1	LOL, CDI	0
5217	Pratt	Collector	A169	A176	2.99	53.09	1	LOL, CDI	0
5218	Pratt	Collector	A176*	A184	2.99	78.53	1	LOL, CDI	0
5221	Pratt	Collector	A196	A198	0.25	62.28	1	CDI	0
5222	Pratt	Collector	A198	A204	0.76	75.4	1	CDI	0
5223	Pratt	Collector	A204	A207	0.36	78.53	1	CDI	0
5226	Pratt	Collector	A208	A210	0.25	89.16	1	CDI	0
5229	Pratt	Collector	LA211	A216	0.56	87.95	1	CDI	0
5227	Pratt	Collector	A210	LA210A	0.08	94.47	1	CDI	0
5228	Pratt	Collector	LA210A	LA211	0.10	86.67	1	CDI	0
5213	Pratt St.	Collector	A136	A144	1.00	45.55	0	LOL, LEP, CDI	367
5214	Pratt St.	Collector	A144	A152	0.99	99.83	1	LOL, LEP, CDI	0
5215	Pratt St.	Collector	A152	A160	1.00	99.83	1	LOL, SMP, CDI	0
1722	Riggin	Major Arterial	R88	R92	1.00	99.98	1	CDI	252
5591	Roa 132	Collector	A352	A358	2.01	61.92	0	LOL	0
5592	Roa 132	Collector	A358	A368	2.01	99.98	1	LOL	0
5257	Road 100	Local	A352	A360	2.52	67.19	1	LOL, CDI	0
5271	Road 104	Local	A128	A136	1.00	44.68	0	CDI	0
5272	Road 104	Local	A136	A144	1.00	72.69	0	CDI	0
5277	Road 104	Collector	A392	A400	1.00	56.65	0	LOL	0
5278	Road 104	Collector	A400	A404	0.50	99.79	0	LOL, CDI	0
5279	Road 104	Collector	A404	A408	0.50	73.3	0	LOL, CDI	0
5280	Road 104	Collector	A408	A412	0.50	84.4	0	LOL	0
5264	Road 104	Local	A72	A80	1.99	48.55	0	CDI	0
5265	Road 104	Local	A80	A88	1.99	16.41	0	CDI	0
5275	Road 104	Collector	A388	D108A	0.53	63	0	LOL	0
5293	Road 108	Collector	A264	A272	1.01	77.42	1	LOL	0
5293	Road 108	Collector	A264	A272	1.00	77.42	1	LOL	0
5299	Road 108	Collector	A320	A328	1.00	70.48	0	CDI	0
5300	Road 108	Local	A328	A336	1.00	99.79	0	SMP, CDI	356
5301	Road 108	Local	A336	A338	0.25	75.69	0	SMP, CDI	92
5313	Road 112	Local	A112	A120	1.00	71.12	0	Hilmar Cheese, LOL	0
5322	Road 112	Collector	A176	A184	1.00	77.42	1	CDI	0
5325	Road 112	Collector	A336	A340	0.50	99.98	0	CDI	0
2690	Road 122	uLocal	A116	A118	0.26	0	0	LOL, CDI	0
5400	Road 122	Local	A271	A272	0.12	73	1	LOL, LEP	0
5415	Road 124	Collector	D134	D122	1.78	99.98	1	LOL	0
5519	Road 128	Local	A168	A176	1.00	55.48	1	LOL	0
5520	Road 128	Local	A176	A180	0.50	53.9	1	LOL	0
5521	Road 128	Local	A180	A184	0.49	46.42	1	LOL, LEP	0
5522	Road 128	Collector	A184	A186	0.25	82.95	1	LOL, SMP, LEP, CDI	0
5524	Road 128	Local	A271	A272	0.13	64.07	1	LOL, LEP	0
5539	Road 130	Local	A72	A76	0.50	55.48	1	LEP	0
5576	Road 132	Local	A200	A208	1.00	44.24	1	CDI	106
5577	Road 132	Local	A208	A212	0.49	71.44	1	CDI	102
5587	Road 132	Collector	A328	A336	0.97	79.62	1	LOL	0
5588	Road 132	Collector	A336	A344	1.69	73.61	1	LOL	0
5590	Road 132	Collector	LA349	A352	0.30	88.56	1	LOL	0
5593	Road 132	Collector	A368	A376	1.99	74.51	1	LOL	0
5594	Road 132	Collector	A376*	A384	1.99	99.79	1	LOL	186
5632	Road 136	Local	A136	A144	1.02	72.38	0	LOL	42
5633	Road 136	Local	A160	A168	1.00	99.83	0	LOL	0
5634	Road 136	Local	A168	A180	1.50	99.83	0	LEP	0
5635	Road 136	Local	A180	A192	1.51	99.93	0	LOL	0
5688	Road 140	Local	A190	A192	0.26	70.16	0	LOL	10
5713	Road 140	Local	A364	A368	0.50	51.05	0	CDI	0
5726	Road 142	Local	A186	A190	0.49	71.75	0	LOL	0

ID ¹	NAME	FUNCTION	FROM	TO	LENGTH (MI)	PCI	BASE ²	DAIRY	TRUCKS ³
5746	Road 144	Local	A120	A128	1.00	44.68	0	CDI	0
5747	Road 144	Local	A128	A136	0.99	48.13	0	CDI	0
5748	Road 144	Local	A136	A144	1.02	50.64	0	CDI	0
5758	Road 144	Local	A364	A376	1.49	63.72	0	CDI	0
5759	Road 144	Local	A376	A384	0.99	99.68	0	CDI	0
5779	Road 148	Local	A224	A232	1.00	62.64	1	LOL	0
5782	Road 148	Local	A248	A256	1.00	43.36	1	LEP	0
5814	Road 152	Collector	A96	A104	1.00	39.3	1	CDI	0
5815	Road 152	Collector	A104	A112	0.99	40.67	1	CDI	0
5815.20	Road 152	Collector	A112	A116	0.50	96.21	1	CDI	0
5816	Road 152	Collector	A116	A120	0.50	89.75	1	CDI	0
5820	Road 152	Collector	A144	A152	1.00	83.68	1	LOL, CDI	372
5821	Road 152	Collector	A152	A160	1.00	71.12	1	LOL	810
5827	Road 152	Collector	A188	A192	0.50	99.79	1	SMP	480
5828	Road 152	Collector	A192	A200	1.01	99.98	1	SMP, CDI	0
5829	Road 152	Collector	A200	A208	1.00	99.98	1	SMP, CDI	426
5831	Road 152	Collector	NA216A	A224	1.00	99.98	1	LOL, CDI	0
5832	Road 152	Collector	A224	A232	0.92	99.98	1	LOL, CDI	372
5833	Road 152	Collector	A232	A236	0.09	99.79	1	Hilmar Cheese	372
5833	Road 152	Collector	A232	A236	0.43	99.79	1	Hilmar Cheese, LOL, CDI	372
5834	Road 152	Collector	A236	A240	0.50	73	1	Hilmar Cheese, LOL, CDI	0
5835	Road 152	Collector	A240	A244	0.25	91.24	1	LOL, CDI	0
5835	Road 152	Collector	A240	A244	0.25	91.24	1	LOL, CDI	0
5836	Road 152	Collector	A244	A248	0.51	77.13	1	CDI	0
5837	Road 152	Collector	A248	A256	1.00	90.69	1	CDI	146
5830	Road 152	Collector	A208	NA216A	0.99	99.98	1	LOL, CDI	0
5982	Road 164	Local	A192	A198	0.75	18.54	0	CDI	0
5983	Road 164	Local	A198	A200	0.25	80.67	0	CDI	0
5984	Road 164	Local	A200	A208	1.00	59.7	0	CDI	0
5975	Road 164	Local	A88	A96	1.00	55.87	1	CDI	0
2927	Road 164	Other Arterial	A295	NA296	0.10	54.29	1	LEP	0
6026	Road 168	Local	A136	A144	1.00	45.99	0	LOL	0
6027	Road 168	Collector	A144	A152	1.00	72.38	1	LOL, CDI	0
6028	Road 168	Collector	A152	A160	1.00	61.19	1	LOL, SMP	70
6029	Road 168	Collector	A160	A164	0.00	51.46	1	SMP	0
6030	Road 168	Collector	A164	A167	0.37	68.19	1	SMP	0
6033	Road 168	Collector	A168	A172	0.50	53.09	1	SMP	26
6034	Road 168	Collector	A172	A176	0.50	80.15	1	SMP	0
6035	Road 168	Collector	A176	A184	0.99	95.44	1	SMP	0
6036	Road 168	Collector	A184	A188	0.50	78.53	1	SMP, LEP	0
6037	Road 168	Collector	A188	A192	0.51	82.21	1	LEP	0
6039	Road 168	Local	A200	A208	1.00	99.98	1	CDI	0
6040	Road 168	Collector	A232	A240	0.99	99.79	1	CDI	0
2928.10	Road 168	Collector	A248	A246	0.33	99.79	1	CDI	0
6045	Road 168	Collector	A296	A304	0.97	60.08	1	LEP	82
6041	Road 168	Collector	A240	D168	0.50	99.68	1	CDI	0
6059	Road 170	Local	A304	A308	0.67	29.8	0	LEP	0
6096	Road 176	Local	A144	A152	1.00	69.84	0	CDI	0
6097	Road 176	Local	A152	A160	1.01	24.27	0	LOL	0
6115	Road 180	Collector	A216	A224	0.50	49.81	0	LOL	0
6115	Road 180	Collector	A216	A224	0.50	49.81	0	LOL	0
6116	Road 180	Collector	A224	A232	1.01	63	0	LOL	0
6117	Road 180	Local	A232	A240	0.98	51.05	0	LOL, CDI	0
6135	Road 182	Local	A296	A304	0.99	92.11	1	CDI	0
6156	Road 184	uLocal	A144	A152	1.00	93.26	0	CDI	0
6228	Road 192	Collector	A168	A176	1.00	99.98	1	LEP	188
6227	Road 192	Collector	A176	A184	0.99	99.98	1	LEP, CDI	318
6301	Road 200	Local	A148	A152	0.50	42.02	1	LOL	0
6396	Road 208	Collector	D208B	A160	0.16	59.7	0	LOL, CDI	0
6397	Road 208	Collector	A160	A164	0.50	61.92	0	LOL, CDI	0
6398	Road 208	Collector	A164	A176	0.99	66.85	0	LOL, CDI	0
6398	Road 208	Collector	A164	A176	0.50	66.85	0	LOL, CDI	0
6395	Road 208	Collector	A152	D208B	0.84	99.98	1	LOL, CDI	0

ID ¹	NAME	FUNCTION	FROM	TO	LENGTH (MI)	PCI	BASE ²	DAIRY	TRUCKS ³
6449	Road 216	Local	A168	A176	1.00	65.47	1	LOL	0
4742	Road 24	Local	A132	A136	0.50	0	0	CDI	0
4743	Road 24	Local	A176	A184	1.01	1.86	0	LOL	0
4744	Road 24	Local	A184	A190	0.61	53.9	0	LOL	38
6746	Road 240	Local	A39	A48	1.18	53.9	0	LEP	0
6747	Road 240	Local	A48	A56	0.49	67.19	0	LEP	0
6747	Road 240	Local	A48	A56	0.49	67.19	0	LEP	0
4758	Road 28	Collector	A208	A216	1.01	59.33	0	LOL	0
4759	Road 28	Collector	A216	A224	1.03	34.64	0	LOL	71
4760	Road 28	Collector	A224	A228	0.51	29.8	0	LOL	0
4761	Road 28	Collector	A228	A232	0.51	42.92	0	LOL	0
4762	Road 28	Collector	A232	A240	1.04	55.09	0	LOL	0
4763	Road 28	Collector	A240	A248	0.99	50.64	0	LOL	0
4756	Road 28	Collector	A192	D27	0.12	99.79	0	LOL	0
4756	Road 28	Collector	A192	D27	0.36	99.79	0	LOL	0
4788	Road 32	Local	A176	A184	1.01	43.36	0	LOL	0
4789	Road 32	Local	A184	A192	0.99	6.46	0	LOL	0
4805	Road 36	Collector	A228	A232	0.51	42.47	1	LOL	0
4806	Road 36	Collector	A232	A236	0.51	86.45	1	LOL	0
4807	Road 36	Collector	A236	A240	0.55	99.79	1	LOL	0
4808	Road 36	Collector	A240	A248	0.99	70.16	1	LOL	0
4809	Road 36	Collector	A248	A256	0.98	91.76	1	LOL	0
4811	Road 36	Local	A352	A360	1.01	99.68	0	LOL	0
4812	Road 36	Collector	A360	D36A	0.47	71.44	0	LOL	0
4855	Road 40	Local	A232	A236	0.51	0	0	LOL	0
4879	Road 44	Local	A232	A236	0.51	70.48	1	LOL	0
4880	Road 44	Local	A248	A256	0.99	47.28	0	LOL, CDI	0
4899	Road 48	Local	A176	A184	1.01	27.31	0	LOL	0
4904	Road 48	Local	A232	A236	0.51	60.45	0	LOL, CDI	0
4905	Road 48	Local	A236	A240	0.54	23.76	0	LOL, CDI	0
4906	Road 48	Local	A240	A244	0.50	43.8	0	LOL, CDI	0
4907	Road 48	Local	A244	A248	0.50	79.35	0	LOL, CDI	0
4912	Road 48	Local	A296	A304	0.98	67.52	0	LEP	0
4929	Road 52	Local	A200	A208	1.99	62.28	0	LOL, CDI	0
4930	Road 52	Local	A208	A216	1.99	45.55	0	LOL, CDI	0
4931	Road 52	Local	A216	A224	1.00	23.76	1	CDI	0
4932	Road 52	Local	A224	A228	0.50	85.33	1	CDI	0
4935	Road 52	Collector	A256	A260	0.50	69.51	1	CDI	0
4937	Road 52	Local	A280	A286	1.07	70.48	1	LOL	0
4938	Road 52	trail	A296	A304	0.99	85.1	0	LEP	0
4948	Road 56	Local	A224	A228	0.50	71.12	0	CDI	0
4950	Road 56	Local	A232	A236	0.51	83.92	0	LOL	0
4953	Road 56	Local	A272	A280	0.99	64.78	0	CDI	0
4954	Road 56	Local	A280	A288	2.04	69.51	0	LOL, LEP	0
4955	Road 56	Local	A288	A296	2.04	38.38	0	LOL, LEP	0
4956	Road 58	Local	A296	A304	1.00	70.8	0	LOL	0
4974	Road 60	Local	A192	A200	1.00	13.16	0	LOL	0
4977	Road 60	Local	A216	A224	0.99	77.7	0	CDI	0
4978	Road 60	Local	A224	A228	0.49	49.39	0	CDI	0
4985	Road 60	Local	A272	A280	1.00	79.62	1	CDI	0
4986	Road 60	Local	A296	A304	1.00	75.4	0	LOL, CDI	0
4996	Road 64	Local	A160	A168	1.00	58.95	0	LEP, CDI	0
4997	Road 64	Local	A168	A176	1.01	16.95	0	LEP, CDI	8
4998	Road 64	Local	A176	A184	0.99	47.7	0	LEP	0
4999	Road 64	Local	A184	A192	0.99	62.28	0	LOL	0
5002	Road 64	Local	A256	A260	0.50	63	0	LOL	0
5005	Road 64	Local	A384	A392	0.00	99.79	1	LEP	0
5022	Road 68	Local	A200	A204	0.50	72.07	0	LOL	0
5024	Road 68	Local	A208	A216	1.00	96.45	1	LOL	0
5024	Road 68	Local	A208	A216	0.50	96.45	1	LOL	0
5025	Road 68	Collector	A216	A224	1.00	68.86	1	LOL, CDI	0
5025	Road 68	Collector	A216	A224	1.00	68.86	1	LOL, CDI	0
5026	Road 68	Collector	A224	A228	0.50	81.45	1	LOL, CDI	0

ID ¹	NAME	FUNCTION	FROM	TO	LENGTH (MI)	PCI	BASE ²	DAIRY	TRUCKS ³
5027	Road 68	Collector	A228	A232	0.50	23.25	1	LOL, CDI	0
5032	Road 68	Collector	A248	A260	1.51	66.16	1	LOL	0
5032	Road 68	Collector	A248	A260	1.51	66.16	1	LOL	0
5033	Road 68	Collector	A260	A264	1.00	99.79	1	LOL, CDI	0
5036	Road 68	Collector	A272	A280	0.50	96.21	1	LOL, CDI	0
5036	Road 68	Collector	A272	A280	1.00	96.21	1	LOL, CDI	0
5037	Road 68	Collector	A280	A288	1.01	92.11	1	LOL, CDI	0
5038	Road 68	Collector	A288	A290	1.01	92.45	1	LOL, CDI	0
5041	Road 68	Collector	A304	D68	0.36	99.98	1	CDI	0
5066	Road 72	Local	A120	A128	1.01	75.69	0	CDI	0
5067	Road 72	Local	A128	A136	2.01	50.64	0	LOL	0
5068	Road 72	Local	A136	A144	2.01	85.78	0	LOL	0
5070	Road 72	Local	A152	A160	0.99	12.61	0	LOL, LEP	0
5071	Road 72	Local	A184	A190	0.76	98.31	0	LOL	0
5106	Road 80	Local	A96	A104	1.00	25.29	0	LEP	0
5109	Road 80	Local	A120	A128	1.01	66.85	0	CDI	0
5110	Road 80	Local	A128	A136	2.01	76.28	0	LOL, CDI	0
5111	Road 80	Local	A136	A144	2.01	62.28	0	LOL, CDI	80
5112	Road 80	Local	A144	A152	1.00	68.19	0	LOL	0
5113	Road 80	Local	A152	A160	1.00	48.97	0	CDI	0
5116	Road 80	Local	A176	A184	1.00	44.68	1	LOL, CDI	0
5118	Road 80	Local	A190	A192	0.25	46.85	1	LOL	0
5119	Road 80	Local	A192	A194	0.25	57.04	0	LOL	0
5122	Road 80	Local	A248	A256	1.00	33.68	1	LEP	0
5125	Road 80	Other Arterial	A320	A328	0.99	99.94	1	Myovich, CDI	0
5126	Road 80	Other Arterial	A328	A336	4.05	94.18	1	Myovich, LOL, CDI	1984
5130	Road 80	Other Arterial	A360	A368	1.01	99.79	1	Myovich, LOL, CDI	0
5131	Road 80	Other Arterial	A368	A376	1.00	99.79	1	Myovich, LOL, CDI	0
5132	Road 80	Other Arterial	A376	A384	1.03	46.85	1	Myovich, LOL, CDI	0
5133	Road 80	Other Arterial	A384	A388	0.50	46.42	1	LOL	1000
5134	Road 80	Other Arterial	A388	A392	0.49	38.85	1	LOL	0
5135	Road 80	Other Arterial	A392	A400	1.01	37.92	1	LOL	0
5195	Road 92	Local	D92B	A264	0.34	68.19	0	CDI	0
5201	Road 92	Collector	A312	A320	1.00	90.51	1	CDI	0
5202	Road 92	Collector	A320	A328	0.99	99.68	1	CDI	0
2491	Road 92B	Local	R92	D94	0.10	41.57	1	CDI	0
5208	Road 96	Collector	A96	A104	1.00	55.87	0	LOL, CDI	0
5209	Road 96	Collector	A104	A112	1.00	55.09	0	LOL, LEP, CDI	0
5210	Road 96	Collector	A112	A120	1.00	55.48	0	LOL, LEP, CDI	0
5219	Road 96	Collector	A184	A194	1.28	55.87	1	CDI	0
5220	Road 96	Collector	A194	A196	0.26	31.75	1	CDI	0
5207	Road 96	Collector	A88	A96	1.00	36.05	0	CDI	116
2171	Sierra	Local	R96	R104	1.01	98.85	1	LOL	0
0212	Sierra Ave.	Collector	D135	D136A	0.03	46.85	0	LEP	0
0213	Sierra Ave.	Collector	D136A	LR134B	0.10	88.36	1	LEP	0
0214	Sierra Ave.	Collector	LR134B	LR135	0.05	88.36	1	LEP	0
0215	Sierra Ave.	Collector	LR135	LR135B	0.05	93.26	1	LEP	0
0217	Sierra Ave.	Collector	R136	LR136G	0.08	99.79	1	LEP	534
0216	Sierra Ave.	Collector	LR135B	R136	0.05	93.26	1	LEP	0
2813	Spacer	Collector	A192	A200	1.35	99.98	1	LOL	0
2814	Spacer	Collector	A200	R124	0.71	99.98	1	LOL	0
0428	Terra Bella	Collector	R122	D123	0.25	67.19	0	CDI	0
0429	Terra Bella	Collector	D123	D124A	0.08	99.79	0	CDI	0
0431	Terra Bella	Collector	D126A	D125A	0.07	44.68	1	CDI	0
0430	Terra Bella	Collector	D124A	D126A	0.07	99.79	0	CDI	0
0432	Terra Bella	Collector	D125A	D126B	0.04	44.68	0	CDI	0
0432	Terra Bella	Collector	D125A	D126B	0.02	44.68	0	CDI	0
0432	Terra Bella	Collector	D125A	D126B	0.04	44.68	0	CDI	0
0424	Terra Bella	Collector	R96	R104	1.00	99.83	0	CDI	0
0425	Terra Bella	Collector	R104	R112	1.00	99.83	0	CDI	0
0426	Terra Bella	Collector	R112	R120	1.01	99.83	0	CDI	0
0427	Terra Bella	Collector	R120	R122	0.26	33.68	0	CDI	0
0433	Terra Bella	Collector	D126B	R127	0.06	99.94	1	CDI	0

ID ¹	NAME	FUNCTION	FROM	TO	LENGTH (MI)	PCI	BASE ²	DAIRY	TRUCKS ³
0434	Terra Bella	Collector	R127	R128	0.13	99.94	1	CDI	0
0435	Terra Bella	Collector	R128	R129	0.13	89.56	1	CDI	0
0436	Terra Bella	Collector	R129	R130	0.13	86.45	1	CDI	0
0437	Terra Bella	Collector	R130	R136	0.74	84.16	1	CDI	380
0438	Terra Bella	Collector	R136	R140	0.49	85.78	1	CDI	324
0439	Terra Bella	Collector	R140	R152	1.00	93.73	1	CDI	324
0439	Terra Bella	Collector	R140	R152	0.49	93.73	1	CDI	324
0440	Terra Bella	Collector	R152	R164	1.52	70.8	1	CDI	314
2649	Thompson	Collector	A152	A160	1.10	65.12	1	LOL	0
1341	Tulare Avenue	Collector	R36	R44	0.50	99.98	1	LOL	0
2692	Turner	Collector	R124	R118	1.78	80	0	LOL	0
5194	West	Collector	A260	D92B	0.17	93.26	0	CDI	0

1 Tulare County Pavement Management System ID

2 1=Engineered Road Segment; 0= Non-Engineered Road Segment

3 Axle Classes 5 -13

Appendix I

Revised Dairy Truck Volumes Analysis



MEMORANDUM

Date: March 20, 2015
To: Roberto Brady, Tulare County Association of Governments
From: Mike Wallace and Patrick Gilster
Subject: **Revised Dairy Truck Volumes Analysis**

WC12-2954

This memo serves as documentation for the analysis performed to estimate the truck trips associated with the dairies within Tulare County as requested by TCAG. The steps included in the analysis are trip generation, trip distribution, and route assignment for existing (2011, 2012, and 2013) and four future (2023 and 2040) scenarios. The revised analysis includes passenger vehicles generated by employees and truck trips from dairy (gallons of milk) and feed activities. In addition to project only trips, background trips from the TCAG travel model are included. After refining the growth allocations and clarifying the 1.237 million growth cap is applied to total head (also known as total bovine animals) rather than animal units, resulting in the growth cap being reached in 2023 with slightly under 2% growth, eliminating the need for further analysis in 2040. Evaluating background and project traffic, the study locations were narrowed to those where projects contribute a substantial volume of employees or trucks.

The scenarios presented in this memo include:

- Existing Background: 2011, 2012, and 2013
- Future Background: 2023 and 2040
- Existing Project Only: 2011, 2012, and 2013
- Future Project Only: 2013 1% growth, 2013 growth cap 1.237 million total bovine animals
- Existing and Future with Project: existing and future background scenarios with project only added

The analysis results presented below show the trip generation of employees increases from a low in 2013 of 6,900 to a high of 8,200 in 2023 with growth cap. A similar increase in truck trips is forecast from the low of 4,930 total truck trips in 2013 to a high of 6,038 trips in 2023 with growth cap.



The distribution of existing and expanded dairies throughout the county also result in the increased trips being dispersed. Roadways were evaluated for increase in passenger and truck trips, and those with the highest percentage of project contribution are reported in this memo. Roadways with the highest addition of project trips are near creameries and granaries since the routes to the multiple dairies overlap. Although the largest increase is along Road 80 since it used by both employees and trucks, the highest increase in truck traffic is to the south due to nearly 20% of anticipated expansion occurring south of Avenue 56.

BACKGROUND TRAFFIC

The background traffic for existing and future conditions were obtained from the TCAG travel model, which forecasts passenger trips separate from truck trips. For the purposes of this study, dairy trips were considered to be in addition to the background trips since the model was developed at a regional scale and does not specifically forecast dairy activity. See Figure 1 for existing total daily trips and Figure 2 for total daily future background trips. A breakdown of background roadway volumes by passenger vehicles and trucks can be found in Table 1 and on Figure 4a.

GROWTH ALLOCATION AND TRIP GENERATION

To calculate the volume of dairy trucks utilizing major roadways throughout Tulare County, Fehr & Peers used data provided by TCAG and Tulare County to group dairy farms by their underlying Traffic Analysis Zone (TAZ). This process involved determining the existing location of dairy and feedlot animals and the potential for future expansion, then determining the employee and truck trips associated with total head and cows in milk. Assumptions on current and future dairy activity were provided by Tulare County¹. Countywide totals of milk and total head for each scenario are provided in Table 2A, with the resulting number of employee and truck trips in Table 2B.

The existing allocation of animal units and potential for expansion were provided by Tulare County and are summarized by TAZ in Table 3, with percentage allocation of total growth above existing shown on Figure 3.

¹ Current and future dairy cow locations and trip generation assumptions provided by Tulare County Resource Management Agency.



After determining the allocation of animals associated with existing and expanded dairies, the trips associated with each dairy were calculated. The assumptions for converting animals and milk production to trucks are:

- Truck generation
 - 1 Milk Truck per 5500 Gallons of Milk
 - 1 Feed Truck per 550 Head
- Employee generation
 - 1 'Dairy Worker' per 2000 Gallons of Milk
 - 1 'Feed Worker' per 550 Head
- An equal number of trucks would be inbound and outbound over the course of the day, and partially full trucks are allowed

We were then able to aggregate the truck and employee trip generation for each dairy by TAZ. Tables 4a and 4b contain the number of cows and resulting employee and truck trips for each TAZ for existing and future scenarios, respectively.

TRIP DISTRIBUTION

The dairy trucks were then distributed to the major dairy buyers in and around Tulare County based on information provided by Tulare County Resource Management Agency. Based on the total amount of dairy farms that each buyer receives a supply from, trip distribution percentages were created. Similarly, the feed trucks were allocated to the granaries based on information provided by Tulare County Resource Management Agency. The resulting trip distribution percentages are shown in Table 5 for both existing and future conditions. For dairies that do not currently exist, the distribution pattern for a nearby dairy was used. Each figure shows the location of the creameries (green) and granaries (blue), representing the origin or destination of truck trips between the following:

- Creameries (7)
 - CDI-N :California Dairies, Inc
 - HC :Hilmar Cheese (Hilmar)
 - DF :Dairy Farmers of America
 - LEP :Leprino Foods (Lemoore)
 - LOL-N :Land "O" Lakes (Tulare)



- LOL-S :Land "O" Lakes (Hwy99)
- CDI-S :California Dairies, In
- Granaries (2)
 - Gn: North granary (Goshen)
 - Gs: South granary (Pixley)

Employee trips were assumed to come from a location east of SR 99 representing both Visalia and Tulare.

TRIP ASSIGNMENT

Trips were assigned to major arterials, major county roads, and state routes that would provide the most direct access between the dairy and the milk buyer. Future refinement into actual routes used could be made if desired and data are available.

ROADWAY VOLUMES

The combination of trip generation, distribution, and assignment resulted in project trips assigned to the roadways through Tulare County. Roadway volumes for background (blue shade), project only (green shade), and with project (purple shade) for each of the scenarios can be found in Table 6, and on Figures 4a through 4c.

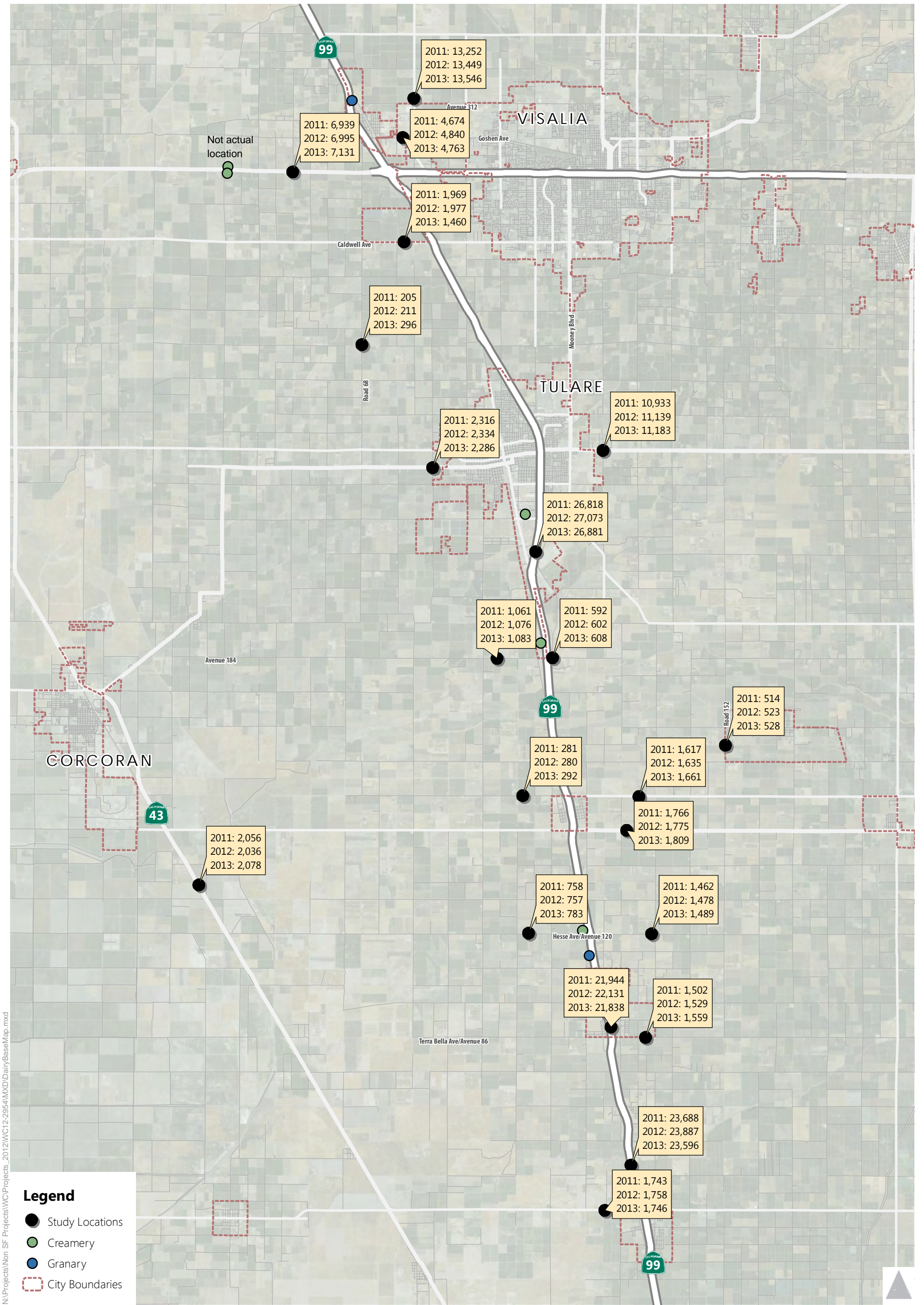
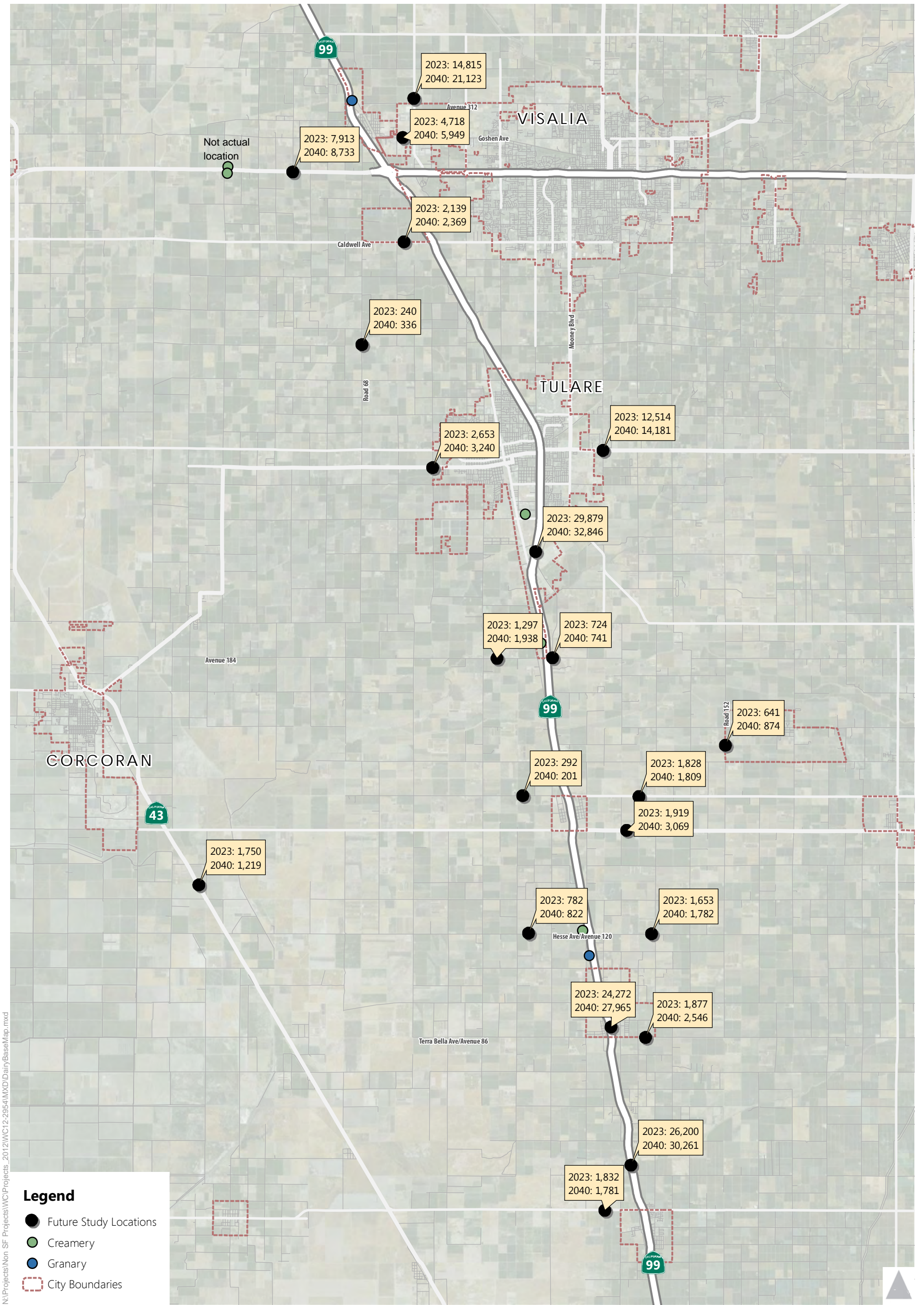


Figure 1
Existing Background Average Daily Total Volumes



N:\Projects\Non SF Projects\WC\Projects_2012\WC12-2954\MXD\DailyBaseMap.mxd



Figure 2
Future Background Average Daily Total Volumes

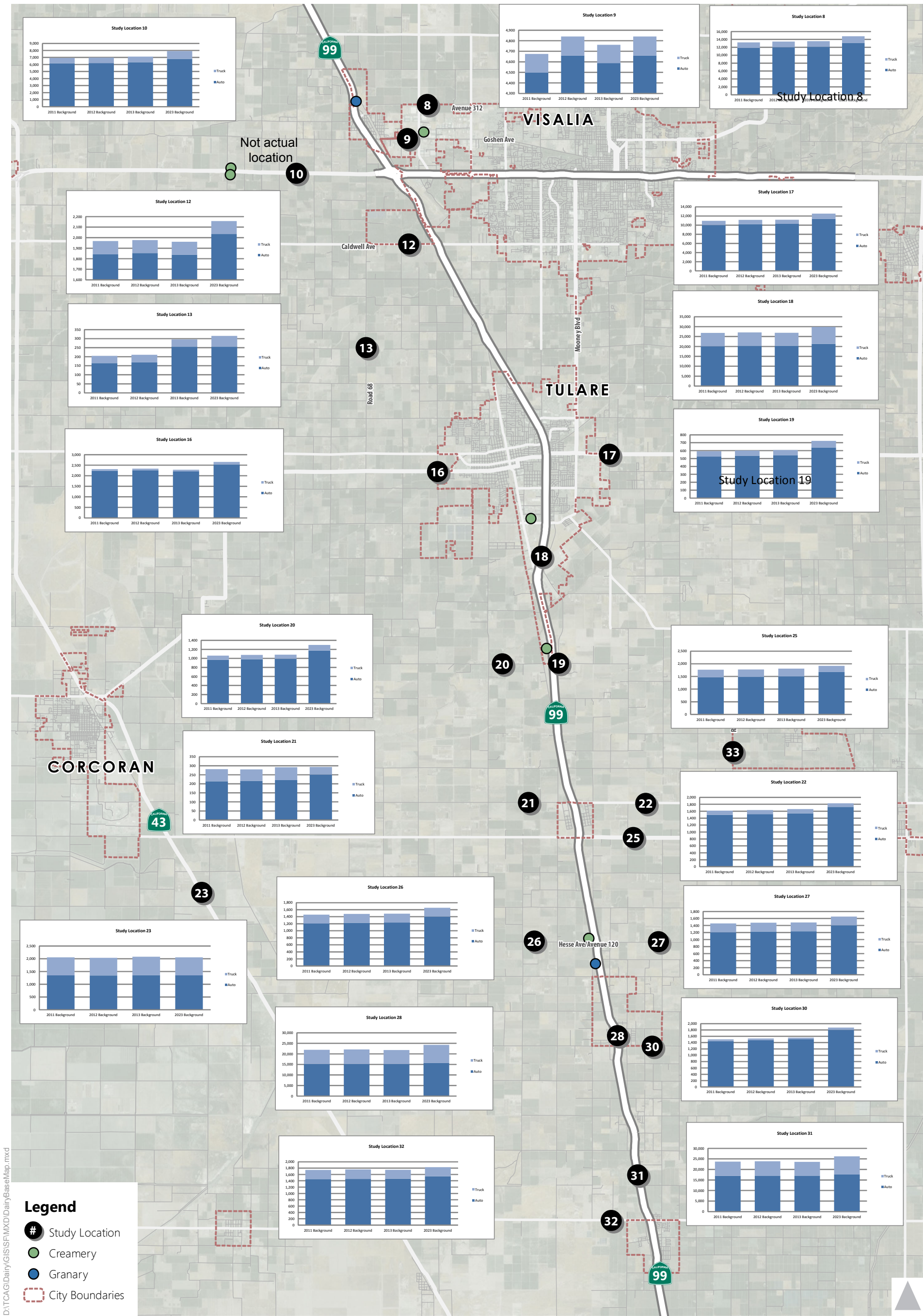


Figure 4a
Background Only Average Daily Total Volumes

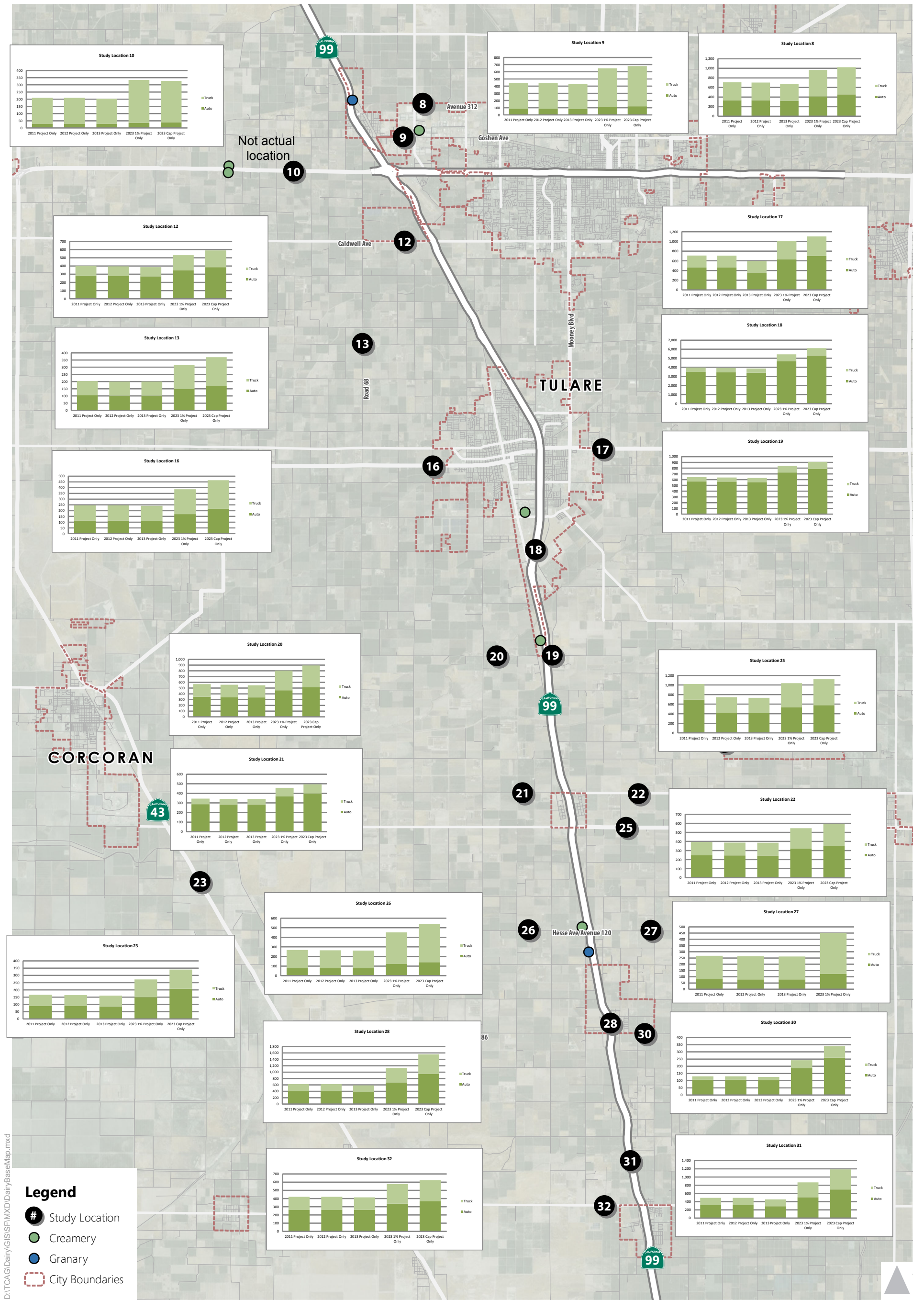


Figure 4b
Project Only Average Daily Total Volumes

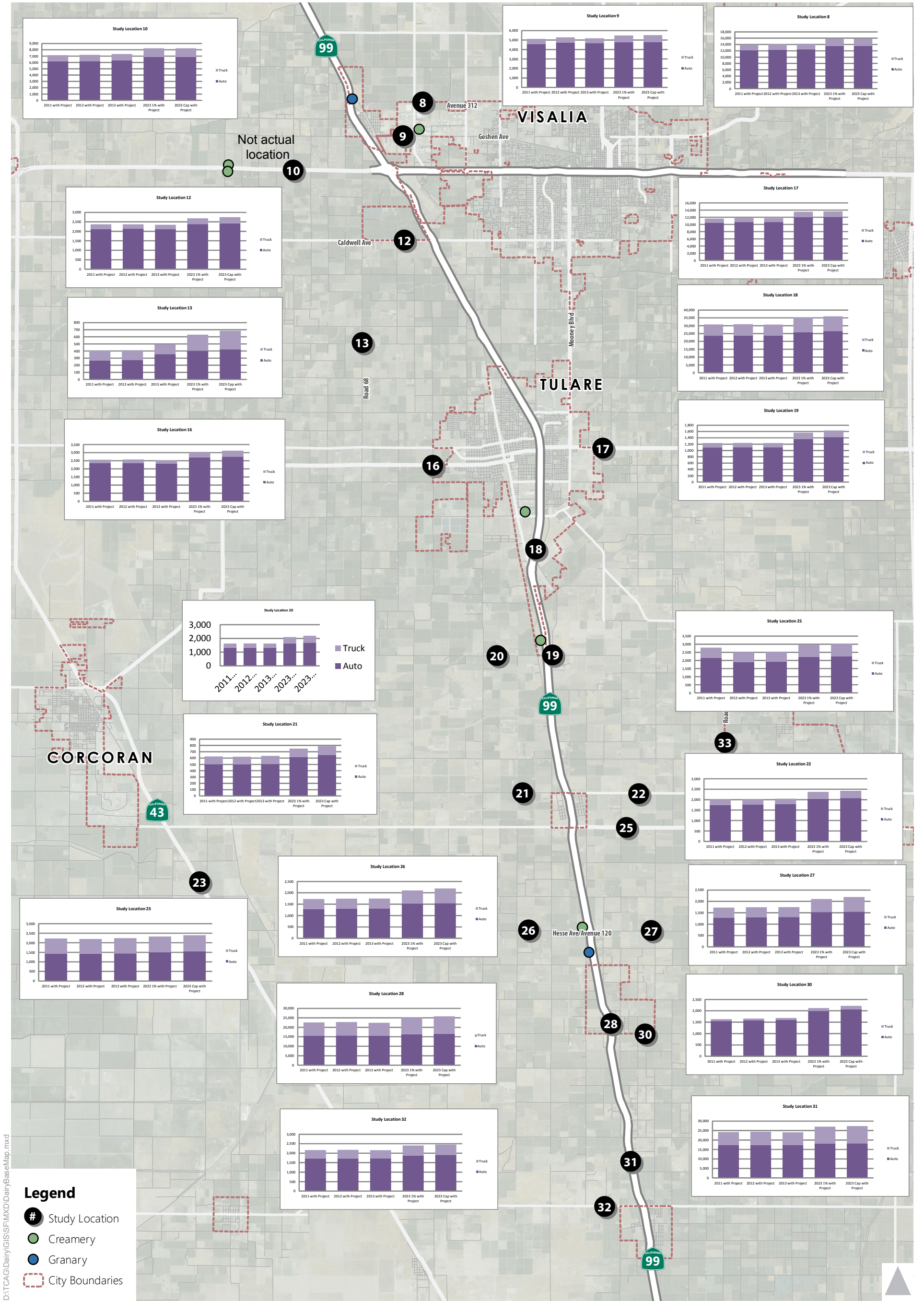


Figure 4c
Background with Project Average Daily Total Volumes

Table 1 - Background Conditions Daily Volumes

Roadway	Description	2011			2012			2013			2023 No Project			2040 No Project		
		Auto	Truck	Total	Auto	Truck	Total	Auto	Truck	Total	Auto	Truck	Total	Auto	Truck	Total
8	Road 80 north of Riggins	20,111	6,707	26,818	20,219	6,854	27,073	20,318	6,563	26,881	21,295	8,584	29,879	22,156	10,690	32,846
9	Goshen east of Road 76	525	67	592	534	68	602	542	66	608	640	84	724	634	107	741
10	SR 198 west of Road 68	969	92	1,061	981	95	1,076	992	90	1,083	1,173	124	1,297	1,726	212	1,938
12	Avenue 280 west of SR 99	214	67	281	216	64	280	221	71	292	251	42	292	183	18	201
13	Road 68 south of Avenue 260	1,497	120	1,617	1,517	118	1,635	1,537	124	1,661	1,724	105	1,828	1,734	75	1,809
16	Inyo at Road 84	1,466	301	1,766	1,482	294	1,775	1,500	309	1,809	1,678	241	1,919	2,832	237	3,069
17	SR 137 at Oakmore	583	175	758	589	167	757	600	183	783	677	105	782	777	45	822
18	SR 99 north of Rankin	1,207	254	1,462	1,226	253	1,478	1,234	254	1,489	1,406	247	1,653	1,572	210	1,782
19	Avenue 184 east of SR 99	15,253	6,691	21,944	15,291	6,840	22,131	15,290	6,548	21,838	15,680	8,592	24,272	16,490	11,475	27,965
20	Avenue 184 west of SR 99	1,447	56	1,502	1,473	56	1,529	1,503	56	1,559	1,805	72	1,877	2,428	118	2,546
21	Avenue 152 west of SR 99	16,990	6,698	23,688	17,038	6,849	23,887	17,044	6,553	23,596	17,576	8,624	26,200	18,659	11,602	30,261
22	Avenue 152 east of SR 99	1,453	290	1,743	1,460	298	1,758	1,468	278	1,746	1,544	288	1,832	1,646	135	1,781
23	SR 43 north of Avenue 120	11,837	1,415	13,252	12,023	1,426	13,449	12,143	1,404	13,546	13,126	1,688	14,815	18,743	2,380	21,123
25	Avenue 144 east of SR 99	4,497	178	4,674	4,659	181	4,840	4,588	174	4,763	4,598	120	4,718	5,800	149	5,949
26	Avenue 120 west of SR 99	6,172	767	6,939	6,197	797	6,995	6,329	802	7,131	6,807	1,106	7,913	7,208	1,525	8,733
27	Avenue 120 east of SR 99	1,842	126	1,969	1,854	123	1,977	1,338	123	1,460	2,034	105	2,139	2,297	72	2,369
28	SR 99 north of Avenue 96	165	40	205	169	42	211	256	40	296	181	59	240	234	102	336
30	Avenue 96 east of SR 99	2,232	84	2,316	2,249	85	2,334	2,205	80	2,286	2,536	117	2,653	3,061	179	3,240
31	SR 99 north of Avenue 56	1,348	708	2,056	1,343	693	2,036	1,357	721	2,078	1,284	466	1,750	1,186	33	1,219
32	Avenue 56 west of SR 99	472	43	514	480	43	523	486	42	528	586	55	641	791	83	874
33	Road 152 south of Avenue 168	10,019	913	10,933	10,202	937	11,139	10,291	892	11,183	11,361	1,153	12,514	12,823	1,358	14,181

TABLE 2A EXISTING AND FUTURE TOTAL DAIRY ANIMALS

Scenario	Gallons of Milk	Total Head
Existing 2011	3,182,085	1,037,137
Existing 2012	3,334,045	1,017,020
Existing 2013	3,087,352	1,005,690
2023, 1% growth	3,411,524 (324,172)	1,111,287 (105,597)
2023, growth cap	3,797,447 (710,095)	1,237,000 (231,310)

Note: values for future year are shown as Total (Growth)

TABLE 2B EXISTING AND FUTURE DAILY PROJECT ONLY TRIPS

Scenario	Employee Trips	Truck Trips
Existing 2011	7,104	5,080
Existing 2012	7,178	5,058
Existing 2013	6,898	4,934
2023, 1% growth	7,606	5,440
2023, growth cap	8,456	6,038

Table 3 - Existing and Expanded Allocation

Project Zone	TAZ	Scenario_Dist	
1	1763	1.3%	0.0%
2	1731	0.2%	0.6%
3	1761	4.5%	1.1%
4	1760	0.3%	0.0%
5	1768	0.9%	0.0%
6	1757	0.5%	1.2%
7	1778	2.4%	1.7%
8	1779	0.5%	0.8%
9	1772	0.5%	0.0%
10	1792	0.8%	0.0%
12	1793	0.3%	0.0%
13	1823	0.3%	0.0%
14	1688	0.6%	0.0%
15	1832	1.3%	0.0%
16	1840	1.6%	0.5%
17	1841	1.4%	0.0%
18	1379	0.1%	0.0%
19	1510	0.2%	0.0%
20	388	0.2%	0.0%
21	1866	1.8%	2.4%
22	1867	2.8%	2.6%
23	1895	0.3%	0.3%
24	1893	1.1%	1.2%
25	1868	0.4%	0.5%
26	1505	0.1%	1.7%
27	1876	0.1%	0.5%
28	1896	0.2%	0.7%
29	1149	0.2%	0.0%
30	1152	0.2%	0.0%
31	1873	0.3%	0.0%
32	1880	0.3%	0.3%
33	1874	0.9%	0.0%
34	1881	0.4%	0.3%
35	1875	0.9%	0.4%
36	1903	1.2%	2.1%
37	1931	0.4%	1.3%
38	1902	5.0%	2.0%
39	1900	0.7%	0.0%
40	1899	0.5%	0.0%
41	1769	2.5%	0.0%
42	1781	0.2%	0.0%
43	1098	0.0%	0.0%
44	1924	0.4%	1.0%
45	1897	0.3%	2.3%
46	1922	0.2%	0.3%
47	1923	3.2%	2.8%
48	1926	0.2%	0.0%
49	1927	1.3%	0.0%
50	1925	2.2%	1.9%
51	1929	1.4%	0.6%
52	1930	0.7%	0.5%
53	1932	1.1%	1.0%
54	1626	0.3%	0.0%
55	1928	0.4%	0.0%
56	1968	4.4%	2.9%
57	1970	1.8%	1.1%
58	1973	1.8%	0.6%
59	1969	7.2%	3.4%
60	1971	0.4%	4.2%
61	1967	5.4%	4.6%
62	1966	5.1%	2.7%
63	1965	1.6%	2.1%
64	1994	1.4%	2.6%
65	1991	9.0%	3.1%
66	1990	1.5%	6.3%
67	2005	4.2%	2.2%
68	1992	0.6%	0.9%
69	2013	0.7%	1.5%
70	1964	2.9%	2.4%
71	2009	0.4%	0.6%
72	2017	0.4%	0.0%
73	2020	0.6%	6.8%
74	1977	0.3%	0.0%
75	1404	0.2%	0.0%
76	2004	0.0%	19.2%

