

**TECHNICAL APPENDICES TO THE
DRAFT
ENVIRONMENTAL IMPACT REPORT**

for the

VAN DER KOOI DAIRY

SCH # 2006011107



San Joaquin Valley Air Pollution Control District
1990 East Gettysburg Avenue
Fresno, California 93726-0244

November 2006

Technical Appendices to the
Draft Environmental Impact Report
VAN DER KOOI DAIRY

November 2006

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

Contact Person: Elena Nuño, Air Quality Specialist
Phone: (559) 230-6000
Fax: (559) 230-6061

Consultant: Quad Knopf
5110 West Cypress Avenue
Visalia, CA 93277

Contact Person: Harry A. Tow
Phone: (559) 733-0440
Fax: (559) 627-2336

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APPENDICES

Appendix A
Initial Study/Notice of Preparation and Comments

**INITIAL STUDY
NOTICE OF PREPARATION**

CHARLES VAN DER KOOI DAIRY



SAN JOAQUIN VALLEY AIR POLLUTION CONTROL DISTRICT



January, 2006

**INITIAL STUDY/NOTICE OF PREPARATION
CHARLES VAN DER KOOI DAIRY**

January, 2006

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

Contact Person: Elena Nuño, Air Quality Specialist
Phone: (559) 230-6000
Fax: (559) 230-6061

Consultant: Quad Knopf
5110 West Cypress Avenue
Visalia, CA 93277

Contact Person: Harry A. Tow
Phone: (559) 733-0440
Fax: (559) 627-2336

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CHAPTER ONE

INTRODUCTION / DETERMINATION

CHAPTER ONE – INTRODUCTION / DETERMINATION

1.1 Purpose and Authority

The purpose (objective) of the project is to build and operate an economically viable and competitive dairy facility in compliance with applicable laws and regulations, optimally utilizing the available land resources and mitigating any environmental impacts to the extent feasible and as required by CEQA.

This document is the Initial Study/Notice of Preparation for the Project. A Regional Location map is included as Figure 1-1 on the following page.

The San Joaquin Valley Air Pollution Control District (SJVAPCD) is the lead agency pursuant to the State Guidelines for implementation of the California Environmental Quality Act (CEQA Guidelines), Section 15050. Consistent with these guidelines, this Initial Study evaluates and discusses the Project's potential environmental impacts.

The Initial Study and Notice of Preparation will be circulated for agency and public review for 30 days, pursuant to CEQA Guidelines Section 15073(d).

1.2 Organization of the Initial Study

This Initial Study is organized into the following sections:

Chapter One: Introduction: Provides background information about the proposed Project including the project purpose, Initial Study authority, Study determination as to required environmental analysis.

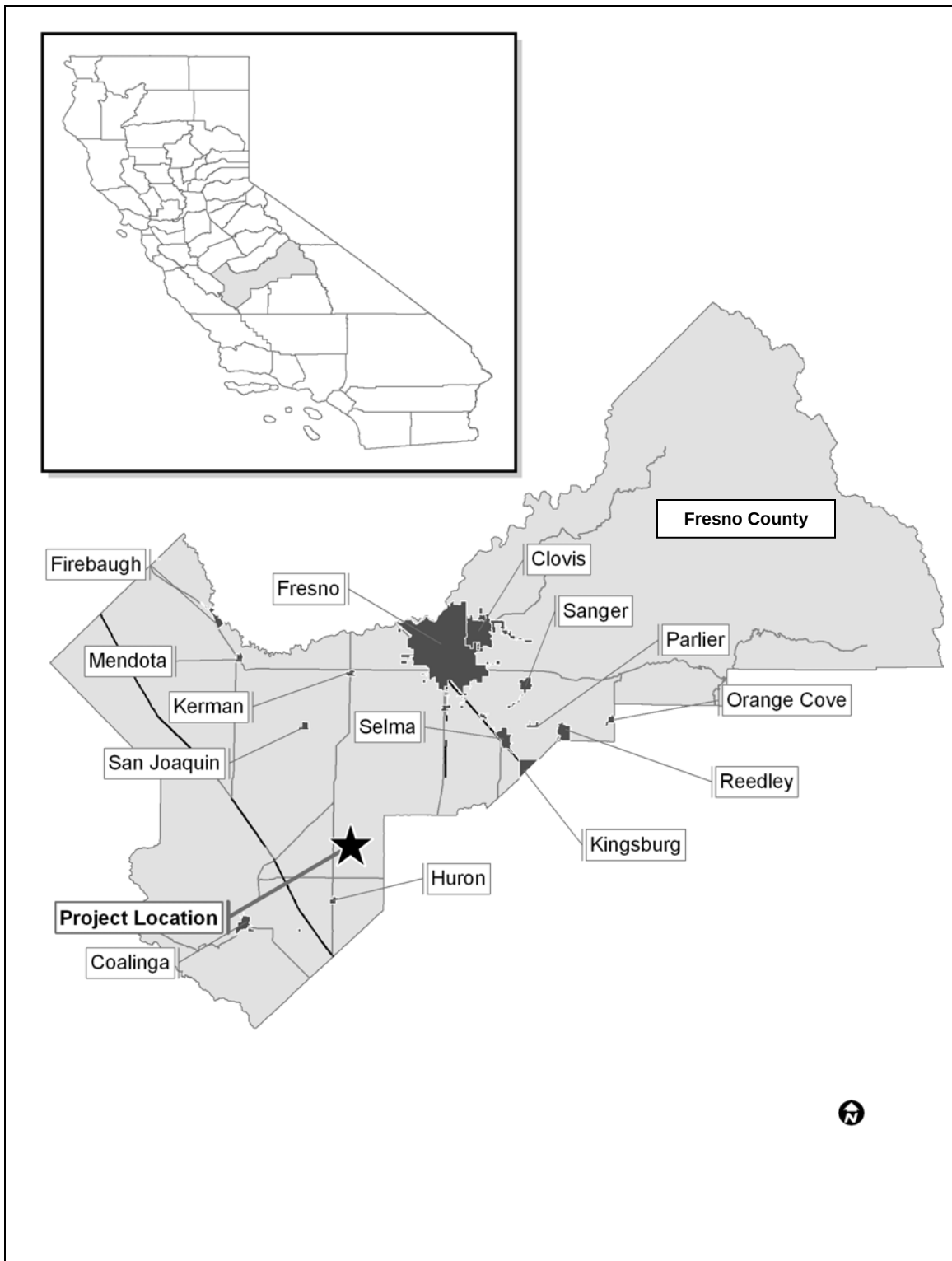
Chapter Two: Project Location and Description: Describes the proposed Project location, site plan, surrounding land uses, and characteristics.

Chapter Three: Environmental Checklist: Contains the environmental checklist which is used to guide the evaluation of environmental issues related to the construction and operation of the proposed Project. A discussion of each environmental issue and of any mitigation measures which may be required to address the issue follows the checklist.

Chapter Four: List of Preparers - Lists the persons assisting in the preparation of this Initial Study.

1.3 Determination

The Initial Study concludes that the proposed project may have a significant effect on the environment and that an environmental impact report must be prepared (see Chapter Three)



CHAPTER TWO

PROJECT LOCATION AND DESCRIPTION

CHAPTER TWO – PROJECT LOCATION AND DESCRIPTION

2.1 Project Location

The project is located in western Fresno County, California (see Figure 1-1, Regional Location). It is approximately 25 miles southwest of the City of Fresno, and 20 miles northwest of the City of Lemoore.

A Vicinity Map, Figure 2-1 on the following page, further depicts the project site location bisected by Elkhorn Avenue and west of Howard Avenue, approximately one mile southwest of the Fresno Slough.

The project site is located in a FEMA Flood Zone C (not subject to 100 year flood events). Depth to groundwater at the project site is estimated to be 150 feet below ground surface (see Appendix A).

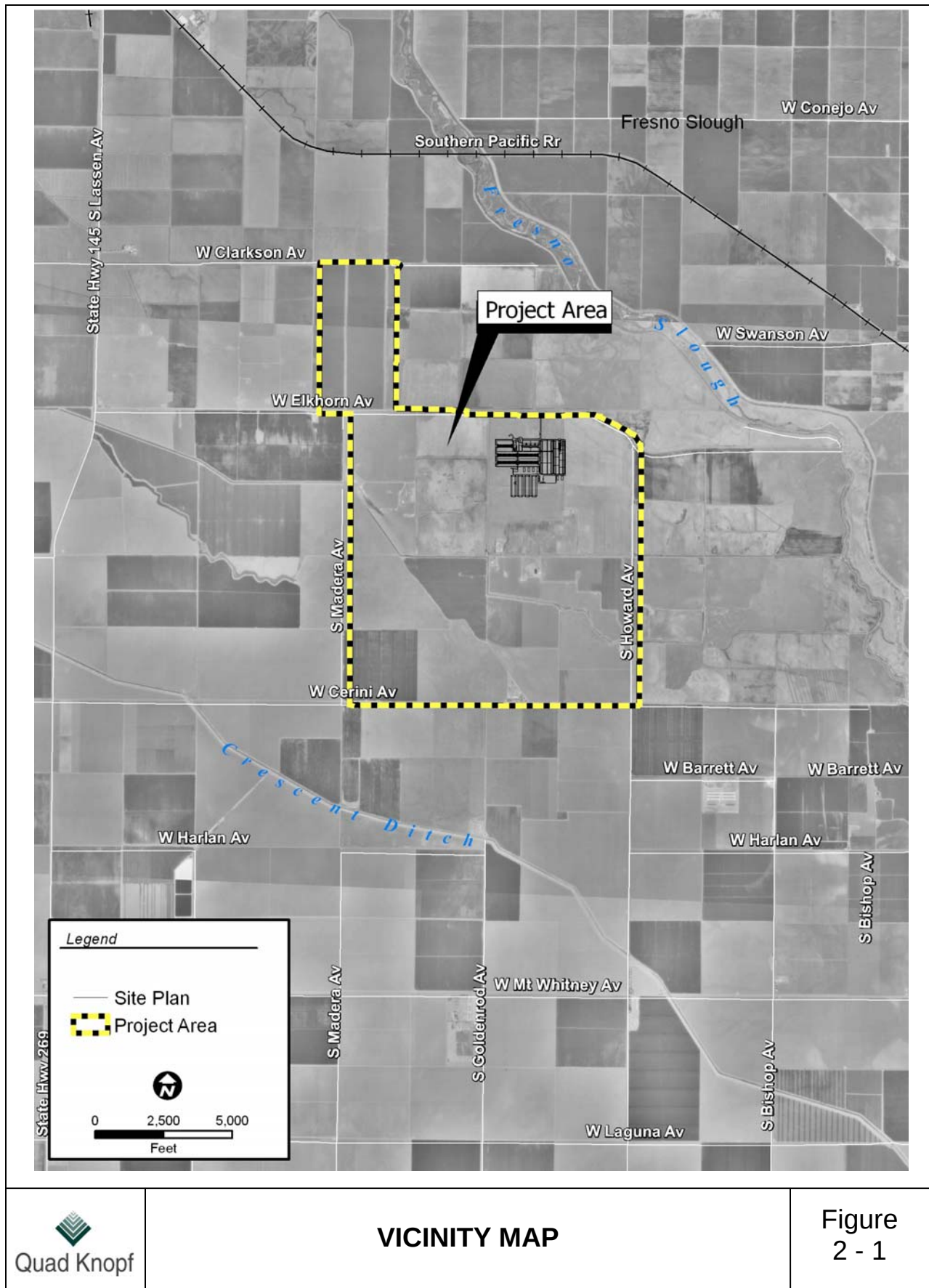
The project is the construction and operation of a 3,200 milk cow (Holstein) dairy on 1,132 acres of land currently in agricultural row crop production and 110 acres of land graded for the dairy facilities site. The dairy will include support stock, as follows:

HERD SIZE			
	Animal Count	Factor	Animal Units*
Milk Cows	3,200	1.40	4,480
Dry Cows	480	1.12	538
Heifers 1-2 yr	960	1.02	979
Heifers 3mo-1yr	1,100	0.49	539
Calves	380	0.29	110
Total	6,120	--	6,646

*Animal units based on 1,000 pound cows, and support stock ratios approved by Central Valley Regional Water Quality Control Board.

The Comprehensive Nutrient Management Plan which has been prepared for the project (Appendix B) indicates that the cropped area on the project site will accommodate the usage of liquid manure and solid manure from the project within the Central Valley Regional Water Quality Control Board's nitrogen and salts loading limitations.

The proposed dairy facilities are typical of those currently being constructed in the San Joaquin Valley, housing milk cows in freestall barns and support stock in corrals with flushed alleys. The facilities are illustrated on Figure 2-2.



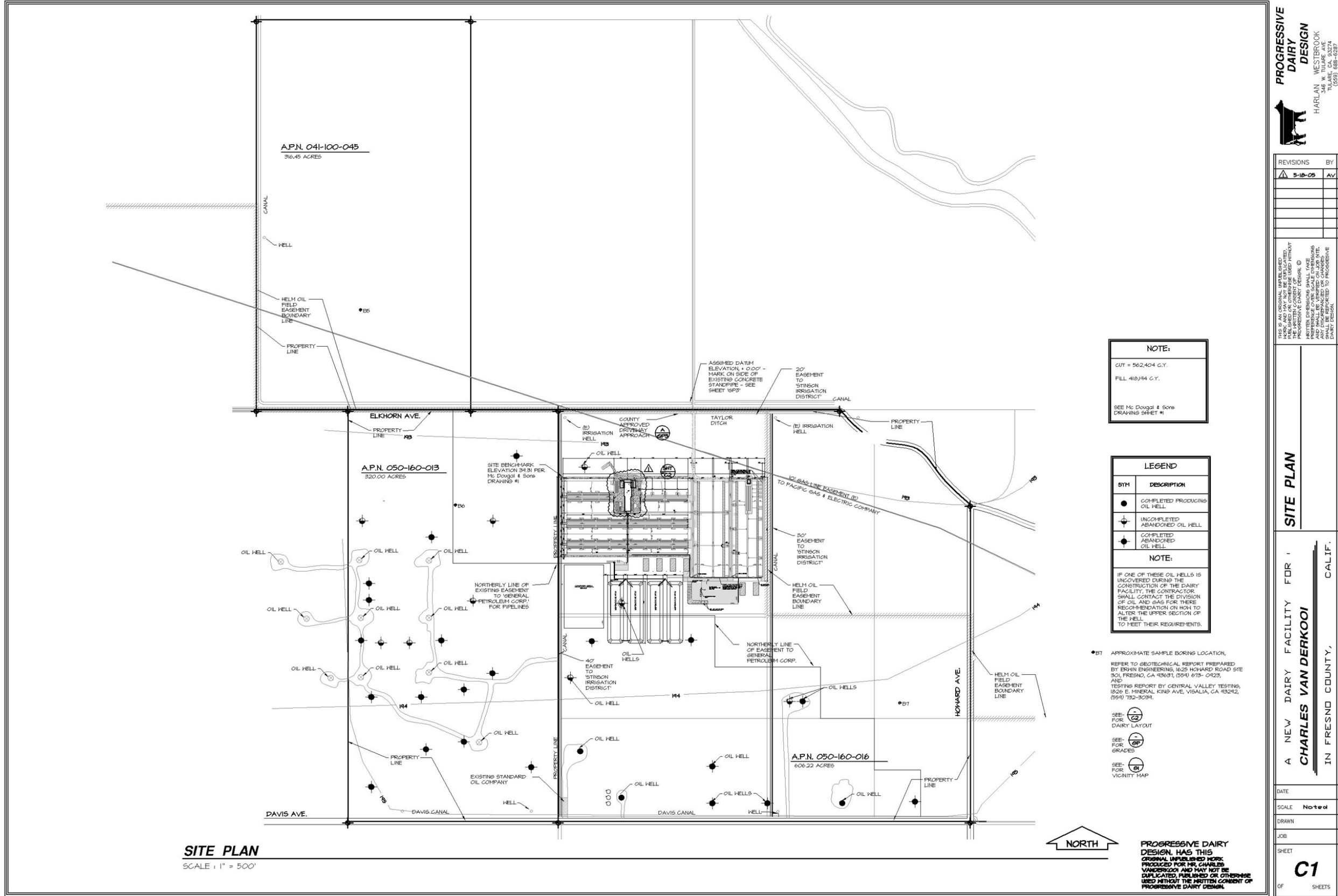


Figure 2-2

DAIRY FACILITIES



CHAPTER THREE

ENVIRONMENTAL CHECKLIST AND DETERMINATION

SECTION THREE – ENVIRONMENTAL EVALUATION

3.1 Environmental Checklist

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

Response:

- a) *There are no scenic vistas associated with or conceivably affected by the project. It is located in the midst of an intensive agriculture area.*
- b) *The project site contains no identified or identifiable scenic resources. There is no scenic highway bordering or visible from the site.*
- c) *The site is currently intensively farmed; several oil wells are located thereon.*
- d) *The dairy will, with nighttime security lighting, introduce a new source of light to the project area. A mitigation measure restricting lighting placement and design will be required to reduce the potential impact to less than significant.*

Issues:

Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact

II. AGRICULTURE RESOURCES: - Would the project:

a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
c) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of farmland to non-agricultural use?	☐	☐	☐	☒

Response:

- a) *The proposed dairy facility is an agricultural use; no use conversion is created by the project.*
- b) *The property is currently zoned for agricultural usage (Fresno County Zoning Ordinance, March 22, 2004). The majority of the project site is under Williamson Act Contract. The proposed project, as an agricultural use, does not conflict with zoning or with the provisions of the applicable Williamson Act contract.*

Issues:

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

Response:

- a) *The project is of sufficient size (6,646 animal units) that emissions therefrom, if not mitigated or mitigable to less than significant, may conflict with or obstruct implementation of the San Joaquin Valley Air Pollution Control District's (SJVAPCD's) PM₁₀ Attainment Demonstration Plan and the District's Ozone Attainment Demonstration Plan.*

The District will evaluate, and impose to the extent legal and feasible, Best Available Control Technologies (BACTs) in accord with its air emissions plan for dairies, as mitigation measures to reduce such emissions.

- b) *The project is of sufficient size that emissions therefrom, if not mitigated or mitigable to less than significant, may violate SJVAPCD air quality standards.*

The District will evaluate, and impose to the extent legal and feasible, Best Available Control Technologies (BACTs) in accord with its air emissions plan for dairies, as mitigation measures to reduce such emissions.

- c) *The project is of sufficient size that emissions therefrom, if not mitigated or mitigable to less than significant, may result in such cumulatively considerable net increase.*

The District will evaluate, and impose to the extent legal and feasible, Best Available Control Technologies (BACTs) in accord with its air emissions plan for dairies, as mitigation measures to reduce such emissions.

- d) *There are no receptors within one mile of the proposed project.*
- e) *There are residences, or other land uses which house or employ a substantial number of people, within one mile of the proposed project.*

Issues:

Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact

IV. BIOLOGICAL RESOURCES – Would the project:

a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☒	☐	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☐	☒
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☐	☒
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☒	☐
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☒
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

Response:

- a) *The project site is currently, with the exception of the graded and excavated dairy facilities site, intensively farmed. No natural habitat remains thereon.*

Project operations could, however, if not mitigated have a significant effect on several candidate, sensitive or special status avian species: Swainson's hawk, tricolored blackbird, and burrowing owl. Swainson's hawk may nest in the eucalyptus stand bordering the northern boundary of the project site; tricolored blackbird colonies may

nest in project site feed crops; burrowing owls may be present on the canal banks bordering the southern boundary of the site.

Appropriate mitigation measures involving prohibitions of disturbance of nest sites must be incorporated in the project EIR to reduce potential impacts on such species to less than significant.

- b) There is no riparian habitat or other sensitive natural community on or abutting the project site.*
- c) There are no federally protected wetlands on or near the project site.*
- d) Although not on an established wildlife corridor the project site is within the historic range of the San Joaquin kit fox. It may traverse or forage on the site.*

The project EIR will include as a mitigation measure the Standardized Recommendations for Protection of the San Joaquin Kit Fox Prior to or During Ground Disturbance, U.S. Fish and Wildlife Service, 1999.