Table 4a - Existing Trip Generation by Zone

Project Zone	TAZ	2011					2012					2013							
		Gallons_11	Head_11	Emp_Trips_11	Milk_Trucks_11	Feed_Trucks_11	Total_Trucks_11	Gallons_12	Head_12	Emp_Trips_12	Milk_Trucks_12	Feed_Trucks_12	Total_Trucks_12	Gallons_13	Head_13	Emp_Trips_13	Milk_Trucks_13	Feed_Trucks_13	Total_Trucks_13
1	1763	40,168	13,092	90	16	48	64	42,086	12,838	92	16	48	64	38,972	12,695	88	16	48	64
2	1731	5,836	1,902	14	4	8	12	6,115	1,865	16	4	8	12	5,662	1,845	14	4	8	12
3	1761	144,516	47,102	318	54	172	226	151,417	46,188	320	56	168	224	140,214	45,674	310	52	168	220
4	1760	9,940	3,240	22	4	12	16	10,415	3,177	24	4	12	16	9,645	3,142	22	4	12	16
5	1768	27,215	8,870	62	10	34	44	28,514	8,698	62	12	32	44	26,404	8,601	60	10	32	42
6	1757	16,778	5,468	38	8	20	28	17,579	5,362	38	8	20	28	16,278	5,303	38	6	20	26
7	1778	77,440	25,240	170	30	92	122	81,138	24,751	174	30	92	122	75,135	24,475	166	28	90	118
8	1779	17,364	5,660	40	8	22	30	18,194	5,550	42	8	22	30	16,847	5,488	38	8	20	28
9	1772	14,433	4,704	34	6	18	24	15,122	4,813	34	6	18	24	14,003	4,561	34	6	18	24
10	1792	25,438	8,291	58	10	32	42	26,652	8,130	58	10	30	40	24,680	8,039	56	10	30	40
12	1793	10,897	3,552	26	4	14	18	11,417	3,483	26	6	14	20	10,572	3,444	26	4	14	18
13	1823	8,903	2,902	22	4	12	16	9,328	2,846	22	4	12	16	8,638	2,814	22	4	12	16
14	1688	20,070	6,542	46	8	24	32	21,029	6,415	46	8	24	32	19,473	6,343	44	8	24	32
15	1832	40,520	13,207	92	16	50	66	42,455	12,950	92	16	48	64	39,313	12,806	88	16	48	64
16	1840	50,181	16,355	112	20	60	80	52,577	16,038	114	20	60	80	48,687	15,859	108	18	58	76
17	1841	43,569	14,200	96	16	52	68	45,649	13,925	98	18	52	70	42,272	13,770	96	16	52	68
18	1379	2,075	676	8	2	4	6	2,174	663	8	2	4	6	2,013	656	8	2	4	6
19	1510	5,899	1,923	14	4	8	12	6,181	1,885	16	4	8	12	5,724	1,864	14	4	8	12
20	388	4,853	1,582	12	2	6	8	5,085	1,551	12	2	6	8	4,709	1,534	12	2	6	8
21	1866	56,522	18,422	126	22	68	90	59,221	18,065	126	22	66	88	54,839	17,864	122	20	66	86
22	1867	89,149	29,056	196	34	106	140	93,400	28,493	198	34	104	138	86,495	28,175	192	32	104	136
23	1895	9,526	3,105	22	4	12	16	9,980	3,044	22	4	12	16	9,242	3,011	22	4	12	16
24	1893	36,442	11,878	82	14	44	58	38,183	11,647	84	14	44	58	35,358	11,518	78	14	42	56
25	1868	13,747	4,481	32	6	18	24	14,404	4,394	32	6	16	22	13,338	4,345	30	6	16	22
26	1505	2,697	879	8	2	4	6	2,826	862	8	2	4	6	2,617	852	8	2	4	6
27	1876	4,258	1,388	12	2	6	8	4,461	1,361	12	2	6	8	4,131	1,346	12	2	6	8
28	1896	7,505	2,446	18	4	10	14	7,863	2,399	18	4	10	14	7,282	2,372	18	4	10	14
29	1149	5,818	1,896	14	4	8	12	6,096	1,860	16	4	8	12	5,645	1,839	14	4	8	12
30	1152	7,694	2,508	18	4	10	14	8,062	2,459	20	4	10	14	7,465	2,432	18	4	10	14
31	1873	8,118	2,646	20	4	10	14	8,506	2,595	20	4	10	14	7,877	2,566	18	4	10	14
32	1880	8,569	2,793	22	4	12	16	8,979	2,739	20	4	10	14	8,314	2,708	20	4	10	14
33	1874	27,350	8,914	62	10	34	44	28,656	8,741	62	12	32	44	26,536	8,644	60	10	32	42
34	1881	12,674	4,131	30	6	16	22	13,279	4,051	30	6	16	30	12,296	4,005	30	6	16	22
35	1875	28,144	9,173	64	12	46	58	29,488	8,995	64	12	34	46	27,306	8,895	62	10	34	44
36	1903	36,794	11,992	82	14	44	58	38,551	11,760	84	16	44	60	35,699	11,629	80	14	44	58
37	1931	11,357	3,701	26	6	14	20	11,899	3,630	26	6	14	20	11,019	3,589	26	6	14	20
38	1902	159,210	51,891	350	58	190	248	166,813	50,885	354	62	186	248	154,470	50,318	340	58	184	242
39	1900	22,894	7,462	52	10	28	38	23,987	7,317	52	10	28	38	22,212	7,236	52	10	28	38
40	1899	16,011	5,219	38	6	20	26	16,776	5,117	38	8	20	28	15,535	5,060	36	6	20	26
41	1769	79,488	25,907	176	30	96	126	83,284	25,405	178	32	94	126	77,121	25,122	170	30	92	122
42	1781	7,893	2,573	18	4	10	14	8,270	2,523	20	4	10	14	7,658	2,495	18	4	10	14
43	1098	613	200	4	2	2	4	643	196	4	2	2	4	595	194	4	2	2	4
44	1924	14,270	4,651	34	6	18	24	14,952	4,561	34	6	18	24	13,845	4,510	32	6	18	24
45	1897	8,569	2,793	22	4	12	16	8,979	2,739	20	4	10	14	8,314	2,708	20	4	10	14
46	1922	7,433	2,423	18	4	10	14	7,788	2,376	18	4	10	14	7,212	2,349	18	4	10	14
47	1923	102,075	33,269	226	38	122	160	106,950	32,624	228	40	120	160	99,036	32,261	218	38	118	156
48	1926	6,116	1,993	16	4	8	12	6,408	1,955	16	4	8	12	5,934	1,933	14	4	8	12
49	1927	42,387	13,815	96	16	52	68	44,411	13,547	96	18	50	68	41,125	13,396	92	16	50	66
50	1925	69,096	22,521	152	26	82	108	72,396	22,084	156	28	82	110	67,039	21,838	148	26	80	106
51	1929	44,281	14,433	100	18	54	72	46,396	14,153	100	18	52	70	42,963	13,995	96	16	52	68
52	1930	22,271	7,259	52	10	28	38	23,335	7,118	50	10	26	36	21,608	7,039	48	8	26	34
53	1932	36,488	11,892	82	14	44	58	38,230	11,662	84	14	44	58	35,401	11,532	78	14	42	56
54	1626	10,022	3,266	24	4	12	16	10,500	3,203	24	4	12	16	9,723	3,167	22	4	12	16
55	1928	12,764	4,160	30	6	16	22	13,373	4,079	30	6	16	22	12,384	4,034	30	6	16	22
56	1968	139,275	45,394	306	52	166	218	145,926	44,513	308	54	162	216	135,129	44,018	298	50	162	212
57	1970	56,603	18,449	126	22	68	90	59,306	18,091	126	22	66	88	54,918	17,889	122	20	66	86
58	1973	57,406	18,710	128	22	70	92	60,147	18,347	130	22	68	90	55,697	18,143	122	20	66	88
59	1969	228,135	74,356	502	84	272	356	239,030	72,914	506	88	266	354	221,343	72,102	486	82	264	346
60	1971	11,294	3,681	26	6	14	20	11,833	3,610	26	6	14	20	10,957	3,569	26	4	14	18
61	1967	173,372	56,507	380	64	206	270	181,652	55,411	384	68	202	270	168,211	54,794	370	62	200	262
62	1966	161,068	52,497	354	60	192	252	168,760	51,479	358	62	188	250	156,273	50,905	344	58	186	244
63	1965	51,335	16,732	114	20	62	82	53,787	16,407	114	20	60	80	49,807	16,224	110	20	60	80
64	1994	43,776	14,268	96	16	52	68	45,867	13,991	98	18	52	70	42,473	13,835	96	16	52	68
65	1991	287,904	93,837	630	106	342	448	301,653	92,017	638	110	336	446	279,333	90,991	612	102	332	434
66	1990	48,846	15,920	108	18	58	76	51,178	15,611	110	20	58	78	47,391	15,438	106	18	58	76
67	2005	133,989	43,671	294	50	160	210	140,388	42,824	298	52	156	208	130,000	42,347	286	48	154	202
68	1992	17,788	5,798	40	8	22	30	18,638	5,685	42	8	22	30	17,259	5,622	40	8	22	30
69	2013	22,641	7,379	52	10	28	38	23,722	7,236	52	10	28	38	21,967	7,156	50	8	28	36
70	1964	93,497	30,473	206	34	112	146	97,961	29,882	208	36	110	146	90,713	29,549	200	34	108	142
71	2009	12,475	4,066	30	6	16	22	13,071	3,967	30	6	16	22	12,104	3,943	30	6	16	22
72	2017	13,170	4,292	30	6	16	22	13,799	4,209	30	6	16	22	12,778	4,162	30	6		

Table 4b - Future Trip Generation by Zone

Project Zone	TAZ	Existing_Dist	Scenario_Dist	2023 1%					2023 Cap						
				Gallons_231f	Head_231P	Emp_Trips_231	Milk_Trucks_231	Feed_Trucks_231	Total_Trucks_231	Gallons_23C	Head_23Cap	Emp_Trips_232	Milk_Trucks_232	Feed_Trucks_232	Total_Trucks_232f
1	1763	1.3%	0.0%	38,972	12,695	88	16	48	64	38,972	12,695	88	16	48	64
2	1731	0.2%	0.6%	7,687	2,504	18	4	10	14	10,098	3,289	24	4	12	16
3	1761	4.5%	1.1%	143,715	46,814	316	54	172	226	147,883	48,172	324	54	176	230
4	1760	0.3%	0.0%	9,645	3,142	22	4	12	16	9,645	3,142	22	4	12	16
5	1768	0.9%	0.0%	26,404	8,601	60	10	32	42	26,404	8,601	60	10	32	42
6	1757	0.5%	1.2%	20,035	6,526	46	8	24	32	24,507	7,983	56	10	30	40
7	1778	2.4%	1.7%	80,578	26,248	178	30	96	126	87,059	28,359	192	32	104	136
8	1779	0.5%	0.8%	19,557	6,371	44	8	24	32	22,783	7,422	52	10	28	38
9	1772	0.5%	0.0%	14,003	4,561	34	6	18	24	14,003	4,561	34	6	18	24
10	1792	0.8%	0.0%	24,680	8,039	56	10	30	40	24,680	8,039	56	10	30	40
12	1793	0.3%	0.0%	10,572	3,444	26	4	14	18	10,572	3,444	26	4	14	18
13	1823	0.3%	0.0%	8,638	2,814	22	4	12	16	8,638	2,814	22	4	12	16
14	1688	0.6%	0.0%	19,473	6,343	44	8	24	32	19,473	6,343	44	8	24	32
15	1832	1.3%	0.0%	39,313	12,806	88	16	48	64	39,313	12,806	88	16	48	64
16	1840	1.6%	0.5%	50,164	16,341	112	20	60	80	51,923	16,914	114	20	62	82
17	1841	1.4%	0.0%	42,272	13,770	96	16	52	68	42,272	13,770	96	16	52	68
18	1379	0.1%	0.0%	2,013	656	8	2	4	6	2,013	656	8	2	4	6
19	1510	0.2%	0.0%	5,724	1,864	14	4	8	12	5,724	1,864	14	4	8	12
20	388	0.2%	0.0%	4,709	1,534	12	2	6	8	4,709	1,534	12	2	6	8
21	1866	1.8%	2.4%	62,683	20,419	140	24	76	100	72,021	23,460	160	28	86	114
22	1867	2.8%	2.6%	95,014	30,950	210	36	114	150	105,156	34,254	232	40	126	166
23	1895	0.3%	0.3%	10,175	3,314	26	4	14	18	11,285	3,676	26	6	14	20
24	1893	1.1%	1.2%	39,341	12,815	88	16	48	64	44,083	14,360	100	18	54	72
25	1868	0.4%	0.5%	14,982	4,880	34	6	18	24	16,940	5,518	40	8	22	30
26	1505	0.1%	1.7%	8,091	2,636	20	4	10	14	14,608	4,758	34	6	18	24
27	1876	0.1%	0.5%	5,688	1,853	14	4	8	12	7,542	2,457	18	4	10	14
28	1896	0.2%	0.7%	9,541	3,108	22	4	12	16	12,231	3,984	30	6	16	22
29	1149	0.2%	0.0%	5,645	1,839	14	4	8	12	5,645	1,839	14	4	8	12
30	1152	0.2%	0.0%	7,465	2,432	18	4	10	14	7,465	2,432	18	4	10	14
31	1873	0.3%	0.0%	7,877	2,566	18	4	10	14	7,877	2,566	18	4	10	14
32	1880	0.3%	0.3%	9,443	3,076	22	4	12	16	10,788	3,514	26	4	14	18
33	1874	0.9%	0.0%	26,536	8,644	60	10	32	42	26,536	8,644	60	10	32	42
34	1881	0.4%	0.3%	13,333	4,343	30	6	16	22	14,567	4,745	34	6	18	24
35	1875	0.9%	0.4%	28,486	9,279	64	12	34	46	29,890	9,737	66	12	36	48
36	1903	1.2%	2.1%	42,497	13,843	96	16	52	68	50,591	16,480	112	20	60	80
37	1931	0.4%	1.3%	15,249	4,967	36	6	20	26	20,286	6,608	48	8	26	34
38	1902	5.0%	2.0%	160,880	52,406	354	60	192	252	168,510	54,891	370	62	200	262
39	1900	0.7%	0.0%	22,212	7,236	52	10	28	38	22,212	7,236	52	10	28	38
40	1899	0.5%	0.0%	15,535	5,060	36	6	20	26	15,535	5,060	36	6	20	26
41	1769	2.5%	0.0%	77,121	25,122	170	30	92	122	77,121	25,122	170	30	92	122
42	1781	0.2%	0.0%	7,658	2,495	18	4	10	14	7,658	2,495	18	4	10	14
43	1098	0.0%	0.0%	595	194	4	2	2	4	595	194	4	2	2	4
44	1924	0.4%	1.0%	17,187	5,599	40	8	22	30	21,166	6,895	48	8	26	34
45	1897	0.3%	2.3%	15,743	5,128	36	6	20	26	24,586	8,009	56	10	30	40
46	1922	0.2%	0.3%	8,315	2,708	20	4	10	14	9,628	3,136	22	4	12	16
47	1923	3.2%	2.8%	107,984	35,175	236	40	128	168	118,637	38,645	262	44	142	186
48	1926	0.2%	0.0%	5,934	1,933	14	4	8	12	5,934	1,933	14	4	8	12
49	1927	1.3%	0.0%	41,125	13,396	92	16	50	66	41,125	13,396	92	16	50	66
50	1925	2.2%	1.9%	73,255	23,863	162	28	88	116	80,656	26,273	178	30	96	126
51	1929	1.4%	0.6%	45,033	14,669	100	18	54	72	47,497	15,472	106	18	58	76
52	1930	0.7%	0.5%	23,317	7,595	52	10	28	38	25,351	8,258	58	10	32	42
53	1932	1.1%	1.0%	38,781	12,633	86	16	46	62	42,804	13,943	96	16	52	68
54	1626	0.3%	0.0%	9,723	3,167	22	4	12	16	9,723	3,167	22	4	12	16
55	1928	0.4%	0.0%	12,384	4,034	30	6	16	22	12,384	4,034	30	6	16	22
56	1968	4.4%	2.9%	144,368	47,027	318	54	172	226	155,368	50,610	342	58	186	244
57	1970	1.8%	1.1%	58,523	19,063	130	22	70	92	62,814	20,461	140	24	76	100
58	1973	1.8%	0.6%	57,532	18,741	128	22	70	92	59,718	19,453	132	22	72	94
59	1969	7.2%	3.4%	232,352	75,688	510	86	276	362	245,458	79,957	538	90	292	382
60	1971	0.4%	4.2%	24,669	8,036	56	10	30	40	40,993	13,353	92	16	50	66
61	1967	5.4%	4.6%	183,264	59,697	402	68	218	286	201,185	65,535	442	74	240	314
62	1966	5.1%	2.7%	165,138	53,793	362	62	196	258	175,692	57,231	386	64	210	274
63	1965	1.6%	2.1%	56,569	18,427	126	22	68	90	64,619	21,049	144	24	78	102
64	1994	1.4%	2.6%	50,967	16,602	114	20	62	82	61,079	19,896	136	24	74	98
65	1991	9.0%	3.1%	289,395	94,269	634	106	344	450	301,372	98,171	660	110	358	468
66	1990	1.5%	6.3%	67,693	22,051	150	26	82	108	91,863	29,924	202	34	110	144
67	2005	4.2%	2.2%	137,095	44,658	302	50	164	214	145,541	47,409	320	54	174	228
68	1992	0.6%	0.9%	20,254	6,598	46	8	24	32	23,820	7,759	54	10	30	40
69	2013	0.7%	1.5%	26,747	8,713	60	10	32	42	32,437	10,566	74	12	40	52
70	1964	2.9%	2.4%	98,594	32,116	218	36	118	154	107,976	35,173	236	40	128	168
71	2009	0.4%	0.6%	13,995	4,559	32	6	18	24	16,247	5,292	38	6	20	26
72	2017	0.4%	0.0%	12,778	4,162	30	6	16	22	12,778	4,162	30	6	16	22
73	2020	0.6%	6.8%	42,001	13,681	94	16	50	66	68,372	22,272	152	26	82	108
74	1977	0.3%	0.0%	9,023	2,939	22	4	12	16	9,023	2,939	22	4	12	16
75	1404	0.2%	0.0%	5,251	1,711	14	2	8	10	5,251	1,711	14	2	8	10
76	2004	0.0%	19.2%	62,333	20,305	138	24	74	98	136,540	44,477	300	50	162	212
Total				3,411,524	1,111,287	7,606	1,322	4,118	5,440	3,797,447	1,237,000	8,456	1,454	4,584	6,038

Table 5 - Existing and Future Trip Distribution by TAZ

Project Zone	TAZ	99 N	CDI Visalia	CDI Tipton	198 W	LOL Tulare	LOLKraft	G, Goshen	G, Pixley
		HC	CDIn	CDIs	DF, LEP	LOLn	LOLs	GN	GS
	1 1763			52%			48%		100%
	2 1731			59%			41%		100%
	3 1761			85%			15%		100%
	4 1760			100%					100%
	5 1768						100%		100%
	6 1757			100%					100%
	7 1778			84%			16%		100%
	8 1779			61%			39%		100%
	9 1772			100%					100%
	10 1792			100%					100%
	12 1793			100%					100%
	13 1823			100%					100%
	14 1688			59%			41%		100%
	15 1832			15%	60%		25%		100%
	16 1840			92%	8%				100%
	17 1841			81%			19%		100%
	18 1379			100%					100%
	19 1510						100%		100%
	20 388			100%					100%
	21 1866						100%		100%
	22 1867			32%			68%		100%
	23 1895						100%		100%
	24 1893						100%		100%
	25 1868				100%				100%
	26 1505				100%				100%
	27 1876						100%		100%
	28 1896				55%		45%		100%
	29 1149						100%		100%
	30 1152						100%		100%
	31 1873				100%				100%
	32 1880						100%		100%
	33 1874			89%	3%		8%		100%
	34 1881			100%					100%
	35 1875	69%		19%			13%		100%
	36 1903			26%			74%		100%
	37 1931				61%			39%	100%
	38 1902			74%			15%	11%	37%
	39 1900				10%		90%		63%
	40 1899			100%					100%
	41 1769			100%					100%
	42 1781			41%			59%		100%
	43 1098						100%		100%
	44 1924							100%	100%
	45 1897						100%		100%
	46 1922						100%		100%
	47 1923			38%			62%		100%
	48 1926						100%		100%
	49 1927						100%		100%
	50 1925			76%			24%		100%
	51 1929			24%	44%		32%		100%
	52 1930						100%		100%
	53 1932			72%	28%				100%
	54 1626			100%					100%
	55 1928						100%		100%
	56 1968			20%	29%		51%		100%
	57 1970			22%			78%		100%
	58 1973			22%			78%		100%
	59 1969			67%			33%		100%
	60 1971						100%		100%
	61 1967			78%	10%		12%		100%
	62 1966			29%	10%		61%		100%
	63 1965			100%					100%
	64 1994			100%					100%
	65 1991			24%	54%		22%		100%
	66 1990			100%					100%
	67 2005			100%					100%
	68 1992	37%		32%			30%		100%
	69 2013			100%					100%
	70 1964			56%	44%				100%
	71 2009			100%					100%
	72 2017			100%					100%
	73 2020			100%					100%
	74 1977						100%		100%
	75 1404			100%				100%	
	76 2004			100%					100%

Table 6 - Roadway Volumes

Roadway	Type	2011 Background	2012 Background	2013 Background	2023 Background	2011 Project Only	2012 Project Only	2013 Project Only	2023 1% Project Only	2023 Cap Project Only	2011 with Project	2012 with Project	2013 with Project	2023 1% with Project	2023 Cap with Project
18	Auto	20,111	20,219	20,318	21,295	3,492	3,458	3,402	4,692	5,306	23,603	23,677	23,720	25,987	26,601
	Truck	6,707	6,854	6,563	8,584	480	478	472	746	806	7,187	7,332	7,035	9,330	9,390
19	Auto	525	534	542	640	570	564	556	725	786	1,095	1,098	1,098	1,365	1,426
	Truck	67	68	66	84	74	74	74	114	124	141	142	140	198	208
20	Auto	969	981	992	1,173	350	340	338	461	516	1,319	1,321	1,330	1,634	1,689
	Truck	92	95	90	124	218	218	210	344	378	310	313	300	468	502
21	Auto	214	216	221	251	287	284	284	368	398	501	500	505	619	649
	Truck	67	64	71	42	58	58	58	90	96	125	122	129	132	138
22	Auto	1,497	1,517	1,537	1,724	248	246	244	320	352	1,745	1,763	1,781	2,044	2,076
	Truck	120	118	124	105	146	142	142	226	244	266	260	266	331	349
25	Auto	1,466	1,482	1,500	1,678	695	420	416	536	578	2,161	1,902	1,916	2,214	2,256
	Truck	301	294	309	241	324	324	316	502	542	625	618	625	743	783
26	Auto	583	589	600	677	510	506	504	640	678	1,093	1,095	1,104	1,317	1,355
	Truck	175	167	183	105	1,052	1,048	1,026	1,774	2,068	1,227	1,215	1,209	1,879	2,173
27	Auto	1,207	1,226	1,234	1,406	80	78	78	122	140	1,287	1,304	1,312	1,528	1,546
	Truck	254	253	254	247	188	186	184	330	400	442	439	438	577	647
28	Auto	15,253	15,291	15,290	15,680	406	406	374	680	945	15,659	15,697	15,664	16,360	16,625
	Truck	6,691	6,840	6,548	8,592	218	218	210	448	610	6,909	7,058	6,758	9,040	9,202
30	Auto	1,447	1,473	1,503	1,805	106	106	104	188	260	1,553	1,579	1,607	1,993	2,065
	Truck	56	56	56	72	24	24	22	54	80	80	80	78	126	152
31	Auto	16,990	17,038	17,044	17,576	320	320	286	506	694	17,310	17,358	17,330	18,082	18,270
	Truck	6,698	6,849	6,553	8,624	174	172	168	362	490	6,872	7,021	6,721	8,986	9,114
32	Auto	1,453	1,460	1,468	1,544	264	264	262	338	370	1,717	1,724	1,730	1,882	1,914
	Truck	290	298	278	288	158	158	152	238	254	448	456	430	526	542
8	Auto	11,837	12,023	12,143	13,126	334	332	324	416	454	12,171	12,355	12,467	13,542	13,580
	Truck	1,415	1,426	1,404	1,688	374	370	352	549	568	1,789	1,796	1,756	2,237	2,256
9	Auto	4,497	4,659	4,588	4,659	86	86	84	110	120	4,583	4,745	4,672	4,769	4,779
	Truck	178	181	174	181	360	356	346	538	558	538	537	520	719	739
10	Auto	6,172	6,197	6,329	6,807	30	30	28	36	40	6,202	6,227	6,357	6,843	6,847
	Truck	767	797	802	1,106	180	180	176	298	288	947	977	978	1,404	1,394
12	Auto	1,842	1,854	1,838	2,034	282	280	274	348	386	2,124	2,134	2,112	2,382	2,420
	Truck	126	123	123	123	120	116	112	184	204	246	239	235	307	327
13	Auto	165	169	256	256	104	102	102	148	170	269	271	358	404	426
	Truck	40	42	40	59	100	98	98	168	200	140	140	138	227	259
16	Auto	2,232	2,249	2,205	2,536	114	114	112	170	216	2,346	2,363	2,317	2,706	2,752
	Truck	84	85	80	117	132	132	130	216	248	216	217	210	333	365
23	Auto	1,348	1,343	1,357	1,348	88	88	86	150	208	1,436	1,431	1,443	1,498	1,556
	Truck	708	693	721	708	78	76	74	122	132	786	769	795	830	840
33	Auto	472	480	486	586	254	252	250	348	392	726	732	736	934	978
	Truck	43	43	42	55	56	56	55	92	102	99	99	97	147	157
17	Auto	10,019	10,202	10,291	11,361	462	462	358	628	702	10,481	10,664	10,649	11,989	12,063
	Truck	913	937	892	1,153	246	244	238	380	402	1,159	1,181	1,130	1,533	1,555

Appendix J

Buildout Projections

TULARE COUNTY DAIRY AND FEEDLOT HERD PROJECTION – NUTRIENT CONSTRAINED BUILDOUT

Introduction

The maximum County herd capacity will be calculated on the basis of the County's total cropland nitrogen (N) requirements in 2009 adjusted by the use in the County of commercial fertilizer and other confined animal and biosolids sources. The capacity will then be confirmed by calculating the maximum acreage of manure-use affected cropland against allowable salt deposition per acre.

Summary

- Table A on the following page estimates total nitrogen requirements for County crops except vegetables in 2009 as 77,955 tons.
- Table B estimates total nitrogen requirements in 2009 for non-producing cropland (young trees and vines, not yet in production) as 811 tons.
- Table C details the total Tulare County usage in 2009 of commercial fertilizer, and its nitrogen contribution, 21,697 tons (of which $(21,697/1.4)$ 15,498 is available to crops.
- Table D details the total County nitrogen contribution from other confined animals and from biosolids, 2,548 tons of which $(2,548/1.4)$ 1,820 tons is available to crops.
- The remaining nitrogen requirement is thus $(77,955 + 811 - 15,498 - 1,820)$, 61,448 tons.
- The nitrogen limitation on maximum usage of dairy manure on cropland in the County is thus calculable as 62,089 tons x the Regional Water Quality Control Board's (RWQCB's) maximum application rate of 1.65 x nitrogen demand, $1.65 \times 61,448$, 101,388 tons.
- Based on the maximum herd size allowed by all existing permits (647,000 mature cows), the manure nitrogen output would be 86,555 tons, approximately 85% of the calculated available nitrogen capacity.
- Salts application rates from this increased herd size, 1,075 pounds per acre, would not exceed the RWQCB recommended single-crop rate of 2,000 pounds per double-cropped acre from manure. Much of this manure is transferred to farm land that is not associated with bovine facilities, reducing this conservative estimated loading rate substantially.
- The maximum existing mature-cow defined dairy herd size may thus be increased by 110,875 mature cows plus support stock utilizing existing farmed acreage only in the County.

- Based on the maximum herd size allowed by all existing permits (647,000 mature cows), the manure nitrogen output would be 86,555 tons, approximately 85% of the calculated available nitrogen capacity.

Table A
Crop Nitrogen Required, Tulare County

	Acres Under Production^(a)	Nitrogen Requirement per Year, per Acre^(b)	Total Nitrogen Requirement, All Crops, Pounds	All Crops, Tons
Irrigated Field Crops				
Alfalfa	103,000	55*	5,660,000	
Barley – Grain	1,070	140	150,000	
Beans – Dry	5,420	161	870,000	
Corn - Grain	13,900	226	3,140,000	
Corn – Silage	162,000	236	38,230,000	
Cotton	11,200	164	1,840,000	
Pasture – Irrigated	93,000	210	19,530,000	
Silage – Small Grain	125,000	160	20,000,000	
Sorghum Grain	13,100	236	3,090,000	
Sudan Grass	6,140	239	1,470,000	
Wheat Grain	47,000	160	7,520,000	
Miscellaneous	32,300	180**	5,810,000	
Subtotal	613,130		107,310,000	53,655
Vegetable Crops				
Broccoli	742	66	50,000	
Cucumbers	584	66	40,000	
Sweet Corn	676	236	160,000	
Miscellaneous	5,975	120**	720,000	
Subtotal	7,977		970,000	485
Fruit/Nut Crops				
Almonds	25,500	186	4,740,000	
Apples	90	76	7,000	
Apricots	301	67	20,000	
Avocados	236	76	18,000	
Blueberries	1,020	78	80,000	
Cherries	1,510	79	120,000	
Figs	15	70	1,000	
Grapes	54,300	111	6,030,000	
Grapefruit	1,310	252	330,000	
Kiwifruit	1,840	120	220,000	
Lemons	4,070	252	1,030,000	
Nectarines	11,800	70	830,000	
Olives	12,500	70	880,000	
Oranges	91,700	252	23,110,000	
Peaches	13,370	81	1,080,000	
Pears	246	71	20,000	
Pecans	636	142	90,000	
Persimmons	815	74	60,000	
Pistachio Nuts	17,600	117	2,060,000	
Plums	12,400	76	940,000	
Pomegranates	2,640	65	170,000	
Prunes	3,550	67	240,000	
Quince	142	70	10,000	
Tangerines	9,960	252	2,510,000	
Walnuts	27,700	136	3,770,000	
Miscellaneous	1,383	150**	207,000	
Subtotal	296,624		48,600,000	24,300
Total	917,731		156,800,000	78,400

^aTulare County Annual Crop and Livestock Report, 2009

^bWestern Fertilizer Handbook, Eighth Edition, 1995 (- atmospheric nitrogen, 14 pounds per acre), except as noted

*Estimated from similar crops or from known commercial fertilizer usage

**Average of listed crops

Table B
Nitrogen Required – Non-Bearing Fruit and Nut Crops

Crop	Non-Bearing Acreage^(a)	Applied Nitrogen Requirement Per Year, Per Acre^(b)	Total Nitrogen Requirement All Crops, Pounds	All Crops, Tons
Almonds	1,650	93	153,000	
Apples	0	-	-	
Apricots	22	33	1,000	
Avocados	0	-	-	
Blueberries	321	39	12,000	
Cherries	492	40	20,000	
Figs	1,878	55	103,000	
Grapes	0	-	-	
Grapefruit	502	126	63,000	
Kiwifruit	0	-	-	
Lemons	719	126	90,000	
Nectarines	209	35	7,000	
Olives	210	35	7,000	
Oranges	1,901	126	240,000	
Peaches	547	40	22,000	
Pears	0	-	-	
Pecans	108	71	8,000	
Persimmons	38	37	1,000	
Pistachio Nuts	10,400	58	603,000	
Plums	164	38	6,000	
Pomegranates	1,010	32	32,000	
Prunes	355	38	13,000	
Quince	0	-	-	
Tangerines	1,600	35	56,000	
Walnuts	1,430	126	180,000	
Miscellaneous	55	68	4,000	
Total	23,611		1,621,000	811

^aTulare County Annual Crop and Livestock Report, 2009

^bWestern Fertilizer Handbook, Eighth Edition, 1995 (- atmospheric nitrogen, 14 pounds per acre), except as noted

Nitrogen Sources

Table C
Nitrogen from ACFs other than Dairies in Tulare County

Other Confined Animals	Number of Animals ^a	Nitrogen (lbs) per finished animal ^b	Time taken to finish animal (days) ^b	Nitrogen tons per year ^c
Turkey – male	334,500	1.21	133	555
Turkey – female	334,500	0.57	105	331
Swine – Grow/Finish	91,500	10.36	120	1,441
Total Nitrogen				2,328

Additional nitrogen from biosolids (City of Porterville only; all other biosolids disposed of out-of-County)
11,000 tons/year x .02% N = 220 tons

Note: Excrement from turkeys housed in foothill areas is probably not an N contributor to Valley cropland.

Table D
Annual Nitrogen from Fertilizer Use in Tulare County

Fertilizer	Amount Utilized in Tulare County (tons) ^d	Total % Nitrogen ^e	Nitrogen Applied to fields (tons)
Ammonium nitrate	1,341	34	456
Ammonium sulphate	3,087	21	648
Anhydrous ammonia	4,197	82	3,442
Calcium ammonium nitrate	3,740	17	636
Calcium nitrate	1,135	16	182
Nitrogen solutions	32,225	32	10,312
Potassium nitrate	1,090	26	283
Urea	3,659	46	1,683
Other commercial nitrogen fertilizers	15,019	27*	4,055
Total	65,493		21,697

The California Department of Food and Agriculture's Fertilizing Materials Inspection Program is responsible for regulating fertilizers in the State of California. Approximately 90 percent of fertilizer distribution reported within the State is for agricultural farm use. The Western Fertilizer Handbook provides the nitrogen content for the various fertilizer types. As shown in Table B, approximately 21,697 tons of nitrogen from fertilizer is applied to cropland annually in the County.

*Average nitrogen content of all listed fertilizers except anhydrous ammonia.

^a Tulare County Annual Crop and Livestock Report, 2009

^b ASAE, 2005

^c Column D = [A x B x 365/C]/2,000/2 Takes into account 50% unavoidable losses of nitrogen

^d California Department of Food and Agriculture, July 2008 – June 2009

^e Western Fertilizer Handbook, 2002

Nitrogen Limitations

Commercial fertilizers are used, in part, on irrigated field crops which have an estimated annual nitrogen demand, Table A, of 53,655 tons. Manures are used, in part, on some fruit and nut crops, with an estimated, Table A, nitrogen demand of 24,300 tons. Manure is not used (unless composted) on vegetable crops, with a Table A estimated 480 ton demand. The total nitrogen demand of irrigated field crops and of fruit and nut crops is 53,655 tons plus 24,300 tons; 77,955 tons. The total nitrogen demand of non-producing cropland (Table B) (young trees and vines not yet in production) is 811 tons.

As a guide to manure usage, the Regional Water Quality Control Board suggests that manure application not exceed 1.4 times estimated crop nitrogen demand (usage), 1.65 times with individual dairy proof of sustainability. Utilizing the lower application rate for calculating the impact of commercial fertilizer usage on satisfaction of crop nitrogen demand (Table D), that impact will be 21,697 tons/1.4, 15,498 tons. Similarly, the nitrogen demand satisfaction by residuals from other animal confinement facilities and biosolids (Table C) will be 2,548 tons/1.4, 1,820 tons. The remaining crop nitrogen demand by all County crops other than vegetables is thus $(77,955 + 811 - 15,498 - 1,820)$, 61,448 tons.

The nitrogen limitation on maximum usage of dairy manure on cropland in the County is thus calculable as 61,448 tons x 1.65, 101,388 tons.

Allowable Salt Deposition

If it is conservatively estimated that 25 percent of the commercial fertilizers-derived nitrogen and other-animal derived nitrogen utilized in the County is used on field crops, the necessary remaining usage area by field crops of dairy herd manures would be $[53,655 - (0.25 \times 15,498 + 0.25 \times 1,820)]/53,655 \times 613,130/1.4$, 402,688 acres.

Similarly, the fruit and nut cropland to be utilized, in part, for manure satisfaction of crop requirements would be: $[24,300 - (0.75 \times 15,498 + 0.75 \times 1,820)]/24,300 \times 296,624/1.4$, 107,349 acres.

Thus, conservatively assuming single-cropping on all land, the total acreage upon which manure would be applied would be $(402,688 + 107,349)$, 510,037 acres.

With the Regional Water Quality Control Board's suggested dairy manure maximum salt loading per year of 2,000 pounds per single-cropped acre (as compared to 3,000 pounds per double-cropped acre), the total salt capacity for manure used in the County is: $(559,488 \times 2,000)/2,000 = 559,488$ tons.

Salt Produced by Dairy Herds

The maximum herd of 647,000 mature cows plus associated support stock would produce an estimated 300,824 tons of non-nutrient salts.

Salt Constraints on Dairy Herd Growth

The salt loading capacity of 559,488 tons/year should easily accommodate the 300,824 tons/year of salt produced by the proposed county-wide herd at an average loading rate of approximately 1,075 lb/ac.

Conclusion

Therefore, the maximum project herd is not limited by salt loading.

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Appendix K

Existing Tulare County Animal Confinement Facilities Plan, 2000

ANIMAL CONFINEMENT FACILITIES PLAN



***Phase I: Dairy/Bovine Animal
Confinement Facilities***

**Phase I
Animal Confinement Facilities Plan
of the
Environmental Resources Management Element
of the
Tulare County General Plan**

General Plan Amendment No. GPA 99-05

And

**Final Program Environmental Impact Report
SCH #99031044**

March 2000

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INTRODUCTION

INTRODUCTION

NEED FOR THE STUDY

In 1974, an Animal Waste Management Element (AWME) was prepared as part of the Environmental Resources Management Element (ERME) of the Tulare County General Plan. Included within the AWME were proposed policies for the establishment and operation of dairies and feedlots. The Board of Supervisors did not adopt the AWME for incorporation into the General Plan. The policies set forth were, however, adopted by the Tulare County Planning Commission and have been used since 1974 as guidelines in considering Special Use Permit applications for the establishment of confined animal operations, in particular dairies and feedlots.

The policies and guidelines utilized for the establishment and operation of confined animal operations have been reviewed and modified to provide consistency with other regulatory agencies, e.g., California Regional Water Quality Control Board. These reviews have resulted in the modification of the guidelines, particularly in regards to the intensity of operation or density of animal units.

The impact of dairies on county resources has been an issue under investigation by the Tulare County Grand Jury over the past several years. Pursuant to the Grand Jury's findings and recommendations, the Tulare County Board of Supervisors, in January 1998, adopted a "Quality of Life Program". Set forth in this Program was a commitment to protect and enhance the quality of life for the residents of Tulare County. The provision of resources to monitor the impacts of the dairy industry on the county's groundwater supply was included as a component of this program.

The Tulare County Agricultural Advisory Committee (AAC), on May 26, 1998, adopted a set of recommended "Dairy/Animal Confinement Facility Policies" which include locational and animal density criteria for the establishment of new dairies and animal confinement facilities. The Tulare County Planning Commission (by Resolution No. 7693), and subsequently the Board of Supervisors (by Resolution No. 98-0582), adopted the Committee's policies on an interim basis until the Animal Confinement Facilities Plan (ACFP) can be adopted and incorporated into the ERME of the Tulare County General Plan.

OBJECTIVES AND SCOPE OF THE STUDY

The Environmental Resources Management Element (ERME)) series of the Tulare County General Plan has been developed to establish goals and policies that would protect and enhance the county's resources. Under the Environmental Management concept, the following objectives are addressed:

- (a) Development of policies and programs which will avoid degradation of the natural environment and offset or reverse degradation which has already occurred;
- (b) Recognition of the complexity and interrelation of the environmental and planning processes;
- (c) Attendance to environmental issues that, due to their importance, should be given priority attention for policy and action in order to provide for future development; and
- (d) Acknowledge those resource systems that require long periods to restore or require ongoing conservation practices in order to avoid continued decline or degradation.

The proposed amendment to the General Plan involves the adoption of the Animal Confinement Facilities Plan (ACFP) and its incorporation into the Environmental Resources Management Element (ERME) of the Tulare County General Plan. The ACFP will be a phased document covering the following:

- Phase I will cover dairy and other bovine animal confinement facilities
- Phase II will cover all other livestock (including, swine, sheep, rabbit, poultry, ratite, and other bird) raising facilities

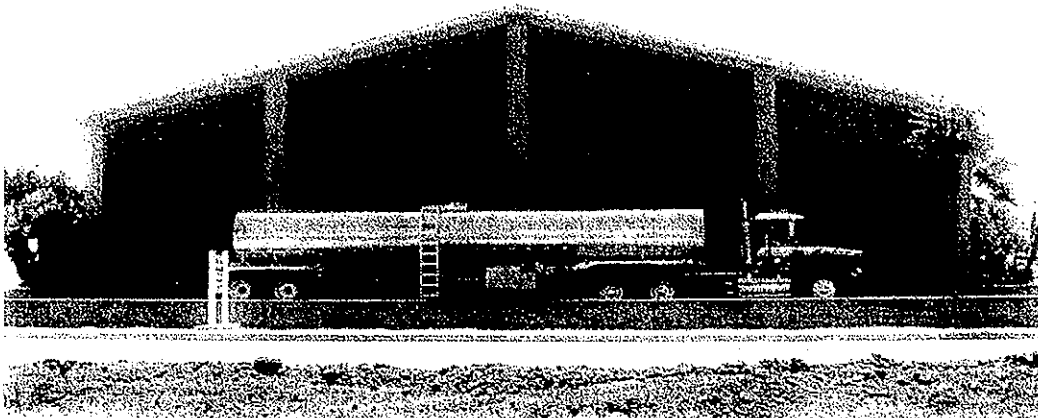
Policies and standards have been developed that specifically address dairies and other bovine animal confinement operations and associated environmental issues for inclusion in Phase I of the ACFP. These policies and standards are premised on current scientific data and technology that provide for the strategic siting and operation of these facilities. Additionally, the policies and standards are reflective of and consistent with State and federal regulations, adopted and proposed.

It is intended that the policies and standards established herein will provide for the development of dairies and other bovine animal confinement facilities on the Valley floor of the county in such a manner that: protects the quality of the environment; safeguards the health, safety and general welfare of the County's residents; and provides for the continuation and growth of animal related industries.

ORGANIZATION OF THE STUDY

Phase I of the Animal Confinement Facilities Plan includes the following sections:

Chapter 1 provides a background of the Animal Industry in Tulare County, outlines associated environmental issues, and summarizes federal, State and local regulations.



CHAPTER 1: BACKGROUND

CHAPTER 1 BACKGROUND

1.1 TULARE COUNTY'S ANIMAL INDUSTRY

Tulare County is ranked second in the nation for agricultural production. The 1998 Tulare County Agricultural Crop and Livestock Report prepared by the Tulare County Agricultural Commissioner reported a total of \$2.9 billion in gross receipts. Forty-two percent of this value is attributed to livestock and poultry (11 percent of total), and to livestock products (31 percent of total). Eighty-one percent of the livestock and poultry value is attributed to cattle and calves; ninety-eight percent of the livestock products value is attributed to milk production. Milk has been the County's leading commodity since 1988.

According to the Tulare County Agricultural Commissioner, the value of milk production in 1998 was almost \$898 million, ranking the County as the number one dairy county in the State. Increasing the importance of dairy farming in Tulare County is the value of other high-value crops grown in the county which are directly related, such as alfalfa hay and silage (\$82 million), grain and silage corn (\$64 million), and small grain silage (\$17 million). Additionally, studies by the University of California suggest that the "added value" activities (e.g., marketing, shipping, facility construction, and other support services) can generate an additional \$2.50 to \$3.00 for each dollar of income directly produced by an agricultural commodity.

The statistics noted above reflect the current economic importance of the dairy industry in Tulare County. When compared to statistics for the previous five years, the growth of the industry is substantial: 1997 - >\$716 million; 1996 - >\$698 million; 1995 - >\$567 million; 1994 - >\$554 million; and 1993 - >\$447 million. The current or 1998 crop value of milk production is double the 1993 value. It should be noted, however, that the increase in crop value is influenced by market conditions and does not necessarily reflect an equitable or across the board increase in the number of dairies in the county or the number of animals. For instance, in January of 1994, there were 290 dairies in operation with a total of approximately 258,986 cows. As of January 1999, there were 291 dairies with a total of approximately 312,340 cows. This reflects a relatively constant number of dairies (increased by less than 1 percent) but an increase in the herd count of approximately 19 percent. (Dairy and cow numbers are based on statistics compiled by the County's Dairy Advisor for annual Master Dairy Lists.)

With 291 dairies in the county supporting an estimated 312,340 cows (milking and dry), the average herd size is 1,073. The average herd size for the previous year (as of January 1998) was 1,040 (305,390 cows on 293 dairies). These numbers reflect the trend that has been seen in the county over the years toward larger herds as farm numbers hold fairly constant but total cow numbers grow. Over the past five years, the number of dairies with less than 200 cows remains relatively unchanged and represents only five percent of the total dairies. A noticeable drop has occurred in the numbers of

herds with 200 to 600 cows, while herds with 600 to 1,000 cows increased slightly during the 5-year span. Herds with 1,000 to 1,500 cows grew from 56 percent in 1994 to 59 percent in 1999. The other noticeable growth has been in the 1,500 to over 2,500 cow herds during this same time frame, and indications are this trend will continue. (Tom Shultz, U.C.Cooperative Extension 1999). A comparison of herd size for 1994 and 1999 is shown on Table 1.1-1 below.

**Table 1.1-1
Tulare County Dairy Herd Size**

Herd Size	Number of Herds	
	1994	1999
<200	15	14
200-400	51	38
400-600	47	33
600-800	35	40
800-1,000	40	40
1,000-1,500	56	59
1,500-2,000	29	33
2,000-2,500	12	17
>2,500	5	17

(NOTE: The dairy totals include two non-private dairies, the College of the Sequoias and Tulare High School farms).

1.2 ENVIRONMENTAL ISSUES ASSOCIATED WITH THE INDUSTRY

It is anticipated that Tulare County will continue to lead the milk production industry on both a State and national level. However, it is not anticipated that the number of dairies would increase proportionately with the milk production; only the number of cows would increase. If the herd size increases without a proportional increase in the cropland utilized for waste disposal/nutrient recycling, the potential for groundwater contamination increases.

The increase in herd size without a proportionate increase in cropland disposal area is not an issue exclusive to dairies. In December 1997, a report on animal waste pollution and the environmental risks associated with livestock and poultry operations was compiled by the United States Senate Committee on Agriculture, Nutrition & Forestry, Minority Staff. This report indicates that nationwide, the number of hog farms and poultry operations has decreased by 35 to 60 percent while maintaining production or, in some cases, doubling or tripling production. This trend is apparent in Tulare County as well with livestock and poultry production maintaining or increasing without a net increase in new facilities.

The addition of new dairy operations, as well as the increase in herd size of confined animal operations without a proportional increase in operational area, can

result in too high a concentration of animals both on-site and within a given area. It is possible that certain areas in the county may be nearing saturation. A review of planning records from the County Resource Management Agency reveals that the greatest number of existing dairies in Tulare County are found east and west of the City of Tulare. Figure 1-1 reflects the generalized locations of dairies. Other established dairy areas in the county are located:

- between Dinuba and Goshen along Road 80 and Avenue 360;
- southwest of Goshen along State Highway 198 and west of Highway 99;
- the Waukena area northeastward to within four miles of the western county line;
- south of the Tule River between Roads 48 and 160, generally east and west of Tipton and Pixley; and
- west of Tipton along Avenue 144 (Highway 190) between Roads 64 and 96.

Higher concentration of dairies results in a higher concentration of animal waste, which if not managed and disposed of properly can lead to soil and water (ground and surface) contamination. The degradation of ground and surface water quality has evolved as a major concern on a State and national level, however, it is not the only issue associated with the industry. Although the PEIR contained in Chapter 4 of this Report discusses potential impacts on a more detailed level, the following list reflects the major environmental concerns associated with confined animal operations.

- Degradation of Surface Water
- Degradation of Ground Water
- Degradation of Air Quality
- Land Use Conflicts
- Road Construction and Maintenance
- Potential Health Hazards
- Loss of Natural Habitat

1.3 REGULATORY ENVIRONMENT

1.3.1 FEDERAL STANDARDS

Clean Water Act

In 1972, Congress enacted the Clean Water Act (CWA) that established national policies for protecting water resources. For the past 25 years, the basic approach of the Act has been for stringent control of "point sources" of water pollution with specific exemptions for many agricultural operations. On October 18, 1997, the 25th anniversary of the CWA, the Department of Agriculture (USDA) and the Environmental Protection Agency (EPA) were directed to prepare a Clean Water Action Plan (CWAP). The purpose of the Plan is to strengthen and expand existing clean water programs by:

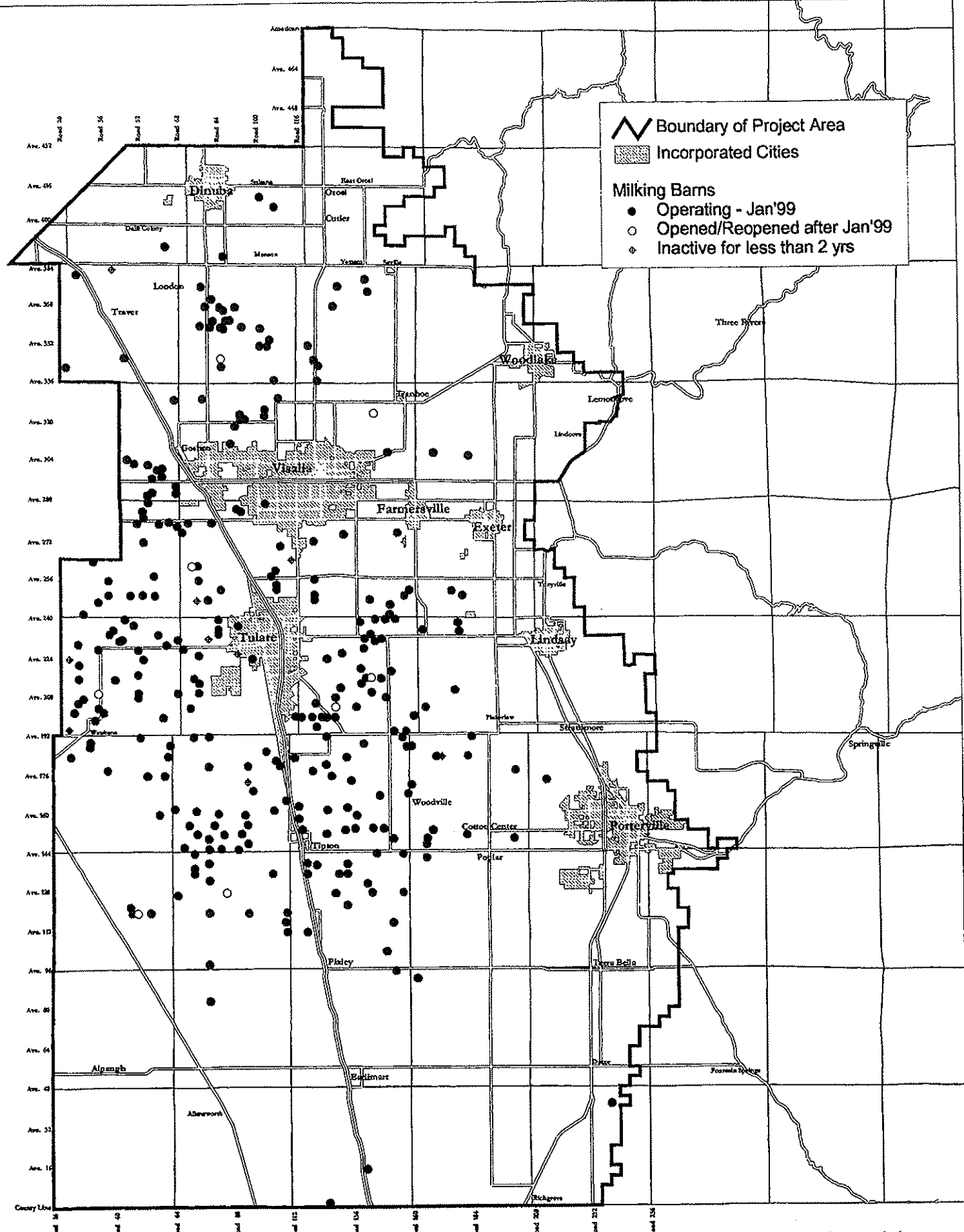
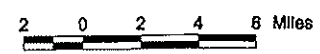


Figure 1-1

Location of Dairies in Tulare County

Prepared for the Draft Animal Confinement Facilities Plan / Draft PEIR
Tulare County Resource Management Agency



- protecting public health;
- enhancing stewardship of natural resources;
- strengthening polluted runoff standards and controls; and
- improving information and citizen's right to know.

The CWAP includes more than 100 key actions that will achieve the desired goals. One specific action calls for the development of a Unified National Strategy for Animals Feeding Operations. On September 11, 1998, USDA-EPA released a draft strategy that is intended to minimize the water quality and public health impacts of animal feeding operations (AFOs). Under the draft strategy, AFOs are characterized or defined as:

“agricultural enterprises where animals are kept and raised in confined situations. AFOs congregate animals, feed, manure and urine, dead animals, and production operations on a small land area. Feed is brought to the animals in lieu of grazing or otherwise seeking feed in pastures or fields.”

The draft strategy establishes a national performance expectation that all AFOs should develop and implement a Comprehensive Nutrient Management Plan (CNMP) by the year 2008. However the filing of a CNMP is voluntary unless the AFO qualifies as a “Concentrated Animal Feeding Operation” (CAFO) and is subject to NPDES regulations (refer to discussion of NPDES regulations below). An AFO is considered a CAFO under federal regulations if:

- it confines more than 1,000 animal units (equivalent of 700 mature dairy cows); or
- it confines between 301 (equivalent of 200 mature dairy cows) and 1,000 animal units and discharges pollutants into waters of the United States (either directly into on-site water, or indirectly by channeling wastes through a ditch, flushing system, or other device); or
- EPA has designated it as a CAFO upon determining that the operation, regardless of its size, is a significant source of pollution. This determination, which considers a number of factors (such as slope, vegetation, and the proximity of the operation to the waters), is based on an on-site inspection by the agency that issues the permits.

According to federal regulations, a facility will not be considered a CAFO if it discharges pollutants only in the event of a 25-year, 24-hour storm. (Defined as the number of inches of rainfall in a 24-hour period that is expected to occur only once every 25 years, a figure that is published for every location in the United States by the National Weather Service).

At a minimum, a CNMP should address feed management, manure handling and storage, land application of manure, land management, record keeping, and other utilization options (for AFOs located within vulnerable watersheds). A CNMP should

also include a schedule for implementing the best management practices that are identified.

National Pollutant Discharge Elimination System (NPDES) Permits

The federal Clean Water Act regulates water quality in surface waters with respect to discharges into those waters from industrial, municipal or agricultural uses. Under Section 402 of the Act, permits can be issued for point sources to ensure that national minimum standards for effluent are met. These permits are called National Pollutant Discharge Elimination System permits or NPDES permits. In California these permits are issued by the Regional Water Quality Control Boards and implemented under the authority of the California Water Code. NPDES discharge permits are not generally issued for dairies if the operation meets Regional Water Board requirements. However, a NPDES permit cannot be waived if discharge to surface water occurs.

1.3.2 STATE STANDARDS

Water Quality Control Plan for the Tulare Lake Basin

The Basin Plan for Tulare County was first adopted by the Central Valley Regional Water Quality Control Board (CVRWQCB) in 1975 under the auspices of the Water Quality Control Plan for the Tulare Lake Basin. (Reference Figure 1-2 for the location of the Tulare Lake Basin.) The Plan became effective after the approval by the State Water Board and U.S. Environmental Protection Agency. Included within the Basin Plan, as originally adopted and subsequently amended, are water quality standards that protect both surface and ground waters.