- e) There are no such local policies or ordinances applicable to the project site.*
- f) There are no adopted Habitat Conservation Plans, Natural Community Conservation Plans or other local, regional or state habitat conservation plans applicable to the project site.*

Issues:

Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact

V. CULTURAL RESOURCES -- Would the project:

a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	☐	☐	☐	☒
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☐	☒	☐	☐
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☒	☐	☐
d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☒	☐	☐

Response:

a), b), c) and d) *There are no buildings or other potential historic resources on the project site. The project site has been farmed for many years, and the dairy facilities site has been graded and excavated, both without evidence of archaeological, paleontological, or human remains. However, it is conceivable that further grading or excavation or continued farming practices could divulge the presence of such resources.*

The project EIR must therefore incorporate mitigation procedures to research record evidence of cultural or historic resources, and to provide for the evaluation, recordation, and preservation when appropriate, of any cultural, historic, paleontologic or skeletal remains which may be encountered during project construction or operation.

Issues:

VI. GEOLOGY/SOILS -- Would the project:

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving?				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☐	☒
ii) Strong seismic ground shaking?	☐	☐	☐	☒
iii) Seismic-related ground failure, including liquefaction.	☐	☐	☐	☒
iv) Landslides	☐	☐	☐	☒
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☐	☒
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☐	☒
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building code (1994), creating substantial risks to life or property?	☐	☒	☐	☐
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☐	☒	☐	☐

Response:

- a) *Compliance with County of Fresno building codes in the design and construction of project facilities will assure that earthquake-related impacts do not occur.*
- b) *Project topography (existing ground slopes less than 1 percent) and the limited slopes which have been utilized for dairy facilities grading (in the order of 2%) militate against the occurrence of any significant soil erosion.*
- c) *The Geological/Hydrological Report for the project (Erwin Engineering, February 18,*

2002) provides information regarding dairy facility site soils (Armona loam, Gepford clay, Tachi clay) which confirms that the soils on the site exhibit none of these characteristics.

- d) Gepford clay soils have high shrink-swell potential. Mitigation measures including, even for the project's single-story construction, engineering design which incorporates consideration of such potential, and backfill with other soils, should be considered to reduce impacts to less than significant.*
- e) Dairy facility site soils vary in their suitability for septic system leach lines, although the site size provides adequate area for oversizing of leach line lengths.*

Mitigation measures involving engineered design of leach line disposal installations to prevent surfacing of sewage should be required.

Issues:

Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact

VII. HAZARDS/HAZARDOUS MATERIALS – Would the project:

a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☐	☒
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☐	☒
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☐	☒

Response:

- a) b) *Hazardous materials usage on, and transport to, the project site will be essentially unchanged from or less than that now involved in total-site usage for intensive farming. Agricultural usage and materials transport are regulated by Fresno County Agriculture Commissioner. Compliance with these regulations will obviate the need for mitigation*

measures.

- c) There is no existing or proposed school within one-quarter mile of the site.*
- d) The project is not so located.*
- e), f) The project site is not so located.*
- g) There is no such plan applicable to or affected by the development.*
- h) There are no wildlands adjacent to or near the project site.*

Issues:

VIII. HYDROLOGY/WATER QUALITY – Would the project:

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

Response:

- a) *Mitigation measures satisfactory to the California Regional Water Quality Control Board will be required to prevent potential groundwater degradation. Such measures will include impoundment design, dairy facilities design and cropped area characteristics and constraints assuring compliance with all applicable State regulations.*
- b) *The project will utilize less water than that currently used for intensive agriculture on the dairy facilities site.*
- c) d) *The project will not adversely impact the site's current sheet flow drainage; it does not contain or abut a stream or river.*
- e) *There will be no runoff from the site.*
- f) *Refer to response to Issue VIII.a).*
- g) *No housing is proposed on the site.*
- h) *The project site is not located within a 100-year flood hazard area.*
- i) *The project site is located within the plotted dam failure inundation zone of Little Panoche Dam. The low probability of the occurrence of dam failure, the large volume of flood water available for dilution of pollutants, and the relatively long warning period to ready the site for flooding indicate that inundation related to dam failure is not a significant risk to the project site, or thus, a significant impact.*
- j) *The project site location is located in the San Joaquin Valley, remote and far upgradient (MSL 190) from any water body capable of generating a seiche or tsunami. It is topographically almost level and over thirty miles from any terrain capable of generating a mud flow.*

Issues:

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

Response:

- a) *The site is not near any established community.*
- b) *The project is in compliance with applicable County of Fresno planning regulations. No other agency has any applicable land use/environmental programs, ordinances or specific plans affecting the site.*
- c) *There is no such plan for any area including the project site.*

Issues:

Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact

X. MINERAL RESOURCES – Would the project:

a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☒

Response:

- a) ,b) *The petroleum resource underlying the site is being utilized by existing onsite and site-adjacent oil wells. Project development and operation will have no impact on these facilities or on existing oil leases. No other mineral resources have been identified on or underlying the site.*

Issues:

XI. NOISE – would the project result in:

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

Response:

- a) *There are no residences or other sensitive receptors within a mile of the dairy facilities site; there will, therefore, be no noise level standards violations resulting from the project's dairy operations. The project site is currently row-crop farmed; there will be no change in the noise levels occasioned by continued row-crop farming.*
- b) *No such vibration is generated by either dairy construction and operation or by continued row-crop farming.*
- c) *The operation of the dairy, and the continuation of row-crop farming on the project site, will not result in any substantial permanent increase in ambient noise levels.*
- d) *The construction of the dairy facilities will occasion substantial temporary increases in ambient noise levels. The lack of any residences or other sensitive receptors within one mile of the dairy facilities site, and normal distance-related attenuation of noise levels*

created by such construction, mitigate such levels to less than significant.

e), f) The project is not so located.

Issues:

Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact

XII. POPULATION AND HOUSING – Would the project:

a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☒
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

Response:

- a) *The dairy will employ 25 to 30 people who will be recruited from the existing local work force; thus there will be no direct population growth inducement. No road or other infrastructure extensions will be required by the project.*
- b) ,c) *The project will not displace any existing housing or persons.*

Issues:

Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact

XIII. PUBLIC SERVICES – Would the project:

- a) Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impact, in order to maintain acceptable service ratios for any of the public services:

Fire protection?	☐	☐	☐	☒
Police protection?	☐	☐	☐	☒
Schools?	☐	☐	☐	☒
Parks?	☐	☐	☐	☒
Other public facilities?	☐	☐	☐	☒

Response:

- a) *Since the project will employ persons from the existing local work force there will be no impact on schools, parks or other population-growth related public facilities and services.*

Fire protection and police protection requirements of the project will be de minimus and similar to those of other dairy facilities in the area; no additional personnel or equipment for these public safety services is therefore warranted.

- b) *Since the project workforce will be recruited from the existing local population, there will be no impact on recreational facilities.*

Issues:

Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact

XIV. RECREATION – Would the project:

a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☐	☒

Response:

- a) *Since the project workforce will be recruited from the exiting local population, there will be no impact on recreational facilities.*
- b) *The project does not include recreational facilities or (see response XIV.a)) require the construction or expansion of existing facilities.*

Issues:

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

Response:

- a) *A typical net increase in automobile/pickup traffic for a dairy of this size is 40 trips per day (Bitter Root Dairy EIR, Tulare County). A typical net increase in truck traffic for a dairy of this size and acreage is 16 trips per day (Bitter Root Dairy EIR, Tulare County).*

Existing traffic volumes on the County roads serving the project (Elkhorn Avenue) are approximately 300 vehicles per day. The nearest major intersection, on Elkhorn Avenue, to the project is at Elkhorn Avenue and SR145, which is approximately 2.5 miles from the dairy's facility site.

The project-induced increase in traffic is not substantial with respect to increase in vehicle trips, volume-to-capacity ratio, or congestion at intersections, and thus is less than significant.

- b) *The County of Fresno has not established level of service (LOS) standards for rural streets.*
- c) *The project has no conceivable impact on air traffic patterns; it is not located near, or served by, an airport, nor does it include an airport or landing strip.*
- d) *The project's access roadway is located 800 feet distant from the nearest curve, bend or corner of Elkhorn Avenue. There are no sight distance impediments to observation of traffic using the project access roadway to enter or leave Elkhorn Avenue. Elkhorn Avenue is already utilized by farm equipment and farm-related truck traffic, thus accustoming traffic thereon to such vehicles and equipment entering or leaving the Avenue. There is, therefore no significant hazard increase.*
- e) *The project itself requires no "emergency access". Its design and location do not affect any existing emergency access.*
- f) *The project design incorporates adequate onsite parking for workers, salesmen, service vehicles, feed trucks and milk trucks.*
- g) *The project location and function do not occasion the possibility of such conflict.*

Issues:

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

Response:

- a) The project facilities design must comply with all applicable water quality law and regulations enforced by the California Regional Water Quality Control Board, Central Valley Region. (See response to Issue VIII.a).*
- b) The proposed onsite house will be served by an onsite septic tank and leach line system, the design of which must be approved by the County of Fresno. Given such permit approval, and construction and operation in accord therewith, there will be no potential for significant environmental effects from the facility.*
- c) All storm drainage runoff will be contained onsite. The construction of the required facilities for such containment must be in accord with Regional Water Quality Control Board requirements (see response to Issue XVI.a). Such compliance will assure that the*

construction does not cause significant environmental effects.

- d) Water usage calculations for numerous dairy projects located, as is the proposed project, on land currently in intensive agricultural production, have demonstrated that the net usage of water for the dairies is less than if the dairy project site were reclaimed to agricultural crop production.² There is, therefore, no water supply impact.*
- e) The project will not utilize a wastewater treatment provider's facilities.*
- f) The project will, based upon analyses of typical dairy projects of similar size, produce approximately 2 cubic yards per year of refuse to be disposed of at a landfill. The landfills serving the project area is the Coalinga Disposal Site, located near the City of Coalinga and American Avenue Disposal Site located approximately 5 miles northeast of the City of San Joaquin. The County of Fresno Department of Public Works states that the lifespans of these landfills are 2043 and 2029, respectively. The project's impact thereon is therefore less than significant.*
- g) The regulations pertinent to the project involve the onsite usage of liquid and solid manure. Such usage is constrained by the amount of salts which can be utilized by the crops on the site. It has been determined by a nutrient management plan prepared for the project (see Appendix B) that all of the liquid and solid manure, and their salts, which will be generated by the project can be utilized on the project site.*

The project thus creates no solid waste impact with respect to compliance with the pertinent regulations.