Title 27 of the California Code of Regulations, Section 2510-2601 (Chapter 15) contains minimum standards to protect both surface and ground waters from discharges of animal waste at confined animal facilities. (Reference Appendix B) In addition to the standards in Chapter 15, the following are required by RWQCB, as outlined in the 1995 edition of the Tulare Lake Basin Plan:

- Lands that receive dry manure shall be managed to minimize erosion and runoff, and applied manure shall be incorporated into surface soils soon after manure application.
- Animal confinement areas, manure storage areas, lagoons, disposal fields, and crop lands that receive manure shall not create a nuisance.
- Salt in animal rations should be limited to the amount required to maintain animal health and optimum production.
- Animal confinement facilities, including retention ponds, shall be protected from overflow from stream channels during 20-year peak stream flows for facilities that existed as of 25 July 1995 and protected from 100-year peak stream flows for facilities constructed after 25 July 1975. Facilities constructed after 8 December 1984 must comply with the specifications in Chapter 15.

REGIONAL WATER QUALITY CONTROL BOARDS TULARE LAKE BASIN LOCATION MAP

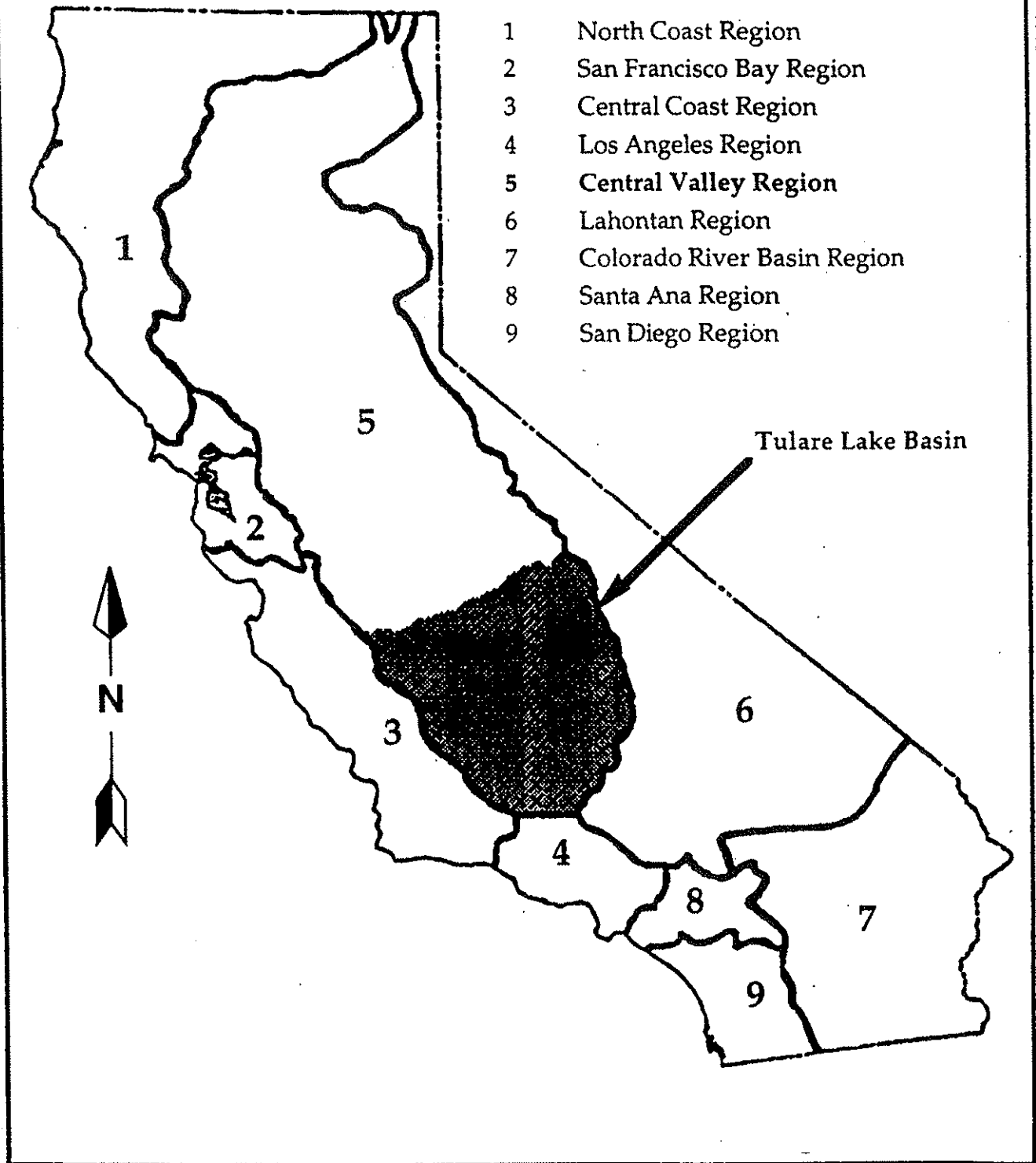


Figure 1-2



LOCATION OF THE TULARE LAKE BASIN

Tulare County Resource Management Agency

25 0 25 50 75 100 Miles



- Facilities shall be designed and constructed to retain all facility wastewater generated, together with all precipitation on, and drainage through, manured areas during a 25-year, 24-hour storm. Facilities with operation capacities equal to or greater than the capacities described in 40 CFR 412 (Feedlots Point Source Category) must obtain an National Pollutant Discharge Elimination System (NPDES) permit prior to discharge for events greater than a 25-year, 24-hour storm.
- New manure retention ponds shall be sited, designed, constructed, and operated to ensure that the invert of the pond will be at least 5 feet above the highest anticipated elevation of underlying groundwater.

Waste discharge requirements for the land application of wastewater may be conditionally waived for animal confinement facilities that can demonstrate compliance with the above. This waiver does not waive responsibility of the facility owner or operator to apply for and comply with a storm water permit. Facilities for which waste discharge requirements are waived shall provide an annual report to the Regional Water Board describing land and waste management practices for the prior year. The annual report must summarize the following:

1. Inventory of total head of milking cows, dry cows, heifers, calves, and comparable number of animal units at the dairy during the year.
2. Crops and acreage used for wastewater disposal (irrigation application).
3. Estimates of the quantity of dry manure (tons) spread on site and exported off site, including the location of the fields where the manure is applied, and the names of buyers and/or location of application (disposal) areas, if applicable.

The California Regional Water Quality Control Board (RWQCB), Central Valley Region, has adopted General Waste Discharge Requirements for Milk Cow Dairies under Order No. 96-270 (see Appendix B). As regulated under the State Water Code, discharges of dairy waste include, but are not limited to: (a) the application of wastes to land; (b) the movement of waste constituents from application and storage areas into the soil; and (c) movement of waste or water containing wastes into surface waters. Under Resolution No. 82-036, RWQCB waives waste discharge requirements (WDRs) for specific types of discharge, including those from confined animal facilities, when discharge activities are in compliance with Title 27 of the California Water Code. However, for milk cow dairies that do not meet the waiver conditions in Resolution No. 82-036, individual waste discharge requirements are established. Typically, dairies that would not meet the waiver conditions include, but are not limited to, those located on very sandy soils, in areas of high ground water, or where the loading rates of the operation are excessive.

1.3.3 LOCAL REQUIREMENTS

Special Use Permit

The Tulare County Zoning Ordinance provides that dairies and feedlots, when more than 25 animals are on the property at any time, are permitted in most agricultural zones upon the granting of a Special Use Permit. Use permits have been required for these facilities since October 5, 1972. Facilities that were existing prior to this date are permitted to continue operation under a "legal nonconforming" or "grandfathered" status. Under the Zoning Ordinance, a use permit is not required for grandfathered dairies unless they propose to expand or the operation is being revised in some way, triggering the requirement for a use permit.

Of the 291 dairies operating in the county as of January 1999, 188 or sixty-five percent of operating dairies are under a Special Use Permit. A summary of dairy special use permit activity since 1973 is provided in Table 1.3.3-1 on page 11.

The Tulare County Zoning Ordinance defines a 'feed lot' as "an enclosed area where bovine animals, sheep, goats, horses, mules, swine or other similar domesticated quadrupeds are held for concentrated feeding or display preliminary to slaughtering, shipping or resale". In the various agricultural zones, no feed lot or area for concentrated feeding of more than 25 animals may be permitted unless a use permit has been secured as required under the Zoning Ordinance.

Of the eighty-eight established bovine feedlots in the county, seventeen have been issued use permits for feedlots. In addition, five bovine feedlots were established or, in the case of two existing feedlots, were expanded after approval of a use permit for a dairy, although the approved dairy facility (milk barn, lagoon, etc.) was not built. In these cases, a feedlot with maximum animal numbers not exceeding those allowed by the dairy use permit was allowed to continue even though the dairy facility component of the use permit was considered to be expired because construction did not occur within two years of permit approval.

Bovine feedlots established by use permit range in acreage and maximum animal numbers permitted from 10 acres with 100 animal units to 720 acres with 7,200 animal units, with most approved for at least 80 acres with 800 animal units. A number of bovine feedlots are located at the sites of former dairy facilities. These feedlots tend to be smaller than those established under special use permit, most likely because the older dairies tended to be much smaller than dairies (or feedlots) established more recently. Also, other small feedlots (generally less than ten acres of corral area) are found throughout the county (especially west and east of the City of Tulare), the status of which varies. Animal numbers for feedlots without use permits are not known.

TABLE 1.3.3-1
Summary of Dairy Special Use Permit Activity

Year	Total # PSP Applications	Action					Approvals		
		Approved	Denied	Withdrawn	Expired	Pending	New	Amend/Expand	Bring into Conformance & Expand
1973	23	17	2	1	3	--	15	--	2
1974	5	5	--	--	--	--	3	1	1
1975	4	4	--	--	--	--	3	--	1
1976	9	7	1	1	--	--	3	--	4
1977	2	1	--	--	1	--	--	--	1
1978	8	4	--	--	4	--	3	--	1
1979	10	8	--	--	2	--	8	--	--
1980	12	10	--	2	--	--	8	--	2
1981	11	9	--	--	2	--	6	--	2
1982	3	3	--	--	--	--	2	1	--
1983	8	7	--	1	--	--	5	--	2
1984	6	5	--	--	1	--	3	1	1
1985	8	6	2	--	--	--	4	1	1
1986	7	7	--	--	--	--	1	2	4
1987	38	28	1	2	7	--	21	3	4
1988	26	15	--	6	5	--	7	4	4
1989	33	20	--	2	11	--	7	7	6
1990	28	13	--	2	13	--	6	4	3
1991	14	10	--	1	3	--	--	4	6
1992	18	11	1	1	5	--	3	3	5
1993	15	11	--	2	2	--	6	5	--
1994	33	20	1	3	9	--	8	8	4
1995	19	15	1	2	1	--	3	11	1
1996	15	14	1	2	2	1	1	7	1
							P=1		
1997	27	19	--	1	--	7	8	8 p=4	3 p=3
1998	26	12	--	1	--	13	7 p=7	4 p=3	1 p=3
1999*	12	--	--	--	--	12	-- p=5	-- p=2	-- p=5

*Submitted between January 1-April 30; P= Pending.

Animal Waste Management Element

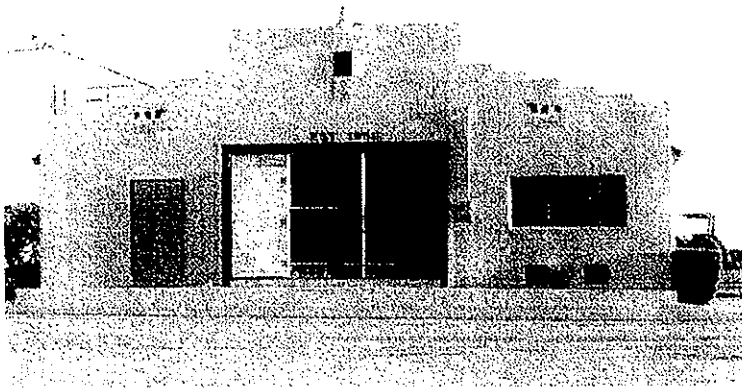
The Animal Waste Management Element (AWME) of the Tulare County General Plan was approved by the Tulare County Planning Commission in 1974. Although the Planning Commission recommended adoption to the Board of Supervisors, the AWME was not adopted by the Board and consequently not incorporated into the General Plan. Included within the original AWME were standards that would have been utilized for a staff-level permitting process for dairy and other concentrated animal raising facilities. The Tulare County Planning Commission did, however, adopt these standards by resolution to be used as "guidelines" when considering and approving use permits for new dairies.

Because the AWME was not adopted by the Board of Supervisors, the guidelines do not have the force of law behind them, e.g., they are not regulations. As noted above, they are only "guidelines" adopted by the Planning Commission which provide a baseline for evaluation by staff and the Commission in considering whether or not to issue a special use permit for a dairy project. The guidelines are applicable only to new facilities. Expansions of existing animal raising facilities are not subject to the guidelines except for animal unit densities. This does not, however, preclude the evaluation of expansion requests in light of the guidelines, nor does it limit the evaluation of requests to bring "grandfathered" facilities into compliance. Limiting the applicability of the guidelines to new facilities has, however, provided flexibility in dealing with unique situations because as "guidelines", the standards can be adjusted or modified to fit special circumstances.

An Agricultural Advisory Committee (AAC) was activated by the Tulare County Board of Supervisors in 1992, with the directive to submit recommendations concerning improvement and update to the AWME. Among the issues of concern at the time were:

- The on-site animal density standards in the County's guidelines are more permissive than what the Central Valley Regional Water Quality Control Board permits. Because of that, it gives the dairymen a false sense of what is really permitted in terms of animal units even though it was common knowledge that State regulations, if more restrictive than local regulations, would supercede County requirements.
- The need to convert animal unit density standards from gross acreage to crop or net acreage.
- There was a growing belief, now confirmed, that many of the permitted dairies, as well as the old nonconforming dairies, had increased herd sizes without getting a special use permit. The County's lack of enforcement resources was recognized along with a need to build an effective monitoring program.
- There was no local tracking of where solid wastes were being disposed.

The function of the first four policies is to prevent over concentration of dairies and other animal confinement facilities in any particular area to prevent excessive discharges of nitrates and salts, as well as controlling nuisances such as dust, vectors and odor. The function of the last two policies is to avoid present and future land use conflicts and environmental hazards. The separation from fruit and vegetable growing areas has resulted in the location of new dairies and animal confinement facilities in the western section of the Valley floor.



CHAPTER 2: DAIRY MANAGEMENT SYSTEMS

CHAPTER 2

DAIRY MANAGEMENT SYSTEMS

2.1 DAIRY DESIGN

There are a number of options when designing dairy facilities as outlined below. In Tulare County, dairy design includes free stall and open air corral systems. Most newer dairies tend to be free stall design (Tom Shultz, U.C. Cooperative Extension).

Environmental Barn Systems: This is a self-contained system combining all basic facilities in either a warm (insulated) or cold (non-insulated) barn structure. This system is ideal for cold or moderate climates providing year-round protection for cows and operators.

Roofed Free Stall System: This system consists of a compact series of roofed free stalls, matched with sufficient feed bunks. Service alleys between rows of free stalls and feed bunks are paved to allow mechanical scraping or flush cleaning of alleys. This system is ideal for moderate climates where extreme cold or heat is not common. Systems can be expanded easily with minimum land required for improvements.

Free Stall Corral System: Ideal for warm and dry climates where some protection from cold, wind and heat is desired, this system uses unpaved corrals. Fence line feeding is utilized. Paved service lanes connect corrals to the milking parlor/holding facility. Dry manure is collected from corrals periodically.

Free Stall with Lot System: This system allows use of non-insulated free stall barns with doors open to paved area, depending on prevailing winds. Outside feed bunks may be covered for protection. The milking parlor/holding area may be located according to best farmstead layout. A variety of feeding methods is possible including mixer wagons and fence line feeding. Manure handling can be semi-solid or liquid according to facilities and equipment. Settling tanks should be provided for lot run-off.

Open Air Corral System: This system is used in hot and dry climates where unpaved lots are desired and practical. Corrals should contain shade structures to protect cows from heat stress. Evaporator cooled shades are practical with temperatures above 90°F. Fence line feeding is utilized. Paved service lanes connect corrals to the milking parlor facility. Dry manure is collected from corrals periodically.

The design of dairy facilities is dependent upon location and environment. However, when planning any dairy system there are eight basic elements to consider:

- **Housing or Shelter** – In colder climates, environmental free stall barns provide protection for cows and convenience for operators on a year-round basis. In moderate climates, rows of roofed free stalls provide necessary cover and comfort

for cows. In hot climates, shade structures (some with evaporator coolers) provide protection from extreme heat and rain.

- Milking Parlor – Provides a sanitary and convenient area for milking large numbers of cows with minimum time and labor. Includes elevated milking stalls, prep-stalls, pipeline milking systems, milkroom, utility room, office and lavatory space.
- Holding Area – Holding cows prior to milking in milking parlor is required. A separate area apart from free stalls should funnel cows into parlor efficiently. Consider crowd gates, entrances, exits, catch pens, foot baths and fly control.
- Service Areas – Include paved lots, unpaved corrals, service alleys in free stall barns, movement lanes, fences, railing and water facilities.
- Feeding Facilities – Includes storage, mixing, distributing and feeding of silage, haylage, hay, grains supplements, etc. Manger space for each cow and herd groupings should be considered.
- Treatment & Maternity Areas – These areas should include stanchions or lanes for confining cows for treatment, artificial insemination, vaccination, etc. Separate maternity pens, apart from small calves, should also be provided in large herds. A bullpen, when needed, is sometimes included.
- Calf & Young Stock Facilities – Are often separated from the main herd facility. Provides controlled nursery for small calves and group pens or free stalls for older calves, grouped according to age and size.
- Manure Handling – The cleaning of barns, service alleys, holding areas and parlors must be planned. Cleaning methods, storage and/or disposal must be considered.

2.2 WASTE DISPOSAL SYSTEMS

The concentration of polluting by-products associated with confined animal operations requires the appropriate treatment and disposal of wastes so as to prevent pollution and preclude nuisances. Several types of treatment systems have been used to solve the problems associated with manure disposal. There are advantages and disadvantages to all types of systems. The most common methods of waste treatment systems and disposal methods used over the past 20 – 30 years are outlined below.

Most dairies in Tulare County utilize a “two phase” treatment system. Phase 1 is considered aerobic and involves sedimentation/separation. Phase 2 is considered anaerobic and involves the storage lagoon/retention pond. (Tom Shultz, U.C. Cooperative Extension)

2.2.1 WASTE TREATMENT

Anaerobic Lagoons: One of the first efforts for treatment of animal wastes was the anaerobic lagoon, a take-off and often direct copy of the treatment system used for human wastes. However, because the composition of human and bovine animal wastes is so radically different, this method generally must be followed by additional treatment prior to discharge into the environment.

Solids entering an anaerobic lagoon will decompose at varying rates depending on environmental factors such as the temperature of the lagoon, the degree of mixing that takes place, and the acidity and alkalinity levels of the lagoon. Most of the hydrogen, carbon and oxygen will be removed from the soluble portion in the form of methane and carbon dioxide. (Manure Waste Ponding and Field Application Rates, J.L. Meyer, March 1973.) Considerable gas is evolved and is temporarily trapped with infrequent gas eruption into the air. This results in an objectionable odor in the immediate area. References show that this odor dissipates within 1,000 feet of the source. (Tom Shultz, U.C. Cooperative Extension 1999)

The general purpose of the anaerobic lagoon is the removal, destruction and stabilization of organic matter and not water purification. Lagoons provide excellent settling capacity for interception and separation of heavy solids from liquid flows. The lagoons are relatively cheap to construct and do not require a great deal of maintenance other than removal of the solids build-up at regular intervals and vector control through abatement of weeds and floatage. Dirt removed from the lagoons is used to slope corrals for drainage back to the lagoon. (Tom Shultz, U.C. Cooperative Extension 1999)

Aerobic Lagoons: The aerobic lagoon was developed in an attempt to minimize the objectionable features of the anaerobic lagoon. If properly operated, aerobic lagoons, with either natural aerobic features or mechanical aeration, provide for continual bacteriological action and gradual dissipation of odors. The effluent is well-mixed and easier to dispose of in slurry form.

If no mechanical aeration is provided, lagoons must be no more than three or four feet deep, requiring a large area of land for treatment. Lagoons designed for mechanical aeration may be fifteen to twenty feet deep. A solids removal system is needed with mechanically aerated lagoons. A typical unit might include an aerobic lagoon with diffused aeration, a solid-liquid separator, pumping station and automatic flushing equipment.

Combination Systems: A combination anaerobic-aerobic system may produce an effluent that meets desired water quality standards. An anaerobic unit can serve to equalize any periodic slug loads from confinement feeding operations and can provide for partial degradation, solubilization, and gasification of organic matter. The aerobic unit can provide aerobic stabilization of the soluble and remaining particulate matter in the aerobic unit effluent. Additional units for removal of the biological solids in the

effluent may be necessary in certain cases. Such combination systems can be useful when animal wastes cannot be distributed upon the land.

Oxidation Ditches: In the oxidation ditch process, wastes are either dropped directly into the ditch or pumped into the ditch. The wastes then serve as a substrate for microbial decomposition. The wastewater slurry is mixed and oxygenated by a continuously operating mechanical surface rotor that keeps the wastes circulating so that the solids are kept in suspension. (Proceedings of National Symposium on Animal Waste Management, EPA, September 1971.) It also supplies the necessary oxygen for aerobic bacteria to work. Oxidation ditches do tend to foam, and large undigested materials tend to settle out, sometimes restraining the flow in the ditch.

Composting: The composting of dairy manure where the stacks are either stirred or air is forced through them by blowers can be an effective method of disposal but is not problem-free. In the early stages of composting when the waste is still moist, fly attraction can be a nuisance. If handled properly, composted manure is easily adapted to bulk handling and improves the usefulness and acceptability of the product by eliminating offensive odors and fly attraction. Manure can then be reused for bedding, sold for humus, or transferred to fields for use as fertilizer.

2.2.2 WASTE DISPOSAL

Liquid Handling: After the various types of treatment as outlined above, there is still a problem of how to handle the liquid effluent. Waste liquids can vary from 75-140 gallons per cow per day, depending on individual practices, e.g., size of washing areas, use of sprinklers, etc. Liquid disposal on land, together with liquid holding ponds, provides for flexible application of liquid manure. A typical system for converting liquid manure into usable fertilizer consists of a standpipe, into which the liquid manure is discharged, which also receives irrigation water. This dilutes the manure into a slurry that is then distributed to the fields. Slurry is used to irrigate in two ways: (1) gravity flow distribution on the surface; and (2) injection by mechanical means under the surface. Surface spreading has two objectionable effects, potential for odors and the potential for runoff. The injection method eliminates the potential for these impacts but cannot be used in wet weather or when the fields contain crops.

Land Disposal: Manure is one of the most logical additives to build and maintain fertile soils. Significant amounts of basic plant nutrients are present in manure and the organic matter in livestock manure improves soil tilth, increases water-holding capacity, lessens wind and water erosion, improves aeration of the soil, and has a beneficial effect on the soil micro-organisms. (Manure Waste Ponding and Field Application Rates, J.L. Meyer, March 1973.) When the manure is added to crop lands, the nitrogen (N) content is subjected to the same reactions as the N from commercial fertilizers. These reactions include mineralization, absorption by crops, nitrification, and denitrification or leaching. If not properly managed, manure storage areas can generate point sources of excessive salts and nitrates into groundwater. Also, excessive addition

of manure can increase nitrogen and salt content in soil and groundwater to levels injurious to crops and human and animal health.

Appendix C to this document contains a table that is an excerpt from the *Western Fertilizer Handbook* (1995) listing plant food utilized by various crops.

2.3 SOIL LOADING CAPACITIES

A common denominator for calculating the amount of nutrient matter that can safely be applied to crop areas is the "animal unit". In Tulare County, one mature cow (1,400 pounds) represents one animal unit. An "Animal Unit" is the feed equivalent of one milk cow, as follows:

<u>Classification</u>	<u>Animal Units per Head</u>
Dairy cows in milk and bulls	1.00
Dry cows and heifers more than two years of age	0.75
Heifers one year to two years (beef or dairy)	0.70
Heifers three months to one year (beef or dairy)	0.40
Calves to three months of age	0.17
Beef cows in milk and feedlot steers	0.75

It is acknowledged that other agencies/jurisdictions use an animal use equivalent of 1,000 pounds. For this reason, the following conversion table is provided:

	1,400 lb. AU	1,000 lb. AU	Lbs.
1 mature cow, bull or steer	1.00	1.40	1,400
1 dry cow	0.75	1.20	1,200
1 heifer (1 – 2 years)	0.70	1.10	1,100
1 heifer (3 months to 1 year)	0.40	0.50	500
1 calf (under 3 months)	0.17	0.15	150

(Reference: 40 CFR 122, Appendix B)

The discussion below provides the assumptions and references utilized for determining an acceptable range for soil loading capacity based on nitrates and salts. This information is taken from reports prepared by a dairy subcommittee of the Agricultural Advisory Committee and by Dr. Tom Shultz, U.C. Cooperative Extension, Dairy Advisor for Tulare County. These reports are provided in submitted form in Appendix R.

Based on scientific data provided by the University of California Cooperative Extension Service staff, the Dairy Subcommittee of the Tulare County Agricultural Advisory Committee, in April 1998, prepared the following for determining acceptable animal units per crop acre:

Different classes of livestock produce nitrogen in manure at different amounts or rates; the classes of livestock used are milk cow, dry cow and heifer. Table values for nitrogen excretion is often expressed on a 1,000 lb. AU basis (ASAE, 1992; MWPS-18, 1985). Today's average milk cow in the southern San Joaquin Valley is better represented at a weight of 1,400 lbs. (D. Bath, 1993; H. H. Van Horn/ C. J. Wilcox, 1992). With today's modern rations, higher producing cows, and intensive management systems, average nitrogen produced is estimated at 0.80 lbs/day, 0.45 lbs/day, and 0.225 lbs/day for milking cows, dry cows, and replacement heifers, respectively (D. Bath, 1993; H. H. Van Horn/ C. J. Wilcox, 1992).

Volatilization of ammonia from manure represents a 50 percent loss from the point of excretion to the ground (MWPS-18, 1985; J. Meyer/R. Rauschkolb/ E. Olson, 1976; D. Vanderholm, 1975). Corral management systems result in different levels of nitrogen volatilization loss. The two standard management systems in the Southern San Joaquin Valley are Open Corral and Free Stall, which have nitrogen retention coefficients of 60 percent and 80 percent, respectively. (MWPS-18, 1985; D. Vanderholm, 1975) A higher coefficient for Free Stall systems is attributed to the fact that cows spend more time in the free stalls, resulting in a greater amount of manure being collected and flushed into the lagoon systems.

Nitrogen (N) loss in recycling ponds is dependent on storage duration and management with a range of losses reported from 30 percent to 80 percent. (J. Meyer/R. Rauschkolb/ E. Olson, 1976; D. Vanderholm, 1975) Nitrogen loss has been determined to be 30 percent for storage duration of <30 days; 40 percent for storage duration of 30-60 days; and 50 percent for storage duration >60 days. Recycled N removal by crops has been determined to typically be 250 lbs. N per acre for a single crop rotation to be 350 lbs. N for a double crop rotation. (California Fertilizer Association, 1995) The Natural Resources Conservation Service (NRCS) allows 425 lbs. of N for a double crop rotation if evidence of maximum yields is provided. However, RWQCB limits AU/ac for total salts to 2,000 lbs./ac/yr. for single crop and 3,000 lbs. for double cropping (for salt production calculations use 1.8 lb/day/1,400 AU, not including N). (Tom Shultz, U.C. Cooperative Extension 1999)

Based on scientific data provided by the University of California Cooperative Extension staff, dairy manure salt guidelines are as follows:

The figures and references are compiled to assist in preparing only guidelines on manure nutrient utilization. Site specific physio-chemical information of soil types and irrigation water, as well as crop production history and proposed cropping patterns, should be supplied to more accurately determine the animal unit capacity in a given dairy permit application. Regardless of which guidelines are used, the correct and accurate labeling of factors in the calculations are essential. The following information is offered to reduce misinterpretations.

Daily elemental form of salts (atomic weight of mineral \div atomic weight of the compound containing the mineral i.e., potassium oxide), excluding nitrogenous fractions, equals .926 lbs./1,000 lb. animal unit (AU). Nitrogenous fractions listed are 0.45 lb./1,000 lbs. AU/day total Kjeldahl nitrogen (TKN) that includes 0.08 lb. ammonia nitrogen. (ASAE, 1992)

Conversions: 0.926×1.4 (1,400 lb. cow) = 1,296 lbs. elemental salts (without nitrogen) and $0.45 \times 1.4 = 0.63$ lbs. N fraction for a 1,400 lb. dairy cow AU.

Average total potential salts/1,400 lb. cow daily (excluding nitrate) for typical Chino, San Joaquin Valley and Northern California rations equaled 1.8 lbs. compound form salts and the elemental form salts (without N) equaled 1.296 lbs. Total N was listed at 0.79 lbs./1,400 lb. dairy cow. (Meyer, J. et al, 1973)

Conversions: $1.296 \div 1.4$ AU = 0.926 lbs. elemental form salts for 1,000 lb. AU. 0.79 lbs. N/1,400 lb. AU $\div 1.4 = 0.56$ lb. N/1,000 AU.

Salts are given as 1.5 lbs./1,000 lb. AU/day in "Fixed Solids" (600°C residue) and 0.45 lb. elemental N. (USDA-SCS [now USDA-NRCS], 1992)

Conversions: $1.5 \times 1.4 = 2.1$ lb. compound form salts/1,400 lb. AU
 $0.45 \times 1.4 = 0.63$ lb. N/1,400 lb. AU

In Merced County the RWQCB uses the chemical element guidelines (ASAE) on a 1,000 lb. AU basis. The RWQCB uses the mineral compound version (UCCE) on a 1,400 lb. AU in Tulare and Kings counties. The above conversions show they are essentially the same, when properly converted into an equivalent basis. However, misinterpretation can result if erroneously quoted or not correctly converted. The mineral compound, i.e., phosphate, oxide, etc., version appears more readily applicable to field situations.

RWQCB, Fresno office, guidelines for manure salts and N uptake by plants from double cropped land are 3,000 lbs. and 425 lbs. respectively/acre/year. The average used for single cropping is 2,000 lbs. compound form salts and 250 lbs. of N/acre/year. These figures are based on 1.8 lbs. 1,400 AU/year of compound

form salts. The figures are derived from UCCE references on salt loading data and N needs from the Western Fertilizer Handbook.

Regardless if nutrient loading is based on ASAE and 1,000 lb. AU or UCCE and 1,400 lb. AU, the acres needed for recycling manure should be similar. Since N can volatilize and in large part salts do not, the first limiting factor will be salts. Subtracting volatilized N will allow two 1,400 lb. AU more /acre than would salts at higher AU/crop acre densities. Higher yields and variable salt uptakes by selective plants may reduce the difference. This could be verified by appropriate tests.

Both the ASAE and NRCS publications state that whenever locally derived values for animal waste are available, this information should be given preference over the more general data in these publications. Also, including phosphorous in local manure salt guidelines restrictions is questioned if adding inorganic fertilizer is needed to meet plant requirements. Proper sampling and replication of testing are needed for justification of any site specific variations. These procedures are outlined in UCCE Dairy Manure Management Series #3.

Table 2.3-1 shows the range of maximum animal units per crop acre based on salt loading with different scenarios based on dairy design, cropping patterns, and solid manure disposal. Table 2.3-2 shows the range of maximum animal units per crop acre based nitrogen content of manure and manure water for different scenarios based on dairy design, cropping patterns, and length of time effluent left in ponds. Tables 2.3-3 and 2.3-4 provide sample calculations for nitrogen content for open corral and free stall designs, respectively.

Table 2.3-1
SALTS LOADING ANIMAL DENSITY

<u>Animal Housing Type</u>	<u>Cropping Program</u>	<u>Solids Discharge Method/Location</u>	<u>Max. AUs per Crop Acre *</u>
Open corral (all)	Double	Off site (100%) }	7.61
Open corral (all)	Single	Off site (100%) }	5.07
Open corral (all)	Double	On site (100%) }	4.56
Open corral (all)	Single	On site (100%) }	3.04
Free stall & Open corral	Double	Off site (100%) }	5.71
Free stall & Open corral	Single	Off site (100%) }	3.80
Free stall & Open corral	Double	On site (100%) }	4.56
Free stall & Open corral	Single	On site (100%) }	3.04

(*See Above Text for Deviations from Maximum for Salts)

ASSUMPTIONS for Scenarios between Upper and Lower Parameters:

Open Corral-Double Crop-Solids Off-site = 7.61 AU x 1.8 lb. salts/AU x 365 days x 60% retained = 3,000 lbs. salts

Open Corral-Single Crop-Solids Off-site = 5.07 AU x 1.8 lb. salts/AU x 365 days x 60% retained = 2,000 lbs. salts

Open Corral-Double Crop-Solids On-site = 4.56 AU x 1.8 lb. salts/AU x 365 days x 100% retained = 3,000 lbs. salts

Open Corral-Single Crop-Solids On-site = 3.04 AU x 1.8 lb. salts/AU x 365 days x 100% retained = 2,000 lbs. salts

Free Stalls-Double Crop-Solids Off-site = 5.71 AU x 1.8 lb. salts/AU x 365 days x 80% = 3,000 lbs. salts

Free Stalls-Single Crop-Solids Off-site = 3.80 AU x 1.8 lb. salts/AU x 365 days x 80% = 2,000 lbs. salts

Free Stalls-Double Crop-Solids On-site = 4.56 AU x 1.8 lb. salts/AU x 365 days x 100% = 3,000 lbs. salts

Free Stalls-Single Crop-Solids On-site = 3.04 AU x 1.8 lb. salts/AU x 365 days x 100% = 2,000 lbs. salts

Table 2.3-2
Summary of Animal Units Per Crop Acre

Animal Housing Type	Cropping Program	Solids Disposal Method/Location	Maximum A.U.s per crop acre		
			50% ^m	60% ⁿ	70% ^p
Open Corral (all)	Double	100% off site	9.71	8.13	6.71
	Single	100% off site	6.94	5.78	4.98
	Double	100% on site	5.85	4.85	4.17
	Single	100% on site	4.17	3.47	2.98
Free stall milk cows	Double	100% off site	7.81	6.54	5.59
Dry cows & heifers	Single	100% off site	5.59	4.65	4.00
Open corral	Double	100% on site	5.85	4.85	4.17
	Single	100% on site	4.17	3.47	2.98

^m Effluent in lagoon 60 days or more

ⁿ Effluent in lagoon 30 to 60 days

^p Effluent in lagoon 30 days or less

Table 2.3-3
EXAMPLE: OPEN CORRAL

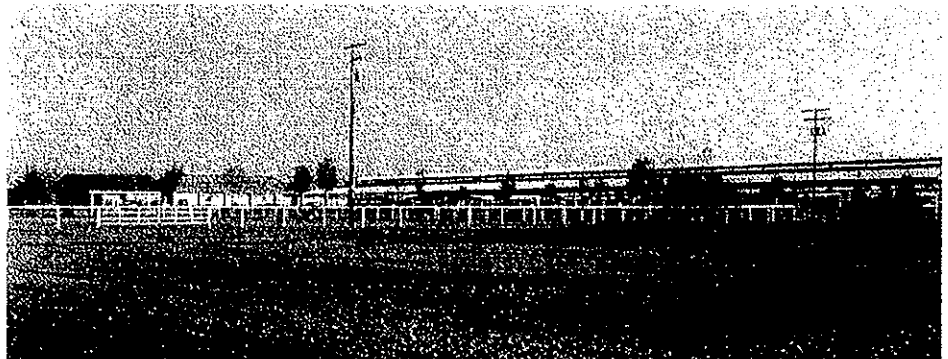
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Milk Cows	600	X .80	X .50	X .60	X 365	=52560				
Dry Cows	102	X .45	X .50	X .60	X 365	= 5026				
Heifers	582	X .225	X .50	X .60	X 365	=14339				
						71925	X .70			= 50348
						71925		X .60		= 43155
						71925			X .50	= 35963
Double crop			50348/350			= 149 acres			6.71 AU/ac	
Solids off site			43155/350			= 123 acres			8.13 AU/ac	
			35963/350			= 103 acres			9.71 AU/ac	
Single crop			50348/250			= 201 acres			4.98 AU/ac	
Solids off site			43155/250			= 173 acres			5.78 AU/ac	
			35963/250			= 144 acres			6.94 AU/ac	
Double crop			83913/350			= 240 acres			4.17 AU/ac	
Solids on site			71925/350			= 206 acres			4.85 AU/ac	
			59938/350			= 171 acres			5.85 AU/ac	
Single crop			83913/250			= 336 acres			2.98 AU/ac	
Solids on site			71925/250			= 288 acres			3.47 AU/ac	
			59938/250			= 240 acres			4.17 AU/ac	

Column 1	Classification
Column 2	No. of head
Column 3	Lbs. N secreted per head per day
Column 4	% volatilization in corral/feed area
Column 5	% of excretion recovered in lagoon
Column 6	days per year
Column 7	Lbs. N into lagoon
Column 8	% N left after denitrification in lagoon up to 30 days
Column 9	% N left after 30 to 60 days in lagoon
Column 10	% N left after 60 or more days in lagoon
Column 11	Lbs. N from the lagoon annually

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CHAPTER 3: POLICIES AND STANDARD CONDITIONS

CHAPTER 3

POLICIES AND STANDARD CONDITIONS

The following policies apply to dairies and other bovine animal confinement facilities for which a special use permit is required under the Tulare County Zoning Ordinance. In applying these policies, the following definitions are to be referenced:

Animal Confinement Facility: Where used, the term "animal confinement facility" includes animal barns, corrals, or pens; feed (excluding hay barns) and manure storage and handling areas; and wastewater lagoons/sumps. When measuring setbacks and distances between animal facilities, measurements shall be taken from or between the most proximate part of the above-described facilities. Areas used for crop production or not otherwise utilized in the production of animals shall not be included for purposes of determining said setbacks and distances.

Bovine Animal: Dairy and beef cattle and/or other similar ox-like animals.

Crop Acreage: Irrigable portion of the total/gross subject parcel(s), including wastewater conveyance ditches, that is to be used for wastewater discharge and which excludes buildings, corrals and/or pens, feed and/or manure storage areas, lagoons/sumps, canals, waterways, and public road rights-of-way.

Animal Unit: A common animal denominator, based on feed consumption, whereas one mature cow (1,400 pounds) represents one animal unit, as defined by the Regional Water Quality Control Board. An "Animal Unit" is the feed equivalent of one milk cow, as follows:

<u>Classification</u>	<u>Animal Units per Head</u>
Dairy cows in milk and bulls	1.00
Dry cows and heifers more than two years of age	0.75
Heifers one year to two years (beef or dairy)	0.70
Heifers three months to one year (beef or dairy)	0.40
Calves to three months of age	0.17
Beef cows in milk and feedlot steers	0.75

Animal Units for other animals on site will be calculated according to Regional Water Quality Control requirements.

3.1 LOCATIONAL AND ANIMAL DENSITY POLICIES:

1. A new dairy site shall contain at least 160 acres (gross). Other new animal confinement facility sites shall contain at least 80 acres (gross).
2. The density of animals on a dairy/confined animal raising facility shall be limited to the number whose production of wastes (Nitrogen, salts and other minerals)

can be utilized by the crops grown on site or transported off site for beneficial use in a way that does not create a pollution problem. Each dairy or other animal confinement facility should have its own liquid manure discharge area; if however, sharing of discharge areas is necessary, the combined nutrient loading on the discharge area shall be within the range of parameters for discharge as reflected in the Table shown below. Plans shall be submitted that: (1) demonstrate that liquid manure and solid manure can be evenly distributed over the entire crop acreage; (2) detail the number of acres of cropland, crops to be grown, and amount of doubled cropped acreage; (3) indicate the amount of liquid manure and solid manure to be disposed of off site and the intended use of said manure; and (4) identify any off-site discharge area for recycled lagoon water available through a recorded easement [NOTE: any off-site land proposed for discharge of liquid manure water must be dedicated for such purpose through a recorded easement in a form acceptable to the County]. Ultimately, the number of animals allowed on a project site shall be based on nitrogen and salt loading rates so that onsite wastewater (including precipitation and drainage) and manure are discharged or applied to crop lands at rates of application that are appropriate for the crop, soil, climate, special local situations, management system, and type of waste product. The Regional Water Quality Control Board shall determine the adequacy of loading rate plans to assure the preceding.

The following tables set forth the range of parameters for the maximum allowable Animal Units per Crop Acre for different dairy/animal confinement facility development and operating scenarios (depending on animal housing type and solid wastes disposal method/location) that may be utilized for individual facilities. Salts content in manure and manure water is considered the first limiting factor. Values are based on current RWQCB daily allowance of 1.8 lbs. compound form Salts per 1,400 lb. AU and single and double crop plan uptake of 2,000 and 3,000 lbs. compound Salts respectively per acre yearly.

The Salts Loading Animal Density Table (which generally requires a lower density than the Nitrogen Loading Animal Density Table shown below the Salts Table) will be used to establish the maximum animal units per crop acre for new and expanded dairies and other animal confinement facilities. However, if mitigation measures can be demonstrated to the decision making body (with assistance from the University of California Cooperative Extension and/or the Regional Water Quality Control Board), then deviations from the requirements of the Salts Loading Table can be considered. Such deviations shall be based on a management plan (Salts Loading Report) which demonstrates how a proposed animal facility can avoid salts over-loading of the available crop acreage beyond that shown in the Salts Loading Table. If the decision-making body determines that salts over-loading can be adequately mitigated to avoid salts buildup in groundwater and soils, then the Nitrogen Loading Animal Density Table below can be used to determine the animal confinement facility's maximum animal units per crop acre.

Acceptable salts loading factors could be achieved beyond that listed in the Salts Loading Animal Density Table based on a facility's site specific and operational factors including soil types, irrigation water, crop production history and proposed cropping types and patterns, manure and sludge use and removal, and any accepted technology proposed to further control potential salts loading (refer to Animal Waste Utilization pages 10.1 and 10.2 as cited in Appendix O). These variables are to be documented in a Salts Loading Report to be submitted with applications for use permits for dairy or other animal confinement facilities. Deviations from the Salts Loading Animal Density Table can be permitted by showing that the additional salts generated by an animal facility are being utilized in a beneficial way and/or are being reduced by accepted technology.

SALTS LOADING ANIMAL DENSITY TABLE

<u>Animal Housing Type</u>	<u>Cropping Program</u>	<u>Solids Discharge Method/Location</u>	<u>Max. Anima Units per Crop Acre *</u>
Open corral (all)	Double	Off site (100%) }	7.61
Open corral (all)	Single	Off site (100%) }	5.07
Open corral (all)	Double	On site (100%) }	4.56
Open corral (all)	Single	On site (100%) }	3.04
Free stall & Open corral	Double	Off site (100%) }	5.71
Free stall & Open corral	Single	Off site (100%) }	3.80
Free stall & Open corral	Double	On site (100%) }	4.56
Free stall & Open corral	Single	On site (100%) }	3.04

(*See Above Text for Deviations from Maximum for Salts)

ASSUMPTIONS for Scenarios between Upper and Lower Parameters:

Open Corral-Double Crop-Solids Off-site = 7.61 AU x 1.8 lb. salts/AU x 365 days x 60% retained = 3,000 lbs. salts
 Open Corral-Single Crop-Solids Off-site = 5.07 AU x 1.8 lb. salts/AU x 365 days x 60% retained = 2,000 lbs. salts
 Open Corral-Double Crop-Solids On-site = 4.56 AU x 1.8 lb. salts/AU x 365 days x 100% retained = 3,000 lbs. salts
 Open Corral-Single Crop-Solids On-site = 3.04 AU x 1.8 lb. salts/AU x 365 days x 100% retained = 2,000 lbs. salts

Free Stalls-Double Crop-Solids Off-site = 5.71 AU x 1.8 lb. salts/AU x 365 days x 80% = 3,000 lbs. salts
 Free Stalls-Single Crop-Solids Off-site = 3.80 AU x 1.8 lb. salts/AU x 365 days x 80% = 2,000 lbs. salts
 Free Stalls-Double Crop-Solids On-site = 4.56 AU x 1.8 lb. salts/AU x 365 days x 100% = 3,000 lbs. salts
 Free Stalls-Single Crop-Solids On-site = 3.04 AU x 1.8 lb. salts/AU x 365 days x 100% = 2,000 lbs. salts

The following table sets forth the range of parameters for the maximum allowable Animal Units (A.U.s) per Crop Acre for different dairy/animal confinement facility development and operating scenarios that may be utilized for individual facilities, based on Nitrogen content in manure and manure water. This table can be used to calculate an animal facility's maximum allowable animal density only if the decision-making body determines that salts overloading can be adequately mitigated as set forth in the preceding provisions of this Policy.

NITROGEN LOADING ANIMAL DENSITY TABLE

<u>Animal Housing Type</u>	<u>Cropping Program ♣</u>	<u>Solids Discharge Method/Location</u>	<u>Maximum Animal Units Per Crop Acre</u>		
			50% N ♦	60% N ♦	70% N ♦
Open Corral (all)	Double	Off site (100%) }	9.71	8.13	6.71
Open Corral (all)	Single	Off site (100%) }	6.94	5.78	4.98
Open Corral (all)	Double	On site (100%) }	5.85	4.85	4.17
Open Corral (all)	Single	On site (100%) }	4.17	3.47	2.98
Free stall & Open Corral ♥	Double	Off site (100%) }	7.81	6.54	5.59
Free stall & Open Corral ♥	Single	Off site (100%) }	5.59	4.65	4.00
Free stall & Open Corral ♥	Double	On site (100%) }	5.85	4.85	4.17
Free stall & Open Corral ♥	Single	On site (100%) }	4.17	3.47	2.98

ASSUMPTIONS for Ratios for Scenarios between Upper and Lower Parameters:

♥ Free stall = 60% milk cows and Open corral = 40% support stock ♥

♣ Double cropping based on 350 pounds of Nitrogen utilized per acre and Single cropping based on 250 pounds of Nitrogen utilized per acre (Double crop = 1.4 x Single crop) ♣

♦ Percentage of Nitrogen remaining = function of the number of days wastewater has been in the lagoon [>60 days in lagoon = 50% N remains; 30-60 days in lagoon = 60% N remains; <30 days in lagoon = 70% N remains] ♦

However, in all cases, the maximum total animal density on the dairy site shall not exceed ten (10) animal units per crop acre, and the maximum density of cows in milk on site shall not exceed eight (8) animal units per crop acre. For confined animal facilities other than dairies, the maximum on-site density shall not exceed ten (10) animal units per crop acre.

3. New dairy and other animal confinement facilities (animal barns, corrals, and pens; wastewater lagoons/sumps; manure and feed storage areas excluding hay barns) shall be located at least one-half mile (2,640 feet) from the nearest dairy, swine, poultry, or other animal confinement facility. These separations are required to avoid potential nuisance problems, disease transmission, soil and groundwater contamination, and air quality degradation.

Expansions of legally-established dairies or other legally established animal confinement facilities that do not meet the one-half mile separation may be permitted provided that any new facilities do not encroach any closer than the

existing facilities. Consideration of such expansions shall be on a case-by-case basis through the special use permit process; however, in no instance shall the degree of nonconformity of the separation encroachment be increased.

4. A new dairy or other animal confinement facility shall not be located as follows:
- within any Windshed Area for incorporated and unincorporated communities or within the Windsheds for areas zoned for residential use and containing at least thirty (30) legally-established dwelling units (for which the Windshed Area shall be measured from the outermost residential zoning boundary) — a 'Windshed Area' is defined as a one-mile setback from an incorporated or unincorporated community's Urban Area Boundary (however, for those communities that have an Urban Development Boundary but do not have an Urban Area Boundary, the Urban Development Boundary line shall be used) or urban-type residential zoning boundary line;
 - within primary floodplains;
 - within 1000 feet of the boundary of a public park;
 - in sink holes or areas draining into sink holes; or
 - within one-half mile (2640 feet) of school grounds or of the nearest point of a dwelling structure in a concentration of ten (10) or more occupied private residences [to qualify as a 'concentration', such residences must be legally established, occupied, located within a contiguous area, and exceed a density of one dwelling unit per acre, excluding travel trailers]. As used herein, 'legally established' residences are defined as residences "established in accordance with all applicable building and zoning regulations".

[NOTE: The Community Windshed shall not apply where the decision-making body determines that a portion of a community's Urban Area Boundary has been expanded to include municipal uses such as sewage treatment facilities, airports, and waste disposal sites that are located well beyond the city's Urban Development Boundary. In such cases, the decision-making body shall determine the location of the Community Windshed area; however, in no instance shall a Community Windshed setback of less than one mile be allowed from a community's Urban Development Boundary.]

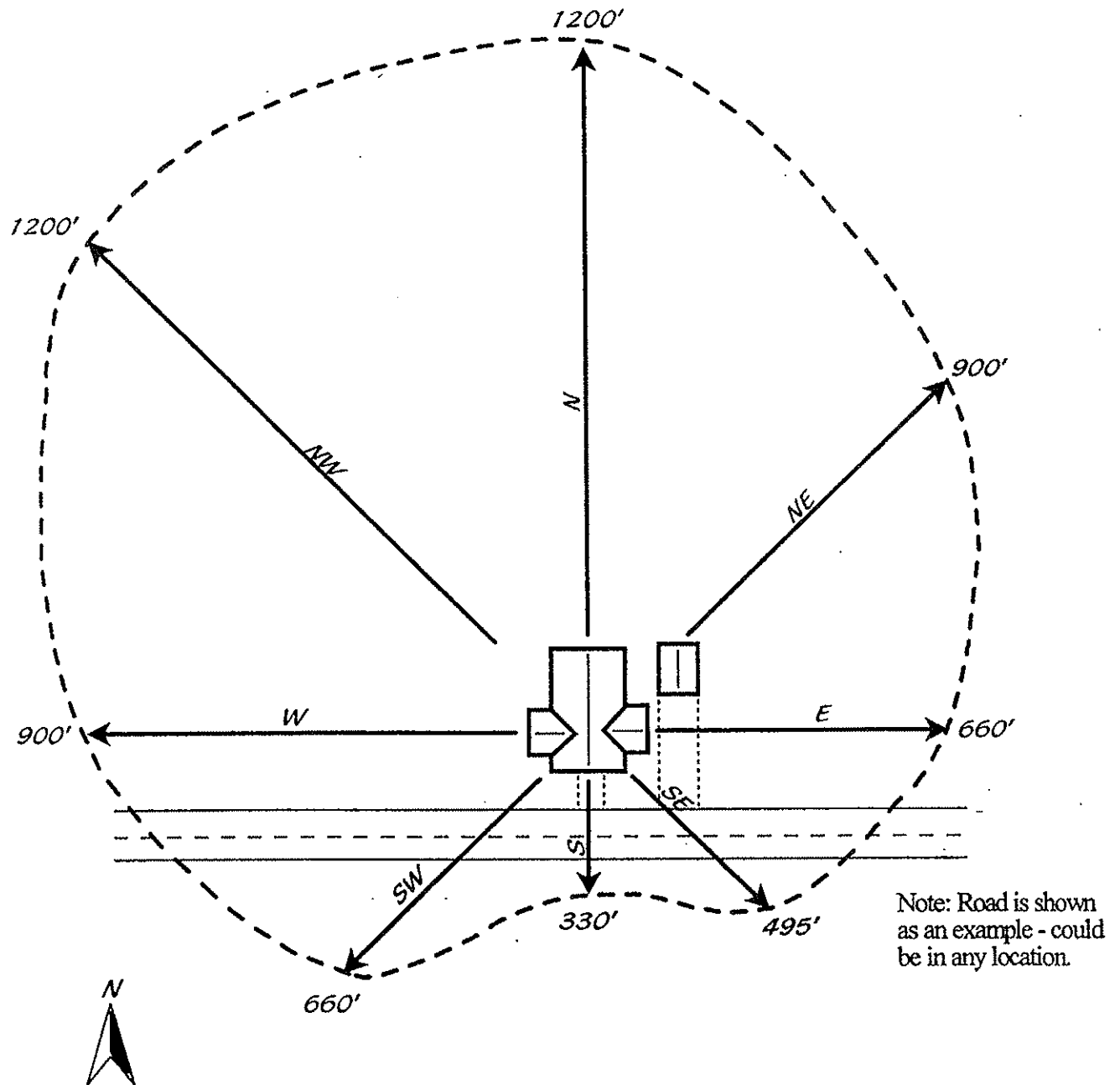
5. A new dairy or other animal confinement facility shall not be located closer than the distances shown on Micro-Windshed Diagram "A" (Residential) to an occupied dwelling owned by a property owner other than the animal confinement facility site owner/operator or employee.

A new dairy or other animal confinement facility shall not be located closer than the distances shown on Micro-Windshed Diagram "B" (Agricultural) to an established citrus grove, vineyard, deciduous fruit/nut orchard, or vegetable agricultural enterprise.

6. These above regulations shall not apply to the repair, maintenance, replacement, and upgrading of a legally-existing dairy or other animal confinement facility, provided that such work does not increase the animal capacity of the facility.
7. Expansions of existing legal nonconforming dairies or other existing legal nonconforming animal confinement facilities that do not meet the policies set forth above will be considered on a case-by-case basis, subject to the Special Use Permit process, provided that the degree of nonconformity is not significantly increased. However, no expansions of existing dairy or other animal confinement facilities shall be approved unless the whole dairy under permit meets the density standards set forth in Policy No. 2 above.
8. Deviations from the animal density standards set forth in Policy No. 2 and the Micro-Windshed criteria in Policy No. 5 above may be allowed on a case-by-case basis provided that (a) The animal facility proposal meets Policies No. 1, 3, and 4 above; and (b) a more detailed environmental review (for example, an EIR) demonstrates that the proposed change(s) from Policy No. 2 and No. 5 will clearly have no environmental effects that cannot be mitigated to a level which is less than significant. However, in no instance shall the maximum total onsite animal density for any dairy or animal confinement facility ever exceed ten (10) animal units per crop acre, nor shall the maximum density of cows in milk onsite ever exceed eight (8) animal units per crop acre.