Issues:

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

XVII. MANDATORY FINDINGS OF SIGNIFICANCE

a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☒	☐	☐	☐
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☒	☐	☐	☐
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☒	☐	☐	☐

Response:

- a) *The project has the potential to degrade the quality of the environment (Issues III.a), b), c))*
- b) *The project has impacts that are individually limited but may be cumulatively considerable (Issues III.a), b), c); IV.a); VIII.a); XVI.a).*
- c) *The project has environmental effects that will cause substantial adverse effects on human beings (Issues III.a), b), c)).*

3.2 Environment Determination

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

Determination

On the basis of this initial evaluation:

- ☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION 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, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.
- ☐ I find that although the proposed project could have a significant effect on the environment, but because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Hector Guerra

Date

CHAPTER FOUR
LIST OF PREPARERS

CHAPTER FOUR – LIST OF PREPARERS

Quad Knopf, Inc.

Harry A. Tow, AICP

Jackie Neuffer, Associate Planner

Linda Norton, Office Administrator

APPENDICES

APPENDIX A

GEOLOGICAL-HYDROLOGICAL REPORT

GEOLOGICAL-HYDROLOGICAL REPORT

FNS Investments Dairy
Elkhorn Avenue and Howard Avenue
Fresno County, California

Project No. 42-202-16
February 18, 2002

Prepared by:

ERWIN ENGINEERING

Geotechnical/Environmental Consultants
1625 Howard Road, Ste 301
Fresno, California 93637
(559) 673-0923

ERWIN ENGINEERING

Geotechnical/Environmental Consultants
1625 Howard Road, Ste 301, Fresno, Ca., 93637
(559) 673-0923 Fax 673-0923

February 18, 2002

FNS Investments Incorporated
P.O. Box 1267
Hollister, CA 95024-1267

Attention: Mr. Marc Frelier

RE: Geological-Hydrological Report
FNS Investments Dairy
Elkhorn Avenue and Howard Avenue
Fresno County, California

Pursuant to your request, Erwin Engineering has completed a Geological-Hydrological Report for the above-referenced subject property. The attached report summarizes the details of our findings.

Should you have any questions or if we may be of some additional service, please contact me at (559) 673-0923.

Respectfully submitted,

Erwin Engineering



Michael Erwin, PE
CE18625
GE297

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Appendix A	Logs of Borings
Appendix B	Well Water Test Results
Appendix C	Grain Size Analysis

1.0 INTRODUCTION

This report presents the findings of Erwin Engineering's Geological-Hydrological Investigation of the property located near the intersection of Elkhorn Avenue and Howard Avenue in Fresno County, California (Figure 1). The subject site is located in the west half of section 31 of T16S, R18E, and sections 5 and the west half of sections 6 of T17S, R18E, MDB&M.

At the time of the investigation, the property was developed for agricultural production and encompasses approximately 1,242 acres. The Site Map (Figure 1) shows the approximate location of the subject site.

2.0 PURPOSE AND SCOPE OF SERVICES

The purpose of our Geological-Hydrological Investigation was to explore and evaluate the subsurface soil conditions, the current and historical groundwater conditions at the site.

This report includes the following items:

- Site plan and vicinity map showing the approximate location of the site with well locations (Fig 1) and test borings drilled for this study (Fig. 2);
- Logs of Test Borings;
- Geological conditions including USDA Soil Survey data, topography and proposed grading;
- Historical groundwater levels, highest anticipated groundwater, gradient and those items that may effect the future groundwater levels;
- Groundwater quality from current test samples and historical data;
- Available well logs;
- An evaluation of the need for groundwater monitoring wells;

3.0 FIELD EXPLORATION

Central Valley Testing completed the soil borings for the subject property. The field portion of the investigation included the drilling of seven exploratory borings. The exploratory soil boring locations are shown on the Dairy Site Plan which is included as Figure 2 of this report.

The field exploration was performed on February 8 and 14, 2002. The exploration consisted of drilling and sampling six test borings for soil classification to the maximum depth drilled of 35 feet below the existing grade. Soils were classified according to the Unified Soil Classification System.

4.0 SOIL PROFILE AND SUBSURFACE CONDITIONS

Based on the exploratory soil borings, soils beneath the site were predominantly a silty sand, sandy silt, and silty clay. Silty clay typically occupies the near surface soils to a depth of approximately 15 feet. Below this level and to the maximum depth drilled of 35 feet alternating strata of silty sands and sandy soils were encountered. A fine to medium sand was the predominant soil below the 15 foot level.

Detailed descriptions of the soils encountered in each boring are noted on the logs of borings, included in the Appendix of this report. All soils have been classified according to the Unified Soil Classification System.

The soils encountered during the soil drilling had a damp to moist moisture contentment. The depth to ground water's unconfined aquifer is approximately 150 feet as reported by the Department of Water resources. It is possible that groundwater conditions at the site could change due to variations in rainfall, groundwater withdrawal, irrigation, construction activities, or other factors not apparent at the time the borings were drilled.

Review of the Soil Conservation Service's Soil Survey for Fresno County reveals the near surface soil types in the vicinity of the proposed dairies' acreage varies from a Tachi and Gepford clay and Armona loam. These soils are described as irrigated cropland. The predominant soil type that occupies the near surface of the pond area and most of the proposed dairy site is the Tachi clay. The Soil Conservation Service describes these soils as poorly drained or slow permeability to a depth of 60 inches. The reported irrigated crops include alfalfa, pasture and other saline-sodic tolerant crops. The slope across the site varies from approximately 0 to 1 percent. The soil survey notes flooding is rare in years of abnormally high precipitation.

4.1 Soils Particle Size Analysis

During the drilling of the exploratory borings, soil samples were obtained at approximately the 10 and 20 foot intervals from borings 1, 2, 3 and 4 at the proposed pond locations. Samples were obtained at the 10 foot level from borings 5, 6 and 7. The samples were tested for their particle size in accordance with test method ASTM D422. The tests measures the percent by weight of the soils that are gravel, sand, silt, and clay. The specific information required by the CRWQCB and Fresno County includes the percent of clay content. The following table summarizes the clay content from the tests.

TABLE I			
Particle Size Test Results			
Sample No.	Sample Location	Depth (feet)	Clay (Percent)
1	B1	10	39
2	B1	20	15
3	B2	10	11
4	B2	20	9
5	B3	10	42
6	B3	20	13
7	B4	10	44
8	B4	20	12
9	B5	10	36
10	B6	10	29
11	B7	10	32

The complete results of the tests are included in Central Valley Testing's test report. A copy is included in the appendix of this report.

The results of the soil exploratory borings to a depth of 35 feet with the results of the soil gradation tests (hydrometer tests) indicate that the site soils provide materials with at approximately 10 percent clay in the vicinity of the proposed northerly pond. The preliminary test results of drilling samples from the southerly pond revealed results less than 10 percent.

5.0 PHYSICAL SETTING

A summary of the generalized physiological, geological, and hydrogeological settings based on review of the readily available published information is provided in the following sections.

5.1 Physiography

Information obtained by Erwin Engineering, from the review of the USGS maps indicates the following:

- Topographic quadrangle: USGS Topographic Map Five Points Quadrangle, Fresno County, California.
- Location: The west half of section 31 of T16S, R18E, and section 5 and the west half of section 6 of T17S, R18E, Mount Diablo Base & Meridian.
- Elevation: The approximate mid site elevation is 194 feet above sea level.
- Nearest surface water is the Fresno Slough. It is approximately two miles west of the subject site.

5.2 Topography

The subject sites natural grade varies from approximately 0 to 1 percent to the south west. The proposed grade of the site is approximately 1 to 2 percent. The proposed grading will control the on site drainage and divert it in to the proposed waste water ponds. The proposed grading will maintain the storm water on site.

5.3 Geology

The subject property is located within the San Joaquin Valley, a topographic and structural basin bounded on the east by the Sierra Nevada and to the west by the Coast Ranges. The Sierra Nevada, a fault block dipping gently southwestward, is composed of igneous and metamorphic rocks of pre-Tertiary age which comprise the basement complex beneath the valley. The Coast Ranges contain folded and faulted sedimentary rocks of Mesozoic and Cenozoic age, which are similar to those rocks that underlie the Valley at depth, and non-conformably overlie the basement complex. Gently dipping to nearly horizontal, sedimentary rocks of Tertiary and Quaternary age overlie the older rocks. The younger rocks are mostly of continental origin were derived from the Sierra Nevada mountains. The subject area is situated within the central portion of the Great Valley, and its large alluvial basin is comprised of predominantly fine grained sediments.

Alluvial fans, historically formed by the Fresno Slough is the largest geomorphic features in the area of the subject site. The alluvial fan in the younger alluvium of Sierra Nevada and Coast Ranges origin, generally considered as alluvial fan and floodplain deposits. The formation of the fans have resulted in a rather flat regional topography with a southwesterly gradient of less than 5 feet per mile in the vicinity of the site. The nearly level alluvial fan deposits are dissected by shallow, meandering creeks and sloughs.

5.4 Geological Map

The geological mapping of the subject site revealed no bedrock, faults, jointing systems, seeps or springs. The site is occupied by soil alluvium to a depth of several hundred feet. The soil profile is described as noted in the "Soil Profile and Subsurface Conditions" section of this report. Figure 3 shows the near surface soil types of the site as summarized by the Soil Conservation Service.