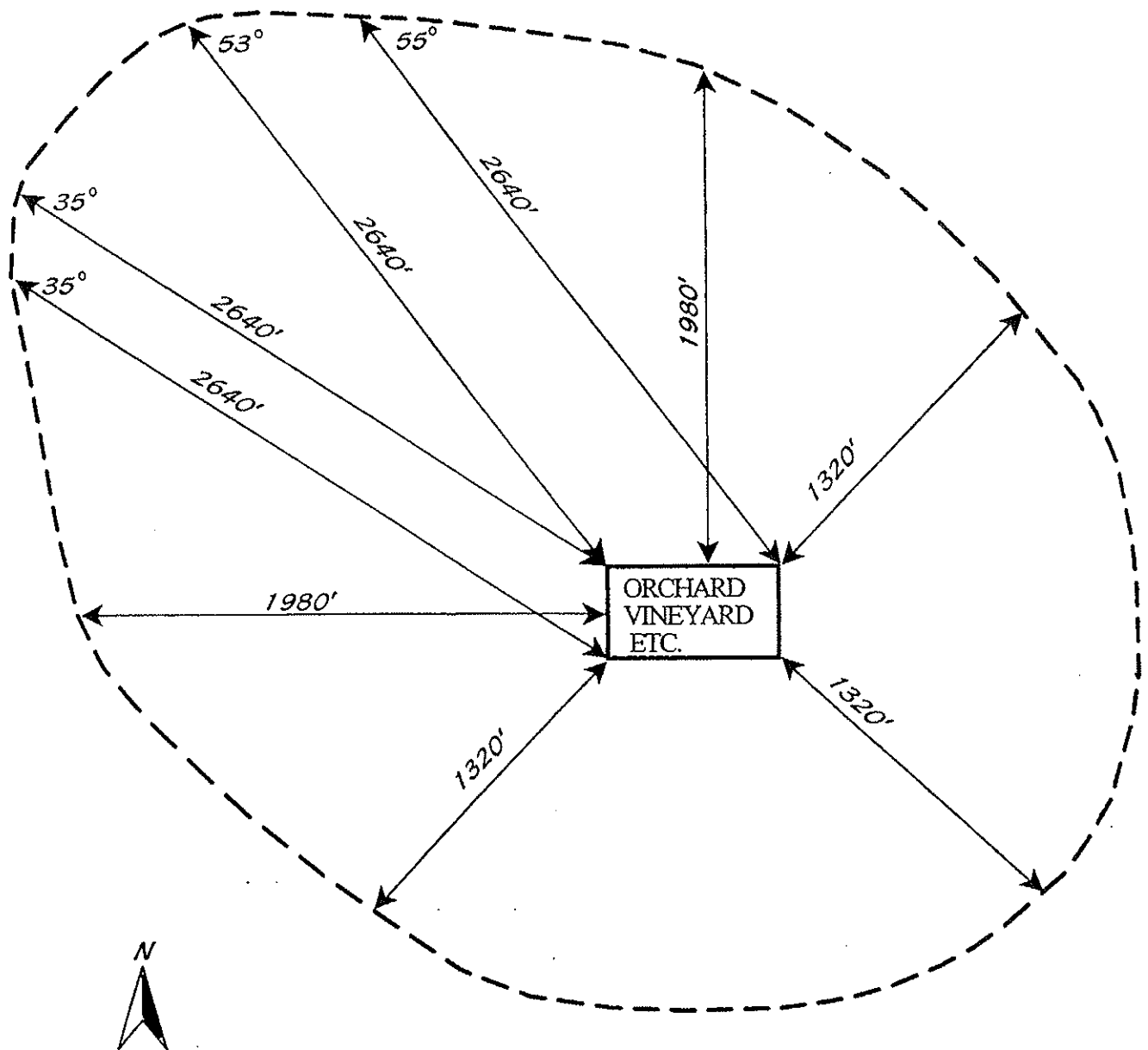
In addition, no deviations from the Micro-Windshed distances set forth in Policy No. 5 above (from an offsite residence or from a tree crop or vineyard operation) may be approved unless the owner of the residence or agricultural operation agrees in writing to the deviation.

MICRO-WINDSHED DIAGRAM 'A'



Measurements are to be made from the geometric center of the dwelling to the nearest part of the subject confined animal facility.

MICRO-WINDSHED DIAGRAM 'B'



Measurements are to be made to the nearest edge of the affected orchard/vineyard/etc from the nearest part of the subject confined animal facility.

3.2 COMPLIANCE AND MONITORING POLICIES:

Pursuant to the need for addressing grandfathered facilities as well as establishing a monitoring and enforcement program, the following policies shall apply to all dairies and other animal confinement facilities in the county:

1. An Annual Compliance Report (in a form established by Ordinance) shall be completed and filed with the appropriate County agency for every confined animal facility in Tulare County. [Appendix D to this document contains a proposed Annual Compliance Report.]
2. Compliance inspections shall be conducted on at least 20 percent of dairies each year with priority given to inspecting those dairies that did not submit an Annual Compliance Report, those dairies that exceed their permitted or grandfathered animal density, and other dairies as determined by Ordinance. Every dairy shall be inspected at least once every five years.
3. All dairies shall be subject to Policy No. 2 (re: animal density) of the new "Locational and Animal Density Policies" and shall be brought into compliance with said Animal Density Policy No. 2 within a reasonable period of time as established and implemented by Ordinance. Existing legal nonconforming dairies or other existing legal nonconforming animal confinement facilities that do not meet the other Dairy/Animal Confinement Facility Policies will be considered on a case-by-case basis, subject to the Special Use Permit or equivalent permitting process.
4. A streamlined administrative permitting procedure shall be developed to facilitate the permitting of legal nonconforming or grandfathered animal facilities.
5. The Dairy/Animal Confinement Facility Policies adopted herein shall be reviewed by the Agricultural Advisory Committee or other entity designated by resolution of the Board of Supervisors, every two years, or as needed, to determine if modifications and/or updating are necessary. The Committee or successor shall then forward a written report to the Tulare County Board of Supervisors.
6. An annual report shall be filed by the RMA with the Planning Commission and the Agricultural Advisory Committee which compiles the Annual Compliance Reports required under Policy No. 1 above and the CEQA-required Mitigation Monitoring & Reporting Program adopted for the Program EIR. The primary purpose of the annual report is to address animal facilities' compliance with the Animal Confinement Facilities Plan, to identify problems and proposed solutions (such as new regulations). In addition, the report should disclose any relevant new technology or industrial advancements that could result in the need to revise policies and/or mitigation measures of the ACFP/PEIR.

3.3 STANDARD CONDITIONS OF APPROVAL

Listed below are suggested conditions of approval for applications for Special Use Permits for dairies and other bovine animal confinement facilities. Conditions may be added and/or deleted prior to or during the course of the public hearing on specific applications. (After each, the agencies requiring the condition are listed in parentheses.)

1. The dairy site shall consist of _____ acres (gross). There will be _____ acres available for distribution of nutrient-laden irrigation water discharged from the dairy facility. At least _____ acres will be double cropped annually and _____ acres will be single cropped annually. The permittee shall provide adequate distribution facilities to deliver recycled lagoon water to the crop acreage and shall make all reasonable efforts to apply manure and recycled lagoon water to crop land at rates which are reasonable for the crop, soil, climate, special local situations, management system, and type of manure.

The total animal units on the dairy site shall not exceed _____. The number of milk cows on site shall be limited to _____ head. [Tulare County Resource Management Agency (RMA)]

{NOTE: Notwithstanding this condition, which is in conformance with Tulare County's animal density policies, the Regional Water Quality Control Board may limit the dairy operation to a lower maximum herd size than is approved under this Special Use Permit or require other adjustments (such as additional acreage) which could require amendment to the special use permit.}


Animal units shall be calculated (based on a common denominator of one animal unit equals a 1,400 pound animal) as follows:

1 cow or bull	= 1.00 animal unit
1 heifer or steer (2 years and up)	= 0.75 animal unit
1 heifer or steer (1-2 years)	= 0.70 animal unit
1 heifer or steer (3 months to 1 year)	= 0.40 animal unit
1 calf (up to 3 months)	= 0.17 animal unit

- 1.A. Cropping patterns and disposal of manure shall be such as to maintain this facility in conformance with the animal density parameters set forth in Policy No. 2 of the Tulare County Dairy/Animal Confinement Facility Policies as adopted pursuant to the Animal Confinement Facilities Plan.
2. The dairy operation is subject to the requirements contained in the California Code of Regulations, Title 27 – pertaining to “Confined Animal Facilities”, as administered by the Regional Water Quality Control Board (RWQCB). The applicant shall submit a completed application, technical reports, and any required filing fee to the RWQCB prior to issuance of any building permits and at least 120 days prior to discharge. A copy of the material shall be submitted to the

Code Compliance Coordinator at the time of submittal to RWQCB. Unless good cause is shown, failure to submit the material in the required time may result in immediate notification sent to the RWQCB and a recommendation to the Planning Commission for initiating the process of revocation of this Use Permit. (RWQCB, RMA)

3. Sufficient on-site parking shall be provided for all cars and trucks. The parking area and the entrance roads shall be treated with an acceptable dust-retarding treatment so that dust and mud will not create conditions detrimental to the surrounding area and roads. Said treatment shall be maintained at all times. (RMA)
4. All drive approaches at driveways and major entrances to the improved portion of the site shall be constructed and surfaced as per the Tulare County Improvement Standards, and the applicant or his contractor shall obtain an encroachment permit from the Tulare County Resource Management Agency prior to issuance of any building permits for construction and/or prior to doing work within any County road right-of-way. (RMA)
5. All public road approaches, driveways and off-street parking areas shall be maintained so that mud, dust, gravel, and manure do not create conditions detrimental to the surrounding roadways. (RMA)
6. All grading activities, with the exception of minor grading incidental to driveway approach installation or grading otherwise exempt by Ordinance, shall be confined to areas on the project site which are set back a minimum distance of 100 feet from all adjacent property boundaries, including County road rights-of-way. {NOTE: Such grading within the prescribed 100-foot setback area may be considered agriculturally exempt from permit requirements under the Grading Ordinance.} (RMA)
7. The applicant shall make all arrangements for the relocation of all overhead and underground public utility facilities that interfere with any improvement work to be performed by the applicant. The applicant shall also make arrangements with the public utility company affected for the cost of relocating such facilities and no portion of relocation cost will be paid by the County. (RMA)
8. The facility shall meet the requirements of Division 15 of the Food and Agricultural Code, and Title 3 of the California Code of Regulations as administered by the Tulare County Milk Inspection Service. [Tulare County Environmental Health Division (TCEHD)]
9. The applicant shall provide detailed plans of the facility to the Milk Inspection Service for review and approval prior to issuance of any building permits. (TCEHD)

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10. All new wells shall comply with the construction requirements of the Tulare County Well Ordinance. (TCEHD)
 11. No well shall be located closer than 100 feet from any animal enclosure, nor shall such enclosure encroach within 100 feet of an existing well. (TCEHD)
 12. Inactive wells shall be properly destroyed in accordance with the Tulare County Well Ordinance. (TCEHD)
 13. All agricultural wells shall have an overhead air gap at the standpipes. (TCEHD)
 14. Lagoons shall meet a minimum 150 foot setback from all wells, public ditches, and public waterways. (TCEHD)
 15. Animal confinement areas, manure storage areas, lagoons, and crop lands shall be properly managed to prevent a nuisance of odors, dust, or vector harborage and breeding. (TCEHD)
 16. Lagoons shall be designed for maximum efficiency of recycled water disposal. Lagoons shall not be deeper than twenty (20) feet and shall maintain a minimum of ten (10) feet of separation from the highest recorded groundwater table. The lagoons shall not cause pollution of groundwater by meeting soil texture requirements of the RWQCB. Verification of final depth shall be provided by a certified engineer or appropriately licensed contractor to the RMA's Planning Compliance Coordinator, in the form of a written statement, prior to any discharge of any liquid into the lagoon and after a final inspection has been conducted. (TCEHD and RMA)
 17. All new sewage disposal systems shall meet all construction standards and minimum setbacks of 100 feet from all wells, ditches, and waterways. (TCEHD)
 18. No liquid waste material shall be discharged into any water-way that runs off the dairy site nor shall there be any pollution of same. (TCEHD and RWQCB)
 19. Lagoons shall provide capacity to hold 120 days accumulation of liquids. (RWQCB)
 20. A surfaced fire apparatus access, twelve (12) feet in width, shall be provided to within five (5) feet of the fresh water holding tank and the water pressure tank. (Fire Warden)
 21. A 30 inch by 30 inch hinged inspection cover shall be located on the fresh water holding tank. The inspection cover shall be located along the portion of the tank that fronts on the surfaced access. (Fire Warden)

Appendix L

The Economic Value of a Dairy in Tulare County in 2013 and 2023

J/D/G Consulting Inc.

The Jerry Dryer Group Inc.

THOUGHT LEADERS IN THE DAIRY FOODS BUSINESS

The Economic Value of Dairy In Tulare County (CA) in 2013 & 2023

**Prepared by
JDG Consulting Inc
Madison, WI & Delray Beach, FL
November 2014**

Introduction

Tulare County wants to determine “the present (2013) economic value of the dairy industry in Tulare County” including the direct, indirect and induced jobs that result from the dairy farms and processing plants located within the county.

Tulare County also wants to determine the likely economic value of the dairy industry in Tulare County in 2023, i.e, milk cow numbers, dairy farm numbers, etc.

JDG Consulting Inc is a team of dairy market analysts that was established in 1989. Prior experience includes having determined the economic impact of the California dairy industry statewide for the California Milk Advisory Board in three annual studies completed between 2000 and 2012.

Jerry Dryer, the president of JDG, has been actively tracking, analyzing and forecasting trends in the dairy business from the farm-to-the-fork for more than 40 years.

Plan of Action

- 1. Develop an historic data set that establishes the annual number of cows, number of dairies and production per cow in Tulare County**
- 2. Develop an historic data set that compares these Tulare County data points to the data developed in the most recent statewide economic impact study**
- 3. Adjust these data to project the current (2013) economic value (impact) of the dairy business in Tulare County with a focus on direct, indirect and induced job creation**
- 4. Prepare an analysis of historic trends in the Tulare County, State of California and USA dairy industry focusing on milk cow numbers, production per cow, dairy production units and related data**
- 5. Develop projections to determine the likely economic size, value and impact of the dairy business in Tulare County in 2023**
 - a. With a focus on the nature of the growth, i.e. number of dairies, number of cows, production per cow and related data**
 - b. With an additional data focus on direct, indirect and induced job creation**
- 6. Prepare a final written report for inclusion in the county administrative records**

The Economic Value of Dairy In Tulare County (CA) in 2013 & 2023

Historic Perspective

Situated in the southern reaches of the Central Valley, Tulare County has been the number one milk production county in the State of California, and, in fact, in the United States for several years. Milk producers in Tulare County generated more than \$1.786 billion worth of on-farm revenue during 2012, according to the U.S. Department of Agriculture (USDA) “2012 Census of Agriculture.

This revenue stream translates into billions of dollars-worth of wages as this milk supply is produced, transported to plants, converted to a broad range of dairy products and moved to markets from coast-to-coast and around the world.

Thousands of jobs, in the form of year-around employment, are created on dairy farms (dairies) and in processing plants. Jobs for farm workers, dairy manufacturing plant managers and employees, truck drivers, veterinarians, animal nutritionists, construction workers...the list goes on and on.

The wages of those directly employed by the dairy business translate into jobs on Main Street as these employees open bank accounts and shop for the necessities and the pleasures of life; everything from food, clothing, gas and medical care to movie-theater tickets, automobiles, insurance. Again, the list goes on and on. Everyone from the clerk at the grocery store to the certified public accountant is a beneficiary of the spending by dairy business employees.

Tulare County (CA) has long been host to a strong dairy business.

There were about 1,100 herds with an average size of 31 cows in 1930 in the county, according to the Dairy Inspector Office, Visalia. This translated into a herd of about 35,130 cows in the county.

By 1980, there was one-fourth as many dairies, but three times as many cows. Just 236 dairies remained in business by 1980; however, they milked a total of 120,695 cows for an average herd size of 511 cows.

The "1999 Top Ten Herds" each had a per cow production average of between 25,193 pounds per 305-day lactation and 29,128 pounds, according to the Tulare County Ag Commissioner's Annual Report.

As population growth pushed dairy production from the population centers along the coast to the desert, the number of herds and herd size pushed higher in Tulare County.

In 1999, there were 299 dairy herds in the county. A total of 337,685 cows were in the County's dairy herd and the average dairy producer milked 1,132 cows. Additional data from 1999 help paint an interesting perspective and foreshadow the future.

The top-producing herd in the county in 1999 was a dairy milking 1,546 cows three times daily, according to the Farm Advisor Survey by the University of California Cooperative Extension, Visalia.

Production per cow (adjusted to a 305-day lactation) averaged 29,128 pounds at this dairy. For perspective, the county-wide average production per cow was slightly less than 20,000 pounds. The top dairy in 1999 truly was exceptional, but it was also foretelling the potential for future production per cow.

Given emerging trends, growth in production per cow will drive virtually all of the growth in milk production in California and, more specifically in Tulare County, within a few years.

Long-term Trends

Milk producers, or maybe more correctly, dairy cows have been masters of productivity.

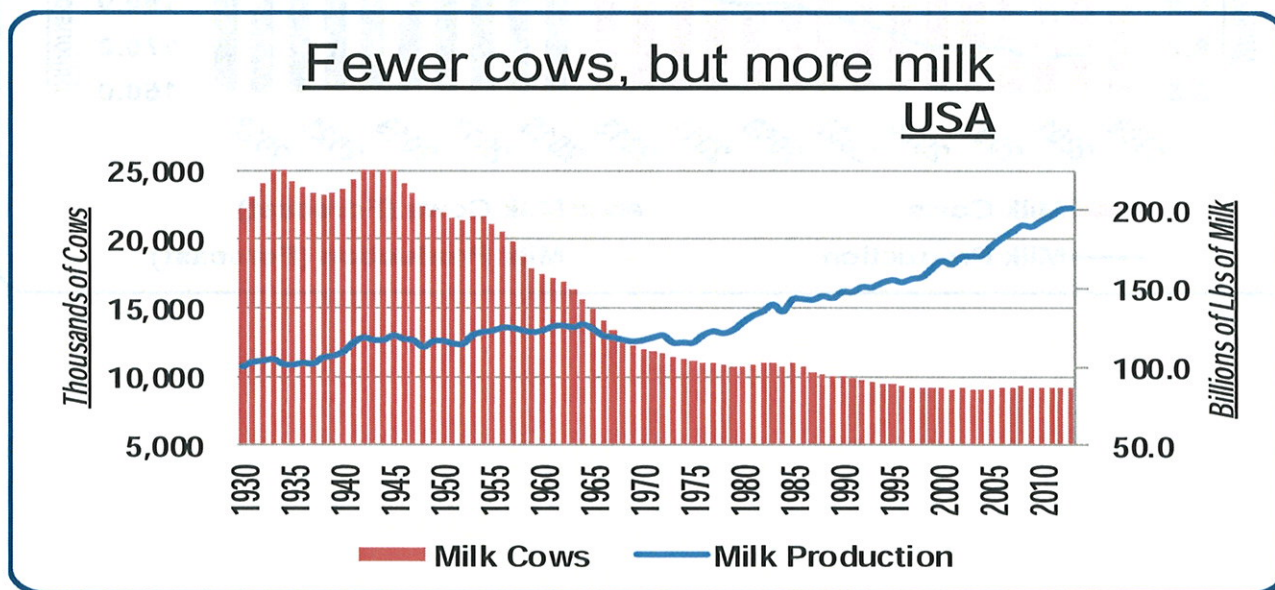
Production per cow has grown on a very steady pace for as long as records have been kept.

“Fewer cows, but more milk”, as graphically presented on pages 5 and 6, details this growth by measuring the number of milk cows in the nation’s milking herd and the billions of pounds of milk produced each year since 1930. Tulare County has been on a similar track.

In 1930, milk production in the United States totaled 100.2 billion pounds and it took 22,218,000 cows to generate that volume. In other words, production per cow averaged just 4,508 pounds per year. A typical lactation was 300 to 305 days long.

By last year, (2013), US milk production had more than doubled and totaled 201.2 billion pounds. However, it only required 9,221,000 cows.

More than twice as much milk and less than half as many cows.

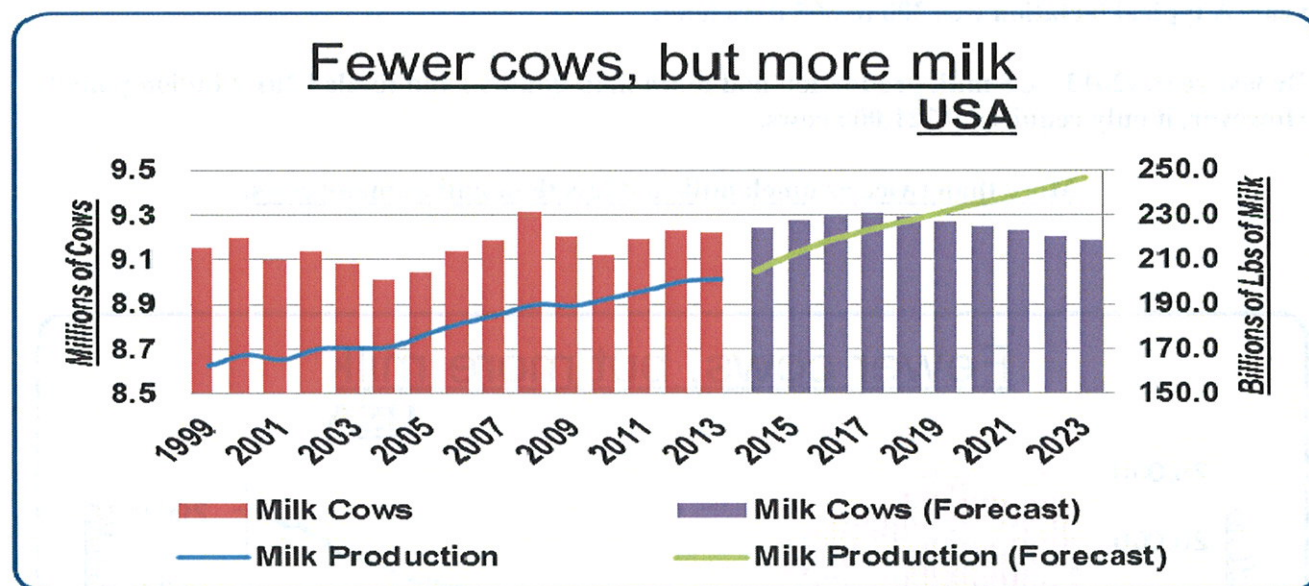


Long-term Trends - Forecast

Previous forecasts by the U.S. Department of Agriculture and the most recent “USDA Long-term Projections,” released in February 2014, call for U.S. milk cow numbers to increase modestly for the next three years; peaking at 9.310 million head in 2017.

The long-term trend will then resume. Cow numbers are then forecast to decline slowly, but steadily reaching 9.185 million head by 2023, the final year covered by this analysis.

Milk production will; however, continue to increase and reach 246.4 billion pounds by 2023. Average production per cow will grow from 21,822 during 2013 to 26,825 pounds by 2023.



Long-term trend – Tulare County

Projections developed by JDG Consulting for California and Tulare County follow a similar trend line with a couple of caveats:

- (1) A record-shattering drought, reduced revenue-over-feed-costs, environmental issues and increased competition for available land and water point to a decline in milk cow numbers in the County. It will be a pattern similar to the national estimates prepared by USDA.
- (2) The rate of increase in production per cow will be less than the US rate projected by USDA; however, California milk producers have historically sustained production per cow (PPC) at levels higher than the national average.
- (3) Milk production in Tulare County will increase at a compound annual growth rate of 1.34%, according to the analysis by JDG Consulting Inc. This trails the prior 10-year rate of 2.4%, but projection realistic given the existing and emerging constraints faced by milk producers.

Milk cow numbers – Tulare County

➤ A record-shattering drought, reduced revenue-over-feed-costs, environmental issues and increased competition for available land and water point to a decline in milk cow numbers in the County. It will be a pattern similar to the national estimates prepared by USDA.

The “USDA Long-term Projections” point toward a modest decline in milk cow numbers across the U.S. over the next ten years. Herd size is projected to decline from 9.221 million cows during 2013 to 9.185 million cows by 2023.

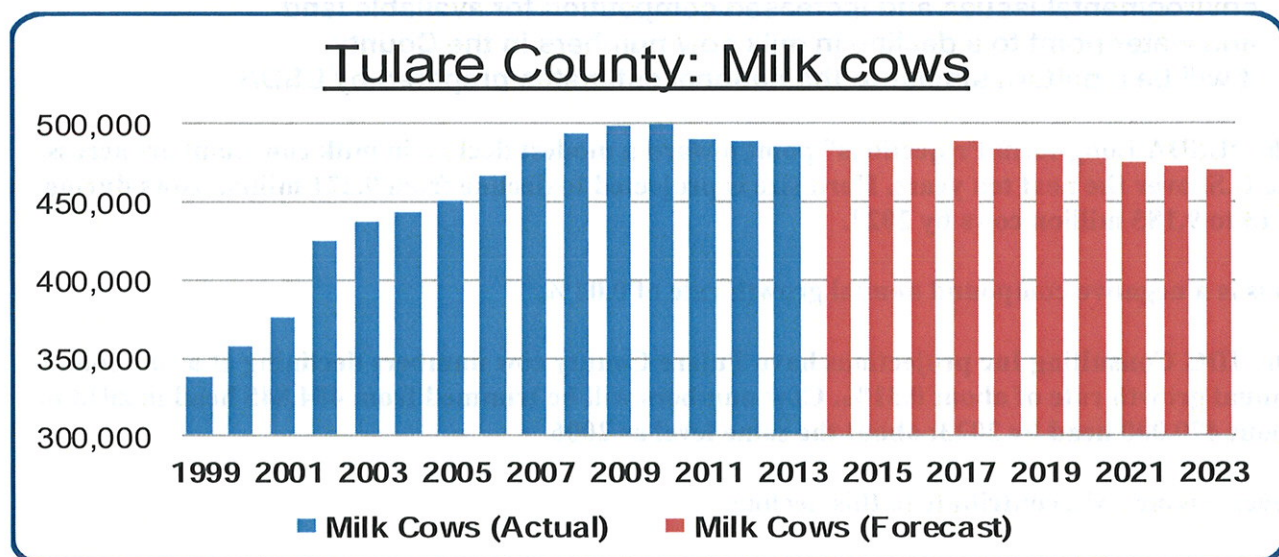
This is a negative compound annual growth rate of 0.04%.

The JDG Consulting Inc projections have Tulare County cow numbers declining at a compound annual growth rate of about 0.31%. Cow numbers will be trimmed from 484,845 head in 2013 to about 470,000 head by 2023; about the same level as 2006.

Several issues will contribute to this decline:

- (1) **Drought:** The lack of rainfall has a direct and very negative impact on milk production. This impact has been slow to materialize, but the impact will be dramatic. It is reducing locally-grown feed supplies; hence, moving feed costs sharply higher, most notable for alfalfa hay and corn silage. Once the drought is broken, the impact will also linger for at least a year and probably longer.

- (2) **Depopulated facilities:** With limits on feed availability, some milk producers will exit the business. A recent expert analysis published in the San Francisco Chronicle (14 Oct 2014) suggested at least 100 dairies statewide will be “forced” out of business by the economics of the new reality. While an estimate for Tulare County is not readily available, about 27% of state’s milk supply is generated in the County. Needless to say, the impact in the County could total 20 to 30 milk production facilities closed due to the drought.
- (3) **Environmental issues:** Once depopulated, environmental regulations typically make in very costly, if not impossible, to re-open the facility as a milk production unit. These depopulated facilities may offer an opportunity to be used as replacement heifer raising sites. This, in turn, may free up some animal units at the existing milk production facility and, therefore, a limited rebuild of the milking herd.
- (4) **Other cropping opportunities:** Numerous other cropping opportunities abound and remain very competitive to dairy operators seeking land and or additional land for milk production.
- (5) **In fact, the forecast growth in milk cow numbers during 2016 and 2017 may not materialize.**

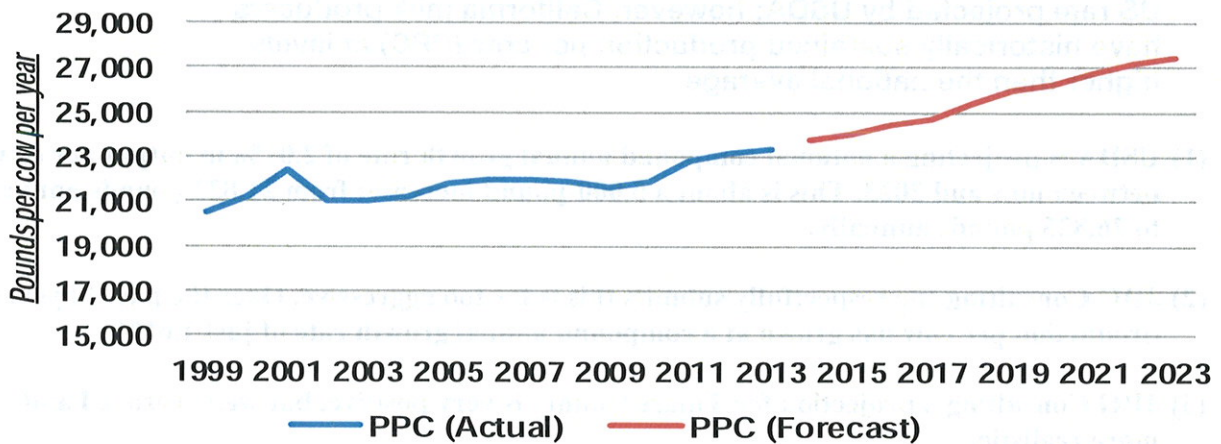


Production per cow – Tulare County

➤ The rate of increase in production per cow will be less than the US rate projected by USDA; however, California milk producers have historically sustained production per cow (PPC) at levels higher than the national average.

- (1) USDA is projecting a national compound annual growth rate of 2.07% in output per cow between now and 2023. This is about a 5,000-pound increase; from 21,822 pounds annually to 26,825 pounds annually.
- (2) JDG Consulting Inc respectfully submits this is far too aggressive. Over the past 10 years, production per cow has grown at a compound annual growth rate of just 1.61%.
- (3) JDG Consulting's projection for Tulare County is very positive, but well-reasoned and more realistic.
 - a. Production per cow in Tulare County increased at compound annual rate of 1.05% during the past five years.
 - b. JDG Consulting Inc is projecting an annual rate of about 1.65% through 2023. This equates to about 4,000 pounds of additional milk per each cow in the milking herd.
- (4) Continuing improvements in animal nutrition, housing (cooling) and handling will spell ongoing steady improvements in production per cow.
 - a. Milk producers across the country, in California and in Tulare County were faced with very difficult economic conditions during four of the past six years.
 - b. Our forty years of observations have noted a recent and significant change in management approach at dairies across the United States.
 - c. Historically, too often, additional gross income was the goal and growing the size of the dairy (the size of the herd) was the instrument of choice.
 - d. Over the past year or more, investments have focused on improving the efficiency of the existing facility; further improving cow comfort and feed handling, etc.
 - e. Out of economic necessity, growth for the sake of growth is no longer the mantra of dairy producers. Instead, the focus has turned to efficiencies, to production per cow.

Tulare County: Production per cow

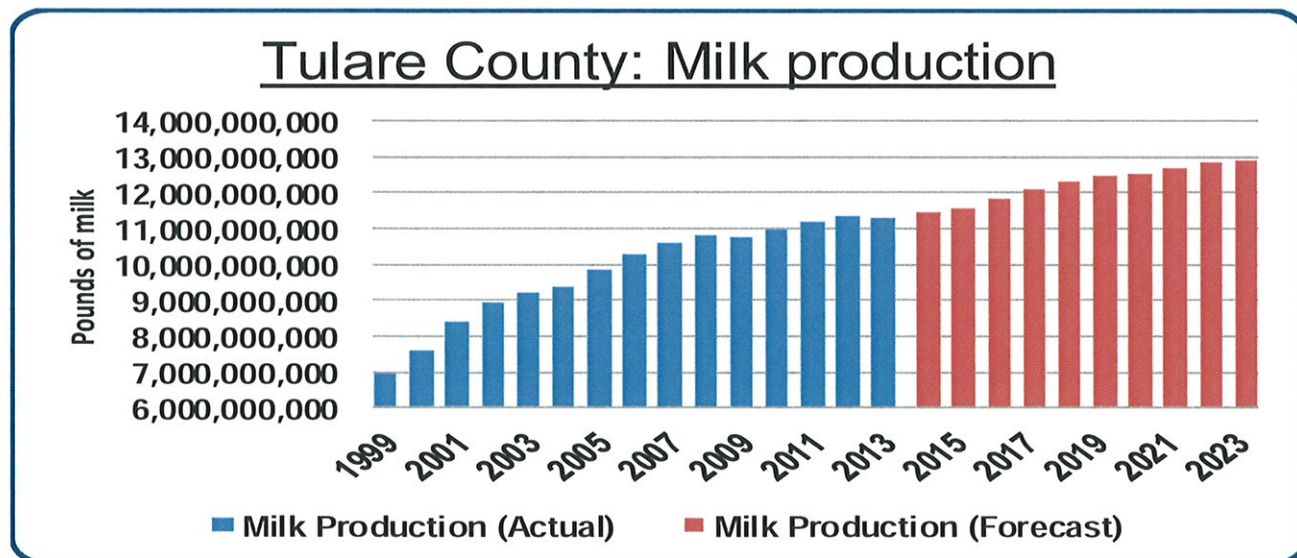


Milk production – Tulare County

➤ Milk production in Tulare County will increase at a compound annual growth rate of 1.34%, according to the analysis by JDG Consulting Inc. This trails the prior 10-year rate of 2.4%, but projection is realistic given the existing and emerging constraints faced by milk producers.

- (1) Milk production in Tulare County totaled 11.3 billion pounds during 2013, according to the California Department of Food & Agriculture. Production increased at an annual rate of 2.4% during previous 10 years, far outpacing the national average growth of 1.69%.
- (2) After careful analysis of the trends in cow numbers and production per cow and an analysis of the obstacles and opportunities facing milk producers in Tulare County, JDG Consulting Inc foresees annual production in Tulare County totaling about 12.925 billion pounds during 2023.
- (3) This is 14.2% more than 2013.

Fewer cows and more milk per cow



Economic Impact 2013

Tulare County is home to numerous dairy processing plants that generate several billions of dollars-worth of milk-based ingredients, products for further processing and finished products.

To determine the estimated economic impact of these businesses, JDG Consulting Inc first identified the various plants operating in the county. Listed below are the plants as determined by a review of a California Department of Food and Agriculture list of plants licensed to operate.

Additional data regarding the products manufactured at each plant were determined using the U.S. Department of Agriculture's list of plants approved for USDA's product grading services and website searches.

The plants identified are listed on pages 13 and 14.

Company	Location	Products*
Per CDFA & USDA		
California Dairies Inc	Tipton	Butter (bulk), butter (consumer-sized packages), concentrated milk fat, dry milk (nonfat and whole), dry buttermilk or buttermilk product, condensed skim milk, condensed milk, buttermilk or buttermilk product, condensed buttermilk or buttermilk product
California Dairies Inc	Visalia	Butter (bulk), butter (consumer-sized packages), concentrated milk fat, dry buttermilk or buttermilk product, condensed skim milk, condensed milk, buttermilk or buttermilk product, condensed buttermilk or buttermilk product
Dreyer's Grand Ice Cream Inc	Tulare	Frozen products
Kraft Foods Inc	Tulare	American (Cheddar, Colby, granular curd or washed curd) cheese, cottage cheese, sour cream
Land O' Lakes Inc, #1	Tulare	Butter (bulk), butter (consumer-sized package), concentrated milk fat, dry milk (nonfat and whole), dry buttermilk or buttermilk product, condensed skim milk, condensed milk, buttermilk or buttermilk product, condensed buttermilk or buttermilk product
Land O' Lakes Inc, #2	Tulare	Dry milk (nonfat and whole), dry buttermilk or buttermilk product, condensed skim milk, condensed milk
		Con't

Company	Location	Products*
Milk Specialties Company	Visalia	Cream, whipping, whipped; whey protein concentrate
Rosa Brothers Milk Company	Tulare	Fluid milk; Cream, whipping, whipped; frozen products
Saputo Cheese USA Inc #1	Tulare	Whey protein concentrate, cheese
Saputo Cheese USA Inc #2	Tulare	Whey protein concentrate, cheese
Three Sisters Farmstead Cheese	Lindsay	Condensed/evaporated milk, cheese
Top O' The Morn Farms	Tulare	Fluid milk; cream, whipping, whipped; eggnog
Tulare Cultured Specialties	Tulare	Buttermilk, cottage cheese, sour cream
Vintage Cheese	Traver	Cheese

*Products listed per California Department of Food & Agriculture and/or "Dairy Plants Surveyed and Approved for USDA Grading Service"

Determining the Economic Impact | Contributions

Dairy business-specific data are nearly non-existent at the county level. That available – milk cow numbers and milk production – have been shared. The production-per-cow estimates were calculated by JDG Consulting Inc.

To determine the economic impact (the economic contributions) of the dairy business, the value of the milk produced at the farm and the value of the products created from that milk are central and the starting point.

Value of the milk

Best available data: Milk production in Tulare County totaled 11.322 billion pounds during 2013, according to the California Department of Food and Agriculture (CDFA); or 113.22 million hundredweight (cwt) of milk.

During 2013, California milk producers received, on average, a milk price of \$18.49 per cwt.

Hence, an estimated value of shipments of \$2.039 billion during 2013.

Perspective: USDA's "Census of Agriculture" pegged the 2012 value of milk and cream sold in Tulare County at \$1.786 billion. During 2012, production totaled 11.332 billion pounds (113.320 million cwt) and the average was \$16.59, according to CDFA. Total calculated value using the JDG Consulting methodology: \$1.880 billion.

Value of products

The "value of the shipments" of the products from these plants listed above is the other key to determining the economic impact of the dairy business in the County. Obviously, individual plant data and company data are highly confidential. Therefore, determining this value entailed numerous steps.

Aggregate data (across all companies and all milk-based products) were used and these data were determined for several product lines including:

1. Dry, condensed and evaporated dairy products manufacturing
2. Cheese manufacturing
3. Butter manufacturing
4. Fluid milk processing
5. Ice cream and frozen dessert production

This product line analysis was designed to match the “multipliers” used to determine economic impact. The Bureau of Economic Analysis (BEA), an agency of the U.S. Department of Commerce, has developed and published these multipliers.

To protect confidential information, this analysis only presents a total (across all of these product lines) for all dairy processing/manufacturing/packaging in the County.

During 2013, milk producers marketed 11.322 billion pounds of milk. Dairy processors converted this milk and an undetermined volume of milk from outside of the County into a host of milk-based products valued at an estimated \$3 billion.

Using the “Multipliers” described below, the following estimated impact/contributions were made to the Tulare County (and surrounding region) economy during 2013.

These data represent the “induced” impact of the Tulare County dairy industry; the impact outside of the dairy business.

In other words, the economic activity of the milk producers and the dairy producers in Tulare County created 35,808 non-dairy jobs and generated \$1.692 billion worth of wages for non-dairy workers.

ECONOMIC IMPACT/CONTRIBUTIONS OF THE DAIRY BUSINESS					
2013 Tulare County, CA					
	Output(1) Billions	Earnings(2) Millions	Employment(3) Jobs	Valued-Added(4) Billions	
Milk Production	\$ 3.57	\$ 613.77	14,513	\$ 1.48	
Milk Processing*	\$ 6.48	\$ 1,077.93	21,295	\$ 1.99	
TOTAL*	\$ 10.05	\$ 1,691.70	35,808	\$ 3.47	
* Estimates based on Bureau of Economic Analysis RIMS III Multipliers					

The “Final Demand Multipliers” include the following:

- (1) **Output:** the total dollar change in output that occurs in all industries within the county/region for each additional dollar of output delivered by the dairy industry. This multiplier ranges between a low of \$1.7038 for each additional dollar’s worth of milk delivered to a high of \$2.2910 for each additional dollar’s worth of cheese produced.
- (2) **Earnings:** the total dollar change in earnings of households employed by all industries within the county/region for each additional dollar of output delivered by the dairy

industry. This multiplier, for example, is \$0.2932 for milk production. During 2013, milk producers delivered \$2.1 billion worth of milk; hence, their contribution to household earnings across the county/region totaled \$613.8 million.

- (3) **Employment:** the total dollar change in the number of jobs that occurs in all industries within the county/region for each additional million dollars of output delivered by the dairy industry. This multiplier, for example, ranges from 6.8 to 8.4 jobs created for each one million dollars of dairy products manufactured. During 2013, milk processors delivered nearly \$3 billion* worth of products; hence, their contribution to jobs creation across the county/region totaled more than 21,295 positions.
- (4) **Value-added:** the total dollar change in value added that occurs in all industries within the county/region for each additional dollar of output delivered by the dairy industry. Milk producers add about \$1.5 billion and processors, at least \$2 billion

Look inside the Tulare County dairy business

Other Multipliers let us look inside the business. These are the so-called “direct effect” multipliers.

DIRECT ECONOMIC IMPACT OF THE DAIRY BUSINESS			
2013		Tulare County, CA	
	Value of Production Billions	Earnings(5) Millions	Employment(6) Jobs
Milk Production	\$2.09	\$4.52	4,488
Milk Processing*	\$3.00	\$9.14	10,238
TOTAL *	\$5.09	\$13.66	14,726
* Estimates based on Bureau of Economic Analysis RIMS III Multipliers			

Milk producers in Tulare County generated \$2.093 billion pounds worth of milk during 2013. To do this created 4,488 jobs and milk producers paid wages totaling \$4.520 million.

Dairy processors turned this milk into \$3 billion worth of dairy products. This process (collecting the milk, converting the milk and packaging the finished product) created 10,238 jobs in the County and paid wages totaling an estimated \$9.140 million.

The “Direct Effect” Multipliers include the following:

- (5) **Earnings (Dollars):** the total dollar change in earnings of households employed by all industries within the county/region for each additional dollar of earnings paid directly to households employed by the dairy industry.
- (6) **Employment (Jobs):** the total change in the number of jobs in all industries within the state for each additional job in the dairy industry. In other words, each time a new position is created and filled on a dairy farm in the county, 2.1441 jobs are subsequently created in other industries. In the fluid milk and butter business, 3.5671 jobs; in the dry dairy products business, 3.4259 jobs and in the cheese business, 3.6942. Each new job in the dairy business or in any other, generates a pay check which is spent; which creates demand for more products and services, which in turn triggers hiring by those businesses.

Economic Impact 2023

What will the Tulare County dairy business contribute to the County economy ten years from now?

A milk production estimate was detailed earlier in this analysis. JDG Consulting Inc then used the same methodology and multipliers used for 2013 to estimate the impact in 2023.

The results look like this:

ECONOMIC IMPACT/CONTRIBUTIONS OF THE DAIRY BUSINESS				
2023	Tulare County, CA			
Output(1)	Earnings(2)	Employment(3)	Valued-Added(4)	
Billions	Millions	Jobs	Billions	
Milk Production	\$ 4.63	\$ 795.82	18,818	\$ 1.92
Milk Processing*	\$ 7.83	\$ 1,302.13	25,711	\$ 2.41
TOTAL	\$ 12.45	\$ 2,097.95	44,529	\$ 4.33
* Estimates based on Bureau of Economic Analysis RIMS III Multipliers				

DIRECT ECONOMIC IMPACT OF THE DAIRY BUSINESS			
2023	Tulare County, CA		
Value of Production	Earnings(5)	Employment(6)	
Billions	Millions	Jobs	
Milk Production	\$2.71	\$5.86	5,820
Milk Processing*	\$3.51	\$11.05	12,375
TOTAL *	\$6.23	\$16.91	18,195
* Estimates based on Bureau of Economic Analysis RIMS III Multipliers			

Milk producers and dairy processors will have grown significantly and brought the County along with them. About 8,721 new jobs will have been created outside of the dairy business and another 3,469 jobs inside of the dairy business.

The earnings of employees within the dairy business will have grown from \$13.66 million to \$16.91 million; an increase of more than \$3.2 million or 24%.

Dairy business contributions to the household incomes of others in the County will have increased from \$1.692 billion to \$2.097 billion; an increase of \$406 million or plus 24%.

DIRECT ECONOMIC IMPACT OF THE DAIRY BUSINESS			
2013		Tulare County, CA	
	Value of Production Billions	Earnings(5) Millions	Employment(6) Jobs
Milk Production	\$2.71	\$5.86	5,820
Milk Processing*	\$3.51	\$11.05	12,375
TOTAL*	\$6.23	\$16.91	18,195
* Estimates based on Bureau of Economic Analysis RIMS III Multipliers			

Appendix M

General Order No. R5-2013-0122

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION
ORDER R5-2013-0122

REISSUED WASTE DISCHARGE REQUIREMENTS GENERAL ORDER
FOR
EXISTING MILK COW DAIRIES

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Attachment B: Waste Management Plan for the Production Area

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Attachment D: Manure/Process Wastewater Tracking Manifest

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**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION**

ORDER R5-2013-0122

**REISSUED WASTE DISCHARGE REQUIREMENTS GENERAL ORDER
FOR
EXISTING MILK COW DAIRIES**

The California Regional Water Quality Control Board, Central Valley Region (Central Valley Water Board or 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. This Order rescinds and replaces General Order R5-2007-0035 (the "2007 General Order"), which the Board originally issued on 3 May 2007.
2. This Order applies to owners and operators of existing milk cow dairies (hereinafter referred to as "Dischargers") that:
 - (1) submitted a complete Report of Waste Discharge (ROWD) in response to the Central Valley Water Board's 8 August 2005 request for such a report (the "2005 ROWD Request Letter"), and
 - (2) have not been expanded ("expansion" is defined in Attachment E) since 17 October 2005.

After the Board issued the 2007 General Order, the Board notified the Dischargers that they were required to comply with the terms and conditions of that Order. After the Board issues this Order, the Board will notify the Dischargers that were previously regulated by the 2007 General Order that they will now be 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 under a conditional waiver issued pursuant to Water Code section 13269.

REASON FOR THE CENTRAL VALLEY WATER BOARD ISSUING THIS ORDER

3. The Central Valley Water Board possesses the authority to regulate waste discharges that could affect the quality of the waters of the state, which includes both surface water and groundwater. This authority is derived from the Porter-Cologne Water Quality Control Act (Division 7 of the Water Code).
4. Water Code section 13260 requires that 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 that discharge with the Central Valley Water Board.

5. The Central Valley Water Board generally regulates waste discharges by prescribing waste discharge requirements, which must implement the relevant water quality control plan. The Central Valley Water Board may prescribe general waste discharge requirements for a category of discharges if all the following criteria apply:
 - 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 waste discharges, the Central Valley Water Board implements State laws and regulations. California regulations governing discharges from confined animal facilities are contained in the Title 27 of the California Code of Regulations ("Title 27"), at sections 22560 et seq.
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 ROWD in response to the 2005 ROWD Request Letter, and have not expanded ("expansion" is defined in Attachment E) since 17 October 2005.
8. Herd sizes at existing dairy operations vary as operators strive to maintain a consistent milk production. Maintaining consistent milk production requires a dairy operator to manage the herd by continually producing calves, some of which eventually replace the dairy's producing herd over time, while excess stock are marketed for beef production or herd replacement elsewhere.
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 ROWD filed in response to the 2005 ROWD 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 ROWD filed in response to the 2005 ROWD Request Letter is considered an expansion.
12. There are approximately 1,300 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*, referred to hereafter as the *State Anti-Degradation Policy*), the sections of Title 27 related to 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 reissued Order as originally issued was intended to enhance requirements on existing milk cow dairies, and recognized that this would mean that many Dischargers would need to make improvements at their facilities to meet these requirements. Because this is a reissued Order, it is recognized that some of the necessary improvements have already occurred. Improvements 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.

CALIFORNIA ENVIRONMENTAL QUALITY ACT

16. The Central Valley Water Board is the lead agency with respect to the issuance of this Order under applicable provisions of the California Environmental Quality Act (CEQA)(Pub. Resources Code, § 21000 et seq.).
17. In accordance with CEQA, the Central Valley Water Board adopted a Negative Declaration in 1982 concurrently 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 states that, "No environmental impact report may be required by any state agency for any activity of a dairy farm, including adoption of waste discharge requirements under Division 7 of the Water Code" 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." (Cal. Code Regs., tit. 14, § 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 Board solicited permit applications (ROWDs) from existing dairies on 8 August 2005. These reports were due on 17 October 2005.

The information contained in the ROWDs submitted to the Board in 2005 presented Board staff with a description of the dairies as they existed at that date. The environmental baseline for the 2007 General Order therefore consisted 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 17 October 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. This Order, which supplements regulatory requirements already imposed on the existing dairy discharges under the 2007 General Order and which is designed to enhance the protection of groundwater resources, is exempt from the provisions of CEQA in accordance with the following categorical exemptions:
- a. California Code of Regulations, title 14, section 15301, which exempts the "operation, repair, maintenance, [and] permitting ... of existing public or private structures, facilities, mechanical equipment, or topographical features" from environmental review. Eligibility under the Dairy General Order is limited to milk cow dairies that were existing facilities as of 17 October 2005, and the Order does not authorize the expansion of these facilities. The 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. California Code of Regulations, title 14, section 15302, which exempts 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..." The Dairy General Order will likely require covered dairies to replace or reconstruct portions of their waste management systems to ensure compliance with the Order's requirements.
 - c. California Code of Regulations, title 14, section 15304 exempts "... 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 Dairy General Order will require covered dairies to make improvements to their waste management systems that will result in only minor alterations to land, water, and/or vegetation.

DAIRY IMPACTS ON WATER QUALITY

21. Groundwater monitoring shows that many dairies in the Region have impacted groundwater quality. A University of California study of five dairies in a high-risk groundwater area in the Region during the 1990s found elevated salts and nitrates beneath the production area, wastewater retention ponds and land application areas. Data included in the first annual monitoring report of the Central Valley Dairy Representative Monitoring Program (CVDRMP) reported that groundwater beneath some dairies that have begun implementation of practices required by the 2007 General Order continue to have elevated levels of salts and nitrates beneath the production area, wastewater retention ponds and land application areas. Representative monitoring programs (RMP) began monitoring groundwater in 2012, and some provisions of the 2007 General Order were only fully implemented by 2012, therefore, monitoring results may not be fully reflective of the effectiveness of current practices. Prior to the issuance of the 2007 General

Order, 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 impacts under many of the dairies, including where groundwater is as deep as 120 feet and in areas underlain by fine-grained sediments.

22. Groundwater monitoring is the most direct way to determine if management practices at a dairy are protective of groundwater, Monitoring and Reporting Program R5-2013-0122 (MRP), 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.
23. Under the MRP, Dischargers have the option of either implementing individual groundwater monitoring or participating in a Representative Monitoring Program (RMP) to identify whether or not their specific management practices are resulting in adverse impacts to groundwater (i.e., whether the discharge is in compliance with the groundwater limitations of this Order). Extensive long-term monitoring is needed to document which dairy waste management practices are protective of groundwater, and what effect these management practices will have on groundwater under a variety of different site conditions.
 - a. Dischargers implementing individual monitoring must submit the following reports to the Board's Executive Officer:

Annual Reports: Dischargers who have elected to perform individual groundwater monitoring must submit annual groundwater monitoring reports to the Executive Officer. These annual reports provide a summary of the analytical data collected to date and an evaluation of the groundwater monitoring program's adequacy to assess compliance with the Order, including whether the data provided are representative of conditions upgradient and downgradient of the wastewater management area, production area, and land application area of the dairy facility.

Summary Report: In addition to submittal of annual reports, the MRP also requires that Dischargers conducting individual groundwater monitoring submit a summary report six (6) years after initiating sampling. The summary report must provide a detailed assessment of the monitoring data, and must include an evaluation of whether site activities associated with operation of the wastewater retention ponds, production area, or land application areas have impacted groundwater quality. The summary report must include a discussion on implementation of changes in management practices and/or activities that are being taken and an evaluation of progress in complying with Groundwater Limitation F.1 of the Order.
 - b. Dischargers participating in an RMP must collectively submit the following reports to the Board's Executive Officer:

Annual Representative Monitoring Reports: The RMP must submit Annual Representative Monitoring Reports (ARMR), which must describe the monitoring activities (including a tabulated summary of groundwater analytical data) conducted by the RMP, and which must identify the number and location of installed monitoring wells and other types of monitoring devices. Within each ARMR, the RMP must evaluate the groundwater monitoring data to determine whether groundwater is being impacted by activities at facilities being monitored by the RMP. The submittal must include a description of the methods used in evaluating the groundwater monitoring data.

Summary Representative Monitoring Report: Six (6) years following submittal of the first ARMR, the RMP must submit a Summary Representative Monitoring Report (SRMR) to the Board's Executive Officer. The SRMR is to identify management practices that are protective of groundwater quality for the range of conditions found at participating facilities. Based on information supplied in the SRMR, if management practices are found not to be protective of groundwater quality, the SRMR must propose solutions and upgrades that will result in compliance.

Individual Annual Monitoring Reports: Dischargers who have participated in the RMP must submit Annual Monitoring Reports following the Executive Officer's approval of the SRMR, which must document what they are doing to upgrade management practices that have been found not to be protective of groundwater. These reports are due every July 1 following Executive Officer approval of the SRMR. The first annual report must identify alternative management practices the Discharger intends to implement at its dairy facility along with a schedule for implementation. With each subsequent Annual Monitoring Report, the Discharger must provide an update on their implementation of additional or alternative management practices.

24. 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.
25. 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 all adverse impacts to waters of the state either because of their

outdated design or need for maintenance or both. Historic operation of these dairies has often resulted in adverse effects on the water quality. 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. This Order includes time schedules for compliance for dairy operators to implement improvements if groundwater data indicate that certain types of facilities/practices are not protective of groundwater quality.

STATE ANTI-DEGRADATION POLICY (RESOLUTION 68-16)

26. The State Anti-Degradation Policy prohibits the Central Valley Water Board from authorizing the degradation of high-quality groundwater unless it has been shown that:
 - a. The degradation is consistent with the maximum benefit to the 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 best practicable treatment or control (BPTC) to minimize degradation.
27. This Order places restrictions on the discharge of wastes from dairy facilities that are intended to prevent pollution and nuisance conditions from occurring or persisting. Though the Board recognizes that degradation of high-quality groundwater will still occur pursuant to this Order, the implementation of nutrient management plans, waste management plans, enhanced management practices within the production area, and improved containment features for new and expanding dairy wastewater retention ponds will limit the amount of degradation that will occur under this Order. Degradation will be limited so that discharges from dairy facilities will not cause long-term impacts to beneficial uses. Where immediate compliance with water quality objectives cannot be achieved, this Order includes a time schedule for compliance for the implementation or modification of waste management practices.
28. Consistent with the *State Anti-Degradation Policy*, this Order establishes requirements and standards that will result in the implementation of BPTC measures to limit the degradation caused by dairy discharges. The following is a general description of what the Board considers to be BPTC for specified areas of a dairy operation:

- a. Production Areas (including milk barns, wash/sprinkler pens, feed and non-liquid manure storage areas, and corrals): surface water discharges from the production area are prohibited, and the production areas shall be managed to limit the extent to which wastewater can infiltrate into the underlying materials.
 - b. Land Application Areas: Dischargers must prepare and implement Nutrient Management Plans (NMPs). Discharges from the land application areas must not cause or contribute to an exceedance of any applicable water quality objective or federal water quality criteria.
 - c. Existing Wastewater Retention Ponds: Existing wastewater retention ponds must be in compliance with design standards specified in Title 27. However, these design standards have not been found to be protective of groundwater under all conditions, and the immediate replacement of these wastewater retention ponds is not a practicable option for many dairies. Therefore, though compliance with Title 27 design standards was once considered to be BPTC, the Board now considers BPTC for existing ponds to be an iterative process whereby the ponds are evaluated (either under an individual monitoring program or under the RMP) to determine whether or not they are protective of the underlying groundwater, and upgraded or replaced on a time schedule that is as short as practicable if they are found not to be protective. This Order contains a time schedule to bring any deficient management practices (including wastewater retention ponds) into compliance.
 - d. New and Expanded Wastewater Retention Ponds: This Order establishes requirements for new and expanded wastewater retention ponds that are more stringent than the requirements in Title 27 in order to provide groundwater protection. New and expanded wastewater retention ponds must meet a strict performance standard that only allows for a very conservative pond design unless there has been a demonstration that an alternative design meets the strict performance standard.
29. This Order also contains closure requirements that specify that 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.
 30. This Order will assure that pollution or nuisance will not occur outside of the time schedule for improvements set by this Order. This Order addresses impacts from future discharges of waste, but does not address the cleanup of surface and groundwater that has been polluted due to historic dairy operations. Any required cleanup would be handled under separate authority under the Water Code.
 31. The Central Valley Water Board recognizes that there is often site-specific, crop-specific, and regional variability which affects the selection of appropriate

management measures, as well as the design constraints and pollution control effectiveness of various practices. In compliance with Water Code section 13360, dairy owners/operators have the flexibility to choose management practices that best achieve a management measure's performance expectations given their own unique circumstances. It is expected that this will be an iterative process whereby the effectiveness of any set of practices in minimizing degradation will be periodically reevaluated as necessary for and/or as more recent and detailed water quality data become available.

32. To assess compliance with the *State Anti-Degradation Policy*, this Order requires Dischargers to monitor discharges to surface waters and groundwater. The requirements to monitor first encountered groundwater (the point in the aquifer where typically detection of changes to groundwater quality, caused by the facility, would be first detected) are met when the Dischargers perform individual groundwater monitoring or participate in an RMP. The purpose of monitoring is to confirm that the discharges are effectively controlled by management practices and to evaluate compliance with this Order.
33. When the Board prescribes waste discharge requirements that will result in the degradation of high-quality waters, the *State Anti-Degradation Policy* requires that the Board first make a determination that the authorized degradation is consistent with the maximum benefit to the people of the State. Consistent with the evaluation contained in the Information Sheet and considering the economic significance of the Central Valley dairy industry and the important role Central Valley dairies play in providing adequate milk supplies to the nation, the Central Valley Water Board finds that maintaining the Central Valley dairy industry is consistent with the maximum benefit to the people of the state. To maintain the industry and to prevent the loss of jobs and the impacts to the local economy that might otherwise occur, some degradation to high quality waters must be allowed. However, this degradation will be limited by this Order so that there will not be long-term impacts to beneficial uses, thereby allowing the full utilization of the aquifer.

ENVIRONMENTAL STEWARDSHIP PROGRAMS

34. 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. 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.

35. 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

36. This Order does not authorize violation of any federal, state, or local law or regulation.
37. As stated in 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.
38. In compliance with Water Code section 106.3, it is the policy of the State of California that every human being has the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes. This order promotes that policy by requiring discharges to meet maximum contaminant levels designed to protect human health and ensure that water is safe for domestic use.
39. This Order is not 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.
40. 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.
41. In 2006, the Central Valley Water Board, the State Water Board, and Regional stakeholders began a joint effort to address salinity and nitrate problems in the region and adopt long-term solutions that will lead to enhanced water quality and economic sustainability. Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS) is a collaborative basin planning effort aimed at developing and implementing a comprehensive salinity and nitrate management program. The CV-SALTS effort might effect changes to the Basin Plans that would necessitate the re-opening of this Order.
42. The Central Valley Water Board recognizes that the 2007 General Order imposed new and more stringent requirements on existing milk cow dairies. This Order is

intended to enhance the requirements imposed under the 2007 General Order. However, some revisions to this Order may be necessary in the future 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.

43. 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.
44. 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.

IT IS HEREBY ORDERED that, pursuant to 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 were formerly regulated under the original version of Order R5-2007-0035 adopted in May 2007, their agents, successors, and assigns shall comply with the following:

A. PROHIBITIONS

1. The discharge of hazardous wastes, as that term is defined in California Code of Regulations, title 22, section 66261.1 *et seq.*, is prohibited.
2. Except when authorized by a National Pollutant Discharge Elimination System (NPDES) permit, the direct or indirect discharge of waste and/or storm water from the production area to surface waters is prohibited¹.
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. The collection, treatment, storage, discharge or disposal of wastes at an existing milk cow dairy shall not result in the creation of a condition of pollution or nuisance².

¹ 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.

² Except in circumstances where a Discharger is making improvements to waste management practices that have

5. The disposal of waste not generated by on-site animal production activities is prohibited except where a ROWD for the disposal has been submitted to the Executive Officer and the Central Valley Water Board has issued or waived WDRs for that discharge.
6. The disposal of dead animals in any liquid manure or wastewater retention ponds 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 animals³.
7. All animals shall be prohibited from entering any surface water within the animal confinement area. (Title 27, § 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.
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.

been found not to be protective of the underlying groundwater under a time schedule that is as short as practicable.

³ In an emergency, guidance is provided by the Conditional Waiver of Waste Discharge Requirements for Disaster-Related Wastes during a State of Emergency within the Central Valley Order 2013-0026.

15. Under this General Order, the expansion of the existing milk cow dairy beyond the level as defined under the term "Expansion" is prohibited⁴.

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, wastewater retention 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 that were built or expanded after 27 November 1984 shall be protected against 100-year peak stream flows. (Title 27, §22562(c).)
3. In the Tulare Lake Basin, existing milk cow dairies in operation on or before 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 that were expanded after 8 December 1984 shall be protected from 100-year peak stream flows.
4. Dischargers who are subject to this Order shall implement water quality management practices, as necessary, to protect water quality and to achieve compliance with applicable water quality objectives on a schedule that is as short as practicable as described in the Time Schedule for Compliance (section M of this Order). The proposed time schedule must be supported with appropriate technical or economic justification as to why the proposed schedule is as short as practicable.
5. If groundwater monitoring demonstrates that discharge(s) from a dairy have caused an exceedance of the groundwater limitations set forth in this Order,

⁴ Dischargers must submit a ROWD, document compliance with CEQA, and obtain coverage under individual waste discharge requirements before any material facility expansion. "Expansion" is defined in Attachment E.

the Executive Officer may issue an order to the owner/operator of the monitored dairy to identify and implement management practices that are protective of groundwater quality on a schedule that is as short as practicable.

6. 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, § 22562(b).)
7. 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.

C. POND SPECIFICATIONS

1. The level of waste in the process wastewater retention ponds (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 registered in California, 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.
2. 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.
3. 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.

4. Existing Ponds⁵

- a. Dischargers conducting groundwater monitoring pursuant to an Individual Monitoring Program shall maintain and operate existing ponds in such a manner so as to constitute best practical treatment or control (BPTC) or best efforts for existing ponds, which is further discussed in the Information Sheet at page 10 (Best Practicable Treatment or Control Measures for Existing Dairy Ponds). Such operations shall be maintained throughout the development of the Summary Report that is required by Monitoring and Reporting Program R5-2013-0122, Attachment A, Section II.12. The Summary Report is due within six years of initiating individual groundwater sampling activities or at an earlier date if required by the Executive Officer.

If the monitoring data in the Summary Report indicate that Groundwater Limitation F.1 of this Order is violated, Dischargers are required to implement management practices/activities (BPTC for high quality waters or best efforts for waters that are not high quality) that will bring the facility into compliance with Groundwater Limitation F.1 on a time schedule that is as short as practicable.

- b. Dischargers enrolled under the Representative Monitoring Program (RMP) shall maintain and operate existing ponds in such a manner so as to constitute best practical treatment or control or best efforts as (defined/discussed) in the Information Sheet throughout the development of the Summary Representative Monitoring Report (SRMR), which is due to the Central Valley Water Board on 1 April 2019.
- c. Dischargers enrolled under the RMP shall implement the recommended management practices that are applicable to Existing Ponds in accordance with the SRMR and its schedule as approved by the Central Valley Water Board Executive Officer.

If the SRMR indicates that the Dischargers Existing Ponds may have discharges that violate Groundwater Limitation F.1, of this Order or that such discharges from Existing Ponds may cause degradation to high quality waters, Dischargers are required to implement the approved SRMR's identified management practices/activities for Existing Ponds

⁵ Existing Ponds are defined to mean those ponds in operation as of 3 May 2007 when the Board issued the 2007 General Order and are not new ponds that are designed to meet the Tier 1 or Tier 2 requirements set forth in Provision C.5 of this Order.

that will bring the facility into compliance with Groundwater Limitation F.1. Such practices are considered to constitute best practical treatment or control or best efforts and are designed to achieve compliance with Groundwater Limitation F.1 on a time schedule that is as short as practicable.

5. New and Reconstructed Ponds

- a. 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.
- b. New and reconstructed pond designs 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:
 - i. 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.
 - ii. 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 Pond Specification 5. C. below.
- c. Prior to the enlargement of an existing pond (settling, storage, or retention) or the construction of any such new pond not associated with an expansion, the Discharger shall submit to the Executive Officer:
 - i. For Tier 1 and 2 pond designs, 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:

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 this Order,
 4. 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
 5. An operations and maintenance plan for the pond.
- ii. 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.

- d. Prior to the placement of waste in any enlarged existing 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 Pond Specification C.5.b 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.

D. PRODUCTION AREA SPECIFICATIONS

The Production area includes, but is not limited to, barns, milk houses, corrals, milk parlors, manure and feed storage areas, process water conveyances and any other area of the dairy facility that is not the land application area or the ponds.

1. All dirt or unpaved corrals shall be graded to promote drainage. Cow washing areas shall be paved (concrete or equivalent) and sloped to a drain. Water troughs, permanent feed racks, and mangers shall have paved access, and water troughs shall have a drain to carry water away from the corrals. (Cal Code Regs., title 3, § 646.1.)
2. All milk rooms and milk barns shall be floored with concrete or other low permeability suitable material and be properly drained. (Cal Code Regs., title 3, §§ 648(c) & 649(a).) All drainage that comes in contact with waste (as defined in Finding 13) shall be directed to the wastewater retention ponds.
3. All drainage that has contacted feed is a waste in accordance with Finding 13 and shall be directed to the wastewater retention ponds.
4. 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 ponds. (Title 27, § 22562(b).)
5. Roof drainage from barns, milk houses, or shelters shall not drain into the corrals unless the corrals are properly graded and drained. (Cal Code Regs., title 3, § 661.)
6. The 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 ponds and to minimize standing water as of 72 hours after the last rainfall and the infiltration of water into the underlying soils.
7. For Dischargers conducting individual groundwater monitoring, if the monitoring data in the Summary Report indicate that the Dischargers Production Area may have discharges that violate Groundwater Limitation F.1 of this Order or that such discharges may cause degradation to high quality waters, the Dischargers are required to implement management practices/activities (BPTC for high quality waters or best efforts for waters that

are not high quality) that will bring the facility into compliance with Groundwater Limitation F.1 on a time schedule that is as short as practicable.

8. Dischargers enrolled under the RMP shall implement the recommended management practices that are applicable to Production Areas in accordance with the SRMR and its approved time schedule.

If the SRMR indicates that the Dischargers Production Area may have discharges that violate Groundwater Limitation F.1 of this Order or that such discharges may cause degradation to high quality waters, the Dischargers are required to implement the approved SRMR's identified management practices/activities for Production Areas that will bring the facility into compliance with Groundwater Limitation F.1. Such practices are considered to constitute best practical treatment or control or best efforts and are designed to achieve compliance with Groundwater Limitation F.1 on a time schedule that is as short as practicable.

E. LAND APPLICATION SPECIFICATIONS

1. 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.
2. 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 J.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.
3. 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.
4. 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.
5. 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 J.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 R5-2013-0122.

6. 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.
7. 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.
8. All process wastewater applied to land application areas must infiltrate completely within 72 hours after application.
9. 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).
10. If the monitoring data in the Summary Report indicate that the Dischargers Land Application Area may have discharges that violate Groundwater Limitation F.1 of this Order, or that such discharges may cause degradation to high quality waters, the Dischargers are required to implement management practices/activities (BPTC for high quality waters or best efforts for waters that are not high quality) that will bring the facility into compliance with Groundwater Limitation F.1 on a time schedule that is as short as practicable.
11. Dischargers enrolled under the RMP shall implement the recommended management practices that are applicable to Land Application Areas in accordance with the SRMR and its approved time schedule.

If the SRMR indicates that the Dischargers Land Application Areas may have discharges that violate Groundwater Limitation F.1 of this Order or that such discharges from Land Application Areas may cause degradation to high quality waters, Dischargers are required to implement the approved SRMR's identified management practices/activities for Land Application Areas that will bring the facility into compliance with Groundwater Limitation F.1. Such practices are considered to constitute best practical treatment or control or best efforts and are designed to achieve compliance with Groundwater Limitation F.1 on a time schedule that is as short as practicable.

F. GROUNDWATER LIMITATIONS⁶

1. Discharge of waste at existing milk cow dairies shall not cause the underlying groundwater to exceed water quality objectives, unreasonably affect beneficial uses, or cause a condition of pollution or nuisance.⁷ 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.).

G. PROVISIONS

1. The Discharger shall comply with the *Standard Provisions and Reporting Requirements for Waste Discharge Requirements General Order R5-2013-0122 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, and the applicable Water Quality Control Plans.
3. The Discharger shall comply with the attached Monitoring and Reporting Program R5-2013-0122 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 ROWD in accordance with the 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 Assessment⁸ indicates that facility improvements are necessary (see Required Reports and Notices J.1.d), the Discharger shall make continual facility improvements while completing implementation of the Waste Management Plan and/or Nutrient Management Plan.

⁶ These limitations are effective immediately except where Dischargers are in compliance with Provision M of this Order and the requirements of Sections II or III of the Monitoring and Reporting Program R5-2013-0122, Attachment A, and such Dischargers are implementing management practices/activities on a time schedule that is as short as practicable. For Dischargers participating in the RMP, the implementation of management practices/activities must be implemented on a time schedule that is as short as practicable and that is consistent with any time schedule or schedule that is included in the SRMR that is approved by the Executive Officer.

⁷ Except in circumstances where a Discharger is making improvements to waste management practices that have been found not to be protective of the underlying groundwater under a time schedule that is as short as practicable.

⁸ The Preliminary Dairy Facility Assessment is required as part of the Existing Conditions Report (Attachment A).

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 ROWD 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 R5-2013-0122. Alterations of the Waste Management Plan (see Required Reports and Notices J.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 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 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 L.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.

H. 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.

I. 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. This includes regulatory changes that may be brought about by the CV-SALTS planning efforts.
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 ROWD and obtain individual waste discharge requirements.

J. REQUIRED REPORTS AND NOTICES

1. Dischargers must submit the following in accordance with the Schedule of Tasks L.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 ROWD submitted in response to the 2005 ROWD Request Letter. 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.
 - 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, General Specifications B.1-B.3, Pond Specifications C.1 through C.3, and Production Area Specifications D.1, D.4, and D.5. If the design, construction, operation, and/or maintenance of the dairy facility do 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 L.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 L.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 J.1.a above) shows that the Whole Farm Nitrogen Balance⁹ 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.

2. Reporting Provisions:

- a. All ROWDs, 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 R5-2013-0122.
- 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

⁹ 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).

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.

K. 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 R5-2013-0122.

L. SCHEDULE OF TASKS

1. Dischargers are required to develop and implement a Waste Management Plan and Nutrient Management Plan, submit an Existing Conditions Report, a Salinity Report, a Proposed Interim Facility Modifications, a 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 J.2.a above and the additional professional specified in Table 1.

Dischargers must submit a statement of completion to the Executive Officer for each of the elements of the Nutrient Management Plan by the deadlines specified in Table 1. All statements must be signed and certified by the Discharger as required in Required Reports and Notices J.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.

M. Time Schedule for Compliance

Dischargers conducting an Individual Monitoring Program shall submit a summary report within six (6) years of initiating sampling activities. The summary report must include identification of management practices that need to be implemented

to achieve compliance with applicable water quality objectives, including the groundwater limitations of the Order. Required Annual Reports presented after the submittal of the summary report, must include a discussion on implementation of changes in management practices and/or activities that are being taken and an evaluation of progress in complying with the Groundwater Limitations F.1. of the Order. Implementation of the identified management practices must be as soon as practicable, supported with appropriate technical or economic justification and in no case may time schedules extend beyond 10 years from the date that the summary report is approved by the Executive Officer.

For Dischargers participating in a representative monitoring program that is required to submit a Summary Representative Monitoring Report (SRMR) (See Monitoring and Reporting Program R5-2013-0122, Provision III.10), the following time schedule shall apply to allow Dischargers sufficient time to implement identified management practices to achieve compliance with Groundwater Limitations described in Section F.1. of this Order. The Central Valley Water Board may modify these schedules based on evidence that meeting the compliance date is technically or economically infeasible, or when evidence shows that compliance by an earlier date is feasible. Any applicable time schedules for compliance established in the Basin Plans supersede the schedules given below (e.g., time schedules for compliance with salinity standards that may be established in future Basin Plan amendments through the CV-SALTS process).

- a. The SRMR must be submitted no later than six (6) years following submittal of the first Annual Representative Monitoring Report (ARMR) (e.g., the CVDRMP submitted its first ARMR on April 1, 2013, thus the CVDRMP's SRMR must be submitted by April 1, 2019).
- b. The SRMR must identify management practices that are protective of groundwater quality for the range of conditions found at facilities participating in the representative monitoring program, and must identify in the SRMR time schedules that are as short as practicable for implementation of the identified management practices. Within 18 months of submittal of the SRMR and no later than July 1, 2020, all member dairies of the RMP for which the SRMR was submitted must submit a letter of intent to comply with applicable management practices identified in the SRMR. Time schedules in the SRMR for implementation of the identified management practices must be as soon as practicable, supported with appropriate technical or economic justification and in no case may time schedules beyond 10 years from the date that the SRMR is approved by the Executive Officer.

If, in the opinion of the Executive Officer, the Discharger fails to comply with the provisions of this Order, the Executive Officer may refer this matter to the Attorney General for judicial enforcement, may issue a complaint for administrative civil liability, or may take other enforcement actions. Failure to comply with this Order may result in

the assessment of Administrative Civil Liability of up to \$10,000 per violation, per day, depending on the violation, pursuant to the Water Code, including sections 13268, 13350 and 13385. The Central Valley Water Board reserves its right to take any enforcement actions authorized by law.

Any person aggrieved by this action of the Central Valley Water Board may petition the State Water Board to review the action in accordance with Water Code section 13320 and California Code of Regulations, title 23, sections 2050 and following. The State Water Board must receive the petition by 5:00 p.m., 30 days after the date of this Order, except that if the thirtieth day following the date of this Order falls on a Saturday, Sunday, or state holiday, the petition must be received by the State Water Board by 5:00 p.m. on the next business day. Copies of the law and regulations applicable to filing petitions may be found on the Internet at:

http://www.waterboards.ca.gov/public_notices/petitions/water_quality
or will be provided upon request.

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 October 2013.

Original signed by

PAMELA C. CREEDON, Executive Officer

Reissued Waste Discharge Requirements General Order No. R5-2013-0122
Existing Milk Cow Dairies

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.R5-2013-0122, 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
1 July 2008	Item VI	Record-Keeping Requirements.	None
	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

Reissued Waste Discharge Requirements General Order No. R5-2013-0122
Existing Milk Cow Dairies

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

Reissued Waste Discharge Requirements General Order No. R5-2013-0122
Existing Milk Cow Dairies

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. R5-2013-0122 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): Items I.F.1.b, I.F.2.b	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. Facility Description	California Registered Professional None

Reissued Waste Discharge Requirements General Order No. R5-2013-0122
Existing Milk Cow Dairies

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. R5-2013-0122 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. R5-2013-0122 including Annual Dairy Facility Assessment with facility modifications implemented to date.	None

Reissued Waste Discharge Requirements General Order No. R5-2013-0122
Existing Milk Cow Dairies

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
	Item III.D Item IV.C	Certification of completion of modifications made to meet flood protection requirements. Certification of modifications made to meet construction criteria for corrals, pens, animal housing area, and manure and feed storage areas.	California Registered Professional None
1 July 2012	Annual Report	Per Monitoring and Reporting Program No. R5-2013-0122 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 ORDER NO. R5-2013-0122

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 California Regional Water Quality Control Board, Central Valley Region (Central Valley Water Board) or 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 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.

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 Central Valley Water 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. If monitoring consistently shows no significant variation of a constituent concentration or parameter, the Discharger may request the MRP be revised to reduce monitoring frequency. The proposal must include adequate technical justification for reduction in monitoring frequency.

The Discharger shall conduct monitoring, record-keeping, and reporting as specified below.

A. MONITORING REQUIREMENTS

Visual Inspections

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
<p><u>Production Area</u></p> <p><u>Weekly during the wet season (1 October to 30 April) and monthly between 1 May and 30 September:</u> 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.</p> <p>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).</p> <p><u>During and after each significant storm event¹:</u> Visual inspections of storm water containment structures for discharge, freeboard, berm integrity, cracking, slumping, erosion, excess vegetation, animal burrows, and seepage.</p> <p><u>Monthly on the 1st day of each month:</u> Photograph each pond showing the height of wastewater relative to the depth marker and the current freeboard on that date. All photos shall be dated and maintained as part of the discharger's record.</p>
<p><u>Land Application Areas</u></p> <p><u>Prior to each wastewater application:</u> Inspect the land application area and note the condition of land application berms including rodent holes, piping, and bank erosion. Verify that any field valves are correctly set to preclude off-property or accidental discharges of wastewater.</p> <p><u>Daily when process wastewater is being applied:</u> 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.</p>

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.

Nutrient Monitoring

The Discharger shall monitor 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.

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), un-ionized ammonia-nitrogen, total Kjeldahl nitrogen, total phosphorus, total potassium, and total dissolved solids.

Once every two years (biennially):

Laboratory analyses for general minerals (calcium, magnesium, sodium, bicarbonate, carbonate, sulfate, and chloride).

Annually

Laboratory analyses of liquid process wastewater, prior to blending with irrigation water, for pH, total dissolved solids, electrical conductivity, nitrate-nitrogen, ammonium-nitrogen, total Kjeldahl nitrogen, total phosphorus, and total potassium.

Manure

Once every two years (biennially):

Laboratory analyses for general minerals (calcium, magnesium, sodium, sulfur, chloride) and fixed solids (ash).

Twice per year:

Laboratory analyses for total nitrogen, total phosphorus, total potassium, and percent moisture.

Each application to each land application area:

Record the percent moisture and total weight (tons) applied.

Each offsite export of manure:

Record the percent moisture and total weight (tons) exported.

Laboratory analyses for percent moisture.

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 percent moisture and total weight (tons) of harvested material removed from each land application area.

Laboratory analyses for total nitrogen, total phosphorus, total potassium (expressed on a dry weight basis), fixed solids (ash), and percent moisture.

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 of Order No. R5-2013-0122 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
<p>Soil</p> <p><u>Once every 5 years from each land application area (may be distributed over a 5-year period by sampling 20% of the land application areas annually):</u> Laboratory analyses for soluble phosphorus</p> <p><i>The following soil tests are recommended but not required:</i></p> <p><u>Spring pre-plant for each crop:</u> Laboratory analyses for: 0 to 1 foot depth: Nitrate-nitrogen and organic matter. 1 to 2 feet depth: Nitrate-nitrogen.</p> <p><u>Fall pre-plant for each crop:</u> Laboratory analyses at depths below ground surface of: 0 to 1 foot: Electrical conductivity, nitrate-nitrogen, soluble phosphorus, potassium and organic matter. 1 to 2 feet: Nitrate-nitrogen.</p>
<p><i>Irrigation Water</i>¹</p> <p><u>Each irrigation event for each land application area:</u> Record volume (gallons or acre-inches)² and source (well or canal) of irrigation water applied and dates applied.</p> <p><u>One irrigation event during each irrigation season during actual irrigation events:</u> For each irrigation water source (well and canal): Electrical conductivity, total dissolved solids, and total nitrogen.³ Data collected to satisfy the groundwater monitoring requirements (below) can be used to satisfy this requirement.</p>

¹ The Discharger shall monitor irrigation water (from each water well source and canal) that is used on all land application areas.

² Initial volume measurements may be the total volume for all land application areas.

³ In lieu of sampling the irrigation water, the Discharger may provide equivalent data from the local irrigation district.

Monitoring of Surface Runoff

The Discharger shall monitor any 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 frequencies specified in Table 3 below.

Table 3. DISCHARGE MONITORING
<p><i>Discharges (Including Off-Property Discharges) of Manure or Process Wastewater, from the Production Area or Land Application Area</i></p> <p><u>Daily during each discharge:</u> Record date, time, approximate volume (gallons) or weight (tons), duration, location, source, and ultimate destination of the discharge.</p> <p>Field measurements of the discharge for electrical conductivity, temperature, and pH.</p>

Table 3. DISCHARGE MONITORING
<p>Laboratory analyses of the discharge for nitrate-nitrogen, total ammonia-nitrogen, un-ionized ammonia-nitrogen, total Kjeldahl nitrogen, total phosphorus, potassium, total dissolved solids, BOD₅¹, total suspended solids, and total and fecal coliform.</p> <p><u>Daily during each discharge to surface water:</u> For surface water upstream² and downstream³ of the discharge: Field measurements for electrical conductivity, temperature, dissolved oxygen, and pH.</p> <p>Laboratory analyses for nitrate-nitrogen, total ammonia-nitrogen, un-ionized ammonia-nitrogen, total Kjeldahl nitrogen, total phosphorus, potassium, total dissolved solids, total suspended solids, and total and fecal coliform.</p>
<p><i>Storm Water Discharges to Surface Water from the Production Area⁴</i> <u>Daily during each discharge to surface water:</u> Record date, time, approximate volume, duration, location, source, and ultimate destination of the discharge.</p> <p>For (1) the discharge and surface water (2) upstream and (3) downstream of the discharge: Field measurements of electrical conductivity, dissolved oxygen, temperature, pH, total ammonia-nitrogen, and unionized ammonia-nitrogen.</p> <p>Laboratory analyses for nitrate-nitrogen, turbidity, total phosphorus, and total and fecal coliform.</p>
<p><i>Storm Water Discharges to Surface Water from Each Land Application Area⁴</i> <u>First storm event of the wet season⁵ and during the peak storm season (typically February)⁶ each year from one third of the land application areas⁷ with the land application areas sampled rotated each year⁸:</u> Record date, time, approximate volume, duration, location, and ultimate destination of the discharge.</p> <p>Field measurements of the discharge for electrical conductivity, temperature, pH, total ammonia-nitrogen, and un-ionized ammonia-nitrogen.</p> <p>Laboratory analyses of the discharge for nitrate-nitrogen, total phosphorus, turbidity, and total and fecal coliform.</p>
<p><i>Tailwater Discharges to Surface Water from Land Application Areas⁹</i> <u>Each discharge from each land application area where irrigation has occurred less than 60 days after application of manure and/or process wastewater:</u> Record date, time, approximate volume (gallons), duration, location, and ultimate destination of the discharge.</p> <p>Field measurements of discharge for electrical conductivity, temperature, pH, total ammonia-nitrogen, and un-ionized ammonia-nitrogen.</p> <p><u>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:</u> Laboratory analyses for nitrate-nitrogen, total phosphorus, and total and fecal coliform.</p>

¹ Five-day biochemical oxygen demand.

² Upstream samples shall be taken just far enough upstream so as not to be influenced by the discharge.

³ 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.

- ⁴ Sample locations must be chosen such that the samples are representative of the quality and quantity of storm water discharged.
 - ⁵ 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.
 - ⁶ 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.
 - ⁷ 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.
 - ⁸ 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 section below).
 - ⁹ Tailwater samples shall be collected at the point of discharge to surface water.
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 the 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.

Groundwater Monitoring

The Discharger shall sample each domestic and agricultural supply well and subsurface (tile) drainage systems 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. The frequency of monitoring the domestic and agricultural supply wells for ammonium nitrogen and total dissolved solids may be reduced to every five years after two years of data are provided to the Executive Officer.

Table 4. GROUNDWATER MONITORING
<i>Domestic and Agricultural Supply Wells</i> <u>Annually:</u> Field measurements of electrical conductivity and ammonium nitrogen ¹ . Laboratory analyses of nitrate-nitrogen. <u>Every five years (may be distributed over a 5-year period by sampling 20% of the wells annually):</u> Laboratory analyses for general minerals (calcium, magnesium, sodium, bicarbonate, carbonate, sulfate, chloride, and total dissolved solids). <i>Subsurface (Tile) Drainage System</i> <u>Annually:</u> Field measurements of electrical conductivity and ammonium nitrogen ¹ . Laboratory analyses of nitrate-nitrogen, total phosphorus, and total dissolved solids.

¹ If field measurement indicates the presence of ammonium nitrogen, the discharger shall collect a sample for laboratory analysis of ammonium nitrogen.

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. If the sample cannot be collected prior to a pressure tank, the well must be purged at least twice the volume of the pressure tank. 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.
2. Additional groundwater monitoring requirements are specified in Attachment A to this Order.

General Monitoring Requirements

1. The Discharger shall comply with the additional groundwater monitoring requirements specified in Attachment A to this Order either through individual groundwater monitoring or by participation in a Representative Monitoring Program as laid out in Attachment.
2. The Discharger shall comply with all the "Requirements Specifically for Monitoring Programs and Monitoring Reports" as specified in the Standard Provisions and Reporting Requirements.

3. 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.
4. 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.
5. All samples collected shall be representative of the volume and nature of the material being sampled.
6. All sample 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.
7. 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.
8. All samples submitted to a laboratory for analyses shall be identified in a properly completed and signed Chain of Custody form.
9. Field test instruments used for temperature, pH, electrical conductivity, ammonia nitrogen, un-ionized ammonia nitrogen, 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 (Owners must maintain their own copies of this information):

1. All information necessary to document implementation and management of the Nutrient Management Plan, including the information described in Items 2 through 6 below;
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 or bypass of the wastewater storage or conveyance structures;
 - 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 of manure applied to each field;
 - d. Dates, locations, and volume of process wastewater applied to each field;
 - e. Whether precipitation occurred, or standing water was present, at the time of manure and process wastewater applications and for 24 hours prior to and following applications;
 - f. Dates, locations, and test methods for soil, manure, process wastewater, irrigation water, and plant tissue sampling;

- g. Results from manure, process wastewater, irrigation water, soil, plant tissue, discharge (including tailwater), and storm water sampling;
 - h. 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 of Order No. R5-2013-0122);
 - i. Calculations showing the total nitrogen, total phosphorus, and potassium to be applied to each field, including sources other than manure or process wastewater (Nutrient Budget);
 - j. Total amount of nitrogen, phosphorus, and potassium actually applied to each field, including documentation of calculations for the total amount applied (Nutrient Application Calculations);
 - k. The method(s) used to apply manure and/or process wastewater;
 - l. 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
 - m. 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 Nutrient Management Plan;
 - 5. Tracking Manifest forms (Attachment D of Order No. R5-2013-0122) for off-site exports of manure or process wastewater 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 through A.5 and A.8 through 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 Emergency Management Agency (CalEMA). 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. CalEMA 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 *Discharges (Including Off-Property Discharges) of Manure or Process Wastewater or Other Dairy Waste 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**. 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. Maximum and average number and type of animals, whether in open confinement or housed under roof during the reporting period;
3. Estimated amount of total manure (tons) and process wastewater (gallons or acre-inches) generated by the facility during the annual reporting period; a calculation of the total nitrogen, total phosphorus, total potassium, and total salt content measured as fixed solids of the solid waste; and total dissolved solids of the liquid waste;
4. 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 total nitrogen, total phosphorus, total potassium, and total salt content measured as fixed solids (ash) of the solid waste and total dissolved solids of the liquid waste;
5. Quantify the ratio of total nitrogen applied to land application areas and total nitrogen removed by crop harvest (nitrogen uptake).
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; a calculation of the total nitrogen, total phosphorus, total potassium, and total salt content measured as fixed solids of the solid waste; and total dissolved solids of the liquid waste;
7. Total number of acres and the Assessor Parcel Numbers for all land application areas that were not used for application of manure or process wastewater during the reporting period;

8. Total number of acres and the Assessor Parcel Numbers of properties 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, and 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, and location; 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, and 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 Nutrient Management Plan has been updated and whether the current version of the facility's Nutrient Management Plan was developed or approved by a certified nutrient management specialist as specified in Attachment C of Order No. R5-2013-0122;
13. Copies of all manure/process wastewater tracking manifests for the reporting period;
14. A statement indicating if there were any changes to third party agreements to receive manure or process wastewater. If there were any changes, submit copies of all new or revised 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 (QA/QC) 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;

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.j, and B.3.l 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 QA/QC results).
2. Dischargers that have monitoring well systems shall include all laboratory analyses (including Chain of Custody forms and laboratory QA/QC 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 Order No. R5-2013-0122.

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 QA/QC 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 of Order No. R5-2013-0122, 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

ORDERED BY:

PAMELA C. CREEDON, Executive Officer

Date

3 October 2013

**MONITORING AND REPORTING PROGRAM NO. R5-2013-0122
ATTACHMENT A**

**Groundwater Monitoring,
Monitoring Well Installation And Sampling Plan
And
Monitoring Well Installation Completion Report
For
Existing Milk Cow Dairies**

I. Groundwater Monitoring

The provisions of Attachment A are set out pursuant to the Executive Officer's authority under California Water Code (CWC) Section 13267 to order Dischargers to implement monitoring and reporting programs. The purpose of groundwater monitoring required by these provisions is to confirm that management practices being employed for the wastewater retention system, land application areas, and animal confinement areas, are protective of groundwater quality and comply with Groundwater Limitation F.1 of the Waste Discharge Requirements General Order for New or Expanded Milk Cow Dairy Facilities (Order).

As an alternative to installing monitoring wells on an individual basis as set out in Section II, Dischargers subject to Order No. R5-2013-0122 (Order) may participate in a Representative Monitoring Program that meets the requirements set forth in Section III below. Dischargers choosing to participate in a Representative Monitoring Program must notify the California Regional Water Quality Control Board, Central Valley Region (Central Valley Water Board). Notification to the Central Valley Water Board¹ must include identification of the Representative Monitoring Program that the Discharger intends to join. Dischargers choosing not to participate in a Representative Monitoring Program or those failing to notify the Central Valley Water Board of their decision to participate in a Representative Monitoring Program, will continue to be subject to the groundwater monitoring requirements of the Order and Monitoring and Reporting Program No. R5-2013-0122 (MRP). If necessary, the Executive Officer will prioritize these groundwater monitoring requirements based on the factors in Table 5 below.

A Representative Monitoring Program is not a Discharger. New or expanded dairy owners and operators are Dischargers and are responsible and liable for individual compliance and for determining if they are in compliance with the terms the Order. As set forth in Section III below, an eligible Representative Monitoring Program will convey information related to a Discharger's participation in the Representative Monitoring Program, conduct representative monitoring pursuant to an approved monitoring plan, and prepare and submit any required plans and monitoring reports. However, member Dischargers will be responsible for failure on the part of the Representative Monitoring Program to comply with the MRP.

¹ In lieu of individual discharger notifications to the Central Valley Water Board, a Representative Monitoring Program may provide to the Central Valley Water Board a list of participants that have signed up and met the initial requirements for participation in that Representative Monitoring Program.

If a Discharger participating in a Representative Monitoring Program wishes to terminate participation in the Program, the Discharger shall submit a Notice of Termination to the Executive Officer and the administrator of the Representative Monitoring Program. Administrators of a Representative Monitoring Program shall also notify the Executive Officer of a participant's failure to participate in their Representative Monitoring Program. A Representative Monitoring Program shall inform the Executive Officer of the participant's failure to participate within 45 days, which may result in the Executive Officer issuing a Notice of Termination to the Discharger stating that the Discharger is no longer able to participate in a Representative Monitoring Program as an alternative to individual groundwater monitoring. Termination from participation in a Representative Monitoring Program will occur on the date specified in the Notice of Termination, unless otherwise specified. Dischargers who voluntarily terminate their participation in a Representative Monitoring Program, receive a Notice of Termination from a Representative Monitoring Program, or receive a Notice of Termination from the Executive Officer, shall be individually subject to the groundwater monitoring requirements of the Order and MRP.

Pursuant to the CWC Section 13267, the Executive Officer may, at any time, order implementation of individual groundwater monitoring at an expanded or new dairy facility, even if the Discharger participates in a Representative Monitoring Program. Such order may occur, for instance, if violations of the Order are documented and/or the facility is found to be in an area where site conditions and characteristics pose a high risk to groundwater quality. In the event the Executive Officer orders implementation of individual groundwater monitoring to a participant of a Representative Monitoring Program, such an order shall constitute a Notice of Termination to the participant and the Discharger shall no longer be eligible to participate in a Representative Monitoring Program to comply with the groundwater monitoring requirements of the MRP.

II. Individual Monitoring Program Requirements

1. 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			
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 to 20	10	
	> 20	20	
Location of production area or land application area relative to a Department of Pesticide Groundwater Protection Area (GWPA).	Outside GWPA	0	
	In GWPA	20	
Distance (feet) of production area or land application area from an artificial recharge area 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	
Whole Farm Nitrogen Balance.	< 1.65	0	
	1.65 to 3	10	
	> 3	20	

Total Score: _____

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 (including the annular space outside of the well casing) from acting as a conduit for pollutant/contaminant transport. Each monitoring well shall be appropriately designed and constructed to enable collection of representative 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. More stringent practices shall be implemented if needed to prevent the well from acting as a conduit for the vertical migration of waste constituents.
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

Quarterly¹:

Measurement of the depth to groundwater from a surveyed reference point to the nearest 0.01 foot in each monitoring well.

Semi-annually:

Field measurements of electrical conductivity, temperature, and pH.

Laboratory analyses for nitrate and ammonia.

Within six months of well construction and every two years thereafter:

Laboratory analyses for general minerals (calcium, magnesium, sodium, potassium, bicarbonate, carbonate, sulfate, and chloride).

¹ After two years of quarterly depth to groundwater measurements, the discharger may request reduction of frequency of depth to groundwater measurements to semi-annually upon demonstration there are no seasonal impacts to groundwater levels.

9. Groundwater samples from monitoring wells shall be collected as specified in the approved Monitoring Well Installation and Sampling Plan (MWISP).
10. The Discharger shall submit to the Executive officer an annual assessment of the groundwater monitoring data due 1 July of each year. The annual assessment may be attached to the annual report required in Section C of the MRP. The annual assessment shall include a tabulated summary of all analytical data collected to date including analytical lab reports for data collected during the past year. The assessment shall include an evaluation of the groundwater monitoring program's adequacy to assess compliance with the Order, including whether the data provided is representative of conditions upgradient and downgradient wastewater management area, production area and land application area of the dairy facility. The assessment shall also include an evaluation of the groundwater monitoring data collected to date with a description of the statistical or non-statistical methods used. The assessment must use methods approved by the Executive Officer. If the Discharger determines that the analytical methods required by this MRP are insufficient to identify whether site activities are impacting groundwater quality, the annual assessment must address Item II.11 below and employ the needed analyses during future monitoring events.
11. If the monitoring parameters required by this MRP are insufficient to identify whether site activities are impacting groundwater quality, the Discharger must employ all reasonable chemical analyses to differentiate the source of the particular constituent. This includes, but is not limited to, analyses for a wider array of constituents and chemical isotopes.
12. Within six years of initiating sampling activities, the Discharger shall submit to the Executive Officer a summary report presenting a detailed assessment of the monitoring data to evaluate whether site activities associated with operation of the wastewater retention system, corrals, or land application areas have impacted groundwater quality. This summary report can be required at an earlier date if evaluation by the Discharger or Central Valley Water Board staff indicates that the

assessment can be completed at an earlier date. This summary report shall also include detailed descriptions of management practices employed at the wastewater retention system, animal confinement areas, and land application areas along with the design standards of the wastewater retention system. The summary report must include an adequate technical justification for the conclusions incorporating available data and reasonable interpretations of geologic and engineering principles to identify management practices protective of groundwater quality. The summary report is subject to approval by the Executive Officer. If monitoring data indicate that Groundwater Limitation F.1 of the Order has been violated, this assessment shall include a description of changes in management practices and/or activities that will be undertaken to bring the facility into compliance. Annual reports required in Section C of the MRP submitted after this summary report must include a discussion and schedule for implementation of changes in management practices and/or activities that are being taken and an evaluation of progress in complying with Groundwater Limitation F.1 of the Order.

13. At any time during the term of this permit, the Central Valley Water Board may notify the Discharger to submit assessments of groundwater monitoring data (including the annual reports and the summary report) electronically. Data shall be submitted in a digital format acceptable to the Executive Officer.

III. Representative Monitoring Program Requirements

To establish a Representative Monitoring Program in lieu of individual groundwater monitoring, the Representative Monitoring Program must have Executive Officer approval of a submitted Monitoring and Reporting Workplan. The Monitoring and Reporting Workplan shall include sufficient information for the Executive Officer to evaluate the adequacy of the proposed groundwater monitoring program to serve as an alternative to the installation of individual groundwater monitoring wells at dairies. The Monitoring and Reporting Workplan must explain how data collected at facilities that are monitored will be used to assess impacts to groundwater at facilities that are not part of the Representative Monitoring Program's network of monitoring wells. This information is needed to demonstrate whether collected facility monitoring data will allow identification of practices that are protective of water quality at all facilities represented by the Representative Monitoring Program, including those for which on-site data are not collected. The Monitoring and Reporting Workplan must additionally propose constituents the Representative Monitoring Program will monitor and the frequency of monitoring for each constituent identified. The Monitoring and Reporting Workplan must propose a list of constituents that is sufficient to identify whether activities at facilities being monitored are impacting groundwater quality. The list of constituents may necessarily be greater than the constituents required to be monitored at sites under individual orders (as listed in Table 6), as failure to determine whether groundwater has been impacted at a monitored facility will impair the ability to extrapolate findings to facilities where monitoring does not occur. At a minimum the baseline constituents shall include those required of individual groundwater monitoring systems.

1. Once the Monitoring and Reporting Workplan is approved, the Representative Monitoring Program shall begin the process of installing monitoring wells as prescribed in paragraphs 3-7 below.
2. Prior to installation of monitoring wells, the Representative Monitoring Program shall submit to the Executive Officer a 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 Representative Monitoring Program in writing that the MWISP is acceptable. The MWISP must be submitted within 60 days of Executive Officer approval of the Monitoring and Reporting Workplan.
3. All monitoring wells shall be constructed in a manner that maintains the integrity of the monitoring well borehole and prevents the well (including the annular space outside of the well casing) from acting as a conduit for pollutant/contaminant transport. Each monitoring well shall be appropriately designed and constructed to enable collection of representative samples of the first encountered groundwater.
4. 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 supersede the Well Standard of DWR, and the Representative Monitoring Program shall comply with the more stringent standards. More stringent practices shall be implemented if needed to prevent the well from acting as a conduit for the vertical migration of waste constituents.
5. 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.
6. Within 45 days after completion of any monitoring well network, the Representative Monitoring Program shall submit to the Executive Officer a 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. In cases where monitoring wells are completed in phases or completion of the network is delayed for any reason, monitoring well construction data are to be submitted within 180 days of well completion, even if this requires submittal of multiple reports.

7. Once the groundwater monitoring network is installed pursuant to an approved Monitoring and Reporting Workplan and paragraphs 3-6 above, the Representative Monitoring Program shall sample monitoring wells for the constituents and at the frequencies as specified in the approved Monitoring and Reporting Workplan. Groundwater monitoring shall include monitoring during periods of the expected highest and lowest water table levels. In cases where the monitoring wells are completed in phases or completion of the monitoring well network is delayed for any reason, collection and analysis of groundwater samples from each well is to commence within 180 days of completion of that well.
8. Groundwater samples from monitoring wells shall be collected as specified in an approved MWISP.
9. The Representative Monitoring Program shall submit to the Executive Officer an Annual Representative Monitoring Report (ARMR). The ARMUR shall be due by 1 April of each year and shall include all data (including analytical reports) collected during the previous calendar year. The ARMUR shall also contain a tabulated summary of data collected to date by the Representative Monitoring Program. The ARMUR shall describe the monitoring activities conducted by the Representative Monitoring Program, and identify the number and location of installed monitoring wells and other types of monitoring devices. Within each ARMUR, the Representative Monitoring Program shall evaluate the groundwater monitoring data to determine whether groundwater is being impacted by activities at facilities being monitored by the Representative Monitoring Program. The submittal shall include a description of the methods used in evaluating the groundwater monitoring data. Each ARMUR shall include an evaluation of whether the representative monitoring program is on track to provide the data needed to complete the summary report (detailed in Item III.10 below). If the evaluation concludes that information needed to complete the summary report may not be available by the required deadline, the ARMUR shall include measures that will be taken to bring the program back on track.

The ARMUR shall include an evaluation of data collected to date and an assessment of whether monitored dairies are implementing management practices that are protective of groundwater quality. If the management practices being implemented at a dairy being monitored are found to not be protective of groundwater quality, the Executive Officer may issue an order to the owner/operator of the monitored dairy to identify and implement management practices that are protective of groundwater quality prior to submittal of the report described in Item III.10 below.

10. No later than six (6) years following submittal of the first ARMUR, the Representative Monitoring Program shall submit a Summary Representative Monitoring Report (SRMR) identifying management practices that are protective of groundwater quality for the range of conditions found at facilities covered by

the Representative Monitoring Program. The identification of management practices for the range of conditions must be of sufficient specificity to allow participants covered by the Representative Monitoring Program and the Central Valley Water Board to identify which practices at monitored facilities are appropriate for facilities with a corresponding range of site conditions, and generally where such facilities may be located within the Central Valley (e.g., the summary report may need to include maps of the Central Valley that identify the types of management practices that should be implemented in certain areas based on specified site conditions). The summary report must include an adequate technical justification for the conclusions incorporating available data and reasonable interpretations of geologic and engineering principles to identify management practices protective of groundwater quality. The summary report is subject to approval by the Executive Officer.

11. Assessments of groundwater monitoring data (including the annual reports and the summary report) are to be submitted electronically. Data shall be submitted in an electronic format acceptable to the Executive Officer.
12. On July 1 following Executive Officer approval of the SRMR, each Discharger that is a participant covered by a Representative Monitoring Program shall include in their annual report required in Section C of the MRP a description of management practices currently being implemented at their wastewater retention system(s), land application area(s), and animal confinement area(s). If these management practices are not confirmed to be protective of groundwater quality based on information contained in the SRMR, and therefore are not confirmed to be sufficient to ensure compliance of the facility with Groundwater Limitation F.1 of the Order the Discharger's annual report shall identify which alternative management practices the participant intends to implement at its dairy facility and a schedule for their implementation (based on the findings of the SRMR). Management practices deemed to be protective of groundwater quality are subject to approval by the Executive Officer. With each annual report submitted after the first report following Executive Officer approval of the SRMR, each participant shall include within his or her annual report an update with respect to implementation of the additional or alternative management practices being employed by the Discharger to protect groundwater quality.
13. Within three months of joining a Representative Monitoring Program, each Discharger that is a participant covered by a Representative Monitoring Program shall submit to the Central Valley Water Board a letter stating that they are voluntarily joining the Representative Monitoring Program, they are aware of the conditions and requirements to be a member of the Program, they intend to fully comply with the monitoring and reporting program and intent of the Program, and they are fully aware failure to comply with the Program may result in their removal from the Program and that they may be subject to enforcement by the Central Valley Water Board.

IV. Monitoring Well Installation and Sampling Plan (MWISP) (Applicable to both Individual and Representative Monitoring Program Requirements)

At a minimum, the MWISP must contain all of the information listed below.

1. General Information:
 - a. Topographic map showing any existing nearby (about 2,000 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. In the case of a Representative Monitoring Program, this information must include an explanation of how the location, number, and depths of wells proposed will result in the collection of data that can be used to assess groundwater at sites with a variety of conditions that have joined the Representative Monitoring Program but are not being monitored as part of the monitoring network.
 - 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 accurately 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 (not less than 48 hours or more than 10 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.

V. Monitoring Well Installation Completion Report (MWICR)

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. 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 protection device (such as below-grade water-tight vaults, stovepipe, bollards, etc).
 - h. All depth to groundwater measurements during field program.
 - i. Field notes from drilling and installation activities (e.g., all subcontractor dailies, as appropriate).
 - j. 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. Disposition 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 (e.g., ground surface, top of casing, etc.).

- c. Horizontal and vertical coordinates of well casing with cap removed (measuring point to nearest ± 0.01 foot).
- d. Name, license number, and signature of California licensed professional who conducted survey.
- e. Surveyor's field notes.
- f. Tabulated survey data.

**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION**

**STANDARD PROVISIONS AND REPORTING REQUIREMENTS
FOR**

**WASTE DISCHARGE REQUIREMENTS GENERAL ORDER NO. R5-2013-0122
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.

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

Order R5-2013-0122

INFORMATION SHEET
REISSUED WASTE DISCHARGE REQUIREMENTS GENERAL ORDER
FOR
EXISTING MILK COW DAIRIES

INTRODUCTION

This Information Sheet provides information to supplement, clarify, and elaborate upon the findings and requirements contained in the reissued Waste Discharge Requirements General Order for Milk Cow Dairies R5-2013-0122 (the "Dairy General Order"). This Information Sheet is considered a part of the Dairy General Order.

The Dairy General Order will serve as general Waste Discharge Requirements (WDRs) for discharges of waste from existing milk cow dairies. The Dairy General Order is not a National Pollutant Discharge Elimination System (NPDES) permit, and does not authorize discharges to surface waters that would otherwise require a NPDES permit.

All dairies receiving coverage under the Dairy General Order are required to:

- Monitor wastewater, soil, crops, manure, surface water discharges, and storm water discharges;
- Monitor surface water and groundwater in accordance with a monitoring and reporting program (regulated dairies have the option to join a Representative Groundwater Monitoring Program (RMP) in lieu of individual monitoring of first encountered groundwater);
- Implement a Waste Management Plan for the dairy production area;
- Implement a Nutrient Management Plan (NMP) for all land application areas;
- Retain records for the production area and the land application areas;
- Submit annual monitoring reports; and
- Improve or replace management practices that are found not to be protective of water quality.

BACKGROUND

Pursuant to Water Code section 13260, any person discharging or proposing to discharge wastes that could affect the quality of the waters of the state is obliged to file a report of that discharge with the appropriate regional water board (this report is referred to as a "Report of Waste Discharge" or "ROWD"). The regional water boards have the authority to waive this requirement pursuant to Water Code section 13269. In 1982, the California Regional Water

Quality Control Board, Central Valley Region (Central Valley Water Board or Board) adopted Resolution No. 82-036, which waived the ROWD requirement for most dairies in the Central Valley Region. This waiver remained in place until statutory changes to Water Code section 13269 resulted in the automatic expiration of all existing waivers on 1 January 2003.

Knowing that the existing waiver was due to expire, the Central Valley Water Board adopted Resolution R5-2002-0205 on 6 December 2002. This resolution stated that all dairies would be expected to obtain regulatory coverage under either:

- Individual or general waste discharge requirements prescribed by the Board pursuant to Water Code section 13263;
- A conditional waiver that the Board would adopt pursuant to Water Code section 13269; or
- Individual or general National Pollutant Discharge Elimination System (NPDES) permits, which would be issued by the Board pursuant to Federal law.

The Board rescinded Resolution R5-2002-0205 on 13 March 2003 because it had failed to issue general waste discharge requirements or a general NPDES permit, and thus dairy operators could not apply for regulatory coverage under either one of those permitting schemes before the deadlines in the resolution expired.

The Central Valley Water Board spent the next couple of years developing a regulatory strategy for addressing dairy wastes. On 8 August 2005, in furtherance of this strategy, the Board issued certified letters to the owners and operators of all known operating dairy facilities. These letters requested that the owners and operators submit a ROWD for each dairy (i.e., multiple ROWDs if they owned or operated more than one dairy) to the Central Valley Water Board by 17 October 2005 (this correspondence is referred to as the "ROWD Request Letter"). On 3 May 2007, the Central Valley Water Board issued General Order R5-2013-0122 (the "2007 General Order"). The 2007 General Order regulated "existing milk cow dairies," defined as those dairies that were operating as of 17 October 2005 and that had filed a ROWD in response to the ROWD Request Letter.

Following the issuance of the 2007 General Order, the Asociación de Gente Unida por el Agua (a coalition of community residents and non-profit organizations) and the Environmental Law Foundation (collectively referred to as the "Petitioners") petitioned the 2007 General Order to the State Water Resources Control Board (State Water Board). The State Water Board dismissed the petition, concluding that it failed to raise substantial issues. The Petitioners then filed a petition for writ of mandate in the Sacramento County Superior Court (the "Superior Court"), arguing that the Central Valley Water Board failed to comply with the requirements of State Water Board Resolution 68-16, the Statement of Policy with Respect to Maintaining High Quality of Waters in California (*State Anti-Degradation Policy*) when it issued the 2007 General Order. The Superior Court denied the petition, and the Petitioners subsequently filed an appeal in the Third District Court of Appeal (the "Appellate Court"). The Appellate Court reversed the Superior Court's decision, and found that the Board's 2007 General Order did not comply with the requirements of the *State Anti-Degradation Policy*. (*Asociación de Gente Unida por el Agua*

v. Central Valley Regional Water Quality Control Bd. (hereafter *AGUA*) (2012) 210 Cal.App.4th 1255.)

Responding to the reversal, the Superior Court issued a Writ of Mandate that compels the Central Valley Water Board to, "[s]et aside the [2007 General Order] and reissue the permit only after application of, and compliance with, the State's anti-degradation policy ... as interpreted by the Court of Appeal in its opinion." The reissued Dairy General Order is intended to set aside and replace the 2007 General Order in compliance with the Superior Court's writ of mandate.

When the Board issued the 2007 General Order, it also issued a companion Monitoring and Reporting Program (MRP) pursuant to Water Code section 13267. This MRP included monitoring, record-keeping, and reporting requirements that were applicable to all dairies regulated by the 2007 General Order. However, due to resource constraints, the dairy industry and the Central Valley Water Board acknowledged that it would be infeasible for all the dairies to immediately implement individual monitoring programs: the dairies lacked the financial resources to install multiple monitoring wells at each facility, there were not enough consultants available to develop groundwater monitoring programs and install multiple monitoring wells at each dairy facility, and the Central Valley Water Board lacked the staff to analyze thousands of individual groundwater monitoring reports.

In order to efficiently assess the water quality impacts associated with various waste management practices employed at the dairies, the Central Valley Water Board proposed two parallel approaches to monitoring: 1) the dairies that elected to conduct their own monitoring could continue to do so under their individual monitoring programs, and 2) the dairies that would prefer to pool their resources could enroll in a RMP. After soliciting public comments on revisions to the MRP that would add an RMP option, the Board's Executive Officer issued the revised version of the MRP (the "Revised MRP") on 23 February 2011.

Under the RMP approach, individual dairies have the option of joining together to collectively monitor different waste management practices in a variety of geologic settings in lieu of developing individual monitoring programs. The collective monitoring effort is being used to develop a suite of effective management practices, and substantially decreases the expense and unnecessary duplication of implementing individual monitoring programs. Dairies utilizing management practices that are found not to be protective of groundwater quality will be required to improve upon those management practices. In accordance with the terms of the Revised MRP, the Board's Executive Officer approved a Monitoring and Reporting Workplan for the Central Valley Dairy Representative Monitoring Program (CVDRMP), which is discussed in greater detail under the section entitled *How Will the Board Evaluate the Effectiveness of Management Practices?*, which is presented later on in this Information Sheet.

DAIRIES REGULATED BY THE DAIRY GENERAL ORDER

There were approximately 1,600 dairy operations that received regulatory coverage under the 2007 General Order. Since then, the number of dairy operations within the Central Valley Region has declined significantly, largely due to economic reasons. Since 2007, revenues from

milk produced by dairies have not kept up with the rising cost of doing business. Increased charges for producing and purchasing cattle feed and depressed milk prices have been the dominant factors in this decline, although regulatory compliance costs have also been a factor. The Board estimates that at this time about 1,300 dairy operations are covered by the 2007 General Order and will be subject to the reissued Dairy General Order.