5.5 Regional Hydrogeology

The principal hydrogeological units beneath the floor of the western portion of the San Joaquin Valley are alluvial fan deposits from the Temblor Range and Kettleman Hills. The San Joaquin Valley has two types of aquifers, including 1) an upper, unconfined to semi-confined aquifer and 2) a lower, confined aquifer. Water quality in the San Joaquin Valley is generally better than that in the Kettleman Plain and Kettleman Hills areas, because these waters have an opportunity to co-mingle with waters from the Sierra Nevada Mountains. TDS concentrations range from 125 to 3300 ppm in the unconfined aquifer, and approximately 500 to 4000 ppm in the confined zones beneath the Corcoran Clay.

5.6 Site Hydrogeology

Erwin Engineering used the State of California, Department of Water Resources' computer retrieval system entitled "Groundwater Level Retrieval Map Interface" to obtain historical hydrologic information for the subject site. In addition, elevation plots and depth to groundwater as reported by the Department of Water Resources were summarized.

Information reviewed regarding hydrologic and hydrogeologic conditions at the subject site and vicinity is indicated by the following:

- On site water wells: Four observed (Fig. 1), three of the wells are older (40 yrs +/-) and well logs were not available, the fourth well was recently constructed to a depth of 590 feet (fig. 5);
- Adjacent site water wells: Four wells were observed near the boundaries of the subject site, two north of Elkhorn Ave. and two near the southeast corner of the subject site, wells number 1 and 35;
- Groundwater gradient: Southwest (Department of Water Resources)
- Depth to ground water: approx 150 feet (Spring 2000) below ground surface (Department of Water Resources) from wells near the subject property.

The following tables are summaries of the depth to ground water below the surface as reported by the Department of Water Resources. These summaries were taken from the following plots of groundwater depth;

- Lines of Equal Elevation of Water in Wells, Unconfined Aquifer;
- Lines of Equal Depth to Water in Wells, Unconfined Aquifer.

TABLE I Lines of Equal Elevation of Water in Wells Unconfined Aquifer		
Date	Calculated Water Surface Depth (Site Elev. 194 ft.)	Water Surface Elevation (feet)
Fall 1987	124	70
Spring 1988	134	60
Spring 1996	144	50
Spring 1998	144	50
Spring 1999	139	55
Spring 2000	154	40

TABLE II Lines of Equal Depth to Water in Wells Unconfined Aquifer	
Date	Water Surface Depth (feet)
Spring 1981	150
Spring 1988	150
Spring 1995	160
Spring 2000	150

These two tabular summaries of elevation and depth of groundwater shows the depth has varied between 124 to 154 feet below the surface since 1987.

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Based on the historical groundwater levels summarized in tables II and III, the highest anticipated groundwater is approximately 150 feet below the surface. Based on the proposed project there is no anticipated items that may effect the future groundwater levels or the current southwest groundwater gradient.

The California Department of Water Resources maintains a computerized data base retrieval system entitled "Groundwater Level Retrieval Map Interface" of groundwater levels from wells for most of California. The data base was accessed through the internet at www.well.water.ca.gov. Figures 4A and 4B in the appendix of this report shows the results of this data base search. They are identified by the State Department of Water Resources' Well Numbers 16S18E31M and 17S18E09C. The identification locates these wells near the southwest corner of section 31, of T.16S., R.18E., and near the northwest corner section 9, T.17 S. R.18 E., M.D.B.& M..

Table IV summarizes shallowest and deepest elevation for state well numbers 16S18E31M and 17S18E09C.

TABLE III				
Summary of State Well Data Base				
Water Surface	State Well No. & (elev.)	Date	W.S. Depth (ft.)	W.S. Elevation (ft.)
Shallowest W.S.	16S18E31M (190.0) **	01-31-86	140.0	50.0
Deepest W.S.	16S18E31M (190.0) **	12-04-92	189.1	0.9
Shallowest W.S.	17S18E09C (194.0) ***	10-20-98	132.0	62.0
Deepest W.S.	17S18E09C (194.0) ***	02-96-00	158.0	36.0

*** Well number 16S18E31M is located near the southeast corner of section 31

*** Well number 17S18E09C is located near the northwest corner of section 9

6.0 WATER QUALITY

Two existing wells, numbered 1 and 35 located near the southeast corner of the subject site, as located on the site map (fig. 1) were sampled and tested. These two currently producing agricultural wells were sampled on 04-24-2001. A copy of the test results are in the appendix of this report and are summarized in table IV. Copies of well logs for these two wells were not available at the time of preparing this report. We are not certain of the depth of pumping of the wells sampled.

The quality of the near surface groundwater (unconfined aquifer) is unknown for the subject area. The scope of this report, as outlined by the California Regional Water Quality Control Board (CRWQCB), is to sample and test for water quality of the uppermost aquifer beneath the site. With out well logs for each well sampled, it is not known from what depth water is being pumped. The samples were tested in accordance with the Fresno Counties requirements.

We are not aware of any historical groundwater quality monitoring records for the subject area. The Department of Water Resources has no historical water quality records for the subject area.

The following table summarizes the well water test results.

TABLE IV
Groundwater Wells
Results of Laboratory Analysis (mg/L)
August 2001

Constituent	Well #1 (meq/l)	Well #35 (meq/l)
Sulfate	34.	nd
Calcium	9.7	13.
Magnesium	0.12	3.5
Sodium	190.	240.
Carbonate	nd	nd
Bicarbonate	330.	350.
Chloride	62.	140.
Potassium	nd	3.0
pH	7.8	7.9
Nitrate (ppm)	nd	nd
E.C. (mmhos/cm)	--	--
Total Suspended Solids (ppm)	--	--
T.D.S.	530.	640.

7.0 MONITORING WELL RECOMMENDATIONS AND CONCLUSIONS

The following is a summary of the information developed during the preparation of this report that should be considered during the determination of whether monitoring wells should be recommended.

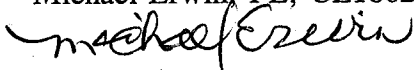
- Based on the historical groundwater levels summarized in tables I, II and III, the highest anticipated groundwater is approximately 150 feet below the surface.
- Historical well drillers logs for the area of the subject site shows the soil types to typically be alternating strata of clay and sandy soils.
- The results of the soil exploratory borings to a depth of 35 feet, test results and the near surface soil types as provided by the Soil Conservation Service indicate that the site soils provide materials with approximately 10 percent clay in the vicinity of the proposed ponds.
- The log of borings and the results the gradation test results show that the soils have at least 10 percent clay content. At a depth of approximately 15 feet the soils become relatively sandy and with a clay size content of approximately 10 percent.
- In accordance with the CRWQCB's Geological-Hydrological Report guide lines recommendations, follow up soil sampling shall be taken after the lagoons and ponds construction is complete. This sampling and test results are to demonstrate the lagoons and ponds underlying soils contain a minimum of 10 percent clay and no more than 10 percent gravel. It is the intent as part of this project to sample soils underlying the proposed lagoons and ponds once the project is constructed.

It is Erwin Engineering's opinion that due to the existence of the alternating strata of clayey and sandy soils to the unconfined aquifer at approximately 150 feet, it may not be advisable for the expenditure of constructing groundwater monitoring wells at the subject site.

Should you have any questions or if we may be of some additional service, please contact me at (559) 673-0923.

Respectfully submitted,

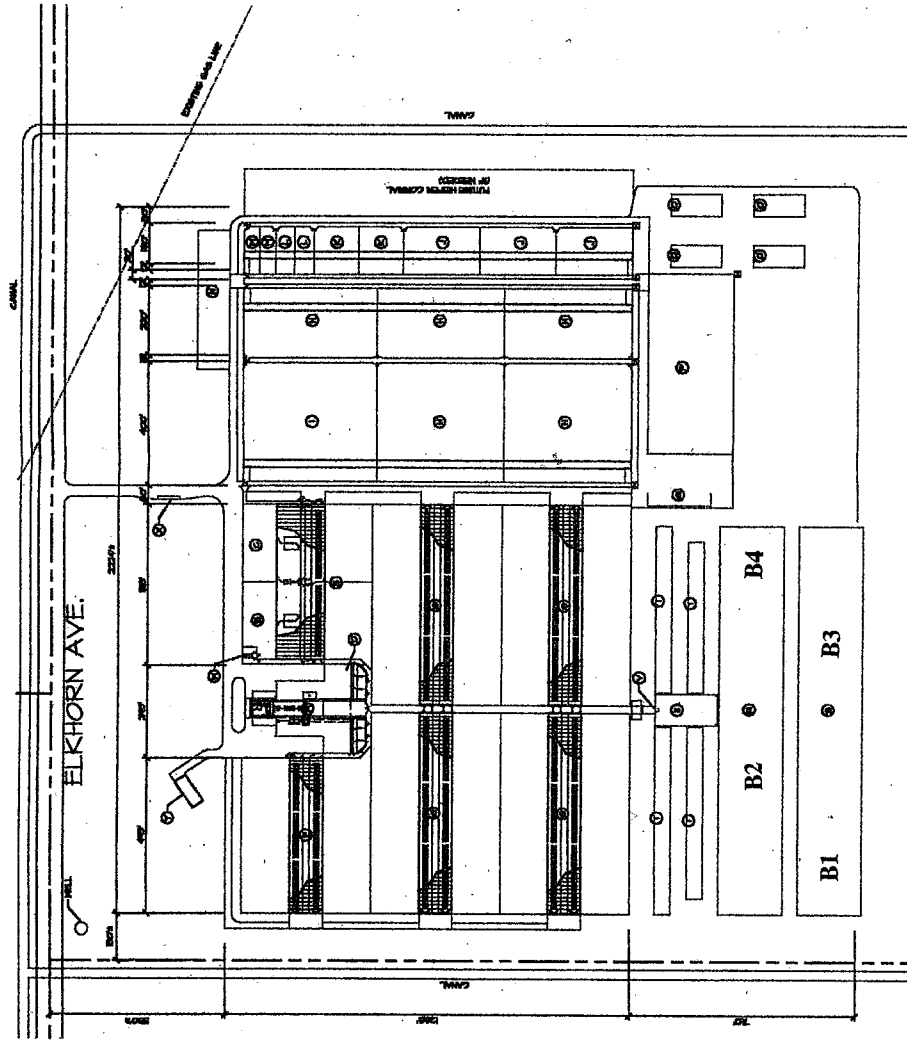
Erwin Engineering
Michael Erwin, PE, CE18625, GE297