The herd sizes at these dairy operations vary as operators strive to maintain a consistent milk production. Maintaining consistent milk production requires a dairy operator to manage the herd by continually producing calves, some of which eventually replace the dairy's producing herd over time, while excess stock are marketed for beef production or herd replacement elsewhere. Professionals at the University of California Davis estimate that 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 ROWDs that were submitted in response to the ROWD Request Letter, plus or minus 15 percent (to account for the normal variation in herd sizes). An increase in the number of mature dairy cows of more than 15 percent is considered an expansion, and the expanded dairy will be required to file a new ROWD to obtain regulatory coverage under a different General Order or an individual order.

As stated above, neither the 2007 General Order nor this Order purports to be a NPDES permit. Dairies that have a discharge requiring coverage under a NPDES permit must obtain coverage under Revised Order R5-2010-118, Revised Waste Discharge Requirements/NPDES Permit CAG015001 (as revised by Order R5-2011-0091). As Order R5-2011-0091 simply modifies Order R5-2010-0118, R5-2011-0091 does not exist as a separate order and the Expiration Date of Order R5-2010-0118 has not changed.

For a variety of reasons, the Central Valley Water Board may also determine that an individual dairy facility is not appropriately regulated under the Dairy General Order, and may require such a facility to be regulated under individual WDRs.

RATIONALE FOR ISSUING A GENERAL ORDER

The Central Valley Water Board has the authority to regulate waste discharges that could affect the quality of the waters of the state under Division 7 of the Water Code. The Board regulates most discharges by prescribing waste discharge requirements (including both waste discharge requirements issued under state law and waste discharge requirements issued under the federal Clean Water Act) or by issuing conditional waivers. All confined animal facilities (as defined in Cal. Code Regs., tit. 27, § 20164), including dairies, are subject to the Board's regulatory authority.

Water Code section 13263(i) describes the criteria that the Board uses to determine whether a group of facilities should be regulated under a general order (as opposed to individual orders). These criteria include:

- 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, and
- The discharges are more appropriately regulated under general WDRs rather than individual WDRs.

Dairy facilities are appropriately regulated by a general order because they: (a) involve similar types of operations, where animals are confined and where their wastes are managed by onsite storage, land application, or removal offsite; (b) the discharges from these facilities, which are primarily composed of animal waste, are similar; (c) the dairies are subject to regulations that impose the same or similar treatment standards; (d) discharges of dairy wastes have the same potential to impact waters of the state; and, (e) given the large number of facilities and their similarities, the dairies are more appropriately regulated under a general order.

APPLICABLE REGULATIONS, PLANS, AND POLICIES

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 Central Valley Region, specify water quality objectives to protect those uses, and include implementation programs for achieving water quality objectives. The Basin Plans also incorporate, by reference, plans and policies of the State Water Board, including the *State Anti-Degradation Policy* and State Water Board Resolution 88-63 (*Sources of Drinking Water Policy*). The Dairy General Order contains requirements necessary to bring the discharges of waste from the dairies into compliance 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

The State Water Board adopted statewide standard definitions for beneficial uses of surface and ground waters. These standard definitions were used to identify the existing and potential future beneficial uses contained in the Basin Plans. Consideration also was given to the practicability of restoring uses which may have been lost because of water quality.

Surface Waters: Pursuant to Chapter II of the Basin Plans, the beneficial uses of surface water may include: municipal and domestic supply; agricultural supply; industrial process supply; industrial service supply; hydro-power generation; water contact recreation; non-contact water recreation; warm freshwater habitat; cold freshwater habitat; migration of aquatic organisms; spawning reproduction and/or early development; wildlife habitat; navigation; rare, threatened, or endangered species; groundwater recharge; freshwater replenishment; aquaculture; and preservation of biological habitats of special significance. The Sacramento River and San Joaquin River Basins Plan includes four additional beneficial use designations not specified in the Tulare Lake Basin Plan (agricultural stock watering, commercial and sport fishing, estuarine

habitat, and shellfish harvesting). Both Basin Plans contain a Table that lists the surface water bodies and the beneficial uses. Where water bodies are not specifically listed, the Basin Plans designate beneficial uses based on the waters to which they are tributary.

The beneficial uses are protected in the Dairy General Order by, among other requirements, a prohibition on the direct or indirect discharge of waste and/or storm water from the production area to surface waters, a prohibition on the discharge of wastewater to surface waters from cropland, a prohibition on 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 a prohibition on the discharge of waste from existing milk cow dairies to surface waters that causes or contributes to an exceedance of any applicable water quality objective or any applicable state or federal water quality criterion.

Ground waters: 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 or cause pollution or nuisance. Degradation of groundwater is allowed provided it is in accordance with this Dairy General Order.

Water Quality Objectives

Pursuant to Water Code section 13263(a), WDRs must implement the Basin Plans, and the Board must consider the beneficial uses of water, the water quality objectives reasonably required to protect those beneficial uses, other waste discharges, and the need to prevent nuisance conditions. 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. (Wat. Code, § 13050(h).) 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 water quality objectives are implemented in WDRs consistent with the Basin Plans' *Policy for Application of Water Quality Objectives*, which specifies that the Central Valley Water Board "will, on a case-by-case basis, adopt numerical limitations in orders which will implement the narrative objectives." To derive numeric limits from narrative water quality objectives, the Board considers relevant numerical criteria and guidelines developed and/or published by other agencies and organizations.

The primary waste constituents of concern (COC's) due to discharges of waste from dairies with respect to surface waters are: nitrogen in its various forms (ammonia and un-ionized ammonia, nitrate, nitrite, and total Kjeldahl nitrogen), phosphorus, potassium, salts (as measured by total dissolved solids and electrical conductivity), total suspended solids, and pathogens. In addition, 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 the production area and land application areas. Some portion of some of these chemicals may be commingled with process wastewater before it is stored in the retention pond.

The COC's due to discharges of waste from dairies with respect to groundwater are: nitrogen in its various forms (ammonia and un-ionized ammonia, nitrate, nitrite, and total Kjeldahl nitrogen), salts, and general minerals (calcium, magnesium, sodium, potassium, bicarbonate, carbonate, sulfate, and chloride). The discharge of waste from dairies must not cause surface water or groundwater to exceed the applicable water quality objectives for those constituents. If compliance cannot be immediately achieved, the Board may set a compliance time schedule for the discharger to achieve compliance with the water quality objectives. Under the Basin Plans, this time schedule must be "as short as practicable."

Water Quality Objectives and Federal Criteria for Surface Water¹

Water quality objectives that apply to surface water include, but are not limited to, (1) 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 Cal. Code Regs., tit. 22, §§ 64431 and 64444 and are applicable through the Basin Plans to waters designated as municipal and domestic supply), dissolved oxygen objectives, pH objectives, and the salinity objectives; and (2) 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 C.F.R. §§ 131.36 and 131.38.)

¹ The Dairy 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.

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 Cal. Code Regs., tit. 22, §§ 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.

State Water Board Resolution 88-63 (The Sources of Drinking Water Policy)

The *Sources of Drinking Water Policy* states 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.
- d. The aquifer is regulated as a geothermal energy producing source or has been exempted administratively pursuant to 40 CFR, Section 146.4. for the purpose of underground injection of fluids associated with the production of hydrocarbon or geothermal energy, provided that these fluids do not constitute a hazardous waste under 40 CFR, Section 261.3.

Both Basin Plans include criteria for granting exceptions to municipal and domestic supply designations based on the *Sources of Drinking Water Policy*. The Tulare Lake Basin Plan also includes criteria for granting exceptions to the designation of beneficial uses for agricultural supply and industrial supply. The Tulare Lake Basin Plan specifies exceptions to the designated beneficial uses for some groundwater within the Tulare Lake Basin. Exceptions to the *Sources of Drinking Water Policy* are not self-implementing, but must be established in an amendment to the Basin Plan.

Title 27 of the California Code of Regulations

Title 27 of the California Code of Regulations prescribes minimum standards for animal waste at confined animal facilities. For surface water protection, Title 27 includes requirements for the 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 require 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, and minimize

infiltration of water into underlying soils in manured areas. Furthermore, retention ponds must be located in, or lined with, soils of at least 10 percent clay and no more than 10 percent gravel. (Cal. Code. Regs., tit. 27, § 22562(d).)

However, it is Central Valley Water Board staff's understanding that the retention pond standard was developed based on the assumption that manure solids contained within the wastewater would effectively reduce the permeability of the soils lining the wastewater ponds. This reduced permeability would result in a lowering of the pond leaching rate to a level thought to be protective of groundwater quality. An October 2003 report (the "Task 2 Report") by Brown, Vence, and Associates (BVA) confirmed that the "...current Title 27 requirements are insufficient to prevent groundwater contamination from confined animal facilities, particularly in vulnerable geologic environments." Adverse impacts have been detected in areas where groundwater is as deep as 120 feet below ground surface, and in some areas underlain by fine-grained sediments. Factors that appear to affect a clay-lined pond's ability to be protective of groundwater quality vary significantly from site to site due to native soil conditions, pond construction, pond age, manure properties, climate, pond operation, pond maintenance and depth to groundwater. Potential controlling factors appear to include: the inherent structure of the underlying soil, the moisture content of the unsaturated portion of the aquifer (vadose zone), the presence or absence of macropores or preferential pathways within the vadose zone (desiccation cracking, earthworm channels, development of root holes), and the oxidation reduction conditions present within the vadose zone and within the aquifer itself.

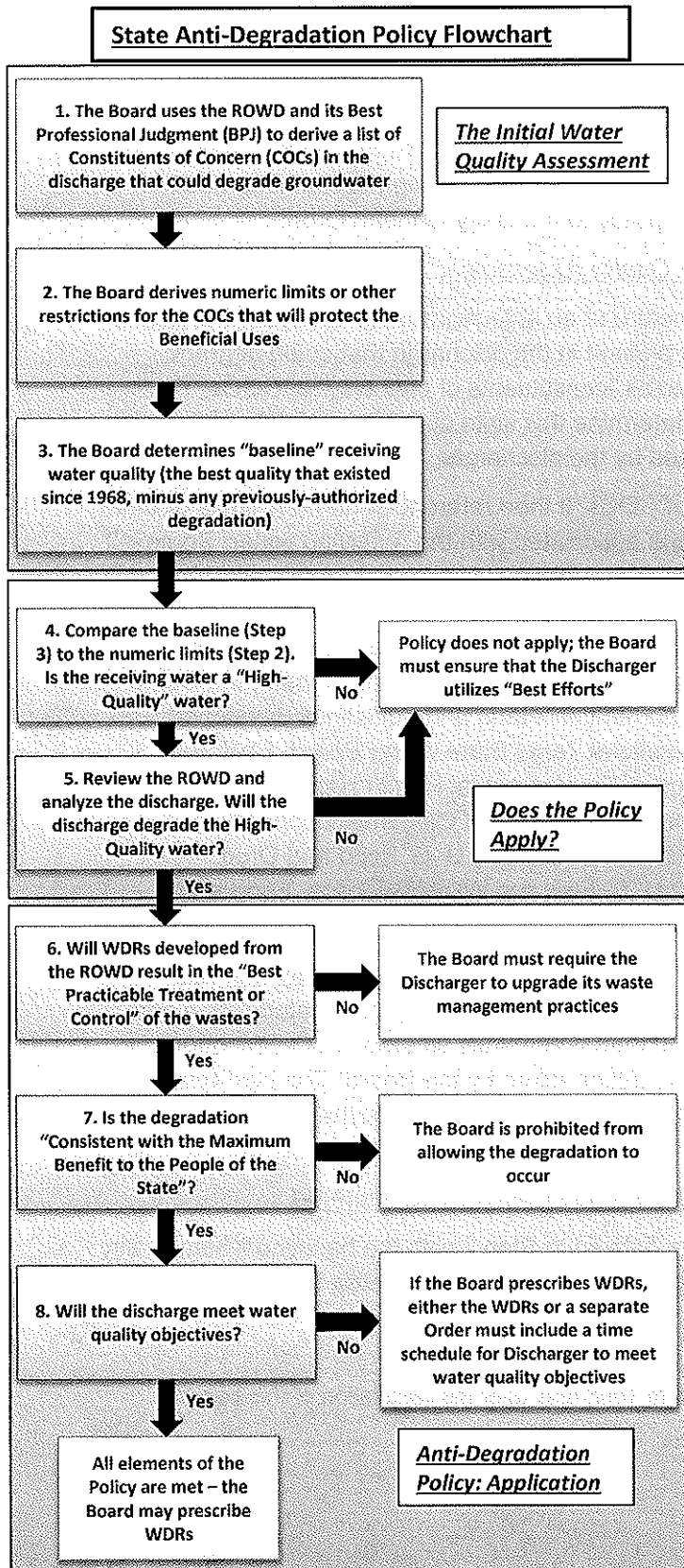
Resolution 68-16 (State Anti-Degradation Policy)

The *State Anti-Degradation Policy*, adopted by the State Water Board in October 1968, limits the Board's discretion to authorize the degradation of high-quality waters. This policy has been incorporated into the Board's Basin Plans. High-quality waters are those waters where water quality is more than sufficient to support beneficial uses designated in the Board's Basin Plan. Whether or not a water is a high-quality water is established on a constituent-by-constituent basis, which means that an aquifer can be considered a high-quality water with respect to one constituent, but not for others. (State Water Board Order WQ 91-10.)

The following provisions of the *State Anti-Degradation Policy* are directly applicable to the discharges regulated by the Dairy General Order:

1. Whenever the existing quality of water is better than the quality established in policies as of the date on which such policies become effective, such existing high quality will be maintained until it has been demonstrated to the State that any change will be consistent with maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial use of such water, and will not result in water quality less than that prescribed in the policies.
2. Any activity which produces or may produce a waste or increased volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters will be required to meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that (a) a pollution or nuisance will not occur and

(b) the highest water quality consistent with maximum benefit to the people of the State will be maintained.



Generally speaking, these provisions require that the Board adopt standards and requirements to ensure the discharger controls the discharge by employing "best practicable treatment or control" methodologies to limit the extent of the degradation, and that the Board carefully consider whether the permitted degradation inheres to the maximum benefit to the people of the State when the Board prescribes waste discharge requirements that will result in the degradation of high-quality waters. The *State Anti-Degradation Policy* also requires that the Board prohibit waste discharges from resulting in water pollution or nuisance, though this is a requirement that also exists outside the context of the *State Anti-Degradation Policy*. (see Wat. Code, § 13263.)

The State Water Board has provided only limited guidance regarding the *State Anti-Degradation Policy*. The State Water Board's Administrative Procedures Update 90-004 provides guidance for implementing *State Anti-Degradation Policy* and the Clean Water Act's anti-degradation provisions (40 C.F.R. § 131.12.) in the context of NPDES permitting. Although APU 90-004 is not directly applicable to the Dairy General Order because nonpoint discharges from agriculture are exempt from NPDES permitting requirements, the Appellate Court found this document informative in interpreting the *State Anti-Degradation Policy*. The following analysis adheres to existing guidance and the Appellate Court's decision in the *AGUA* case.

As recounted in the *AGUA* litigation, the Board erred when it issued the 2007 General Order because it failed to comply with the *State Anti-Degradation Policy*. The reissued Dairy General Order contains revisions designed to comply with the *AGUA* decision, which interpreted the requirements of the *State Anti-Degradation Policy*. The flow chart on this page describes the process that the Board generally uses to apply the *State Anti-Degradation Policy*, and the following discussion elaborates on how these requirements are applied in the context of the Dairy General Order.

The following sections describe the step-by-step approach for applying the Anti-Degradation Policy, followed by the direct application of this policy to the Dairy General Order.

The Initial Water Quality Assessment

Step 1: Due to the constituent-by-constituent nature of an anti-degradation analysis, the Board must first compile a list the waste constituents present in the discharge that could degrade groundwater. These constituents are referred to as “constituents of concern,” or COCs. The Board uses its best professional judgment to determine this suite of COCs, which is usually extrapolated from the ROWD that was submitted by the discharger.

Step 2: Once the Board has compiled the list of COCs, it then references numeric limits or other restrictions that would protect the beneficial uses associated with the receiving water. Some constituents, such as those constituents that have Maximum Contaminant Levels established in Title 22 of the California Code of Regulations, have numeric water quality objectives associated with them, while others have only narrative water quality objectives associated with them. For constituents that have only narrative water quality objectives associated with them, the Board derives numeric limits by considering relevant numerical criteria and guidelines developed and/or published by other agencies and organizations. (e.g., State Water Board, California Department of Health Services, California Office of Environmental Health Hazard Assessment, California Department of Toxic Substances Control, University of California Cooperative Extension, California Department of Fish and Game, U. S. EPA, U. S. Food and Drug Administration, National Academy of Sciences, U. S. Fish and Wildlife Service, Food and Agricultural Organization of the United Nations).

Step 3: The Board then makes a good-faith effort to determine best water quality that has existed since 1968, the year in which the anti-degradation policy was promulgated (often data from 1968 or earlier are unavailable). The Board then determines whether any subsequent lowering of water quality was due to a regulatory action taken by the Board. The best quality that has existed since 1968, minus any authorized degradation, becomes the “baseline” water quality².

Determining Whether the Anti-Degradation Policy is Triggered

Step 4: The Board compares the numeric limits derived in Step 2 with the baseline water quality derived in Step 3. For each constituent, if the baseline water quality is better than the derived

² Water quality control policies adopted subsequent to 1968 may alter the calculation of this baseline.

limits (i.e., the quality needed to support all of the beneficial uses), then the water is considered a "high-quality water." If the receiving water is not a high-quality water for all of the COCs, then the *State Anti-Degradation Policy* does not apply.

Step 5: The Board determines whether the discharge will degrade the receiving water. The Board makes this determination by comparing the information contained in the discharger's ROWD or other applicable information with the baseline water quality. If the discharge will not degrade the receiving water, then the *State Anti-Degradation Policy* does not apply. *Application of the State Anti-Degradation Policy's Requirements*

Step 6: If the discharge will degrade a high-quality water, then the *State Anti-Degradation Policy* requires the Board to prescribe requirements that will result in the best practicable treatment or control (BPTC) of the wastes in the discharge. BPTC is an evolving concept that takes into account changes in the technological feasibility of deploying new or improved treatment or control methodologies, new scientific insights regarding the effect of pollutants, and the economic realities that regulated industries face. Because this concept evolves over time, standard industry practices that are considered BPTC today may not be considered BPTC in the future. And though "practicability" limits the extent to which a discharger must implement expensive treatment or control measures, the Board must ultimately ensure that discharges do not cause pollution or nuisance, thereby protecting those who rely on the quality of groundwater and surface waters.

Neither the Water Code nor the *State Anti-Degradation Policy* defines the term "best practicable treatment or control." However, the State Water Board has stated that "one factor to be considered in determining BPTC would be the water quality achieved by other similarly situated dischargers, and the methods used to achieve that water quality." (See Order WQ 2000-07, at pp. 10-11). Furthermore, in a "Questions and Answers" document for Resolution 68-16 (the Questions and Answers Document), BPTC is interpreted to include:

"[A] comparison of the proposed method to existing proven technology; evaluation of performance data (through treatability studies); comparison of alternative methods of treatment or control, and consideration of methods currently used by the discharger or similarly situated dischargers."

Though the Board is prohibited from specifying the design, location, type of construction, or particular manner in which a discharger may comply with a requirement, order, or decree (Wat. Code § 13360.), the Board can still compare the treatment or control practices that a discharger has described in its ROWD to the treatment or control practices employed by similarly-situated dischargers in order to make a BPTC determination. (State Water Board Order WQ 2000-7.) Furthermore, "practicability" dictates that the Board consider the costs associated with the treatment or control measures that are proposed in the ROWD.

Step 7: The *State Anti-Degradation Policy* also requires that the Board consider whether the degradation authorized in a permit is "consistent with the maximum benefit to people of the state." For discharges subject to the federal Clean Water Act, it is only after "intergovernmental coordination and public participation" and a determination that "allowing lower water quality is

necessary to accommodate important economic or social development in the area in which the waters are located" that the Board can allow for degradation. (40 C.F.R. § 131.12.)

As described in the Question and Answers Document mentioned above, some of the factors that the Board considers in determining whether degradation is consistent with the maximum benefit to people of the State include: economic and social costs, tangible and intangible, of the proposed discharge, as well as the environmental aspects of the proposed discharge, including benefits to be achieved by enhanced pollution controls. USEPA guidance clarifies that the federal anti-degradation provision,

"... is not a 'no growth' rule and was never designed or intended to be such. It is a policy that allows public decisions to be made on important environmental actions. Where the state intends to provide for development, it may decide under this section, after satisfying the requirements for intergovernmental coordination and public participation, that some lowering of water quality in "high quality waters" is necessary to accommodate important economic or social development" (EPA Handbook for Developing Watershed Plans to Restore and Protect Our Waters, Chapter 4).

APU 90-004 requires the Board to consider both the costs to the discharger and the costs imposed upon the affected public in the NPDES context, and states that "[c]ost savings to the discharger, standing alone, absent a demonstration of how these savings are necessary to accommodate 'important social and economic development' are not adequate justification' for allowing degradation."

It is, however, important to keep the "maximum benefit to people of the state" requirement in context. Neither the *State Anti-Degradation Policy* nor the Water Code allows unreasonable effects to beneficial uses. Therefore, such unreasonable effects (such as the unmitigated pollution of a drinking water source) are not the focus of the Board's inquiry, because they are legally prohibited. Instead, the *State Anti-Degradation Policy* requires the Board to consider the costs that may be imposed on other dischargers as a result of the degradation that the Board is allowing to occur. For example, if the Board allows a discharger to operate a sub-standard facility that degrades a high-quality groundwater, dischargers situated downstream (for surface waters) or downgradient (for groundwaters) from that discharge would be discharging to a receiving water that lacks any capacity to assimilate additional waste loads. This may impose higher treatment costs on the downstream/downgradient discharger.

Ultimately, the Board may allow degradation to occur following a demonstration that the degradation is consistent with the maximum benefit to the people of the state; the *State Anti-Degradation Policy* is not a no-growth or no-degradation policy. However, the Board must justify why this degradation is beneficial not only to the discharger, but to others reliant on the water quality of the receiving water body.

Step 8: the Board must ensure that discharges will not unreasonably affect present and anticipated beneficial use of such water, will not result in water quality less than that prescribed in relevant policies, and will not cause pollution or nuisance. The Water Code defines "pollution" to mean an alteration of the quality of the waters of the state by waste to a degree which unreasonably affects either the waters for beneficial uses or the facilities which serve these beneficial uses, i.e., violation of water quality objectives. (Wat. Code, § 13050(1).) The term

nuisance is defined as anything that is, (1) injurious to health, 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 an entire community or considerable number of persons; and (3) occurs during, or as a result of, the treatment or disposal of wastes. (Wat. Code, § 13050(m).) To constitute a nuisance, all three factors must be met.

The Board ensures that this component of the *State Anti-Degradation Policy* is met by requiring a discharger to comply with water quality objectives designed to protect all designated beneficial uses, thereby protecting those who rely on the quality of groundwater and surface waters.

The State Anti-Degradation Policy as Applied to the Dairy General Order

Steps 1-5 (Applied): Although background water quality varies significantly in those areas covered by the Dairy General Order, most receiving waters are considered high-quality waters for one or more constituents of concern, and wastes from dairy facilities will degrade these waters. As the court concluded, "it is certain that the water quality of [at least some of] the existing groundwater is better than the water quality objective, making the groundwater high quality water for antidegradation purposes. Water can be considered high quality for purposes of the antidegradation policy if it is determined to be so for any one constituent, because the determination is made on a constituent by constituent basis." (AGUA at 1271.) Furthermore, evidence in the Administrative Record indicates that wastes discharged from the regulated dairies will degrade this high-quality water, thereby triggering the *State Anti-Degradation Policy*.

Step 6 (Applied): Given that the *State Anti-Degradation Policy* applies, the Board must ensure that the Dairy General Order requires regulated dairies to implement BPTC measures to minimize the amount of degradation that will occur.

Generally speaking, the waste management practices employed by dairies can be broken down into three distinct areas: production areas (including milk barns, feed storage areas, and corral areas), wastewater ponds, and land application areas. The following is a discussion of what the Board considers to be BPTC for each of these three components of the regulated dairy operations.

Best Practicable Treatment or Control Measures for the Production Area

The Dairy General Order considers the term "Production Area" to include milk barns, wash/sprinkler pens, feed and non-liquid manure storage areas, and corrals (i.e., animal confinement areas). For these areas, the most effective way to reduce or eliminate water quality impacts is to restrict the infiltration of waste in these areas. Title 3 of the California Code of Regulations (Title 3), sections 645 et seq., set specifications for milk dairy buildings, including:

- § 646.1 (Corrals, Ramps, and Surroundings). This section requires that dirt or unpaved corrals be graded to promote drainage and that cow washing areas shall be paved (concrete or equivalent) and sloped to a drain. Water troughs, permanent feed racks, and mangers shall have paved access, and water troughs shall have a drain to carry water away from the corrals;

- § 648(c) Requires that milk rooms be floored with concrete or other suitable material and be provided with a vented, trapped drain and §649(a) requires that milk barns be floored with concrete or other suitable material and be sloped to drain; and
- § 661 Requires that roof drainage from barns, milk houses, or shelters shall not drain into a corral unless the corrals are paved and properly drained.

In addition to the requirements of Title 3, the Dairy General Order requires that milk barns, including their related sprinkler pens and gutters be designed and maintained to convey all water that has contacted animal wastes or feed directly to the wastewater retention system, and that all production area structures must be constructed or otherwise designed so that clean rainwater is diverted away from manured areas, feed storage areas, and waste containment facilities, unless drainage is fully contained in the wastewater retention system. Dairy operators must design and maintain the animal confinement area (including corrals), and manure and feed storage areas in a manner that limits infiltration so that wastes, nutrients, and contaminants generated are directed to the manure retention pond(s). The Dairy General Order prohibits standing water in these areas as of 72 hours after the last rainfall (see Production Area Specification D-6 of the reissued Dairy General Order).

Best Practicable Treatment or Control Measures for Land Application Areas

Normal commercial farming practices, including the application of dairy wastes to cropland as fertilizer, can 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. Additional amounts of water are often applied to leach the salts below the root zones. These leached salts can cause impacts to groundwater or surface waters. Even using the most efficient irrigation systems and appropriate fertilizer application rates and timing to correspond to crop needs, irrigation of cropland may degrade high-quality groundwater. In addition, 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, which may include constituents originating from the dairies, 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.

With respect to salts and nutrients, the key to limiting degradation and ensuring compliance with water quality objectives at the dairies' land application areas is an effective Nutrient Management Plan, which specifies the volume and composition of the wastewater that can be applied to land application areas without causing adverse groundwater impacts. The Board considers an effective Nutrient Management Plan to be BPTC for the land application areas. The majority of the dairies covered under the 2007 General Order had been operating for many years without a Nutrient Management Plan. In response, the Board required each dairy operator to develop and implement a Nutrient Management Plan, and the reissued Dairy General Order will continue this requirement.

Unlike most other groundwater-related components of a dairy's waste management strategy, Nutrient Management Plans have received a significant amount of attention from the USEPA. This is because precipitation-related discharges from land application areas are considered agricultural storm water discharges, and are therefore not subject to the federal Clean Water Act's CAFO regulations. However, this exemption applies only when the "...manure, litter, or process wastewater [at the land application area] 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..." (40 C.F.R. §122.23.) Therefore, the USEPA has taken a close interest in the "site specific nutrient management practices" for application of waste from large concentrated animal feeding operations to land application areas. The Dairy General Order mandates that dairies employ the management practices required by Title 40 Code of Federal Regulations Section 122.42(e)(1)(vi)-(ix).

Because the Dairy General Order requires compliance with the federal CAFO regulatory requirements, precipitation-related discharges from land application areas at facilities operating in compliance with this Order are considered agricultural storm water discharges. And since they are consistent with USEPA's "best practicable control technology," the technical standards for nutrient management represent BPTC for the purposes of compliance with the *State Anti-Degradation Policy*. In addition, the Dairy General Order requires dairies who utilize tile drain systems to identify their location and discharge point(s) and to monitor discharges from these systems. The Dairy General Order also specifies well and surface water setbacks and requires certification of backflow prevention for all irrigation wells (Standard Provisions 18 and Attachment B. VI [*Waste Management Plan for the Production Area for Existing Milk Cow Dairies*]). Additionally, the Dairy General Order's Land Application Specifications contains additional requirements regarding waste infiltration and soil moisture capacity limits for waste application.

Pond Requirements: Generally

The Dairy General Order includes requirements that all ponds must be verified by an engineer to have adequate capacity and structural integrity to hold generated process water and precipitation. All ponds must be managed and maintained to prevent breeding of mosquitoes and other vectors. Ponds shall not have small coves and irregularities around the perimeter of the water surface. Weeds shall be minimized in all ponds through control of water depth, harvesting, or other appropriate method, and dead algae, vegetation, and debris shall not be allowed to accumulate on the water surface. These measures are required elements of a BPTC program for all ponds, whether they are already existing ponds or whether they are new or expanded ponds.

Best Practicable Treatment or Control Measures for New or Expanded Ponds

Three counties in the Central Valley 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). For new or expanded ponds, the Board considers these more stringent design standards to be BPTC.

Kings County and Merced County require pond liners to have a maximum seepage rate of 1×10^{-6} centimeters per second (cm/sec). Four of the top ten milk producing states (Wisconsin, Pennsylvania, Michigan, and Washington) 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} 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^{-6} 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 liners³.

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 pond design requirements provide more groundwater protection than the Title 27 requirements, there are no known studies that fully evaluate the ability of any of these county, state, or NRCS pond liner requirements to protect groundwater quality. It would be difficult to determine if any proposed pond design would be protective of groundwater quality without an evaluation of 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. Proposed pond designs that do not include such an evaluation should be very conservative to assure protection of groundwater under any likely 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 at classified waste management units regulated under Title 27 of the California Code of Regulations (i.e., landfills and Class II surface impoundments) and a limited number of wastewater retention ponds at dairies.

The Dairy General Order provides a two-tiered approach that will allow the Discharger two options for retention pond design. 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 Cal. Code

³ National Resources Conservation Service, Agricultural Waste Management Field Handbook, Appendix 10D – Geotechnical, Design, and Construction Guidelines.

Regs., tit. 27, § 20340) between the two liners. 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 Existing Dairy Ponds

Existing dairy ponds were built to contain and store the large quantities of dairy cow wastes prior to discharge to land application areas. These ponds present a difficult challenge for the dairies that may be causing unacceptable groundwater impacts. This is because requiring the immediate retrofitting of existing ponds to meet Tier 1 or Tier 2 requirements (the Dairy General Order's requirements for new or expanded ponds) would be beyond practicable economic limits for most dairies (See Memorandum from John Schaap and Steve Bommelje, Provost & Pritchard to Theresa A. Dunham, Somach Simmons & Dunn (August 5, 2013), *Costs to Retrofit Existing Dairies That Do Not Have Tier 1 or Tier 2 Lagoons* (Provost & Pritchard 2013); see also Memorandum from Annie AcMoody, Western United Dairymen to Theresa A. Dunham, Somach Simmons & Dunn (August 6, 2013), *Financial Impact to Retrofit Existing Dairies That Do Not Have Tier 1 or Tier 2 Lagoons* (AcMoody 2013).) Specifically, the range of costs to retrofit lagoons range from an estimated low of \$180,000 for a single liner at a 300 milk cow dairy to almost \$1.4 million for a double liner at a 3000 milk cow dairy. (See Provost & Pritchard 2013, p. 3.) Considering the net loss in dairy operation revenues over the past five years and the likelihood of an inability to obtain financing, it would be near impossible for most dairy operations retrofit dairy lagoons and remain in operation. (AcMoody 2013, p. 4.) If forced to retrofit such lagoons, many dairy operations would likely go out of business. The widespread closure of dairies in the Central Valley would have regional and state economic impacts.

Considering the wide-spread economic impacts that would occur with respect to requiring application of Tier 1 or Tier 2 requirements to existing ponds, the Central Valley Water Board finds that BPTC for existing ponds constitutes an iterative process of evaluation that includes groundwater monitoring individually or through the RMP, assessment of data collected, evaluation of Existing Pond conditions and their impact on groundwater quality, and case studies that evaluate potential changes in management practices and/or activities that may be necessary to further protect groundwater quality from existing ponds.

The Board will use the SRMR (for dairies represented in the RMP) or individual Summary Monitoring Reports (SMRs), for dairies that are in an individual monitoring program, to determine whether upgrades to existing ponds will be required. Facilities where data demonstrate that an existing pond is resulting in degradation beyond what is authorized under this order will be required to upgrade facilities on a time schedule that is as short as practicable. Substituting alternative management practices for the existing ponds (such as reducing the water level in the ponds, dry-scrape, or other methods) would also be acceptable, provided those management practices are found to be protective of groundwater quality for the conditions present where they would be implemented. Regulated dairies that are found not to be protective

of underlying groundwater must upgrade their management practices on a time schedule that is as short as practicable, supported with appropriate technical or economic justification, but in no case may time schedules extend beyond 10 years from the date that the Summary Report or SRMR is approved by the Executive Officer.

Step 7 (Applied): In the case of the dairies regulated by the Dairy General Order, allowing the maximum extent of degradation allowed by law (i.e., degradation up to the water quality objectives that are protective of the designated beneficial uses) would allow the Board to focus its efforts on ensuring that the discharges do not impact sensitive populations that rely on the quality of the receiving waters. In other words, while the focus of the *State Anti-Degradation Policy* is on justifying degradation that will ultimately result in water quality somewhere between the "best water quality that has existed since 1968" and a numeric limit that is protective of all beneficial uses, the Board and the dairy industry acknowledge that their primary task lies in preventing pollution and protecting sensitive uses.

The Board acknowledges that significant degradation at dairies has occurred throughout the Central Valley Region due to historic practices. In issuing the Dairy General Order, the Board will allow the maximum extent of degradation allowed by law to occur. The Dairy General Order is structured in such a way as to compel the dairy industry to focus their available resources on meeting water quality objectives, thereby protecting communities that are dependent on groundwater. As the dairy industry develops more effective management practices in the coming years, the Board may re-evaluate this goal, and may impose more stringent requirements that reflect the availability of better practicable management practices.

Step 8 (Applied): Although dairy waste materials provide nutrients to crops, they can create pollution or 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.

While the Board recognizes that it may be impracticable for the dairy industry to make dramatic changes to its waste management practices overnight, or even in a few years, those dairies whose practices are found to not be protective of the underlying groundwater through required individual or representative monitoring must upgrade their operations to ensure compliance with water quality objectives on a time schedule that is as short as practicable.

Allowing regulated dairies to degrade high quality waters is consistent with maximum benefit to people of the State as long as that degradation does not result in detrimental impacts to beneficial uses over the long term. California's dairy industry, built on the foundation of 1,563 family-owned dairies statewide⁴, is important to the economic well-being of the Central Valley. Dairy farms generate jobs in a variety of sectors, from employees on the farm, providers of farm and veterinary services, other farmers who grow feed, processors of milk and dairy products, and in transportation of feed, milk and dairy products, and many others. According to a

⁴ Source for this and all data on number of dairies, cows and farm gate value of milk:
CDFA.ca.gov/dairy/dairystatsannual.html

California Milk Advisory Board analysis⁵, California's dairy industry is responsible for creating a total of 443,574 jobs and \$63 billion in economic activity. The same report estimated that a typical dairy cow generates \$34,000 in economic activity annually and a herd of 100 cows creates about 25 jobs.

The economic value of the dairy industry is particularly important within the Central Valley, where 89 percent of the state's cows and 81 percent of the state's dairy farms are located, as well as a significant fraction of the state's 117 dairy processing plants. Moreover, the jobs generated in the Central Valley are of even greater importance given routine double-digit unemployment rates in many rural counties and a high reliance on a healthy agricultural sector. Furthermore, California dairy farms are a significant producer of the nation's milk supply. In 2012, California dairy farms produced about 41.7 million pounds of milk, which is about a fifth of the nation's milk supply. As such, California dairies play an important role in food and nutrition security for California and the nation.

Considering the economic significance of the Central Valley dairy industry as well as the important role Central Valley dairies play in providing adequate milk supplies to the nation, the Central Valley Water Board finds that maintaining the Central Valley dairy industry is to the benefit of the people of the state.

Verifying that the State Anti-Degradation Policy is Satisfied

Although not an explicit provision of the *State Anti-Degradation Policy*, the Appellate Court determined that the Dairy General Order does not comply with the *State Anti-Degradation Policy* without a monitoring program sufficient to determine whether the discharges are in compliance with the *State Anti-Degradation Policy*.

The primary method used to determine if water quality objectives and the requirements of the *State Anti-Degradation Policy* are being met is surface water and groundwater quality monitoring. The Dairy 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. Should discharges of manure, process wastewater, or storm water occur from the production area, the Dairy General Order requires discharge monitoring and chemical analysis to determine if an exceedance of a water quality objective has occurred. The Dairy General Order also requires monitoring of the first storm water discharge of the year to surface waters from land application areas on a rotating basis (1/3 of the fields per year); and tailwater discharges to surface waters from the land application areas if they have occurred less than 60 days following an application of manure and/or process wastewater. Likewise, the Dairy General Order requires individual or

⁵ <http://www.californiadairyroom.com/node/289>, study by J/D/G Consulting using economic output multipliers developed by the U.S. Department of Commerce, Bureau of Economic Analysis. Based on 2008 data (size of the California dairy industry in number of cows has declined about 3.4 percent since 2008 but the economic impact of the industry is expected to be roughly similar today as to 2008 due to slightly higher overall levels of milk production).

representative groundwater monitoring of natural background water quality and the water quality downgradient of the waste management units (production area, corrals, and land application areas).

Monitoring and Reporting Program R5-2013-0122 (MRP) requires dairy operators to sample domestic and irrigation supply wells on their property, and to either monitor first-encountered groundwater at their facility or participate in an approved representative groundwater monitoring program. The purpose of requiring monitoring of water supply wells includes identifying the quality and trends of water being used at the dairy and the amount of nutrients contained in irrigation water so it can be accounted for in the development of the required nutrient management plan. The purpose of requiring monitoring of first-encountered groundwater is to evaluate current management practices in order to determine whether such practices are protective of groundwater quality at the most vulnerable point. Groundwater monitoring at existing dairies is necessary to: determine background groundwater quality, determine existing groundwater conditions near retention ponds, production areas, and land application areas, determine whether improved management practices need to be implemented, and confirm that any improved management practices will have the desired result on groundwater quality.

This Order requires the Discharger to report any noncompliance that endangers human health or the environment or any noncompliance with the Prohibitions contained in the Order within 24 hours of becoming aware of its occurrence. The Dairy General Order also requires the Discharger to submit annual monitoring reports which contain the analytical results of laboratory data, including all laboratory analyses (including Chain of Custody forms and laboratory QA/QC results) for surface and groundwater monitoring. Additionally, an annual assessment of groundwater monitoring is required. The assessment must include an evaluation of the groundwater monitoring program's adequacy to assess compliance with the Order, including whether the data provided are representative of conditions upgradient and downgradient of the wastewater management area, production area, and land application area of the dairy facility.

Similar to the individual groundwater monitoring program, the representative groundwater monitoring program is required to submit annual monitoring reports and an evaluation of data collected to date and an assessment of whether participating dairies are implementing management practices that minimize degradation of high quality groundwaters and are protective of beneficial uses.

The Central Valley Water Board recognizes that monitoring the effectiveness of the dairies' waste management practices and their effect on groundwater is needed to verify that water quality is adequately protected and the intent of the anti-degradation policy is met. Accordingly, the Dairy Order, in conjunction with the MRP, requires additional groundwater monitoring that must be conducted on an individual dairy basis or through Representative Monitoring Programs (RMPs). Under the terms of the Dairy Order and MRP, all dairies subject to the terms of the Dairy Order must either conduct their own groundwater monitoring or actively participate in a RMP. Currently, most dairies subject to the Dairy Order (more than 98 percent) are members of an RMP.

Both the individual groundwater monitoring provisions and the RMP's monitoring requirements are designed to measure water quality data over time in first-encountered groundwater. An RMP is further required to conduct such monitoring on a variety of dairy farms that represent the overall range of conditions on dairies within the Central Valley. This means for a RMP that a variety of physical site conditions must be monitored, such as varying soil types and depth to groundwater. Varying management conditions must also be measured, such as different types of crops, irrigation methods, waste storage structures and animal housing.

It is recognized that in many cases, a single set of groundwater monitoring data, or even monitoring data over a period of months or years, may not be sufficient to determine the effectiveness of existing management practices. Evaluating groundwater results over an extended period of time, in conjunction with gathering data regarding existing surface practices, is necessary to determine whether water quality is being protected or is being unreasonably impacted.

Waters that are Not High Quality: The "Best Efforts" Approach

When a receiving water body quality exceeds or just meets the applicable water quality objective due to naturally-occurring conditions or due to prior Board-authorized activities, it is not considered a high-quality water, and it is not subject to the requirements of the *State Anti-Degradation Policy*. However, where a groundwater constituent exceeds or just meets the applicable water quality objective, the Board must set limitations no higher than the objectives set forth in the Basin Plan. This rule may be relaxed if the Board can show that "a higher discharge limitation is appropriate due to system mixing or removal of the constituent through percolation through the ground to the aquifer." (State Water Board Order No. WQ 81-5.) However, the Board should set limitations that are more stringent than applicable water quality objectives if the more stringent limitations can be met through the use of "best efforts." (State Water Board Order No. WQ 81-5.) (*City of Lompoc*) The "best efforts" approach involves the establishment of requirements that require the implementation of reasonable control measures. Factors which are to be analyzed under the "best efforts" approach include the water quality achieved by other similarly situated dischargers, the good faith efforts of the discharger to limit the discharge of the constituent, and the measures necessary to achieve compliance. (*City of Lompoc*, at p. 7.) The State Water Board has applied the "best efforts" factors in interpreting BPTC. (see State Water Board Order Nos. WQ 79-14 and WQ 2000-07.)

In summary, the Board may establish requirements more stringent than applicable water quality objectives even outside the context of the *State Anti-Degradation Policy*. The "best efforts" approach must be taken where a water body is not "high quality" and the antidegradation policies are accordingly not triggered.

California Environmental Quality Act

The Central Valley Water Board adopted a Negative Declaration in 1982 concurrent with the adoption of Resolution 82-036, which waived waste discharge requirements for milk cow dairies. The adoption of the Dairy General Order, which prescribes regulatory requirements for existing

facilities in order to ensure the protection of groundwater resources, is exempt from the requirements of the California Environmental Quality Act (CEQA)(Pub. Resources Code, § 21000 et seq.) based on the following three categorical exemptions:

- California Code of Regulations, title 14, section 15301 exempts the "operation, repair, maintenance, [and] permitting ... of existing public or private structures, facilities, mechanical equipment, or topographical features" from environmental review. Eligibility under the Dairy General Order is limited to milk cow dairies that were existing facilities as of 17 October 2005, and the Order does not authorize the expansion of these facilities. The 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.
- California Code of Regulations, title 14, section 15302 exempts 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..." The Dairy General Order will likely require covered dairies to replace or reconstruct waste management systems to ensure compliance with the Order's requirements.
- California Code of Regulations, title 14, section 15302 exempts "... 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 Dairy General Order will require covered dairies to make improvements to their waste management systems that will result in only minor alterations to land, water, and/or vegetation.

The majority of the approximately 1,600 dairies covered under the initial Dairy General Order operated under a waiver program that was in effect from 1982 to December 2002.

Approximately 86 of those existing facilities were operating under either an individual WDR Order or a 1996 General WDR Order. This Dairy General Order imposes significantly more stringent requirements compared to the previous WDRs or the waiver of WDRs.

The Dairy 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 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) implement 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 and specifications in the Dairy General Order; (4) document that no cross connections exist that would allow the backflow of wastewater into a water supply 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 to minimize infiltration of wastewater and leachate from these areas to the underlying soils.

In the MRP, the Board is requiring the monitoring of discharges, surface water, groundwater, storm water, tile drainage water, and tailwater to determine compliance with the Dairy General Order.

Central Valley Salinity Alternatives for Long-Term Sustainability

The Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS) initiative has the goal of developing sustainable solutions to the increasing salt and nitrate concentrations that threaten achievement of water quality objectives in Central Valley surface waters and groundwater. The Dairy General Order requires actions that will reduce nitrate discharges and should result in practices that reduce salt loading. The Central Valley Water Board intends to coordinate all such actions with the CV-SALTS initiative. CV-SALTS may identify additional actions that need to be taken by existing milk cow dairies and others to address these constituents. The Dairy General Order can be amended in the future to implement any policies or requirements established by the Central Valley Water Board as a result of the CV-SALTS process.

REQUIREMENTS AND ENFORCEMENT OF THE DAIRY GENERAL ORDER

What are Dairy Wastes, and what are their Potential Impacts to Water Quality?

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 in solid form 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, and 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 nutrient monitoring, discharge monitoring, groundwater monitoring (individual or representative) and continuous tracking of materials being taken off-site for utilization.

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 review of dairy manure by a University of California Committee of Experts on Dairy Manure Management (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 provides some challenges due to the complexity of nitrogen in the soil-crop system. Soil nitrogen occurs primarily in three different forms - organic nitrogen, ammonium, and nitrate. Sources of organic nitrogen in soil include crop residue, the soil organic matter pool, and dairy waste applications. Organic nitrogen will mineralize to ammonium over time (one to seven years according to the UCCE Review). 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.

Ammonium nitrogen is immediately available to the plant, but also sorbs to soil particles. Ammonium nitrogen that is unused by the plant remains in the soil and is converted to nitrate typically within days to weeks under oxidizing conditions which are present in much of the Central Valley. Nitrate is also immediately available to the plant, but unlike organic nitrogen and ammonium nitrogen it does not adsorb to soil particles, rather it is in a dissolved form and moves readily with soil water.

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 by nitrifying bacteria (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 Central Valley Region, if not properly managed. Runoff from manured 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 UCCE 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.

Prior to the issuance of the 2007 General Order, the Central Valley Water Board had documented many discharges of waste from existing milk cow dairies to surface water. Between 2004 and 2007, approximately 70 Dischargers had received Notices of Violation from the Central Valley Water Board for such discharges. The Notices of Violation required immediate cleanup of the discharge and either remediation of the cause of the discharge or a plan with an implementation schedule for such remediation. Additional formal enforcement can be taken based on a case-by-case evaluation of the circumstances. Such enforcement could include the issuance of Administrative Civil Liability by the Board or referral to prosecutors for civil or criminal action.

This General Order includes prohibitions, specifications, and provisions for the existing ponds and new ponds, the production area and land application areas that are consistent with 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 exceedances 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.

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.

How Will the Board Regulate the Discharge of These Wastes?

Prohibitions: The Dairy General Order includes a number of prohibitions to protect surface and groundwater quality, and to ensure that waste discharges not regulated by this Order are prohibited unless otherwise regulated by another Order of the Central Valley Water Board.

General Specifications: The Dairy General Order includes a number of General Specifications that require dairy facilities regulated under this Order to: maintain and retain process wastewater together with all precipitation and drainage through manured areas up to including a 25-year, 24-hour storm; protect ponds and manured areas from inundation or washout by overflow from any stream channel at least during 20-year peak stream flows, and for many facilities be protected against 100-year peak stream flows; direct all precipitation and surface

drainage from outside of the dairy away from manured areas unless such drainage is fully contained; not apply manure and process wastewater closer than 100 feet to vulnerable pathways (e.g., down gradient surface waters, well heads) unless there are sufficient vegetated buffers or physical barriers; and, not use unlined ditches, swales or earthen-berm channels to store process wastewater, manure or tailwater.

Pond Specifications: The Dairy General Order includes requirements that all ponds must be verified by an engineer to have adequate capacity and structural integrity to hold generated process water and precipitation. Specifically, the level of waste in retention ponds shall be kept a minimum of two feet from the top of each aboveground embankment and a minimum of one foot from the ground surface of each belowground pond. All ponds must be managed and maintained to prevent breeding of mosquitoes and other vectors. Ponds shall not have small coves and irregularities around the perimeter of the water surface. Weeds shall be minimized in all ponds through control of water depth, harvesting, or other appropriate method, and dead algae, vegetation, and debris shall not be allowed to accumulate on the water surface.

New or Reconstructed Pond Specifications: New or Reconstructed Ponds must be designed to meet specified Tier or 1 or Tier 2 standards and design for such New or Expanded Ponds must be approved by the Executive Officer. Tier 1 standards consist of a double liner constructed with 60-mil high density polyethylene or material of equivalent durability with a leachate collection and removal system. Tier 2 standards are consistent with Natural Resource Conservation Service Practice Standard 313 or equivalent and the Discharger has demonstrated through submittal of technical reports that the alternative design will comply with the groundwater limitations of this Order.

Existing Pond Specifications: In addition to the general pond specifications, ponds in existence as of 3 May 2007 must be evaluated to determine whether they are protective of underlying groundwater. This will be accomplished through compliance with an individual monitoring program or by participation in the Representative Monitoring Program. When existing ponds are found not to be sufficiently protective of underlying groundwater, a dairy must upgrade the pond in accordance with the time schedule for compliance detailed in section M. of the reissued Dairy General Order. Alternatively, if groundwater monitoring demonstrates that a discharge of waste threatens to exceed a water quality objective, the Executive Officer may issue an order to the owner/operator of the monitored dairy to identify and implement management practices that are protective of groundwater quality on a schedule that is as short as practicable (reissued Dairy General Order, General Specification B.5).

Production Area Specifications: The production area includes the barns, corrals, milk parlors, manure and feed storage areas, process water conveyance facilities and any other area of the dairy facility that is not the land application area or retention ponds. The General Order includes a number of requirements that apply to the production area, including: roofs, buildings, and non-manured areas within the production area shall be constructed and/or designed so that clean rainwater is diverted away from manured areas and waste containment facilities; drainage from the roofs of barns, milk houses, or shelters shall not drain into corrals unless the corrals are

properly graded and drained; all portions of the production area shall be designed and maintained to convey all water that has contacted animal wastes or feed to the wastewater retention system and shall be designed and maintained to minimize standing water. Standing water is not to be present as of 72 hours after the last rainfall. Dischargers shall implement any newly identified management practices/activities from the Summary Representative Monitoring Report which are applicable for their facility on a time schedule that is as short as practicable but cannot exceed 10 years.

Land Application Area Specifications: This General Order includes land application specifications that require Dischargers to develop and implement a Nutrient Management Plan (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. The results of this monitoring are to be used in the development and implementation of the NMP. The Dairy 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.

If existing management practices implemented in the land application area(s) are found not to be sufficiently protective of underlying groundwater, a dairy must change its management practices in accordance with the time schedule for compliance detailed in section M. of the reissued Dairy General Order. Alternatively, if groundwater monitoring demonstrates that a discharge of waste threatens to exceed a water quality objective, the Executive Officer may issue an order to the owner/operator of the monitored dairy to identify and implement management practices that are protective of groundwater quality on a schedule that is as short as practicable (Reissued Dairy General Order, General Specification B.5)

Closure Provisions: This General Order includes a provision that 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. These closure requirements ensure compliance with the provisions of the *State Anti-Degradation Policy*.

Receiving Water Limitations: This Order includes Groundwater Limitations that require the discharge of waste at existing milk cow dairies not cause the underlying groundwater to exceed water quality objectives, unreasonably affect beneficial uses, or cause a condition of pollution or nuisance.

These limitations are effective immediately except where Dischargers are in compliance with the requirements of Sections II or III of the Monitoring and Reporting Program R5-2013-0122, Attachment A, and such Dischargers are implementing management practices/activities on a time schedule that is as short as practicable. For Dischargers participating in the RMP, management practices/activities must be implemented on a time schedule that is as short as practicable and that is consistent with the Time Schedule for Compliance (section M.) contained in the reissued Dairy General Order.

How Will the Board Evaluate the Effectiveness of Management Practices?

This Dairy General Order includes a provision that requires compliance with the MRP, 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 MRP 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
- tile drainage 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

Specifically, the Dairy General Order requires Dischargers to monitor, either individually or through the RMP, first encountered groundwater upgradient and downgradient of the production area, retention ponds, and land application areas. The purpose of the groundwater monitoring program is to determine whether management practices being employed at the dairies do not

cause receiving waters to exceed applicable groundwater objectives and confirm compliance with the requirements of this order.

The Dairy Order contains significant requirements for dairies that are designed to be protective of surface and groundwater quality while also being practicable and economically feasible. These include implementation of nutrient management plans prepared by certified specialists (including testing and measurement of manure, irrigation water, soil and plant tissue to track nutrient flow), and implementation of waste management plans prepared by professional engineers. The Dairy Order practices and design and maintenance standards include measures that apply to all areas of the dairy farm, including the crop production areas, existing manure retention ponds and animal housing areas, including all barns and corrals.

These practices (with the exception of certain pond standards that apply only to new or reconstructed ponds) are already in place, were developed over time with expert input from dairy professionals, the United States Department of Agriculture Natural Resources Conservation Service and the University of California⁶ and are expected to reduce impacts to water quality from the operation of dairy facilities. However, the Regional Board recognizes that monitoring the effectiveness of these practices is needed to verify that they protect water quality adequately and under a variety of conditions. Accordingly, the Dairy Order in conjunction with the MRP requires additional groundwater monitoring that must be conducted on an individual dairy basis or through Representative Monitoring Programs (RMPs). All dairies subject to the Dairy Order must either conduct their own groundwater monitoring or actively participate in a RMP. Currently, most dairies subject to the Dairy Order (more than 98 percent) are members of an RMP.

Individual Groundwater Monitoring: The individual groundwater monitoring program requires the Discharger to submit a Monitoring Well Installation and Sampling Plan (MWISP) which details the installation of a sufficient monitoring well network to characterize groundwater flow direction and gradient beneath the site; natural background (unaffected by the Discharger or others) groundwater quality upgradient of the facility; and groundwater quality downgradient of the production area, retention ponds, and the land application areas.

Under the individual groundwater monitoring program, the Discharger is required to submit to the Executive officer an annual assessment of the groundwater monitoring data which includes analytical lab reports for data collected during the past year and a tabulated summary of all analytical data collected to date. The annual assessment requires an evaluation of the groundwater monitoring program's adequacy to assess compliance with the Order, including whether the data provided are representative of conditions upgradient and downgradient of the wastewater management area, production area, and land application area of the dairy facility. If the monitoring parameters used to evaluate groundwater quality are found to be insufficient to identify whether site activities are impacting groundwater quality, the Discharger must employ all reasonable chemical analyses to differentiate the source of the particular constituent. This

⁶ See "Managing Dairy Manure in the Central Valley of California," published by the University of California Committee of Experts on Dairy Manure Management, 2005.

includes, but is not limited to, analyses for a wider array of constituents and chemical isotopes. Within six years of initiating sampling, or at an earlier date if required by the Executive Officer, a Discharger conducting individual sampling is required to submit a summary report that presents a detailed assessment of the monitoring data to evaluate if site activities associated with the operation have impacted groundwater quality. The Summary Report is subject to Executive Officer approval and must include a description of changes in management practices or activities if the data indicate that Groundwater Limitation D.1 of the Order has been violated.

Representative Monitoring Program: As an alternative to installing monitoring wells on an individual basis, dischargers may participate in a Representative Monitoring Program. The Representative Monitoring Program is a data collection and analysis effort that will develop a knowledge base from a subset of Central Valley dairy farms that will support conclusions with respect to existing management practices and their ability to be protective of groundwater quality that are applicable to non-monitored dairies covered under the Dairy General Order.