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REFERENCES

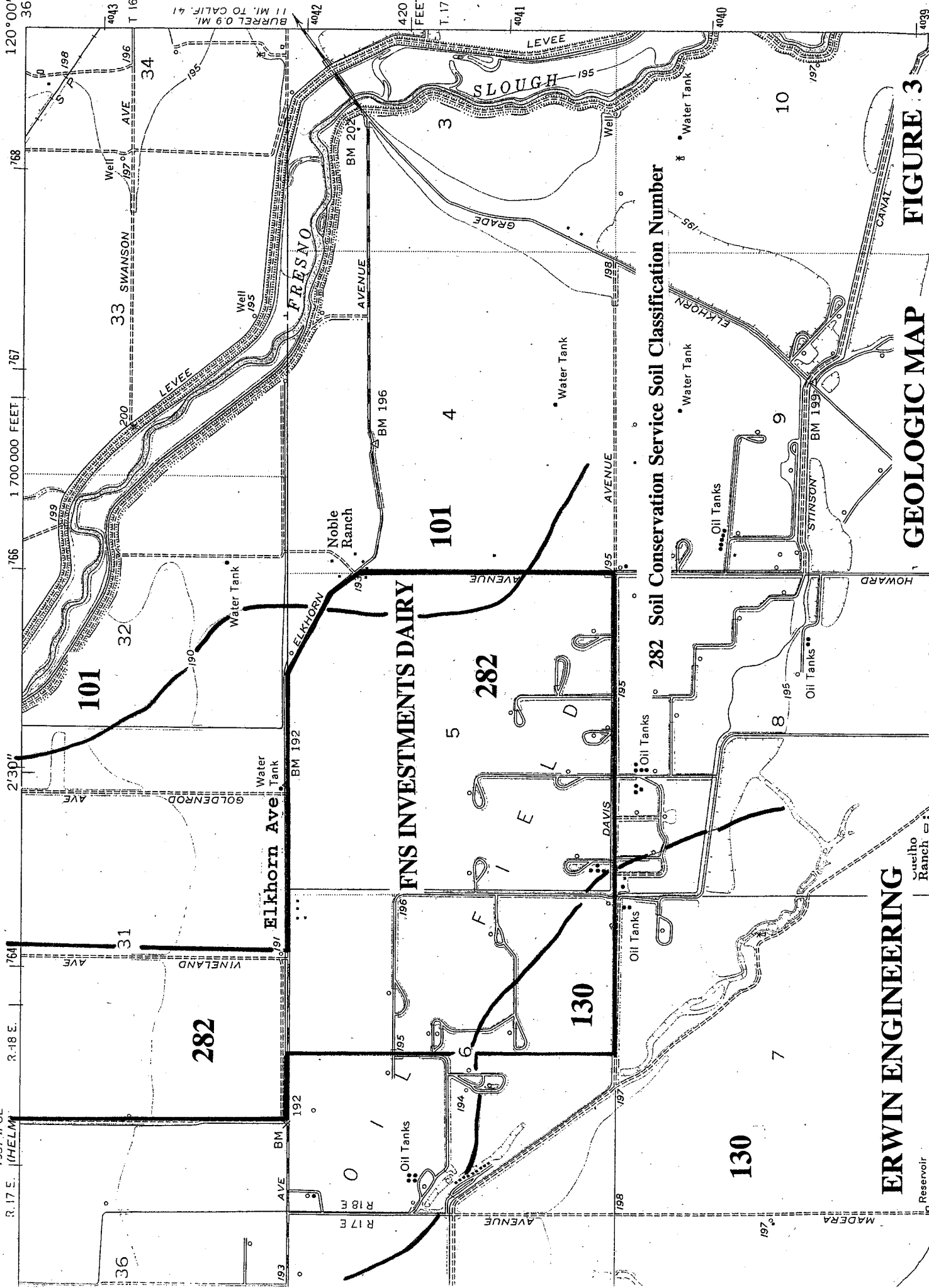
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- Department of Water Resources, Internet Sites of Well Records, Groundwater Level Retrieval Map Interface @ (www.water.ca.gov)
- Department of Water Resources, Historical Groundwater Records for Lines of Equal Elevation of Water in Wells
- Department of Water Resources, Historical Groundwater Records for Lines of Equal Depth to
..... Water in Wells



B1 Boring Number and Location

FNS INVESTMENTS DAIRY LAYOUT
SCALE: 1"=20'

CANAL



APPENDIX A

LOG OF BORING

Client: FNS Investments Dairy
 Job No.: 042-202-16
 BORING No. B-1
 Date drilled: February 8, 2002
 Elevation:

R	USC	Depth	Description
	CL	0	Silty Clay, medium dense, gray/brown, damp
	CL	5	Silty Clay, medium dense, gray/brown, damp
	CL SM	10	Silty Clay, medium dense, gray/brown, damp @ 13 ft., Silty Sand, tan, damp
	SM	15	Silty Sand, medium dense, tan, damp
	SC	20	Sandy, Silt, medium dense, tan, damp
	SM	25	Silty, Sandy, medium dense, tan, damp
	SW	30	Fine to Medium Sand, medium dense, tan, damp
		35	Bottom of Boring @ 35.0 feet

Legend:

M/D Moisture/Density
 R Sampling Resistance
 USC Uniform Soil Classification

LOG OF BORING

Client: FNS Investments Dairy

Job No.: 042-202-16

BORING No. B-2

Date drilled: February 8, 2002

Elevation:

R	USC	Depth	Description
	CL	0	Silty Clay, medium dense, gray/brown, damp
	CL	5	Silty Clay, medium dense, gray/brown, damp
	CL SM	10	Silty Clay, medium dense, gray/brown, damp @ 14 ft., Silty Sand, tan, damp
	SM	15	Silty, Sand, medium dense, tan, damp
	SC	20	Sandy, Silt, medium dense, tan, damp
	SW	25	Fine to Medium, Sand, medium dense, tan, damp
	SW	30	Fine to Medium Sand, medium dense, tan, damp
		35	Bottom of Boring @ 35.0 feet

Legend:

M/D Moisture/Density
R Sampling Resistance
USC Uniform Soil Classification

LOG OF BORING

Client: FNS Investments Dairy

Job No.: 042-202-16

BORING No. B-3

Date drilled: February 8, 2002

Elevation:

R	USC	Depth	Description
	CL	0	Silty Clay, medium dense, gray/brown, damp
	CL	5	Silty Clay, medium dense, gray/brown, damp
	CL	10	Silty Clay, medium dense, gray/brown, damp
	SM	15	Silty Sand, medium dense, tan, damp
	SM	20	Silty Sand, medium dense, tan, damp
	SM	25	Silty Sand, medium dense, tan, damp
	SW	30	Fine to Medium Sand, medium dense, tan, damp
		35	Bottom of Boring @ 35.0 feet

Legend:

M/D Moisture/Density
R Sampling Resistance
USC Uniform Soil Classification

LOG OF BORING

Client: FNS Investments Dairy
 Job No.: 042-202-16
 BORING No. B-4
 Date drilled: February 8, 2002
 Elevation:

R	USC	Depth	Description
	CL	0	Silty Clay, medium dense, gray/brown, damp
	CL	5	Silty Clay, medium dense, gray/brown, damp
	CL SM	10	Silty Clay, medium dense, gray/brown, damp @ 14 ft., Silty Sand, tan, damp
	SM	15	Silty, Sand, medium dense, tan, damp
	SW	20	Fine to Medium, Sand, medium dense, tan, damp
	SW	25	Fine to Medium, Sand, medium dense, tan, damp
	SW	30	Fine to Medium Sand, medium dense, tan, damp
		35	Bottom of Boring @ 35.0 feet

Legend:

M/D Moisture/Density
 R Sampling Resistance
 USC Uniform Soil Classification

LOG OF BORING

Client: FNS Investments Dairy
 Job No.: 042-202-16
 BORING No. B-5
 Date drilled: February 8, 2002
 Elevation:

R	USC	Depth	Description
	CL	0	Silty Clay, medium dense, gray/brown, damp
	CL	5	Silty Clay, medium dense, gray/brown, damp
	CL	10	Silty Clay, medium dense, gray/brown, damp
	CL	15	Silty Clay, medium dense, tan, damp
	SM	20	@ 19 ft., Silty Sand, medium dense, tan, damp
	SW	25	Fine to Medium Sand, medium dense, tan, damp
	SW	30	Fine to Medium Sand, medium dense, tan, damp
		35	Bottom of Boring @ 35.0 feet

Legend:

M/D Moisture/Density
 R Sampling Resistance
 USC Uniform Soil Classification

LOG OF BORING

Client: FNS Investments Dairy
 Job No.: 042-202-16
 BORING No. B-6
 Date drilled: February 8, 2002
 Elevation:

R	USC	Depth	Description
	CL	0	Silty Clay, medium dense, gray/brown, damp
	CL	5	Silty Clay, medium dense, gray/brown, damp
	CL	10	Silty Clay, medium dense, gray/brown, damp
	CL	15	Silty Clay, medium dense, brown, damp
	SW	20	Fine to Medium Sand, medium dense, tan, damp
	CL	25	Silty, Clay, medium dense, gray/brown, damp
	CL	30	Silty Clay, medium dense, brown, wet
	SW	35	@ 32 ft. Fine to Medium Sand, tan, damp Bottom of Boring @ 35.0 feet

Legend:

M/D Moisture/Density
 R Sampling Resistance
 USC Uniform Soil Classification

LOG OF BORING

Client: FNS Investments Dairy
 Job No.: 042-202-16
 BORING No. B-7
 Date drilled: February 14, 2002
 Elevation:

R	USC	Depth	Description
	CL	0	Silty Clay, medium dense, gray/brown, damp
	CL	5	Silty Clay, medium dense, gray/brown, damp
	SC		@ 7 ft., Sandy Silt, medium dense, tan, damp
	SM	10	@ 13 ft., Silty Sand, medium dense, tan, damp
	SW	15	Fine to Medium Sand, medium dense, tan, damp
	SM		@ 18 ft., Fine to Medium Sand, medium dense, tan, damp
	SW	20	
	SM		@ 23 ft., Silty Sand, medium dense, tan Damp
	SW	25	Fine to Medium, Sand, medium dense, tan, damp
	SW	30	Fine to Medium Sand, medium dense, tan, damp
		35	Bottom of Boring @ 35.0 feet