It is recognized that a single set of monitoring data, or even monitoring data over a short period of months or years, may not be sufficient to determine the effectiveness of existing practices. In many cases, because of time lags of weeks, months or even years between surface practices and resulting effects in groundwater, the effects of improved management practices will not be reflected immediately in monitoring wells. Evaluating these results over time and in conjunction with data regarding surface practices and other data is necessary to determine whether water quality is being protected or is being unreasonably impacted. In order to provide time for the development of this knowledge base, a period of six years has been allotted for the installation of groundwater monitoring wells, collection and chemical analysis of the groundwater samples, and assembly of an adequate data set for statistical evaluation of the data. The completed knowledge base will be utilized to identify management practices for the various management units (i.e., production areas, land application areas and wastewater ponds) that are protective of groundwater quality for the range of conditions found at facilities covered by the Representative Monitoring Program.

Dischargers choosing to participate in a Representative Monitoring Program must notify the Central Valley Water Board. Notification to the Central Valley Water Board must include identification of the Representative Monitoring Program that the Discharger intends to join. Dischargers choosing not to participate in a Representative Monitoring Program will continue to be subject to individual groundwater monitoring program requirements.

Representative Monitoring Programs are required to submit a monitoring and reporting workplan for Executive Officer approval. The workplan must explain how data collected at facilities that are monitored will be used to assess impacts to groundwater at facilities that are not part of the Representative Monitoring Program's network of monitoring wells. This information is needed to demonstrate that data collected at the representative facilities allows for identification of practices that are protective of water quality at all facilities represented by the Representative Monitoring Program, including those for which on-site data are not collected. The Monitoring and Reporting Workplan must additionally propose constituents the Representative Monitoring Program will monitor and the frequency of monitoring for each constituent identified. The

Monitoring and Reporting Workplan must propose a list of constituents that is sufficient to identify whether activities at facilities being monitored are impacting groundwater quality, and by extension if other "represented" facilities may also be impacting groundwater quality due to similar management units and site conditions.

To date, the Central Valley Dairy Representative Monitoring Program (CVDRMP) submitted a Phase 1 workplan to establish a Representative Monitoring Program. On 9 September 2012, the Executive Officer conditionally approved the first phase of the CVDRMP Monitoring and Reporting Workplan and Monitoring Well Installation and Sampling Plan for Existing Milk Cow Dairies. The workplan prepared by the CVDRMP consisted of 18 dairies and 126 dedicated monitoring well sites. Of these well sites, CVDRMP constructed 108 as nested wells (i.e., two wells in one borehole) with the remaining 18 well sites being pre-existing, single-well facilities, for a total of 234 wells.

On 6 June 2012 the CVDRMP submitted a Phase II workplan (approved by the Executive Office on 27 August 2012) which expanded the program's monitoring efforts to incorporate 24 additional dairies, including several dairies with numerous pre-existing monitoring wells that have been subject to academic research for many years. CVDRMP now collects data from monitoring wells at 42 Central Valley dairies from Tehama County in the north to Kern County in the south, with 440 wells at 274 well sites.

As part of its Representative Monitoring Program, CVDRMP will examine conditions in first encountered groundwater beneath a select number of Central Valley dairies over time. The Representative Monitoring Program will extrapolate monitoring results from dairy farms monitored under the program to non-monitored member dairy farms to evaluate dairy operations and management practices for specific waste management units (land application areas, production areas, and wastewater ponds), to facilitate the evaluation of cause and effect relationships between subsurface loading of nutrients and salts, and to establish current groundwater quality conditions. For example, dairy management practices on coarse-grained/sandy soils over shallow groundwater that result in groundwater quality improvements beneath cropped manure application fields that are part of the Representative Monitoring Program are expected to produce similar results beneath non-monitored fields of similar soil types, in areas of similar precipitation patterns, and similar application practices. The same rationale applies to the production area and the liquid manure (i.e., wastewater) storage ponds. Representative monitoring is designed to identify a causal link between groundwater chemical characteristics and dairy management practices specific to management units. This includes the identification of groundwater chemical changes in response to changing management practices.

The Representative Monitoring Program is required to submit (on behalf of its member Dischargers) to the Executive Officer an Annual Representative Monitoring Report (ARMR) which describes the monitoring activities (including a tabulated summary of groundwater analytical data) conducted by the Representative Monitoring Program, and identifies the number and location of installed monitoring wells and other types of monitoring devices. Within each ARMR, the Representative Monitoring Program must evaluate the groundwater monitoring data to determine whether groundwater is being impacted by activities at facilities being monitored by

the Representative Monitoring Program. The submittal must include a description of the methods used in evaluating the groundwater monitoring data.

No later than six (6) years following submittal of the first ARMR, the Representative Monitoring Program must produce a Summary Representative Monitoring Report (SRMR) identifying management practices for the various management units (i.e., production areas, land application areas and wastewater ponds) that are protective of groundwater quality for the range of conditions found at facilities covered by the Representative Monitoring Program. The identification of management practices for the range of conditions must be of sufficient specificity to allow participants covered by the Representative Monitoring Program and the Central Valley Water Board to identify which practices at monitored facilities are appropriate for facilities with a corresponding range of site conditions, and generally where such facilities may be located within the Central Valley (e.g., the summary report may need to include maps of the Central Valley that identify the types of management practices that should be implemented in certain areas based on specified site conditions). The summary report must include adequate technical justification for the conclusions incorporating available data and reasonable interpretations of geologic and engineering principles to identify management practices protective of groundwater quality. Further, the SRMR must include a proposed schedule for implementation of management practices that are protective of groundwater quality that is as short as practicable.

Each ARMR must include an evaluation of whether the representative monitoring program is on track to provide the data needed to complete the SRMR. If the evaluation concludes that information needed to complete the summary report may not be available by the required deadline, the ARMR shall include measures that will be taken to bring the program back on track. The ARMR shall include an evaluation of data collected to date and an assessment of whether monitored dairies are implementing management practices that are protective of groundwater quality. If the management practices being implemented at a dairy being monitored are found to not be protective of groundwater quality, the Executive Officer can issue an order to the owner/operator of the monitored dairy to identify and implement management practices that are protective of groundwater quality prior to submittal of the report.

Both the individual groundwater monitoring provisions and the RMP monitoring requirements are designed to measure water quality data in first-encountered groundwater. A RMP is further required to conduct such monitoring on a variety of dairy farms that represent the overall range of conditions on dairies within the Central Valley. This means for a RMP that a variety of physical site conditions must be monitored, such as varying soil types and depth to groundwater. Varying management practices must also be measured, such as different types of crops, irrigation methods, waste storage structures, and animal housing.

In cases where water quality is not being sufficiently protected, additional time is needed to identify additional practices for the various dairy facility areas that both improve water quality protection, and are feasible and practicable for dairy operators to implement. This is a chief goal of the RMP process and work is actively underway, to be completed no later than 2019, to identify and verify additional practices where necessary to protect beneficial uses of

groundwater. This process includes ongoing monitoring and analysis, field studies of management alternatives, and more intensive evaluation of existing practices, including existing manure storage ponds and nutrient management plans.

Considering the need to evaluate the effectiveness of current practices that are being implemented to comply with the Dairy Order, the Regional Board finds that it is not possible in all circumstances for dairy facilities to immediately comply with groundwater limitations. Accordingly, the Dairy Order provides dischargers with an appropriate amount of time to comply with such limitations. The time being provided is consistent with the time frames established in the MRP with respect implementation of RMPs.

Individual Monitoring Orders: The Executive Officer has issued orders to each dairy that require the dairies to either submit individual groundwater monitoring and sampling plans or join a representative groundwater monitoring program. Submitted groundwater monitoring and sampling plans must include a schedule to install groundwater monitoring wells into first encountered groundwater, to collect representative groundwater samples from the wells and have these samples analyzed by a State-certified laboratory for selected constituents, and to report the results back to the Board. The first phase of orders were issued to those dairies where nitrate-nitrogen was detected at 10 milligrams per liter or more in any one domestic well, agricultural well, or subsurface (tile) drainage system in the vicinity of the dairy. The Executive Officer further prioritized the orders 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 was completed by 1 July 2009; and any other pertinent site-specific conditions. A summary of how the Executive Officer determined priorities for installation of monitoring wells is provided in Table 5 of Attachment A to the MRP.

What Has Been Done Under the 2007 General Order?

The 2007 General Order established a schedule for Dischargers to develop and implement their Waste Management Plan (WMP) and NMP and required them to make interim facility modifications as necessary to protect surface water and groundwater, improve storage capacity, and improve the facility's nitrogen balance before all infrastructure changes are completed. The 2007 General Order required 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):

Reissued Waste Discharge Requirements General Order R5-2013-0122
Existing Milk Cow Dairies

- 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.

How Will This Order Be Enforced?

The State Water Board's Water Quality Enforcement Policy (Enforcement Policy) establishes a process for using progressive levels of enforcement, as necessary, to achieve compliance. It is the goal of the Central Valley Water Board to enforce this order in a fair, firm, and consistent manner. Violations of this order will be evaluated on a case-by-case basis with appropriate enforcement actions taken based on the severity of the infraction and may include issuance of administrative civil liabilities. 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 violators; 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 Dairy 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 Dairy 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.

To date, the Executive Officer has initiated and taken a significant number of enforcement actions against Dischargers for failure to comply with the terms of the 2007 General Order. Such actions have included, but are not limited to issuance of: 770 Notices of Violation; 94 Water Code 13267 investigations; 71 Selective Enforcement Letters; 67 Administrative Civil Liability complaints (Wat. Code, §§ 13385 and 13323.); and 12 Expedited Payment Letters.

Reissued Waste Discharge Requirements General Order No. R5-2013-0122
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Table 1. Regional, State, and National Pond Liner Design Requirements

Central Valley Water Board	Pond Liner Design Requirements
<p>Waste Discharge Requirements General Order No. R5-2013-0122</p>	<p>Tier 1 or Tier 2 option: <u>Tier 1:</u> 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.</p> <p><u>Tier 2:</u> 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.</p>
Central Valley Counties	Pond Liner Design Requirements
Kings County	<p>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).</p>
Merced County	<p>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.</p>
Solano County	<p><u>Large dairies (700 or more mature dairy cows):</u> 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.</p> <p><u>Medium sized dairies (200 to 699 mature dairy cows):</u> Liner of compacted clay that is a minimum of one foot thick, with maximum permeability of 1×10^{-6} cm/sec.</p> <p><u>Small dairies (14 to 199 mature dairy cows):</u> No pond liner requirements.</p>

Reissued Waste Discharge Requirements General Order No. R5-2013-0122
Existing Milk Cow Dairies

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^{-8} 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."

Reissued Waste Discharge Requirements General Order No. R5-2013-0122
Existing Milk Cow Dairies

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	<p>In-place soils at least two feet thick and maximum permeability of 1×10^{-6} cm/sec.</p> <p>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.</p> <p>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.</p>
California NRCS Conservation Practice Standard 313	<p>Target maximum seepage rate of 1×10^{-6} cm/sec for all vulnerability/risk categories, except that:</p> <p>(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 and the pond is within 600 feet from a domestic supply well), or</p> <p>(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 and the pond is less than 1,500 feet from a public supply well or less than 100 feet from a domestic supply well).</p>

MEMORANDUM

To: Theresa A. Dunham; Somach, Simmons & Dunn

From: John Schaap, Steve Bommelje

Subject: Costs to Retrofit Existing Dairies That Do Not Have Tier 1 or Tier 2 Lagoons.

Date: August 5, 2013

This memo estimates the costs to retrofit existing dairies that have do not have Tier 1 or Tier 2 lagoons for a range of dairy sizes. It also discusses other cost drivers that could impact retrofit projects.

Qualifications

John Schaap graduated from California Polytechnic State University, San Luis Obispo, California with a B.S. in Agricultural Engineering. He also holds an M.S. in Biological and Agricultural Engineering from the University of California, Davis, California.

Mr. Schaap is a registered agricultural and civil engineer in the State of California (license numbers AG 563 and C 61754). He has been in private practice as a consulting agricultural and civil engineer since January 2001, and has specialized full-time in dairy related matters in the San Joaquin Valley since that time. Mr. Schaap is a principal engineer with Provost and Pritchard Consulting Group (P&P).

Provost and Prichard Consulting Group has been meeting agricultural design and consulting needs in Central California since 1968. We have offices in Fresno, Bakersfield, Visalia, Clovis, Modesto, and Los Banos. Our staff includes licensed agricultural and civil engineers, as well as licensed geologists and other technical staff experienced in dairy work.

P&P acquired the dairy design firms of Valley Management Systems, Inc. (VMS) and EJS & Associates, Inc. in 2004, enfolding key personnel into the company to strengthen our dairy business. Since then, our firm has been at the forefront in assisting dairy clients achieve compliance with new or changing regulatory requirements, for both new and existing facilities.

Within approximately the last 10 years, P&P has designed and assisted in the certification of over 50 dairy lagoons in the Central Valley. These have included approximately 27 sites with lagoons meeting the 10% clay soil requirement, 7 sites that followed the NRCS Appendix 10D compacted clay liner guidelines, 10 sites with single liners, mostly using high density polyethylene (HDPE) material; and 8 sites with double HDPE liners with leachate collection and recovery systems (LCRS). Our firm has many more dairy liner projects that are currently in the design stage. The above projects do not include other similar wastewater impoundments that have been engineered for food processors, wastewater treatment plants, or other similar facilities, going back further in P&P's history. In the last ten years, approximately 14 of our technical staff have worked on lagoon projects.

Cost Estimates

We have prepared a range of cost estimates for retrofitting or rebuilding dairy lagoons with new liners. See Table 1. The estimates are for four sizes of dairies within a range typically found in the Central Valley: 300 milk cows (MC), 750 MC, 1,500 MC, and 3,000 MC. For each herd size we have calculated costs for four possible scenarios. These scenarios represent the four possible combinations of the following variables:

- 1) Liner design: single (Tier 2) or double (Tier 1) liner;
- 2) Lagoon location: new location or build within the current footprint of an existing lagoon location.

In order to keep the analysis consistent through the range of herd sizes, some baseline assumptions were used in sizing lagoons. These include the following:

- Weather conditions found in the Tulare and Kings County area;
- A 5:1 rectangular shape with a total depth of 20 feet;
- A constant rate of dairy barn water generation of 50 gallons per milk cow per day;
- 120 day winter storage period from November 1 to March 1; and,
- Overall storage capacity ratio (actual/required) between 100% and 105%.

Cost estimates assume a completely below ground lagoon with more than 5 feet of clearance to highest anticipated groundwater. Costs for design, earthwork, lining, and construction quality assurance and reporting are included.

Option of Single or Double HDPE Liner Design

The Dairy General Order stipulates that all new or modified lagoons meet the conditions described as a Tier 1 or Tier 2 lagoon. The Tier 1 lagoon is a 60-mil HDPE double liner with a leachate collection and recovery system. The Tier 2 option does not specify the liner material needed; however, it requires groundwater modeling as part of the design, and proposed ongoing monitoring that demonstrates protection of ground water. At this time, when the conditions are such that a single liner is possible, we have found it necessary to design a liner consisting of one layer of 60-mil HDPE over a one-foot thick soil layer with low permeability. Thus, for the Tier 2 case, this is what we have used as the basis of our estimate.

HDPE liner material with proper care and maintenance should have a service life of 20 to 30 years. We have not calculated a life cycle cost, but simply a single installation cost. Dairy facilities can have a useful life that exceeds the liner life, and thus a liner may need to be reinstalled at least once over the useful life of a dairy.

Option of New Location or Existing Location

The existing location option assumes that the size of the current lagoon is adequate, requiring only the excavation of several feet of organic laden soil, and contouring of the side slopes. An existing location requires the removal of liquid and solid manure prior to any construction work. Costs were included for that effort.

The new location option includes estimates for full excavation (assuming stockpiling nearby) and a location within close proximity in order to connect to the existing wastewater system. Here, the cleanout of manure from the old lagoon could be performed at any time but will at some point need to be performed to close the lagoon. If the old lagoon was allowed to dry, the cleanout costs could be reduced by handling the manure in a dry state. So we have included

Cost to Retrofit Existing Dairies That Do Not Have Tier 1 Or Tier 2 Lagoons

the “liquid and wet solid” cleanout cost in parentheses in Table 1 to provide an understanding of the range of costs that could be expected to clean the old lagoon to close the project.

Table 1. Costs to retrofit lagoons based on dairy size and retrofit type.

	<u>Existing Location*</u>	<u>New Location</u>	<u>Wet Cleanout**</u>
300 MC, 2.1 ac lagoon			
Single	\$198,000	\$180,000	(+\$37,000)
Double	\$270,000	\$252,000	(+\$37,000)
750 MC, 3.4 ac lagoon			
Single	\$300,000	\$275,000	(+\$78,000)
Double	\$425,000	\$399,000	(+\$78,000)
1,500 MC, 6.0 ac lagoon			
Single	\$521,000	\$482,000	(+\$171,000)
Double	\$753,000	\$714,000	(+\$171,000)
3,000 MC, 10.7 ac lagoon			
Single	\$948,000	\$887,000	(+\$357,000)
Double	\$1,383,000	\$1,321,000	(+\$357,000)

* An existing location estimate includes the cleanout of liquid and solid manure from the lagoon before construction can begin.

** A new location estimate does not include any cleanout cost of the old lagoon. This wet cleanout cost could be expected if performed while water is in the old lagoon.

Issues

There are many issues that may arise with the retrofitting or replacement of a lagoon. Each dairy has a different set of circumstances that may require additional effort to be expended in locating and designing a lagoon.

Tier 1 Lagoon (Double Liner) vs. Tier 2 Lagoon (Single Liner)

From the estimated costs shown in Table 1, a single liner appears to be a more cost-effective option. However, to obtain approval for a single liner, the design must show that groundwater will not be impacted via a model, and a monitoring system must be installed and maintained.

Groundwater models that are currently used to predict the performance of a liner are simplified models that are highly conservative. Conditions contributing to passing the modeling are low nitrate levels in background groundwater samples, high velocity groundwater flow beneath the site, low permeability soils, and minimal defects in the post-construction liner.

Currently, we are finding that most sites do not pass the simplified model and a single liner is thus not an eligible option. If a detailed modeling effort were performed, the modeling cost could equal the cost of the extra liner layer in question, without a guarantee of positive results. Thus, detailed modeling is generally not pursued at this time.

A single liner requires some type of accompanying groundwater monitoring, as noted above. Monitoring wells focused around the subject lagoon (outside of the representative monitoring program) are the typical monitoring system proposed. When depth to first encountered water is

Cost to Retrofit Existing Dairies That Do Not Have Tier 1 Or Tier 2 Lagoons

great, the cost for installing monitoring wells increases and other groundwater quality influences can possibly be mixed in the samples taken, obscuring the conclusions that can be drawn.

In Table 1 above the single liner option includes costs for installing lagoons, but does not include costs for monitoring. These can include the installation of monitoring wells, sampling and laboratory analysis on an ongoing basis, data assessment and analysis, and technical reports. These costs are not insignificant and can cost tens of thousands of dollars for well installation and hundreds to thousands of dollars per year in ongoing costs.

New Location vs. Existing Location

To rebuild a lagoon in the current location, provisions must be made to divert and contain the daily barn water generation (and any rainfall runoff) temporarily during the construction period. In many cases this may not be feasible, leading to the only other option, to build in a new location.

To compact the soil for structural support and installation of the HDPE liner, the side slopes must typically be 2:1 (horizontal: vertical) or flatter, depending on soil properties. Typical existing lagoon slopes are 1.5:1 or steeper. Therefore a larger lagoon footprint is likely to be needed to maintain the storage volume. In addition, the retrofit will need to provide 5 to 6 feet of additional room around the lagoon perimeter for an anchor trench to hold the liner material. Many lagoons are positioned near other structures on the dairy and this additional space may not be available.

Relocating the lagoon to a new area may require county permit changes if the location is outside of the established footprint of the dairy. Such changes are likely to trigger the need to comply with the California Environment Quality Act (CEQA), which could require the preparation of a mitigated negative declaration or an Environmental Impact Report (EIR). Other land use permits may also be triggered. Additional costs to comply with local land use permitting processes (including CEQA compliance) could possibly range between \$30,000 to \$100,000 or more.

The estimates in Table 1 indicate approximately how many acres the new lagoon is expected to occupy. In some cases, locating the new lagoon near the existing lagoon is infeasible and additional costs may be incurred to route the wastewater to a more distant location. In some cases, significant infrastructure, such as a pump station, may be required.

Highest Anticipated Groundwater

In shallow groundwater areas, this can be a significant issue complicating lagoon design. In other areas where the groundwater has deepened, but historically has been within 5 feet of the invert, it can present a physical or regulatory risk.

In order to quantify the highest anticipated groundwater to plan lagoon construction, areas with shallow groundwater require study on factors influencing the groundwater level, including influences from irrigations, ditches, or rainfall. This could require a complete year of study, periodically recording depth to groundwater in the intended site area, followed by a report from a geologist documenting the findings and recommendations. Conclusions may dictate reducing lagoon depth, building an above ground lagoon, and/or artificially controlling the water table with a tile drainage system.

Above Ground Lagoon

The above ground lagoon can be a good option for a new lagoon, from the perspective of minimizing the volume of soil that must be moved. However, in many areas, these are required due to high groundwater conditions.

Depending on the available soils, embankment height may be limited by engineering constraints. If below grade depth is limited, a deep lagoon (and efficient use of liner area) may not be possible at all. For a given storage volume, decreasing the depth of the lagoon will require increasing the footprint and corresponding liner costs. Thus, the cost for an above ground lagoon could be higher than identified in Table 1, as a function of the depth of the lagoon. There could be a decrease in earthwork costs, as less total volume of earth may need to be moved to provide the same storage volume; however, this is offset by the increased cost of placement of compacted fill in above ground embankments.

Using the 750 milk cow dairy case as an example, an above ground lagoon with only 12 feet of total depth increases the foot print by 1.2 acres and adds an additional cost of approximately \$34,000 to the single liner and \$83,000 for the double liner installation.

Manure and Sand Separation

New lagoons lined with thin layers of synthetic material are vulnerable to damage from lagoon cleaning equipment. A small hole in the liner can allow wastewater to get underneath. The wastewater naturally produces carbon dioxide and methane, byproducts of anaerobic digestion. The trapped gases under the liner can accumulate (if not vented) and eventually tend to float the liner to the surface, introducing stresses in the liner, leading to more liner damage, more wastewater under the liner, and yet more trapped gases. Thus, a minor nick or puncture of a 60 mil layer can lead to a major incident, requiring the replacement of the entire liner. Costs could approach what is estimated in Table 1 for an existing lagoon relining operation. Accordingly, it is very important to minimize liner exposure to equipment and to reduce cleanings as much as possible.

Manure solids separation systems are common on dairies. Some systems still allow a significant amount of solids into the lagoon because of various issues. Good solids separation can be an important factor enhancing the useful life of a liner. Thus, when installing a lined lagoon it is important to consider or reconsider manure separation. Adding a new screen separator and concrete drying pad can cost from \$180,000 for a smaller dairy to \$400,000 or more for a larger dairy. These costs are not included in Table 1 but may be necessary on many dairies to properly maintain and operate lagoons with synthetic liners.

Sand or dirt removal is also an important consideration. Sand can be introduced to the manure stream from bedding, feed, track-in from corrals, or other sources. Sand settling lanes or traps are a good solution, but must be considered during design to account for location, elevation, and gravity flow constraints.

Increased Rainfall and Storage Period

The estimates in Table 1 considered the weather conditions representative within Kings and Tulare Counties. Other areas to the north have more rainfall and may require a longer storage period, both of which require additional storage volume. Providing greater storage volume results in increased costs over what was estimated in Table 1.

Cost to Retrofit Existing Dairies That Do Not Have Tier 1 Or Tier 2 Lagoons

Using the 750 milk cow dairy again, changing the rainfall numbers to what is expected in the northern Sacramento Valley near Orland, the 750 milk cow dairy needs an additional 1.7 acres and costs are increased by roughly 50%. Adding an additional month of storage adds approximately another 7% to the cost.

Conclusion

The estimated costs provided in Table 1 are based on the minimum anticipated cost for the construction of an HDPE lined lagoon for a range of dairy sizes. These estimates are conservative (at an estimated higher cost) based on standardized assumptions that were outlined. However, when compared to each unique dairy situation additional cost drivers can easily increase the overall cost. These additional costs outlined in the Issues section can include location, groundwater conditions, manure and sand separation systems, higher rainfall areas than the south valley, and the length of the storage period.



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MEMORANDUM

To: Theresa A. Dunham; Somach, Simmons & Dunn
From: Annie AcMoody
Subject: Financial Impact to Retrofit Dairies that Do Not Have Tier 1 or Tier 2 Lagoons
Date: August 6, 2013

This memo estimates the financial impact to retrofit existing dairies that do not have Tier 1 or Tier 2 lagoons for a range of dairy sizes.

Scope/methodology

No two California dairies are exactly alike; dairy operators have different resources and production facilities. Therefore, this report provides a range of financial impacts. The estimated costs to retrofit dairy lagoons were based on an analysis provided by Provost and Pritchard (P&P). See memorandum from P&P dated August 5, 2013.

Specific farm financial information was compiled using California Department of Food and Agriculture (CDFA) data. The Cost of Production Unit, within the Dairy Marketing Branch of the CDFA, compiles cost of producing milk on a quarterly basis and publishes yearly averages for each of the production regions in California. More specifically for this analysis, a sample of dairies within California's Central Valley was used for each of the size categories analyzed by P&P.

Assumptions regarding the financing of the projects were made after interviewing personnel from three different lending institutions.

Due to market place volatility, it is extremely difficult to forecast dairy margins with any accuracy. One more reliable way is to look at past recent market conditions. The last five years presented an array of market conditions and provide insight on the financial situation faced by California dairy farmers. Assuming upcoming years are filled with similar extremely variable conditions, allows for an analysis of different scenarios.

Qualifications

Annie AcMoody graduated from Universite Laval, Quebec, Canada with a B.S in Agricultural Economics and Management. She also holds an M.S. in Agricultural Economics from Purdue University, West Lafayette, Indiana. Mrs. AcMoody has been the director of economic analysis for Western United Dairymen (WUD) since 2010. She has been an agricultural economist focusing on dairy economics issues in the state of California since 2007. More specifically, prior to working at WUD, she was an economist at the California Department of Food and Agriculture's Dairy Marketing Branch. In that role, she frequently analyzed the financial health of the California dairy industry, both from the dairy producers' and manufacturers' perspectives.

Dairy production in California

Milk and associated dairy products (cheese, dry milk powder, butter, ice cream, etc.) are California's top grossing agricultural products. Based on a study commissioned by the California Milk Advisory Board, California's dairy industry supported 450,000 jobs and generated \$63 billion in economic impact statewide in 2008. Nationally, California's production is significant: in 2012, California led the nation in milk production, producing 21% of the U.S.'s milk supply.

In recent years, milk price volatility has become a part of dairy operators' reality. The large variation in estimated margins over the past five years is a clear illustration of that. 2009 was especially negative as dairy operators in California were faced with historically low prices for milk and unusually high cost of production. Costs of production have remained high, fueled notably by high feed costs that remain supported by the government's ethanol policies. The margins outlined in this document do not include the cost of compliance with environmental regulations, which are becoming an increasingly larger part of the cost of producing milk in California. Each year, dairies have been forced out of business. The net loss of dairy operations over the past five years totaled 387 farms. This data does not include the number of farmers forced out of business and whose dairies were acquired by another dairy operation that managed to stay in business.

California dairies are complex and advanced operations. Nearly all California dairies are family run, and the farmers strive for production efficiencies through the use of advanced technologies in genetics, nutrition, reproduction, animal housing, and animal welfare.

Data

1) Cost of production

To calculate the impact of retrofitting dairy lagoons, data from the CDFA Cost of production studies were used. Those studies are conducted quarterly. CDFA staff goes to dairies and gather actual financial information. A sample representing approximately 10% of the dairy farms in California is analyzed each year to provide a representative picture of the financial health of the state's dairy operations (cost of production studies can be found at: http://cdfa.ca.gov/dairy/dairycop_annual.html). In this financial impact study, data from that sample was analyzed. More specifically, dairies representative of the sizes used in the P&P study were studied (300 cows, 750 cows, 1,500 cows and 3,000 cows).

CDFA releases a cost of production that includes allowances (return on investment and return on management). Because the return on investment is an allowance that can be foregone if the dairy operation is in a dire situation, it was not included in the cost of production number for the purpose of this analysis.

The cost of retrofitting dairy lagoons was analyzed under four different scenarios. Because the "new location" without assuming a wet clean-up cost was the cheaper option, it was used for a low end estimate. Utilization of both single and double liners was analyzed. The "new location" with wet clean-up cost is the most expensive option; therefore it was used as the most expensive end of the range for analysis purposes. Both single and double liners were also analyzed. From these four scenarios, specific yearly costs to the dairy were calculated using financing assumptions (repayment estimates included in Appendix A).

2) Revenue

Dairy operations' revenues come from the milk check they receive each month. In California, there is a milk pricing system that guarantees a minimum price processors are required to pay. However, each dairy ends up getting a different price due to different milk components, premiums, marketing costs, etc. Therefore, the mailbox price, which represents the net price received by a dairy, was used to determine the dairy revenue for each farm in the sample.

3) Financing

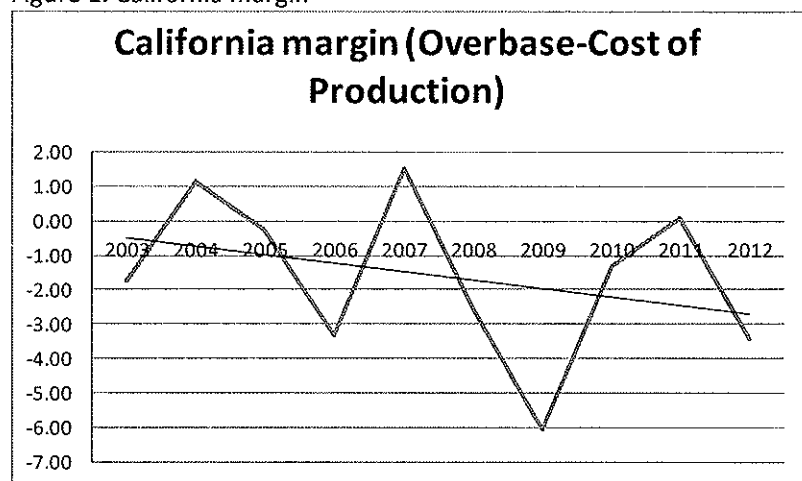
Because the cost of retrofitting dairy lagoons is significant, dairies would have to secure financing to pay for the project. The lack of available credit for dairy operations has been a popular topic in recent years and will be discussed in the Impact section further. For the sake of this study, it was assumed the dairy operation was able to secure a loan. But it is debatable whether a dairy would be able to secure a loan to proceed with the project because retrofitting a dairy lagoon does not create new value on the farm. Therefore, collateral, free of liens, would need to be available. Although some banks would rather lend on a shorter time frame, a twenty year loan seems to be a conservative option, lower yearly cost option and was used as an assumption. The current going interest rate for those terms is 6%.

Impact to dairies

1) Financial impact

Over the last decade, dairies have had to weather various pricing conditions, with some positive and some negative margin years. However, the overall trend is one of declining margins. A quick glance at the overbase price (minimum milk price paid producers) minus the cost of production (including allowances) illustrates that point (see Figure 1).

Figure 1: California margin



The bottom line experienced by dairies of the sizes outlined in the P&P memorandum did not exhibit a different trend during the past five years. 2008 and 2009 were not profitable years and forced dairies to dig into their equity to stay afloat (2008 for the 1,500 cow herd sample was an exception). 2010 and 2011 were profitable years while 2012 was not. Table 1 illustrates the net revenue per cow for each herd size.

Table 1: Net Revenue per Cow

Herd Size	2008	2009	2010	2011	2012
300	\$ (89.74)	\$ (891.12)	\$ 52.11	\$ 396.30	\$ (321.12)
750	\$ (33.26)	\$ (745.69)	\$ 175.36	\$ 364.25	\$ (309.39)
1500	\$ 98.59	\$ (840.59)	\$ 195.37	\$ 622.35	\$ (117.88)
3000	\$ (51.19)	\$ (747.42)	\$ 265.71	\$ 746.33	\$ (139.97)

Overall, for the past five years, dairy operations have fallen behind as the average net revenue per cow was negative for all herd sizes but one (see Table 2).

Table 2: Net revenue per cow, five year average

Average net revenue per cow				
Herd size	300	750	1500	3000
Past five year	\$ (170.71)	\$ (109.75)	\$ (8.43)	\$ 14.69

Looking at this data clearly explains the declining trend in the number of dairy operations in California. Left with no financial room to maneuver, adding on the cost of retrofitting dairy lagoons would prove impossible for most operations. The negative margins resulting are evidence of how much more economically fragile dairy operations would be if the costs of retrofitting lagoons were to be imposed on them. In no analyzed scenarios were dairies profitable with the added costs. Figure 2 illustrates that point. Table 3 after shows a more detailed analysis for each year and herd size.

Figure 2: Average net revenue per cow

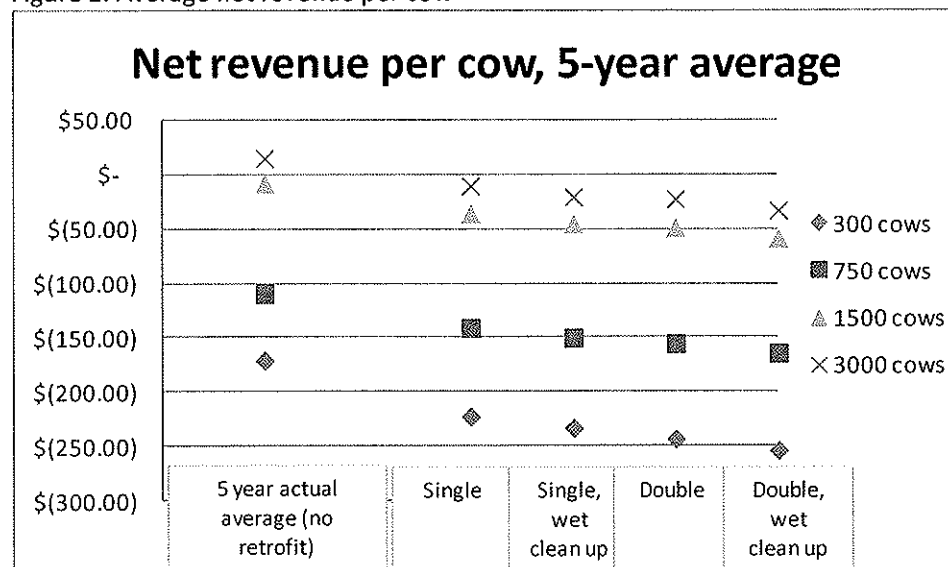


Table 3: Yearly margins by herd size based on four different costs scenarios

300	2008	2009	2010	2011	2012
Single liner	\$ (141.32)	\$ (942.70)	\$ 0.52	\$ 344.72	\$ (372.71)
Single, wet clean up	\$ (151.92)	\$ (953.30)	\$ (10.08)	\$ 334.11	\$ (383.31)
Double liner	\$ (161.95)	\$ (963.33)	\$ (20.11)	\$ 324.08	\$ (393.34)
Double, wet clean up	\$ (172.55)	\$ (973.94)	\$ (30.71)	\$ 313.48	\$ (403.94)
750	2008	2009	2010	2011	2012
Single liner	\$ (64.79)	\$ (777.21)	\$ 143.83	\$ 332.72	\$ (340.91)
Single, wet clean up	\$ (73.73)	\$ (786.16)	\$ 134.89	\$ 323.78	\$ (349.85)
Double liner	\$ (79.00)	\$ (791.43)	\$ 129.62	\$ 318.51	\$ (355.13)
Double, wet clean up	\$ (87.94)	\$ (800.37)	\$ 120.68	\$ 309.57	\$ (364.07)
1500	2008	2009	2010	2011	2012
Single liner	\$ 70.96	\$ (868.22)	\$ 167.75	\$ 594.72	\$ (145.51)
Single, wet clean up	\$ 61.16	\$ (878.02)	\$ 157.95	\$ 584.92	\$ (155.31)
Double liner	\$ 57.67	\$ (881.52)	\$ 154.45	\$ 581.42	\$ (158.81)
Double, wet clean up	\$ 47.87	\$ (891.32)	\$ 144.65	\$ 571.62	\$ (168.61)
3000	2008	2009	2010	2011	2012
Single liner	\$ (76.60)	\$ (772.84)	\$ 240.29	\$ 720.91	\$ (165.39)
Single, wet clean up	\$ (86.83)	\$ (783.07)	\$ 230.06	\$ 710.68	\$ (175.62)
Double liner	\$ (89.04)	\$ (785.27)	\$ 227.86	\$ 708.47	\$ (177.82)
Double, wet clean up	\$ (99.27)	\$ (795.51)	\$ 217.63	\$ 698.24	\$ (188.06)

2) Availability of credit

In conversations with lenders, the financing of the retrofitting projects would be difficult for most operations. To qualify for a real estate secured term loan covering the capital expenses amortized over 20 years, the loan would need to be secured by a 1st priority lien with a maximum debt against the appraised value of the real estate of 65%; this may cover 100% of the expenses or only a portion depending on the available lendable equity of the property. The borrower would need to have a debt-service coverage ratio (for all debt) of 1.25x.

If the dairy lagoon is retrofitted, the value of the dairy would most likely not change, i.e. the dairy's value would not increase because the retrofit was performed. Further, to obtain credit, the dairy likely needs to be free and clear of liens to have equity available. Due to the low profitability in the dairy industry over the past 5 years (as outlined in the previous section), facility values have been discounted heavily. One positive that the aforementioned analysis does not take into account is that farm-land values have appreciated greatly. However, this appreciation may not be sustainable and that appreciation is typically for a highest and best use of something other than growing forage crops to feed cows. It is generally tied to permanent plantings with most of the influence coming from nuts such as almonds, walnuts and pistachios.

Conclusion

A dairy lagoon retrofit would increase the overhead and breakeven cost to the operation. This increased cost of production, because it is not revenue generating, cannot be passed on to the processor or consumer so it reduces the profitability of the dairy. Ultimately, these costs could be the final add-on that may put a dairy operation out of business. Further, a large percentage of dairy operations would not be eligible for financing to complete a retrofit due to the lack of repayment capacity and because the operation is already likely over leveraged with existing debt.

Appendix A

TERMS OF LOAN

Life of loan (years) 20
Payments per year 12
Annual interest rate 6.00%

	New location, no clean up cost, Single liner	New location, wet clean up cost, Single liner	New location, no clean up cost, Double liner	New location, wet clean up cost, Double liner
300 MC				
PRINCIPAL	\$ 180,000.00	\$ 217,000.00	\$ 252,000.00	\$ 289,000.00
Monthly Payment	\$ 1,289.58	\$ 1,554.66	\$ 1,805.41	\$ 2,070.49
750 MC				
PRINCIPAL	\$ 275,000.00	\$ 353,000.00	\$ 399,000.00	\$ 477,000.00
Monthly Payment	\$ 1,970.19	\$ 2,529.00	\$ 2,858.56	\$ 3,417.38
1500 MC				
PRINCIPAL	\$ 482,000.00	\$ 653,000.00	\$ 714,000.00	\$ 885,000.00
Monthly Payment	\$ 3,453.20	\$ 4,678.29	\$ 5,115.32	\$ 6,340.41
3000 MC				
PRINCIPAL	\$ 887,000.00	\$ 1,244,000.00	\$ 1,321,000.00	\$ 1,678,000.00
Monthly Payment	\$ 6,354.74	\$ 8,912.40	\$ 9,464.05	\$ 12,021.71

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. WASTE MANAGEMENT PLAN AND NUTRIENT MANAGEMENT PLAN:

HAVE YOU COMPLETED A WASTE MANAGEMENT PLAN AND NUTRIENT MANAGEMENT PLAN IN ACCORDANCE
WITH THE REQUIREMENTS OF THE WASTE DISCHARGE REQUIREMENTS GENERAL ORDER NO.R5-2013-0122?
____ 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. PRELIMINARY DAIRY FACILITY ASSESSMENT:

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 ASSESSMENT¹ FOR YOUR DAIRY.
THE PRELIMINARY DAIRY FACILITY ASSESSMENT IS AVAILABLE ELECTRONICALLY ON THE CENTRAL VALLEY

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

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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. R5-2013-0122.

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.

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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):

	<u>TYPE</u>	<u>APPROXIMATE ANNUAL AMOUNT USED</u>
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. R5-2013-0122, 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. R5-2013-0122 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. R5-2013-0122 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			

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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:

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- 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.

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- 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. R5-2013-0122 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;

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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. R5-2013-0122;
 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

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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. R5-2013-0122.
- 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. R5-2013-0122.

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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. R5-2013-0122;
- 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;

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- 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. R5-2013-0122.

ATTACHMENT C

Contents Of A Nutrient Management Plan And Technical Standards For Nutrient Management For Existing Milk Cow Dairies

Waste Discharge Requirements General Order R5-2013-0122 (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 R5-2013-0122. 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.

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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.

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- 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 R5-2013-0122, 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 E.3 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 E.5 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 J.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 R5-2013-0122."*

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5. Land Application Specification E.6 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 E.8 of the Order: *"All process wastewater applied to land application areas must infiltrate completely within 72 hours after application."*
7. Land Application Specification E.9 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 G.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 previous 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.

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2. Land Application Specification E.7 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 shall not result in the creation of a condition of pollution or nuisance¹."*
- 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."*

¹ In an emergency, guidance is provided by the CAL/EPA Emergency Animal Disease Regulatory Guidance for Disposal and Decontamination (October 20, 2004).

- F. Land Application Specification E.4 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 E.8 of the Order: *"All process wastewater applied to land application areas must infiltrate completely within 72 hours after application."*
- H. Land Application Specification E.9 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. General Specification B.7 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 R5-2013-0122, 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 R5-2013-0122.

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): _____

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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 E.3 of Reissued Waste Discharge Requirements General Order No. R5-2013-0122) 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 California Code of Regulations, title 27, 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.

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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 Reissued Waste Discharge Requirements General Order R5-2013-0122.
13. "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.
14. "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.
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 filed in response to the 2005 Report of Waste Discharge Request Letter) 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 Reissued Waste Discharge Requirements General Order R5-2013-0122 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 Reissued Waste Discharge Requirements General Order R5-2013-0122.
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

Reissued Waste Discharge Requirements General Order R5-2013-0122
Existing Milk Cow Dairies

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 Water Code section 13050(m) 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.

Reissued Waste Discharge Requirements General Order R5-2013-0122
Existing Milk Cow Dairies

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 Water Code section 13050(l)(1) 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 , barns, milk houses, corrals, milk parlors, manure and feed storage areas, process water conveyances and any other area of the dairy facility that is not the land application area or the ponds.
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

Reissued Waste Discharge Requirements General Order R5-2013-0122
Existing Milk Cow Dairies

(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.

Reissued Waste Discharge Requirements General Order R5-2013-0122
Existing Milk Cow Dairies

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 Water Code section 13050 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
ET _o	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

Reissued Waste Discharge Requirements General Order No. R5-2013-0122
Existing Milk Cow Dairies

State Water Board	State Water Resources Control Board
State Water Board Resolution 68-16	State Water Resources Control Board Resolution 68-16 (<i>Statement of Policy with Respect to Maintaining High Quality of Waters in California</i>)
State Water Board Resolution 88-63	State Water Resources Control Board Resolution 88-63 (<i>Sources of Drinking Water Policy</i>)
State Water Board Resolution 92-49	State Water Resources Control Board Resolution 92-49 (<i>Policies and Procedures for Investigation and Cleanup or Abatement of Discharges Under Water Code Section 13304 or Cleanup and Abatement Policy</i>)
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
$\mu\text{mhos/cm}$	micromhos per centimeter (same as $\mu\text{S/cm}$)
$\mu\text{S/cm}$	microsiemens per centimeter (same as $\mu\text{mhos/cm}$)
USEPA	United States Environmental Protection Agency
WDRs	waste discharge requirements
WMP	waste management plan

Appendix N

Dairies and Feedlots in Tulare County

Tulare County Dairies

- | | |
|------------------------------|------------------------------|
| 1. Franco & Sons Dairy #1 | 47. Codorniz Dairy |
| 2. Airoso Dairy | 48. Coito & Sons Dairy |
| 3. Four Star Dairy #3 | 49. Oscar Sevilla |
| 4. Fernjo #2 | 50. Brasil Dairy (Edwin) |
| 5. Ankeridge Dairy | 51. Curti Family Inc. |
| 6. Homeview Dairy | 52. Curtimade Dairy Inc. |
| 7. Atsma Dairy | 53. Oakbend Dairy |
| 8. G & P Dairy | 54. SBS Ag Dairy |
| 9. Alves Dairy | 55. Holstein Lane |
| 10. Jim Bakker Dairy | 56. DeBoer Dairy |
| 11. Bakker Dairy | 57. Aukeman Farms |
| 12. T-Bar Dairy | 58. Jer-Z-Boyz Ranch |
| 13. F & L Barcellos Dairy | 59. DeGroot Dairy #2 |
| 14. Green Oak Dairy | 60. Sierra View Dairy |
| 15. B & D Dairy | 61. DeGroot Dairy |
| 16. Brasil's Udder Dairy | 62. Louie DeGroot Dairy |
| 17. Poplar Lane Dairy | 63. Milky Way Dairy |
| 18. Frano and Son's Dairy #2 | 64. Shirk Dairy |
| 19. Henry A. Garcia Dairy | 65. Chris DeJong Dairy |
| 20. Shady Oaks | 66. DeJong Dairy Farms Inc. |
| 21. RainiMade Dairy | 67. Tom DeJong Dairy |
| 22. Milk River Dairy | 68. Della & Sons Dairy |
| 23. Boertje & Son Dairy | 69. Delta View Farms |
| 24. Watte Brothers Dairy | 70. Lopes Dairy |
| 25. A & L Dairy | 71. L & L Dairy |
| 26. Borba Dairy #1 & #2 | 72. Henry Brower Dairy |
| 27. Alvin Souza Dairy #6 | 73. Dragt Dairy |
| 28. MJB Dairy | 74. Homestead Dairy |
| 29. Borges Dairy | 75. Milk Maid Dairy |
| 30. Bos Farms Dairy | 76. Harmony Farms |
| 31. Bosma Milk company | 77. Lou-mar Dairy |
| 32. Meadow Lake West Dairy | 78. DLA Dairy |
| 33. Rancho Sierra Vista | 79. F & F Dairy |
| 34. Elbow Creek Dairy | 80. Caldwell Dairy Farms LLC |
| 35. Brasil & Sons Dairy | 81. Simoes Bros. Dairy #4 |
| 36. Macedo Brothers Dairy | 82. Five Star Dairy |
| 37. Little Rock Too | 83. Faria Farms Inc. |
| 38. Bluegrass | 84. Faria Sons Dairy |
| 39. Brower Dairy #1 | 85. Fernjo #1 |
| 40. Triple V Dairy | 86. Heritage Dairy |
| 41. M & L Dairy | 87. Simoes & Ribeiro Dairy |
| 42. Cardoze Dairy | 88. N2 Dairy |
| 43. FM Ranch #3 | 89. Fernjo Dairy #3 |
| 44. Cardoza Dairy | 90. FM Ranch #2 |
| 45. Sunnyvale Dairy | 91. Friesian Dairy #2 |
| 46. L & L Morais Dairy | 92. Galhano Dairy |

Tulare County Dairies

- | | | | |
|------|------------------------------|------|-------------------------------|
| 93. | Alvin Souza Dairy #9 | 139. | Azteca Dairy |
| 94. | Henry Garcia Dairy | 140. | FM Ranch #4 |
| 95. | SBS Ag Heifers | 141. | Souza Acres |
| 96. | HD Ranch | 142. | Rocky Mountain Dairy |
| 97. | Lerda Farms | 143. | Joe Macedo & Sons Dairy |
| 98. | FL Dairy | 144. | FL Machado Bros Dairy |
| 99. | Sun Valley Dairy | 145. | Machado Dairy |
| 100. | Sunrise Dairy | 146. | Oak Creek Jerseys |
| 101. | Griffioen Dairy | 147. | Mancebo Dairy |
| 102. | COS Dairy | 148. | Bel Martin & Sons Dairy |
| 103. | Hamstra Dairy #2 | 149. | Martin Dairy |
| 104. | Verhoeven, Ron Family Dairy | 150. | Tri-Star Dairy Farm |
| 105. | Parreira & RBH Farms | 151. | Mancebo Holsteins #2 |
| 106. | Avenue 128 Dairy | 152. | Five Star Dairy #2 |
| 107. | Hettinga Famrs | 153. | Mellema Dairy |
| 108. | HighStreet Dairy | 154. | Buena Vista Dairy |
| 109. | Triple H Dairy | 155. | F & J Delano Dairy |
| 110. | Vida Boa Dairy #1 | 156. | Ben Mendonca & Family Dairy |
| 111. | Hoffman Dairies | 157. | Mendonca Dairy Farms |
| 112. | John Jacobi Dairy | 158. | John Mendonca Dairy |
| 113. | DJ Dairy LLC | 159. | FM Ranch #1 |
| 114. | Jongsma Dairy (Chris) | 160. | Mendonsa Family Farms Dairy |
| 115. | Jongsma Dairy (James & John) | 161. | Double M Jerseys Dairy |
| 116. | Jongsma Dairy | 162. | Endeavor gold Dairy |
| 117. | Tony & Julie Jorge Dairy | 163. | M.S. Monteiro & Sons |
| 118. | J & A Dairy | 164. | Double Oak Dairy |
| 119. | Kampen & Sons | 165. | Riverbend Dairy (North) |
| 120. | EastView Dairy | 166. | Nace Dairy |
| 121. | Rancho Tersita Dairy | 167. | Nunes & Sons Dairy |
| 122. | Jose Carreira Dairy #2 | 168. | Nunes Brothers Dairy |
| 123. | Mendonca Dairy #2 | 169. | Nunes Dairy |
| 124. | Oakview Dairy | 170. | Nunes Dairy (Tony) |
| 125. | Koetsier Dairy | 171. | Golden J. Dairy |
| 126. | Amstel Farms | 172. | Pacheco & Associates II Dairy |
| 127. | Golden State Dairy | 173. | Pacheco & Fagundas Dairy |
| 128. | Kroes Dairy | 174. | Four J Famrs |
| 129. | LK Ranches | 175. | Joe Pinheiro & Sons Dairy |
| 130. | Lawrence Dairy | 176. | Santa Anita Dairy |
| 131. | Manuel C. Leal & Son Dairy | 177. | Joe Pedro & Son Dairy |
| 132. | Clear Lake Farms | 178. | Pereira Dairy |
| 133. | Sunset Dairy | 179. | Pereira Family Dairy (John V) |
| 134. | Cascade Dairy | 180. | Pinheiro Dairy |
| 135. | Rocky Road Dairy | 181. | Joe C. Pires Jr. Dairy |
| 136. | Leyendekker Dairy #3 | 182. | Frank Pires III Dairy |
| 137. | Gerben Leyendekker Dairy | 183. | Back Road |
| 138. | GTA Dairy | 184. | GMC Dairy |

Tulare County Dairies

- | | |
|------------------------------------|------------------------------------|
| 185. Rib Arrow Dairy | 231. VP Farms Dairy (A) |
| 186. Graceland Dairy Inc. | 232. P & M Dairy (B) |
| 187. Ribeiro Dairy Farm | 233. Sierra Vista Dairy |
| 188. Los Robles | 234. R & S Dairy |
| 189. 4K Dairy | 235. D & V Dairy |
| 190. JR Dairy | 236. Vanderham Dairy |
| 191. Rynsburger Dairy | 237. Vanderham Dairy (Dick & Sons) |
| 192. Mountain View Dairy | 238. F & J Dairy #3 (A & B) |
| 193. Sanchez Dairy | 239. Golden West Dairy |
| 194. Terra Linda Dairy | 240. Westhill Dairy |
| 195. Santos Jer-Z Dairy | 241. A & R Vieira Dairy |
| 196. S & S Dairy | 242. Vander Wall Dairy |
| 197. Sepeda Bros. Dairy | 243. Little H Dairy |
| 198. Joe Simoes Family Dairy | 244. Little Rock Dairy |
| 199. J & E Simoes Dairy #1 | 245. Angiola Dairy |
| 200. Simoes Dairy (Mario) | 246. Cartmill Dairy |
| 201. Mario Simoes Family Dairy #1 | 247. Westra Dairy |
| 202. Simoes Dairy (Melvin) | 248. Countryside Dairy |
| 203. Sousa & Sousa Dairy | 249. Rio Blanco Dairy |
| 204. Sousa Dairy | 250. Del Oasis Farms |
| 205. Legacy Ranch #1 | 251. Island Dairy Farms |
| 206. AC Enterprises | 252. South Corner Dairy |
| 207. Ed Souza and Son Dairy | 253. Tri Bak Dairy, LLC |
| 208. Two Star Dairy | 254. Circle V Dairy |
| 209. Sweeney Dairy | 255. Top of the Morn Farms |
| 210. Double J Dairy | 256. Hettinga Cattle |
| 211. G. J. TeVelde Ranch | 257. Mendonca Dairy #1 |
| 212. Tiemersma Dairy | 258. Moonlight Dairy |
| 213. Tiersma Dairy | 259. Northstar Dairy |
| 214. Toledo Dairy | 260. Scheenstra Dairy |
| 215. Aguiar Dairy | 261. Westview Dairy |
| 216. Ponderosa Dairy | 262. Pires Dairy |
| 217. Tulare Union High School Farm | 263. Alvin Souza Dairy #1 |
| 218. El Monte Dairy | 264. Hynes Dairy |
| 219. Van Beek Bros. Dairy | 265. DG Farms |
| 220. Del Arco Dairy | 266. C & A Holsteins |
| 221. H & T Dairy | 267. Watte Bros #2 |
| 222. Red Rose Dairy | 268. Cornerstone Dairy |
| 223. Double D Dairy | 269. Tri Palm Dairy |
| 224. Rob Van Grouw Dairy | 270. Pacific Rim Dairy |
| 225. Pacific Sun Dairy | 271. Bosman Dairy |
| 226. Kroes South Dairy | 272. DeGroot Dairy #5 |
| 227. Vander Eyk Dairy | 273. Dykstra Dairy |
| 228. Case Vander Eyk Dairy | 274. Elkhorn Dairy |
| 229. Oak Creek Jerseys | 275. Holstein Farms |
| 230. Cross Creek Dairy | 276. K & M Visser Dairy |

Tulare County Dairies

- 277. Legacy Ranch II
- 278. Riverview Dairy
- 279. Robert Vander Eyk Dairy
- 280. Vander Poel Dairy (Pete)
- 281. Sierra Valley Dairy
- 282. Horizon Jersey Dairy
- 283. Fern Oak Farms
- 284. John Vanderpoel Dairy
- 285. Schott Dairy
- 286. Curti Family Farms
- 287. Hilarides Dairy
- 288. South Creek Dairy
- 289. Crossview Dairy
- 290. Dairyland Farms
- 291. South Lakes Dairy Farms
- 292. Borba & Sons Dairy
- 293. Twin River Ranch
- 294. Vanderham West Dairy
- 295. DeGroot Dairy #1
- 296. Circle A Dairy
- 297. Decade Dairy, LLC
- 298. Saddle Back Ranch
- 299. Mineral King Dairy
- 300. Rijlaarsdam Dairy
- 301. Bosman Pixley Dairy
- 302. Joe Pinheiro Dairy #2

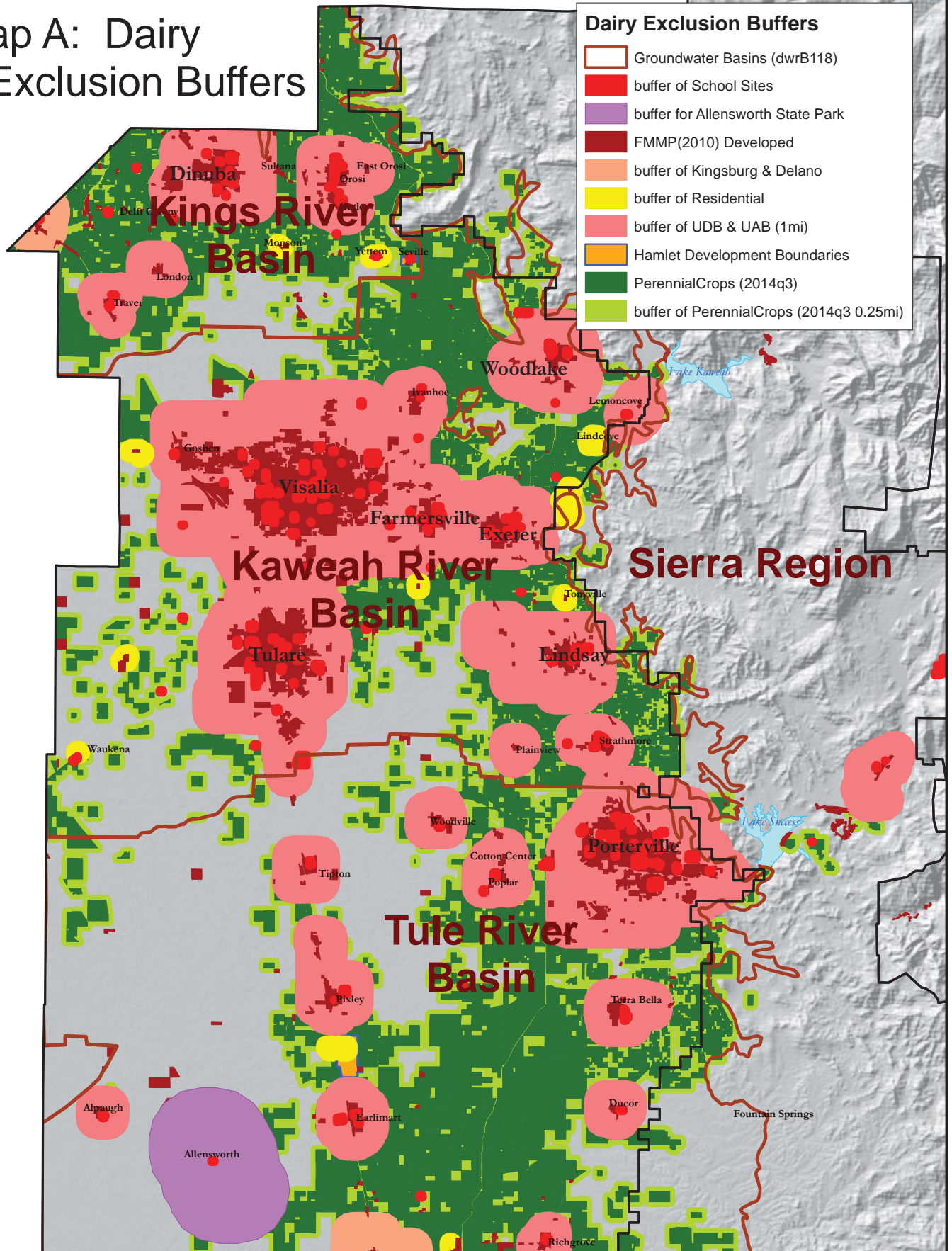
Tulare County Feedlots

1. Vida Boa Dairy #2
2. Shady Acres Dairy
3. DeJong Dairy
4. Zysling Heifer Ranch
5. Tony P Cardoza Dairy
6. Manuel C. Leal & Sons Dairy
7. J & E #2
8. Two Star Dairy
9. Vander Eyk Case – Feedlots
10. M. F. Rosa – Heifer Ranch
11. Rowley Ranch
12. Tulls Calf Ranch
13. Guess Calf Ranch
14. Calftex Corp
15. Tule River Ranch
16. Visser Ranch Feedlot
17. Mendes Calf Ranch
18. Shannon Feedlot
19. Sandlin Feedlot
20. Bamford Cattle
21. Cooper Feedlot
22. Wester Milling Calf Ranch
23. Sharon Hoogland
24. Faria No. 2 Partnership
25. Morais Feedlot
26. Kaweah Delta Water Cons
27. Gist Feedlot
28. Hilarides

Appendix O

Mapped Bases for Available Land for New/Expanded Dairy/Bovine Facilities

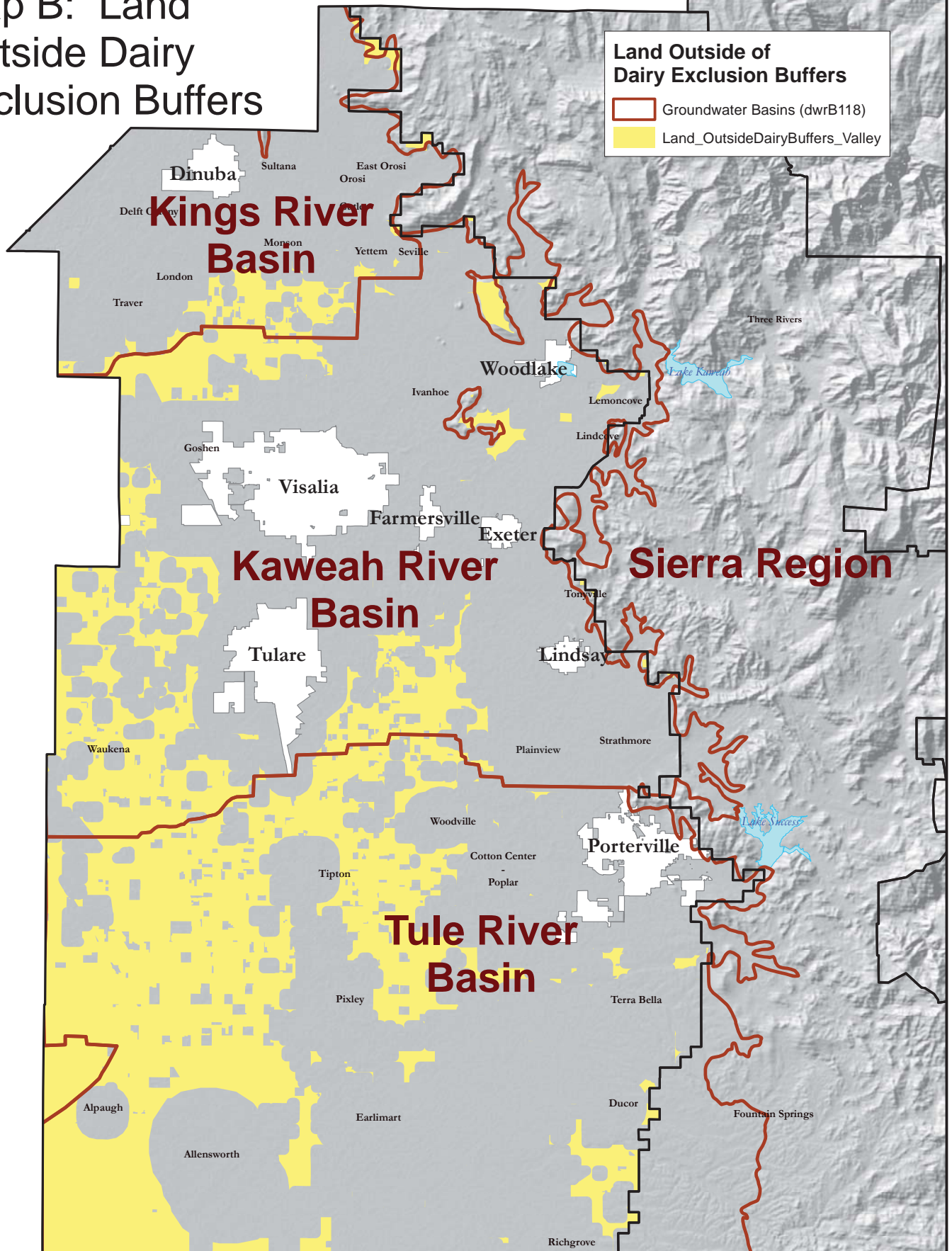
Map A: Dairy Exclusion Buffers



Dairy Exclusion Buffers

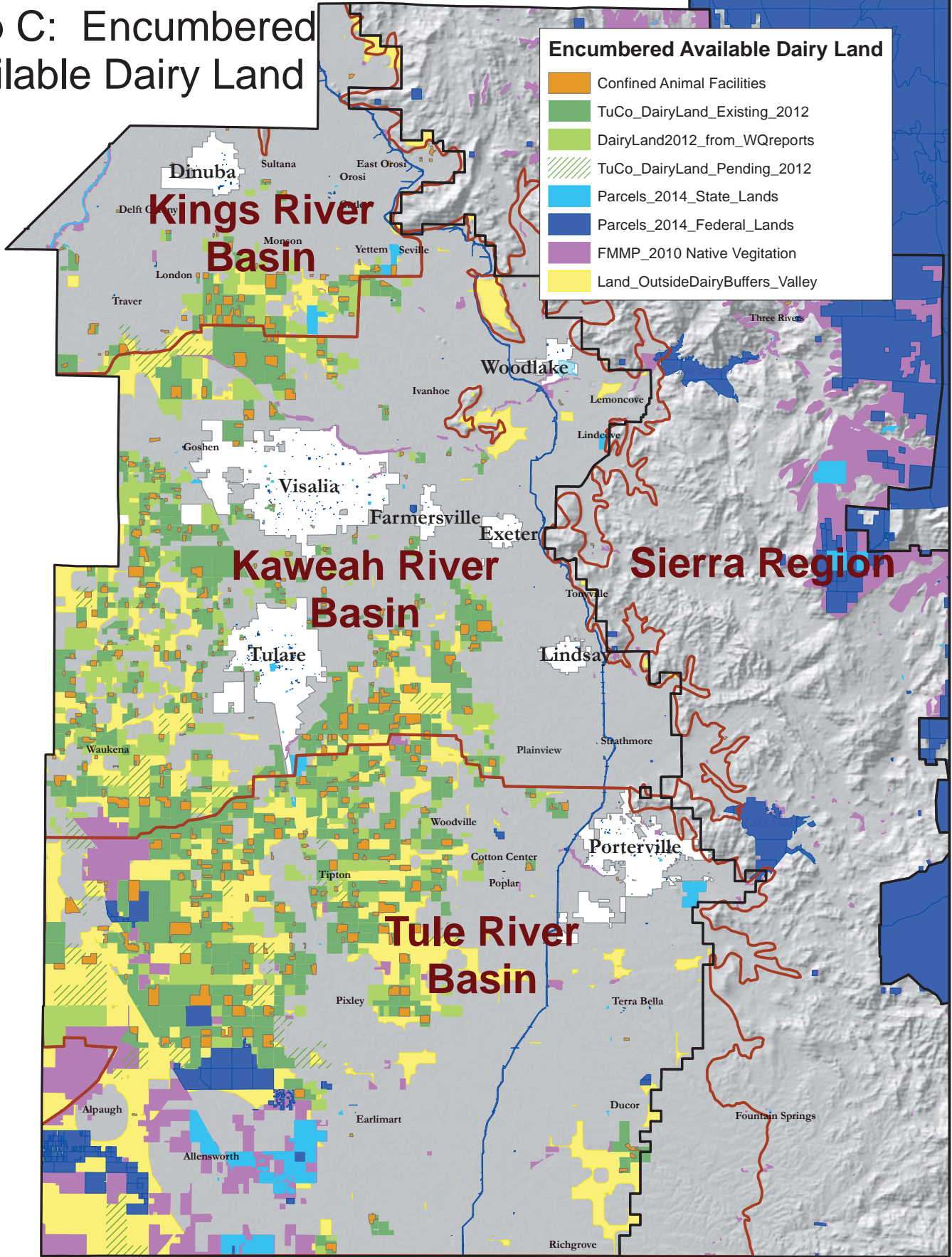


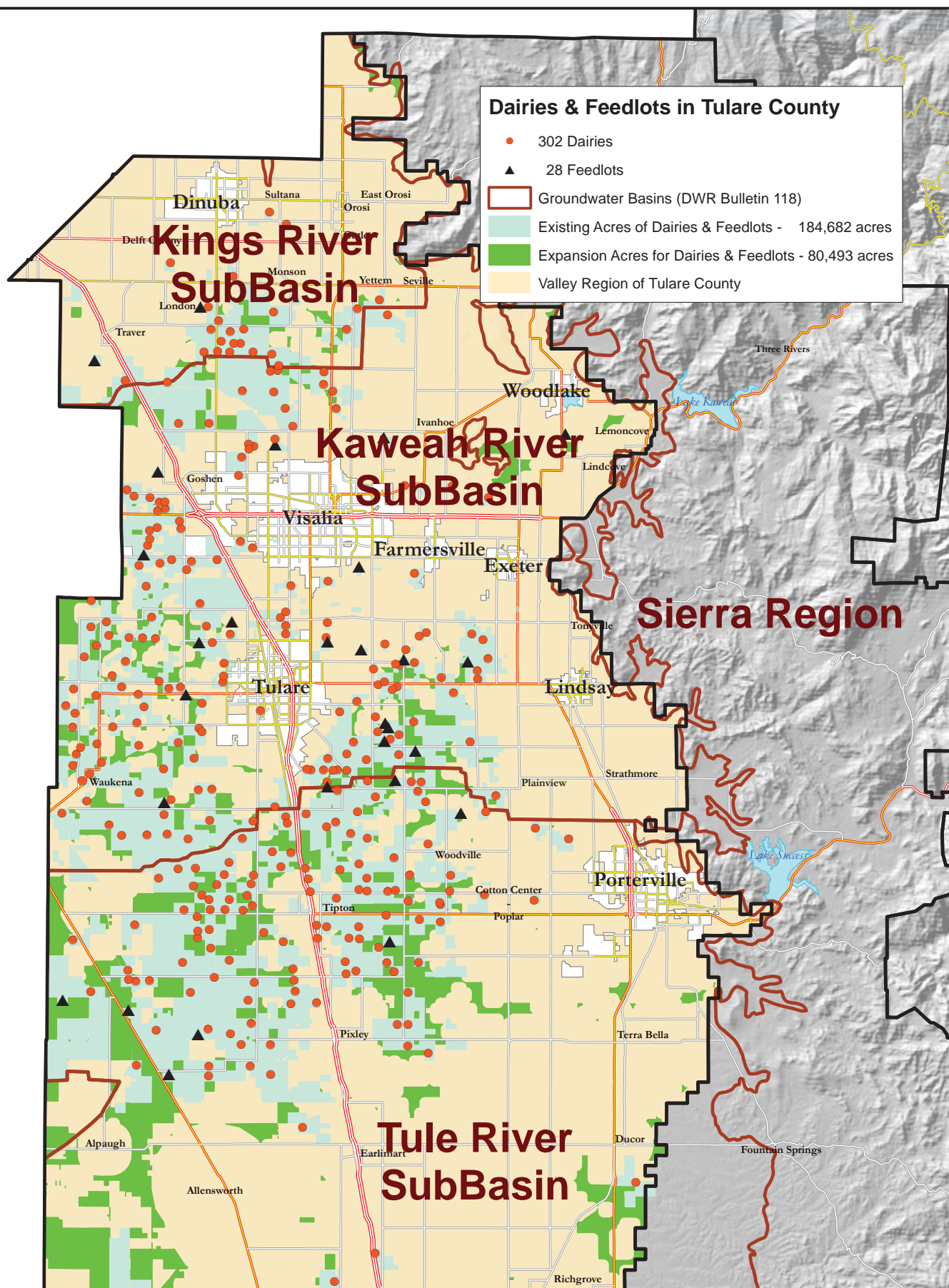
Map B: Land Outside Dairy Exclusion Buffers



Dairy Exclusion Buffers Residual

Map C: Encumbered Available Dairy Land





Dairy & Feedlot Potential Expansion Areas



Appendix P

Contaminant Tables

Table 1a1 - Nitrates and Dairies (Samples by Count)

MCL = 45.0 mg/L (established by EPA - for safe human consumption of drinking water)

Measure	2000	2001	2002	2003	2004	2005	2006	MCL = 45 mg/L							2007-2013
								2007	2008	2009	2010	2011	2012	2013	Total
< MCL	9	47	24	41	61	62	46	1160	1189	1315	1466	1273	1062	1102	8567
% <MCL	40.9%	67.1%	38.1%	45.1%	50.8%	44.6%	37.7%	54.0%	61.3%	58.8%	64.6%	61.9%	59.7%	57.2%	59.7%
> MCL	13	23	39	50	59	77	76	988	752	921	803	784	716	823	5787
% >MCL	59.1%	32.9%	61.9%	54.9%	49.2%	55.4%	62.3%	46.0%	38.7%	41.2%	35.4%	38.1%	40.3%	42.8%	40.3%
Samples	22	70	63	91	120	139	122	2148	1941	2236	2269	2057	1778	1925	14354

The Maximum Contaminant Level (MCL) for Nitrates (NO3) is 45.0 MG/L
Starting in 2007 the RWQCB mandated that all dairy wells be monitored at least once each year

Table 1a2 - Nitrates and Dairies (MEAN by Wells)

MCL = 45.0 mg/L (established by EPA - for safe human consumption of drinking water)

Measure	2000	2001	2002	2003	2004	2005	2006	MCL = 45 mg/L							2007-2013
								2007	2008	2009	2010	2011	2012	2013	Total
< MCL	9	47	24	41	61	62	33	1131	1160	1237	1278	1149	1057	1089	2728
% <MCL	40.9%	67.1%	38.1%	45.1%	50.8%	44.6%	42.3%	55.1%	61.4%	58.9%	64.3%	60.7%	59.9%	57.2%	58.1%
> MCL	13	23	39	50	59	77	45	920	728	864	709	743	708	814	1966
% >MCL	59.1%	32.9%	61.9%	54.9%	49.2%	55.4%	57.7%	44.9%	38.6%	41.1%	35.7%	39.3%	40.1%	42.8%	41.9%
Wells	22	70	63	91	120	139	78	2051	1888	2101	1987	1892	1765	1903	4694

Table 1a3 - Nitrates and Dairies (MEAN by Dairies)

MCL = 45.0 mg/L (established by EPA - for safe human consumption of drinking water)

See MAP 1a

Measure	2000	2001	2002	2003	2004	2005	2006	MCL = 45 mg/L							2007-2013
								2007	2008	2009	2010	2011	2012	2013	Total
< MCL	9	47	24	41	61	62	4	142	152	146	164	152	134	120	161
% <MCL	40.9%	67.1%	38.1%	45.1%	50.8%	44.6%	22.2%	49.7%	57.4%	55.3%	59.4%	55.7%	52.8%	48.8%	51.9%
> MCL	13	23	39	50	59	77	14	144	113	118	112	121	120	126	149
% >MCL	59.1%	32.9%	61.9%	54.9%	49.2%	55.4%	77.8%	50.3%	42.6%	44.7%	40.6%	44.3%	47.2%	51.2%	48.1%
Dairies	22	70	63	91	120	139	18	286	265	264	276	273	254	246	310

Table 2a1 - Salts and Dairies (Samples by Count)

MCL = 1600 uS/cm (established by EPA - for safe human consumption of drinking water)

Measure	2000	2001	2002	2003	2004	2005	2006	MCL = 1600 uS/cm							2007-2013 Total
								2007	2008	2009	2010	2011	2012	2013	
< MCL	9	47	24	41	61	62	46	2012	1878	2101	2052	1790	1688	1883	13404
% <MCL	40.9%	67.1%	38.1%	45.1%	50.8%	44.6%	37.7%	97.7%	97.6%	98.1%	99.4%	97.8%	97.0%	98.2%	98.0%
> MCL	13	23	39	50	59	77	76	47	46	40	13	41	52	34	273
% >MCL	59.1%	32.9%	61.9%	54.9%	49.2%	55.4%	62.3%	2.3%	2.4%	1.9%	0.6%	2.2%	3.0%	1.8%	2.0%
Samples	22	70	63	91	120	139	122	2059	1924	2141	2065	1831	1740	1917	13677

The Maximum Contaminant Level (MCL) for Salts (measured by Electro-Conductivity (EC) is 1600 uS/cm (micro Siemens per centimeter)
Starting in 2007 the RWQCB mandated that all dairy wells be monitored at least once each year

Table 2a2 - Salts and Dairies (MEAN by Wells)

MCL = 1600 uS/cm (established by EPA - for safe human consumption of drinking water)

Measure	2000	2001	2002	2003	2004	2005	2006	MCL = 1600 uS/cm							2007-2013 Total
								2007	2008	2009	2010	2011	2012	2013	
< MCL	9	47	24	41	61	62	33	1987	1851	1998	1788	1634	1678	1865	4349
% <MCL	40.9%	67.1%	38.1%	45.1%	50.8%	44.6%	42.3%	97.8%	97.6%	98.3%	99.3%	97.7%	97.0%	98.2%	98.2%
> MCL	13	23	39	50	59	77	45	44	45	34	12	38	52	34	78
% >MCL	59.1%	32.9%	61.9%	54.9%	49.2%	55.4%	57.7%	2.2%	2.4%	1.7%	0.7%	2.3%	3.0%	1.8%	1.8%
Wells	22	70	63	91	120	139	78	2031	1896	2032	1800	1672	1730	1899	4427

Table 2a3 - Salts and Dairies (MEAN by Dairies)

MCL = 1600 uS/cm (established by EPA - for safe human consumption of drinking water)

See MAP 2a

Measure	2000	2001	2002	2003	2004	2005	2006	MCL = 1600 uS/cm							2007-2013 Total
								2007	2008	2009	2010	2011	2012	2013	
< MCL	9	47	24	41	61	62	4	282	263	259	270	257	247	244	308
% <MCL	40.9%	67.1%	38.1%	45.1%	50.8%	44.6%	22.2%	98.9%	99.6%	99.6%	100.0%	98.8%	98.4%	99.6%	99.7%
> MCL	13	23	39	50	59	77	14	3	1	1	0	3	4	1	1
% >MCL	59.1%	32.9%	61.9%	54.9%	49.2%	55.4%	77.8%	1.1%	0.4%	0.4%	0.0%	1.2%	1.6%	0.4%	0.3%
Dairies	22	70	63	91	120	139	18	285	264	260	270	260	251	245	309

Table 2b1 - Salts and Dairies (Samples by Count)

MCL = 900 uS/mg (established by RWQCB - for safe irrigation)

Measure	2000	2001	2002	2003	2004	2005	2006	MCL = 900 uS/cm							2007-2013 Total
								2007	2008	2009	2010	2011	2012	2013	
< MCL	9	47	24	41	61	62	46	1732	1633	1825	1857	1543	1404	1593	11587
% <MCL	40.9%	67.1%	38.1%	45.1%	50.8%	44.6%	37.7%	84.1%	84.9%	85.2%	89.9%	84.3%	80.7%	83.1%	84.7%
> MCL	13	23	39	50	59	77	76	327	291	316	208	288	336	324	2090
% >MCL	59.1%	32.9%	61.9%	54.9%	49.2%	55.4%	62.3%	15.9%	15.1%	14.8%	10.1%	15.7%	19.3%	16.9%	15.3%
Samples	22	70	63	91	120	139	122	2059	1924	2141	2065	1831	1740	1917	13677

The Maximum Contaminant Level (MCL) for Salts (measured by Electro-Conductivity (EC) is 900 uS/cm (micro Siemens per centimeter)
Starting in 2007 the RWQCB mandated that all dairy wells be monitored at least once each year.

Table 2a2 - Salts and Dairies (MEAN by Wells)

MCL = 900 uS/mg (established by RWQCB - for safe irrigation)

Measure	2000	2001	2002	2003	2004	2005	2006	MCL = 900 uS/cm							2007-2013 Total
								2007	2008	2009	2010	2011	2012	2013	
< MCL	9	47	24	41	61	62	33	1720	1613	1735	1617	1394	1397	1578	3801
% <MCL	40.9%	67.1%	38.1%	45.1%	50.8%	44.6%	42.3%	84.7%	85.1%	85.4%	89.8%	83.4%	80.8%	83.1%	85.9%
> MCL	13	23	39	50	59	77	45	311	283	297	183	278	333	321	626
% >MCL	59.1%	32.9%	61.9%	54.9%	49.2%	55.4%	57.7%	15.3%	14.9%	14.6%	10.2%	16.6%	19.2%	16.9%	14.1%
Wells	22	70	63	91	120	139	78	2031	1896	2032	1800	1672	1730	1899	4427

Table 2a3 - Salts and Dairies (MEAN by Dairies)

MCL = 900 uS/mg (established by RWQCB - for safe irrigation)

See MAP 2b

Measure	2000	2001	2002	2003	2004	2005	2006	MCL = 900 uS/cm							2007-2013 Total
								2007	2008	2009	2010	2011	2012	2013	
< MCL	9	47	24	41	61	62	4	248	232	229	248	228	212	216	274
% <MCL	40.9%	67.1%	38.1%	45.1%	50.8%	44.6%	22.2%	87.0%	87.9%	88.1%	91.9%	87.7%	84.5%	88.2%	88.7%
> MCL	13	23	39	50	59	77	14	37	32	31	22	32	39	29	35
% >MCL	59.1%	32.9%	61.9%	54.9%	49.2%	55.4%	77.8%	13.0%	12.1%	11.9%	8.1%	12.3%	15.5%	11.8%	11.3%
Dairies	22	70	63	91	120	139	18	285	264	260	270	260	251	245	309

Table 2c1 - Salts and Dairies (Samples by Count)

MCL = 700 uS/cm (under study by RWQCB - for safe irrigation)

Measure	2000	2001	2002	2003	2004	2005	2006	MCL = 700 uS/cm							2007-2013 Total
								2007	2008	2009	2010	2011	2012	2013	
< MCL	9	47	24	41	61	62	46	1447	1409	1531	1614	1298	1182	1321	9802
% <MCL	40.9%	67.1%	38.1%	45.1%	50.8%	44.6%	37.7%	70.3%	73.2%	71.5%	78.2%	70.9%	67.9%	68.9%	71.7%
> MCL	13	23	39	50	59	77	76	612	515	610	451	533	558	596	3875
% >MCL	59.1%	32.9%	61.9%	54.9%	49.2%	55.4%	62.3%	29.7%	26.8%	28.5%	21.8%	29.1%	32.1%	31.1%	28.3%
Samples	22	70	63	91	120	139	122	2059	1924	2141	2065	1831	1740	1917	13677

The Maximum Contaminant Level (MCL) for Salts (measured by Electro-Conductivity (EC) is 900 uS/cm (micro Siemens per centimeter)
Starting in 2007 the RWQCB mandated that all dairy wells be monitored at least once each year.

Table 2c2 - Salts and Dairies (MEAN by Wells)

MCL = 700 uS/cm (under study by RWQCB - for safe irrigation)

Measure	2000	2001	2002	2003	2004	2005	2006	MCL = 700 uS/cm							2007-2013 Total
								2007	2008	2009	2010	2011	2012	2013	
< MCL	9	47	24	41	61	62	33	1437	1387	1456	1400	1173	1176	1311	3232
% <MCL	40.9%	67.1%	38.1%	45.1%	50.8%	44.6%	42.3%	70.8%	73.2%	71.7%	77.8%	70.2%	68.0%	69.0%	73.0%
> MCL	13	23	39	50	59	77	45	594	509	576	400	499	554	588	1195
% >MCL	59.1%	32.9%	61.9%	54.9%	49.2%	55.4%	57.7%	29.2%	26.8%	28.3%	22.2%	29.8%	32.0%	31.0%	27.0%
Wells	22	70	63	91	120	139	78	2031	1896	2032	1800	1672	1730	1899	4427

Table 2c3 - Salts and Dairies (MEAN by Dairies)

MCL = 700 uS/cm (under study by RWQCB - for safe irrigation)

See MAP 2c

Measure	2000	2001	2002	2003	2004	2005	2006	MCL = 700 uS/cm							2007-2013 Total
								2007	2008	2009	2010	2011	2012	2013	
< MCL	9	47	24	41	61	62	4	210	193	191	217	198	176	179	229
% <MCL	40.9%	67.1%	38.1%	45.1%	50.8%	44.6%	22.2%	73.7%	73.1%	73.5%	80.4%	76.2%	70.1%	73.1%	74.1%
> MCL	13	23	39	50	59	77	14	75	71	69	53	62	75	66	80
% >MCL	59.1%	32.9%	61.9%	54.9%	49.2%	55.4%	77.8%	26.3%	26.9%	26.5%	19.6%	23.8%	29.9%	26.9%	25.9%
Dairies	22	70	63	91	120	139	18	285	264	260	270	260	251	245	309

Table 3a1 - Coliform and Dairies (Samples by Count)

MDL = 1.0 bacteria/100 ml (established by Tulare County HHSA - for safe production of milk)

Measure	2000	2001	2002	2003	2004	2005	2006	MDL = 1.0 bacteria/100 mL							2007-2013
								2007	2008	2009	2010	2011	2012	2013	Total
Absent	203	350	177	136	253	109	238	159	141	143	107	121	169	97	937
% Absent	79.6%	78.3%	79.0%	84.5%	80.6%	85.2%	81.8%	85.5%	86.0%	86.1%	82.9%	78.6%	71.9%	73.5%	80.4%
Present	52	97	47	25	61	19	53	27	23	23	22	33	66	35	228
% Present	20.4%	21.7%	21.0%	15.5%	19.4%	14.8%	18.2%	14.5%	14.0%	13.9%	17.1%	21.4%	28.1%	26.5%	19.6%
Samples	255	447	224	161	314	128	291	186	164	166	129	154	235	132	1166

The Minimum Detect Level (MDL) for Coliform is 1.0 bacteria per 100 mL

If coliform is detected, the well must be repaired, cleaned, and retested until coliform bacteria is no longer detected.

Starting in 1999 the Tulare County Environmental Health Division tests the main well(s) at each dairy at least once every three years.

Table 3a2 - Coliform and Dairies (MDL by Wells)

MDL = 1.0 bacteria/100 ml (established by Tulare County HHSA - for safe production of milk)

Measure	2000	2001	2002	2003	2004	2005	2006	MDL = 1.0 bacteria/100 mL							2007-2013
								2007	2008	2009	2010	2011	2012	2013	Total
Absent	0	0	0	0	0	0	0	118	125	117	83	93	116	67	377
% Absent	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	85.5%	90.6%	87.3%	79.0%	78.8%	76.3%	71.3%	72.9%
Present	0	0	0	0	0	0	0	20	13	17	22	25	36	27	140
% Present	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	14.5%	9.4%	12.7%	21.0%	21.2%	23.7%	28.7%	27.1%
Wells	0	0	0	0	0	0	0	138	138	134	105	118	152	94	517

Table 3a3 - Coliform and Dairies (MDL by Dairies)

MDL = 1.0 bacteria/100 ml (established by Tulare County HHSA - for safe production of milk)

See MAP 3a

Measure	2000	2001	2002	2003	2004	2005	2006	MDL = 1.0 bacteria/100 mL							2007-2013
								2007	2008	2009	2010	2011	2012	2013	Total
Absent	0	0	0	0	0	0	0	89	98	99	65	81	86	56	191
% Absent	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	86.4%	88.3%	86.8%	75.6%	80.2%	72.9%	69.1%	62.4%
Present	0	0	0	0	0	0	0	14	13	15	21	20	32	25	115
% Present	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	13.6%	11.7%	13.2%	24.4%	19.8%	27.1%	30.9%	37.6%
Dairies	0	0	0	0	0	0	0	103	111	114	86	101	118	81	306

Appendix Q

GHG Emissions Methodology

Dairy Emissions Estimation Methodology

Greenhouse gas (GHG) emission inventories were prepared for dairy sources using a baseline year of 2013 and a future year of 2023. The future year of 2023 is consistent with the Animal Confinement Facilities Plan (ACFP) Update and the Program Environmental Impact Report (PEIR). The dairy inventory consist of industry-specific activity (e.g., animal emissions) and other general sources on dairies (e.g., energy, transportation). Animal-related sources include enteric fermentation and manure management. Other sources include equipment exhaust, agricultural soil management, electricity use, vehicle emissions (on-farm trucks, employee vehicles), and refrigeration. Animal-related sources were estimated using methodology developed by the Intergovernmental Panel on Climate Change (IPCC) and used by the California Air Resources Board (ARB) for quantifying annual statewide GHG emissions. All other sources were obtained from estimates developed for the Tulare County ACFP Update EIR.¹ Table 1 summarizes the major assumptions that were used in this Dairy CAP.

Table 1. Information Used in Animal-Related Inventory Calculations		
Data	Baseline (2013)	Future (2023)
Animal head counts	Tulare County Data Data reported for 2011 ^[a]	Assumed annual growth of 1.5% ^[b]
Manure Decomposition and Enteric Fermentation methodologies	IPCC ^{[c],[d]}	IPCC ^{[c],[d]}
<p>^[a] Although the baseline used is 2013, animal head counts from 2011 were used, because the numbers were slightly greater in that year and to be consistent with the PEIR and the ACFP Update.</p> <p>^[b] The assumed annual growth rate of 1.5% is consistent with the assumptions under the PEIR, the ACFP Update, and the AB 32 Climate Change Scoping Plan.</p> <p>^[c] 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 4, Chapter 10. Available at: http://www.ipcc-nggip.iges.or.jp/public/2006gl/. Accessed May 2014.</p> <p>^[d] Manure decomposition emissions were calculated using the methodology developed by IPCC. Statewide enteric fermentation emissions were obtained from ARB and prorated by the animal head counts assumed in Tulare. Because ARB uses the IPCC methodology as implemented in the Cattle Enteric Fermentation Model (CEFM), this approach and the emissions are consistent with IPCC and ARB methodologies.</p>		

¹ See Attachment 1.

The baseline year used is 2013, consistent with the ACFP Update and PEIR (as described above), and includes emissions estimates from all activities at the facilities based on known data. The methodology used to estimate emissions from the baseline year are described below. The future year, 2023, estimates are projected from the baseline by estimating the impacts of future growth and projected increases in production. It should be noted that most dairies likely already incorporate several GHG reduction measures as part of their standard operations and emissions would reflect that to the extent that the current emissions estimation methodology reflects those measures.

Enteric Fermentation

Enteric fermentation emissions for the baseline year were estimated by calculating the percentage of California enteric fermentation emissions that came from Tulare dairies. This estimate assumes that Tulare enteric fermentation methane emissions are proportional to the California methane emissions based on animal population (see Equation 1).

Equation 1:
$$CH_{4,ent} = CH_{4,ent,CA} \times \frac{Pop_{Tulare}}{Pop_{CA}}$$

California population and methane emissions are from the CARB 2000-2012 GHG Inventory for the year 2012.²

Manure Decomposition

Manure decomposition emissions for the baseline year were estimated using methodology developed by the IPCC.

Methane emissions for the baseline year were estimated using Equation 2.

Equation 2:
$$CH_{4,man} = V_{ex} \times B_0 \times MCF \times c_1$$

$CH_{4,man}$ = methane emissions from manure [kg CH₄/yr]

V_{ex} = volatile solids excreted [kg VS/yr]

B_0 = maximum methane producing capacity [m³ CH₄/kg VS]

MCF = methane conversion factor [%]

c_1 = conversion factor representing density of methane at 25°C.

Volatile solids excreted were estimated using Equation 3.

Equation 3:
$$V_{ex} = VS \times (WMS \times N_{animals})$$

VS = volatile solids excreted per animal [kg VS/animal/yr]

(WMS x $N_{animals}$) = number of animals per waste management system

² See Attachment 2.

Nitrous oxide emissions for the baseline year were estimated using Equation 4.

Equation 4:
$$N_2O = WMS \times N_{animals} \times N_{excreted} \times [D_{EF} + (V_{frac} \times V_{EF}) + (R_{frac} \times R_{EF})] \times 1.5711$$

N_2O = nitrous oxide emissions from manure [kg N_2O /yr]

$N_{excreted}$ = nitrogen excreted per animal [kg N/animal/yr]

D_{EF} = direct nitrogen as N_2O -N [g N_2O -N/g N]

V_{frac} = volatilization fraction of N [fraction]

V_{EF} = indirect nitrogen as N_2O -N [g N_2O -N/g]

R_{frac} = runoff fraction of nitrogen [fraction]

R_{EF} = indirect nitrogen as N_2O -N for runoff N [g N_2O -N/g]

The following factors were obtained from ARB's emissions inventory: MCF, c_1 , B_0 , VS, $N_{excreted}$, D_{EF} , V_{frac} , V_{EF} , R_{frac} , R_{EF} .^{3, 4} The number of animals per waste management system is estimated by assuming that Tulare has the same distribution of waste management systems as California does. The distribution of waste management systems in California was obtained from CARB.⁵

³ Note that ARB's emissions inventory references IPCC methodology.

⁴ See Attachment 2.

⁵ Ibid.

Table B-1. Project Level GHG Emissions without Mitigation (Metric Tons/Year)

Source	CO ₂	CH ₄	N ₂ O	HFC-23	CO ₂ e
Farm Equipment Exhaust	38,054	3	0	0.0	38,129
Farm Agricultural Soil	0	0	2,725	0.0	812,050
Farm Electricity Consumption	79,107	3	1	0.0	79,480
Dairy Equipment Exhaust	99,106	12	0	0.0	99,406
Truck Trips	23,137	0	0	0.0	23,137
Dairy Employee and Visitor Trips	14,882	3	3	0.0	15,851
Dairy Electricity Consumption	144,792	6	1	0.0	145,335
Dairy Refrigeration	0	0	0	4.3	63,640
Total	399,078	27	2,730	4.3	1,277,028

Notes:

1. Project level conditions represent existing conditions relative to a zero baseline. Existing conditions are from 2013 for Dairy Electricity Consumption and 2009 for all other sources.
2. Dairy emissions include support stock at heifer and calf ranches.
3. Farm emissions are associated with dairy and cattle ranch support crops.
4. Metric Ton = 1,000 kg = 1.1 short tons
5. CO₂e = carbon dioxide equivalent emissions, which is the sum of all emissions after multiplying by their global warming potentials (GWPs). GWPs are 1 for CO₂, 25 for CH₄, 298 for N₂O, and 14,800 for HFC-23 (Table A-1, 40 CFR Part 98).

Table B-2. Cumulative GHG Emissions without Mitigation (Metric Tons/Year)

Source	CO ₂	CH ₄	N ₂ O	HFC-23	CO ₂ e
Farm Equipment Exhaust	52,145	2	0	0.0	52,195
Farm Agricultural Soil	0	0	3731	0.0	1,111,838
Farm Electricity Consumption	108,340	5	1	0.0	108,763
Dairy Equipment Exhaust	135,303	7	0	0.0	135,478
Truck Trips	28,493	0	0	0.0	28,493
Dairy Employee and Visitor Trips	14,692	4	5	0.0	16,282
Dairy Electricity Consumption	170,925	7	2	0.0	171,566
Dairy Refrigeration	0	0	0	5.8	85,840
Total	509,898	25	3,739	5.8	1,710,455

Notes:

1. Cumulative conditions represent (10 year horizon) build out conditions with a 1.5% growth rate relative to a zero baseline.
2. Dairy emissions include support stock at heifer and calf ranches.
3. Farm emissions are associated with dairy and cattle ranch support crops.
4. Metric Ton = 1,000 kg = 1.1 short tons
5. CO₂e = carbon dioxide equivalent emissions, which is the sum of all emissions after multiplying by their global warming potentials (GWPs). GWPs are 1 for CO₂, 25 for CH₄, 298 for N₂O, and 14,800 for HFC-23 (Table A-1, 40 CFR Part 98).

Abbreviations:

CH₄ - methaneCO₂ - carbon dioxideCO₂e - carbon dioxide equivalents

GHG - greenhouse gas

GWP - global warming potential

HFC-23 - fluoroform

kg - kilogram

N₂O - nitrous oxide

Dairy and Feedlot Emissions Calculations for Manure Decomposition and Enteric Fermentation

Table A-1. Feedlot Cattle Head counts

Category	Total Cattle	Other Cattle ^[a]
California (2012) ^[b]	5,350,000	1,816,164
Base Year (2012) ^[b]	1,030,000	133,886
Future Year (2023) ^[c]	1,195,357	155,380

Notes:

^[a] This category is assumed to include all cattle other than milking cows, replacement dairy heifers (0-24 months), and dairy calves (see Table A-3).

^[b] California Agricultural Statistics for 2013. Available at:

http://www.nass.usda.gov/Statistics_by_State/California/Publications/California_Ag_Statistics/index.asp

^[c] The Future Year population is projected from the Base Year assuming a 1.5% annual growth rate.

Table A-2. Methane and Nitrous Oxide Emissions Beef Cattle - Enteric Digestion and Manure Management

Source	Enteric Digestion	Manure Management	
	CO ₂ e (MMT CO ₂ e/yr)		
California (2012) ^[a]	3.1	0.40	
	CH ₄ (MT CH ₄ /yr)	CH ₄ (MT CH ₄ /yr)	N ₂ O (MT N ₂ O/yr)
California (2012) ^[a]	123,207	5,269	905
Base Year (2013) ^[b]	9,083	388	67
Future Year (2023) ^[b]	10,541	451	77
	CO ₂ e (MT CO ₂ e/yr) ^[c]	CO ₂ e (MT CO ₂ e/yr) ^[c]	
California (2012) ^[a]	3,080,184	401,499	
Base Year (2013) ^[b]	227,068	30,399	
Future Year (2023) ^[b]	263,522	35,279	

^[a] California populations and methane emissions are from the CARB 2000-2012 GHG Inventory for the year 2012. Data available here: http://www.arb.ca.gov/cc/inventory/data/tables/ghg_inventory_by_ipcc_00-12_2014-03-24.xlsx Accessed April 2015.

^[b] CARB uses the same methodology that EPA uses to estimate emissions from enteric fermentation and manure management. As such, this table assumes that Tulare emissions are proportional to the California emissions based on population.

^[c] CO₂e = carbon dioxide equivalent emissions, which is the sum of all emissions after multiplying by their global warming potentials (GWPs). GWP is 25 for CH₄ and 298 for N₂O (Table A-1, 40 CFR Part 98).

Abbreviations:

CFR - Code of Federal Regulations

CH₄ - methane

CO₂e - carbon dioxide equivalents

GWP - global warming potential

IPCC - Intergovernmental Panel on Climate Change

lbs - pounds

MT - metric tonne

yr - year

Table A-3. Dairy Cattle Head Counts

Category	Dairy Cows	Dairy Heifers 0-12 mo	Dairy Heifers 12-24 mo	Dairy Calves
California (2012) ^[a]	1,780,000	245,322	588,161	920,353
Base Year (2013) ^[b]	543,431	137,985	148,928	65,770
Future Year (2023) ^[b]	630,674	160,137	172,837	76,329

Notes:

^[a] California populations and methane emissions are from the CARB 2000-2012 GHG Inventory.^[b] The Base Year cattle populations are assumed to be the 2011 Tulare cattle populations. The Future Year cattle populations are projected assuming a 1.5% annual growth rate.**Table A-4. Methane Emissions from Enteric Fermentation - Dairy Cattle**

Category	Dairy Cows	Dairy Heifers 0-12 mo	Dairy Heifers 12-24 mo	Dairy Calves
CO₂e (MMT CO₂e/yr)				
California (2012) ^[a]	6.641	0.281	1.017	0.282
CH₄ (kg CH₄/yr)				
California (2012) ^[a]	265,623,543	11,240,117	40,681,265	11,270,084
Base Year (2013) ^[b]	81,094,420	6,322,171	10,300,886	805,379
Future Year (2023) ^[b]	94,113,385	7,337,137	11,954,599	934,676
CO₂e (MT CO₂e/yr)^[c]				
California (2012)	6,640,589	281,003	1,017,032	281,752
Baseline (2013)	2,027,360	158,054	257,522	20,134
Future Year (2023)	2,352,835	183,428	298,865	23,367

Notes:

^[a] California populations and methane emissions are from the CARB 2000-2012 GHG Inventory for the year 2012. Data available here: http://www.arb.ca.gov/cc/inventory/data/tables/ghg_inventory_by_ipcc_00-12_2014-03-24.xlsx Accessed April 2015.^[b] CARB uses the same methodology that EPA uses to estimate emissions from enteric fermentation. As such, this table assumes that Tulare methane emissions are proportional to the California methane emissions based on population.^[c] CO₂e = carbon dioxide equivalent emissions, which is the sum of all emissions after multiplying by their global warming potentials (GWPs). GWP is 25 for CH₄ (Table A-1, 40 CFR Part 98).

Abbreviations:

CARB - California Air Resources Board

CFR - Code of Federal Regulations

CH₄ - methaneCO₂e - carbon dioxide equivalents

GHG - greenhouse gas

GWP - global warming potential

kg - kilogram

mo - months old

MT - metric tonne

yr - year

Table A-5. Dairy Cattle Head Counts

Category	Dairy Cows	Dairy Heifers
Base Year (2013) ^[a]	534,633	352,683
Future Year (2023) ^[a]	620,463	409,303

Notes:

^[a] The Base Year cattle populations are assumed to be the 2011 Tulare cattle populations. The Future Year cattle populations are projected assuming a 1.5% annual growth rate.

Table A-6. Methane Emissions from Manure Management - Dairy Cows

	Base Year (2013)			Future Year (2023)						
	CH _{4,man} (kg CH ₄ /yr) ^[a]	V _{ex} (kg/yr) ^[b]	WMS*N _{animals} (animal) ^[c]	CH _{4,man} (kg CH ₄ /yr) ^[a]	V _{ex} (kg/yr) ^[b]	WMS*N _{animals} (animal) ^[c]	VS (kg VS/animal/yr) ^[d]	B ₀ (m ³ CH ₄ /kg VS) ^[e]	MCF (%) ^[f]	c ₁ (kg/m ³) ^[g]
Anaerobic digester	519,273	18,057,107	6,374	602,638	20,956,010	7,397	2,833	0.24	0.181	0.662
Anaerobic lagoon	104,734,878	881,293,371	311,081	121,549,102	1,022,776,936	361,023	2,833	0.24	0.748	0.662
Daily spread	126,968	159,828,502	56,417	147,351	185,487,502	65,474	2,833	0.24	0.005	0.662
Deep pit	82,721	1,568,222	554	96,001	1,819,986	642	2,833	0.24	0.332	0.662
Dry lot	0	0	0	0	0	0	2,833	0.24	0.015	0.662
Liquid/slurry	16,133,214	305,853,583	107,961	18,723,253	354,955,570	125,293	2,833	0.24	0.332	0.662
Pasture	24,229	10,166,642	3,589	28,119	11,798,804	4,165	2,833	0.24	0.015	0.662
Solid storage	876,051	137,847,860	48,658	1,016,693	159,978,070	56,469	2,833	0.24	0.04	0.662
Total	122,497,334	--	534,633	142,163,157	--	620,463	--	--	--	--
Total (MMT CO ₂ e/yr) ^[h]	3.1			3.6						

Table A-7. Methane Emissions from Manure Management - Dairy Heifers

	Base Year (2013)			Future Year (2023)						
	CH _{4,man} (kg CH ₄ /yr) ^[a]	V _{ex} (kg/yr) ^[b]	WMS*N _{animals} (animal) ^[c]	CH _{4,man} (kg CH ₄ /yr) ^[a]	V _{ex} (kg/yr) ^[b]	WMS*N _{animals} (animal) ^[c]	VS (kg VS/animal/yr) ^[d]	B ₀ (m ³ CH ₄ /kg VS) ^[e]	MCF (%) ^[f]	c ₁ (kg/m ³) ^[g]
Anaerobic digester	0	0	0	0	0	0	1,255	0.17	0.181	0.662
Anaerobic lagoon	0	0	0	0	0	0	1,255	0.17	0.748	0.662
Daily spread	26,903	47,811,006	38,096	31,222	55,486,624	44,212	1,255	0.17	0.005	0.662
Deep pit	0	0	0	0	0	0	1,255	0.17	0.332	0.662
Dry lot	653,028	386,842,083	308,241	757,866	448,946,030	357,726	1,255	0.17	0.015	0.662
Liquid/slurry	144,546	3,868,660	3,083	167,751	4,489,738	3,577	1,255	0.17	0.332	0.662
Pasture	6,913	4,095,416	3,263	8,023	4,752,897	3,787	1,255	0.17	0.015	0.662
Solid storage	0	0	0	0	0	0	1,255	0.17	0.04	0.662
Total	831,391	--	352,683	964,863	--	409,303	--	--	--	--
Total (MMT CO ₂ e/yr) ^[h]	0.02			0.02						

Notes:

^[a] Methane emissions estimated using Equation 1 (see below).

Equation 1 $CH_{4,man} = V_{ex} \times B_0 \times MCF \times c_1$

^[b] Volatile solids excreted estimated using Equation 2 (see below).

Equation 2 $V_{ex} = VS \times (WMS \times N_{animals})$

^[c] Number of animals per waste management system. Assumes Tulare has the same distribution of waste management systems as California does (CARB Annex III.B.)

^[d] Volatile solids excreted per animal (CARB Annex III.B.)

^[e] Maximum methane producing capacity (CARB Annex III.B.)

^[f] Methane conversion factor (CARB Annex III.B.)

^[g] Conversion factor representing density of methane at 25°C (CARB Annex III.B.)

^[h] CO₂e = carbon dioxide equivalent emissions, which is the sum of all emissions after multiplying by their global warming potentials (GWPs). GWP is 25 for CH₄ (Table A-1, 40 CFR Part 98).

Abbreviations:

B₀ - maximum methane producing capacity

c₁ - density of methane at 25°C

CARB - California Air Resources Board

CFR - Code of Federal Regulations

CH_{4,man} - methane emissions from manure management

CO₂e - carbon dioxide equivalents

GWP - global warming potential

kg - kilogram

m³ - cubic meters

MCF - methane conversion factor

MMT - million metric tonnes

N_{animals} - animal population

V_{ex} - amount of volatile solids excreted in each WMS

VS - volatile solids production rate

WMS - waste management system

yr - year

Table A-8. Nitrous Oxide Emissions from Manure Management - Dairy Cows

	Dairy Cow Parameters						Base Year (2013)		Future Year (2023)	
	N _{ex} (g/yr) ^[a]	Direct N as N ₂ O (g N ₂ O-N/g) ^[b]	Volatilization fraction ^[c] (fraction)	Indirect N as N ₂ O, volatilized ^[d] (g N ₂ O-N/g)	Runoff fraction ^[e] (fraction)	Indirect N as N ₂ O, runoff ^[f] (g N ₂ O-N/g)	WMS*N _{animals} (animal) ^[g]	N ₂ O _{man} ^[h] (kg N ₂ O/yr)	WMS*N _{animals} (animal) ^[g]	N ₂ O _{man} ^[h] (kg N ₂ O/yr)
Anaerobic digester	157,605	0	0.43	0.01	0.008	0.0075	6,374	6,881	7,397	7,986
Anaerobic lagoon	157,605	0	0.43	0.01	0.008	0.0075	311,081	335,841	361,023	389,758
Daily spread	157,605	0	0.10	0.01	0	0.0075	56,417	13,970	65,474	16,212
Deep pit	157,605	0.002	0.24	0.01	0	0.0075	554	603	642	700
Dry lot ^[i]	157,605	0.02	0.15	0.01	0.02	0.0075	0	0	0	0
Liquid/slurry	157,605	0.005	0.26	0.01	0.008	0.0075	107,961	204,772	125,293	237,646
Pasture	157,605	0	0.00	0.01	0	0.0075	3,589	0	4,165	0
Solid storage	157,605	0.005	0.27	0.01	0	0.0075	48,658	92,772	56,469	107,666
Total	--	--	--	--	--	--	534,633	654,839	620,463	759,967
Total (MMT CO ₂ e/yr) ^[j]								0.20		0.23

Table A-9. Nitrous Oxide Emissions from Manure Management - Dairy Heifers

	Dairy Heifer Parameters						Base Year (2013)		Future Year (2023)	
	N _{ex} (g/yr) ^[a]	Direct N as N ₂ O (g N ₂ O-N/g) ^[b]	Volatilization fraction ^[c] (fraction)	Indirect N as N ₂ O, volatilized ^[d] (g N ₂ O-N/g)	Runoff fraction ^[e] (fraction)	Indirect N as N ₂ O, runoff ^[f] (g N ₂ O-N/g)	WMS*N _{animals} (animal) ^[g]	N ₂ O _{man} ^[h] (kg N ₂ O/yr)	WMS*N _{animals} (animal) ^[g]	N ₂ O _{man} ^[h] (kg N ₂ O/yr)
Anaerobic digester ^[k]	69,044	0	0.43	0.01	0.008	0.0075	0	0	0	0
Anaerobic lagoon ^[k]	69,044	0	0.43	0.01	0.008	0.0075	0	0	0	0
Daily spread	69,044	0	0.10	0.01	0	0.0075	38,096	4,133	44,212	4,796
Deep pit ^[k]	69,044	0.002	0.24	0.01	0	0.0075	0	0	0	0
Dry lot	69,044	0.02	0.15	0.01	0.02	0.0075	308,241	723,898	357,726	840,114
Liquid/slurry	69,044	0.005	0.26	0.01	0.008	0.0075	3,083	2,561	3,577	2,973
Pasture	69,044	0	0.00	0.01	0	0.0075	3,263	0	3,787	0
Solid storage ^[k]	69,044	0.005	0.27	0.01	0	0.0075	0	0	0	0
Total	--	--	--	--	--	--	352,683	730,592	409,303	847,882
Total (MMT CO ₂ e/yr) ^[j]								0.22		0.25

Notes:

^[a] Nitrogen excreted per animal (CARB Annex III.B.)^[b] Emission factor representing direct nitrogen as N₂O-N for the particular waste management system (CARB Annex III.B.)^[c] Volatilization fraction of N for the animal group (CARB Annex III.B.)^[d] Emission factor representing indirect nitrogen as N₂O-N for re-deposited volatilized N (CARB Annex III.B.)^[e] Runoff fraction of N for the animal group (CARB Annex III.B.)^[f] Emission factor representing indirect nitrogen as N₂O-N for runoff N (CARB Annex III.B.)^[g] Number of animals per waste management system. Assumes Tulare has the same distribution of waste management systems as California does (CARB Annex III.B.)^[h] N₂O emissions estimated using Equation 1 (see below).

$$\text{Equation 1 } N_2O = W_{ms} \times N_{animals} \times N_{excreted} \times [D_{EF} + (V_{frac} \times V_{EF}) + (R_{frac} \times R_{EF})] \times 1.5711$$

^[i] Data were not provided for dairy cows: dry lot; instead the data for heifers: dry lot were used.^[j] CO₂e = carbon dioxide equivalent emissions, which is the sum of all emissions after multiplying by their global warming potentials (GWPs). GWP is 25 for CH₄ and 298 for N₂O (Table A-1, 40 CFR Part 98).^[k] Data were not provided for dairy heifers: anaerobic digester, anaerobic lagoon, deep pit, or solid storage; instead the corresponding data for dairy cows were used.

Abbreviations:

CARB - California Air Resources Board

GWP - global warming potential

N₂O - nitrous oxide

WMS - waste management system

CFR - Code of Federal Regulations

kg - kilogram

N₂O_{man} - nitrous oxide emissions from manure management

yr - year

CO₂e - carbon dioxide equivalents

MMT - million metric tonnes

N_{animals} - animal population

g - gram

N - nitrogen

N_{ex} - nitrogen excreted per animal