Legend:

M/D Moisture/Density
 R Sampling Resistance
 USC Uniform Soil Classification

LOG OF BORING

Client: Van Der Kooi Dairy

Job No.: 056-505-01

BORING No. B-8

Date drilled: August 25, 2005

Elevation:

R	USC	Depth	Description
	CL	0	Silty Clay, stiff, low plasticity, gray/brown, damp
	CL ML	5	Silty Clay, stiff, low plasticity, gray/brown, damp @ 8 ft., Sandy Silt, medium dense, tan, damp
	SM	10	Silty Sand, medium dense, tan, damp
	SM	15	Silty Sand, medium dense, tan, damp
	SM	20	Silty Sand, medium dense, tan Damp
	SM	25	Silty Sand, medium dense, tan, damp
	SM	30	Silty Sand, medium dense, tan, damp
	SM	35	Silty Sand, medium dense, tan, damp
	SM	40	Silty Sand, medium dense, tan, damp

LOG OF BORING

Client: Van Der Kooi Dairy

Job No.: 056-505-01

BORING No. B-8

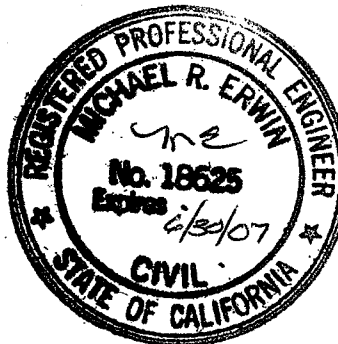
Date drilled: August 25, 2005

Elevation:

R	USC	Depth	Description
	SM	45	Silty Sand, medium dense, tan, damp
	SM	50	Silty Sand, medium dense, tan, damp
	SM	55	Sandy Silt, medium dense, gray/brn, damp
	CL	60	Clayey Silt, stiff ,low plasticity, gray/brn, damp
	ML	65	Sandy Silt, medium dense, gray/brn, damp
	SM	70	Sandy Silt, medium dense, brn, damp
			Bottom of Boring @ 70.0 feet No Groundwater Found

Legend:

M/D Moisture/Density
R Sampling Resistance
USC Uniform Soil Classification



Michael R. Erwin

Erwin Engineering

APPENDIX B

**CENTRAL VALLEY TESTING, Inc.**

materials testing and inspection services
soils and environmental investigations

February 13, 2002

Report No. 02-0377-A

Mr. Mike Erwin
Erwin Engineering
1625 Howard Road
Madera, California

Project: Dairy Site (F-N-S)
Elkhorn Avenue
One-mile West of Madera Avenue
Fresno County, California

Re: Particle Size Analysis of soils

Dear Mr. Erwin,

At your request we have completed laboratory tests for particle size analysis of soils sampled at the above referenced project. The test methods and results are as follows.

ASTM D 422				
PARTICLE SIZE ANALYSIS OF SOILS				
SAMPLE NO.	SAMPLE LOCATION	% SAND	% SILT	% CLAY
1	B-7 @ 10 FT.	21	47	32

If you have any questions please do not hesitate to phone our office at (559) 264-2224.

Central Valley Testing, Inc

Dennis R. Myers
Director of Operations



CENTRAL VALLEY TESTING, Inc.

materials testing and inspection services
soils and environmental investigations

February 13, 2002

Report No. 02-0377

Mr. Mike Erwin
Erwin Engineering
1625 Howard Road
Madera, California

Project: Dairy Site
Elkhorn Avenue
One-mile West of Madera Avenue
Fresno County, California

Re: Particle Size Analysis of soils

Dear Mr. Erwin,

At your request we have completed laboratory tests for particle size analysis of soils sampled at the above referenced project. The test methods and results are as follows.

ASTM D 422				
PARTICLE SIZE ANALYSIS OF SOILS				
SAMPLE NO.	SAMPLE LOCATION	% SAND	% SILT	% CLAY
1	B-1 @ 10 FT.	15	46	39
2	B-1 @ 20 FT.	23	62	15
3	B-2 @ 10 FT.	53	36	11
4	B-2 @ 20 FT.	61	30	9
5	B-3 @ 10 FT.	11	47	42
6	B-3 @ 20 FT.	29	58	13
7	B-4 @ 10 FT.	12	44	44
8	B-4 @ 20 FT.	42	46	12
9	B-5 @ 10 FT.	27	37	36
10	B-6 @ 10 FT.	25	46	29

If you have any questions please do not hesitate to phone our office at (559) 264-2224.

Central Valley Testing, Inc

Dennis R. Myers
Director of Operations

BSK ANALYTICAL LABORATORIES

Certificate of Analysis

ELAP Certificate #1180

Report Issue Date: 05/14/2001

BSK Submission #: 2001041062

BSK Sample ID #: 105972

Project ID:

Project Desc:

Submission Comments:

Sample Type: Liquid

Sample Description: Freitas #1

Sample Comments:

Date Sampled: 04/24/2001

Time Sampled: 1300

Date Received: 04/24/2001

Inorganics

Analyte	Method	Result	Units	PQL	Dilution	DLR	Prep Date	Analysis Date
Sodium (Na)	EPA 200.7	190	mg/L	1	1	1	04/25/2001	05/07/2001
Sulfate (SO4)	EPA 300.0	34	mg/L	2	10	20	04/26/2001	04/26/2001
Thallium (Tl)	EPA 200.8	ND	µg/L	1	1	1	04/25/2001	05/02/2001
Total Dissolved Solids (TDS)	SM 2540-C	530	mg/L	5	1	5	05/01/2001	05/03/2001
Zinc (Zn)	EPA 200.7	ND	mg/L	0.05	1	0.05	04/25/2001	05/07/2001

mg/L: Milligrams/Liter (ppm)

mg/Kg: Milligrams/Kilogram (ppm)

µg/L: Micrograms/Liter (ppb)

µg/Kg: Micrograms/Kilogram (ppb)

%Rec: Percent Recovered (surrogates)

PQL: Practical Quantitation Limit

DLR: Detection Limit for Reporting

: PQL x Dilution

ND: None Detected at DLR

H: Analyzed outside of hold time

P: Preliminary result

S: Suspect result. See Cover Letter for comments.

E: Analysis performed by External laboratory.

See External Laboratory Report attachments.

Report Authentication Code:

1414 Standard

BSK ANALYTICAL LABORATORIES

Certificate of Analysis

ELAP Certificate #1180

Report Issue Date: 05/14/2001

BSK Submission #: 2001041062

BSK Sample ID #: 105973

Project ID:

Project Desc:

Submission Comments:

Sample Type: Liquid

Sample Description: Freitas #35

Sample Comments:

Date Sampled: 04/24/2001

Time Sampled: 1330

Date Received: 04/24/2001

Inorganics

Analyte	Method	Result	Units	PQL	Dilution	DLR	Prep Date	Analysis Date
Alkalinity (as CaCO ₃)	SM 2320 B	350	mg/L	1	1	1	04/25/2001	04/25/2001
Aluminum (Al)	EPA 200.7	8.4	mg/L	0.05	1	0.05	04/25/2001	05/04/2001
Antimony (Sb)	EPA 200.8	ND	µg/L	2	1	2	04/25/2001	05/07/2001
Arsenic (As)	EPA 200.8	18	µg/L	2	1	2	04/25/2001	05/07/2001
Barium (Ba)	EPA 200.7	0.090	mg/L	0.05	1	0.05	04/25/2001	05/04/2001
Beryllium (Be)	EPA 200.8	ND	µg/L	1	1	1	04/25/2001	05/07/2001
Bicarbonate (as CaCO ₃)	SM 2320 B	350	mg/L	1	1	1	04/25/2001	04/25/2001
Cadmium (Cd)	EPA 200.8	ND	µg/L	1	1	1	04/25/2001	05/07/2001
Calcium (Ca)	EPA 200.7	13	mg/L	0.1	1	0.1	04/25/2001	05/04/2001
Carbonate (as CaCO ₃)	SM 2320 B	ND	mg/L	1	1	1	04/25/2001	04/25/2001
Chloride (Cl)	EPA 300.0	140	mg/L	1	15	15	04/26/2001	04/26/2001
Chromium - Total (Cr)	EPA 200.8	12	µg/L	1	1	1	04/25/2001	05/07/2001
Conductivity - Specific (EC)	SM 2510 B	1000	µmho/cm	1	1	1	04/25/2001	04/25/2001
Copper (Cu)	EPA 200.7	ND	mg/L	0.05	1	0.05	04/25/2001	05/04/2001
Cyanide (CN)	SM 4500-CN-F	ND	µg/L	20	1	20	05/08/2001	05/11/2001
Fluoride	EPA 300.0	ND	mg/L	0.1	15	1.5	04/26/2001	04/26/2001
Hardness (as CaCO ₃)		47	mg/L	1.0	1	1.0	05/08/2001	05/08/2001
Hydroxide (as CaCO ₃)	SM 2320 B	ND	mg/L	1	1	1	04/25/2001	04/25/2001
Iron (Fe)	EPA 200.7	9.2	mg/L	0.05	1	0.05	04/25/2001	05/04/2001
Langeller Index (Saturation Index)		0.20	-	-	1	N/A	05/08/2001	05/08/2001
Lead (Pb)	EPA 200.8	5.0	µg/L	5	1	5	04/25/2001	05/07/2001
Magnesium (Mg)	EPA 200.7	3.5	mg/L	0.1	1	0.1	04/25/2001	05/04/2001
Manganese (Mn)	EPA 200.7	0.22	mg/L	0.01	1	0.01	04/25/2001	05/04/2001
Mercury (Hg)	EPA 200.8	ND	µg/L	0.4	1	0.4	04/25/2001	05/07/2001
Nickel (Ni)	EPA 200.8	10	µg/L	10	1	10	04/25/2001	05/07/2001
Nitrate (NO ₃)	EPA 300.0	ND	mg/L	1	15	15	04/26/2001	04/26/2001
Nitrite (NO ₂ -N)	EPA 300.0	ND	mg/L	0.05	15	0.75	04/26/2001	04/26/2001
pH	EPA 9040	7.9	STD	-	1	N/A	04/25/2001	04/25/2001
Potassium (K)	EPA 200.7	3.0	mg/L	2	1	2	04/25/2001	05/04/2001
Selenium (Se) - Total	EPA 200.8	ND	µg/L	2	1	2	04/25/2001	05/07/2001
Silver (Ag)	EPA 200.7	ND	mg/L	0.01	1	0.01	04/25/2001	05/04/2001

mg/L: Milligrams/Liter (ppm)

mg/Kg: Milligrams/Kilogram (ppm)

µg/L: Micrograms/Liter (ppb)

µg/Kg: Micrograms/Kilogram (ppb)

%Rec: Percent Recovered (surrogates)

PQL: Practical Quantitation Limit

DLR: Detection Limit for Reporting

: PQL x Dilution

ND: None Detected at DLR

H: Analyzed outside of hold time

P: Preliminary result

S: Suspect result. See Cover Letter for comments

E: Analysis performed by External laboratory.

See External Laboratory Report attachments.

Data Label: 0.1...



BSK ANALYTICAL LABORATORIES

Certificate of Analysis

ELAP Certificate #1180

Report Issue Date: 05/14/2001

BSK Submission #: 2001041062

BSK Sample ID #: 105973

Project ID:

Project Desc:

Submission Comments:

Sample Type: Liquid

Sample Description: Freitas #35

Sample Comments:

Date Sampled: 04/24/2001

Time Sampled: 1330

Date Received: 04/24/2001

Inorganics

Analyte	Method	Result	Units	PQL	Dilution	DLR	Prep Date	Analysis Date
Sodium (Na)	EPA 200.7	240	mg/L	1	1	1	04/25/2001	05/04/2001
Sulfate (SO4)	EPA 300.0	ND	mg/L	2	15	30	04/26/2001	04/26/2001
Thallium (Tl)	EPA 200.8	ND	µg/L	1	1	1	04/25/2001	05/07/2001
Total Dissolved Solids (TDS)	SM 2540-C	640	mg/L	5	1	5	05/01/2001	05/03/2001
Zinc (Zn)	EPA 200.7	ND	mg/L	0.05	1	0.05	04/25/2001	05/04/2001

mg/L: Milligrams/Liter (ppm)

mg/Kg: Milligrams/Kilogram (ppm)

µg/L: Micrograms/Liter (ppb)

µg/Kg: Micrograms/Kilogram (ppb)

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: PQL x Dilution

ND: None Detected at DLR

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See External Laboratory Report attachments

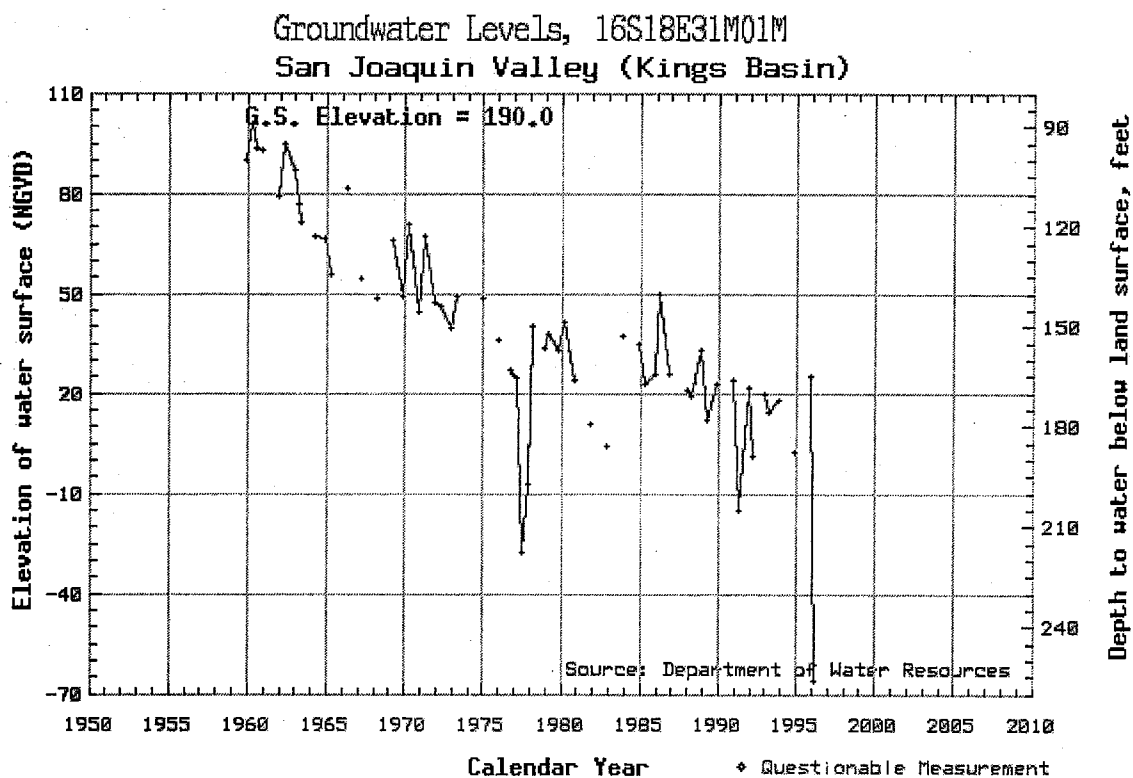
APPENDIX C

California Department of Water Resources
Division of Planning and Local Assistance



Groundwater Level Query Results for '16S18E31M01M'

The query for the well you selected returned **80** records. The data are listed in the table below. The table headings and records contain several codes and abbreviations.



Graphics created using [fly](#).

Meas. Date	R.P.Elev	G.S.Elev	RPWS	WSE	GSWS	QMC	NMC
10/08/1959	191.0	190.0	101.1	89.9	100.1		
02/23/1960	191.0	190.0	90.6	100.4	89.6		
05/12/1960	191.0	190.0	97.4	93.6	96.4		
10/20/1960	191.0	190.0	98.0	93.0	97.0		
10/16/1961	191.0	190.0	111.9	79.1	110.9		
03/06/1962	191.0	190.0	96.4	94.6	95.4		
10/17/1962	191.0	190.0	104.1	86.9	103.1		
02/18/1963	191.0	190.0	114.0	77.0	113.0		
02/27/1963	191.0	190.0	119.9	71.1	118.9		
02/12/1964	191.0	190.0	123.9	67.1	122.9		
09/24/1964	191.0	190.0	124.4	66.6	123.4		
02/02/1965	191.0	190.0	135.2	55.8	134.2		
02/03/1966	191.0	190.0	109.7	81.3	108.7		

ERWIN ENGINEERING - FIGURE 4A

02/07/1967	191.0	190.0	136.2	54.8	135.2	
02/05/1968	191.0	190.0	142.6	48.4	141.6	
02/05/1969	191.0	190.0	125.0	66.0	124.0	
10/01/1969	191.0	190.0	141.7	49.3	140.7	
02/02/1970	191.0	190.0	120.1	70.9	119.1	
09/29/1970	191.0	190.0	146.8	44.2	145.8	
02/03/1971	191.0	190.0	124.1	66.9	123.1	
10/04/1971	191.0	190.0	143.9	47.1	142.9	
02/04/1972	191.0	190.0	145.0	46.0	144.0	
10/04/1972	191.0	190.0	151.6	39.4	150.6	
03/02/1973	191.0	190.0	141.8	49.2	140.8	
10/10/1973	191.0	190.0	0.0	0.0	0.0	5
02/04/1974	191.0	190.0	0.0	0.0	0.0	1
10/16/1974	191.0	190.0	142.7	48.3	141.7	
01/17/1975	191.0	190.0	0.0	0.0	0.0	1
10/17/1975	191.0	190.0	155.0	36.0	154.0	
01/20/1976	191.0	190.0	0.0	0.0	0.0	1
07/23/1976	191.0	190.0	164.2	26.8	163.2	
10/14/1976	191.0	190.0	165.2	25.8	164.2	
01/12/1977	191.0	190.0	166.5	24.5	165.5	
06/09/1977	191.0	190.0	218.5	-27.5	217.5	
10/06/1977	191.0	190.0	198.5	-7.5	197.5	
01/31/1978	191.0	190.0	151.0	40.0	150.0	
10/05/1978	191.0	190.0	157.5	33.5	156.5	
01/31/1979	191.0	190.0	153.0	38.0	152.0	
09/26/1979	191.0	190.0	157.8	33.2	156.8	
01/28/1980	191.0	190.0	149.9	41.1	148.9	
10/04/1980	191.0	190.0	167.3	23.7	166.3	
02/06/1981	191.0	190.0	0.0	0.0	0.0	1
09/09/1981	191.0	190.0	180.3	10.7	179.3	
01/30/1982	191.0	190.0	0.0	0.0	0.0	1
10/08/1982	191.0	190.0	187.0	4.0	186.0	
02/11/1983	191.0	190.0	0.0	0.0	0.0	9
09/26/1983	191.0	190.0	153.6	37.4	152.6	
01/31/1984	191.0	190.0	0.0	0.0	0.0	1
10/09/1984	191.0	190.0	156.2	34.8	155.2	
02/21/1985	191.0	190.0	168.0	23.0	167.0	
10/18/1985	191.0	190.0	165.0	26.0	164.0	
01/31/1986	191.0	190.0	141.0	50.0	140.0	
10/03/1986	191.0	190.0	165.0	26.0	164.0	
02/05/1987	191.0	190.0	0.0	0.0	0.0	9
10/27/1987	191.0	190.0	170.0	21.0	169.0	
01/26/1988	191.0	190.0	172.0	19.0	171.0	
10/19/1988	191.0	190.0	157.9	33.1	156.9	
01/25/1989	191.0	190.0	178.8	12.2	177.8	
10/10/1989	191.0	190.0	168.2	22.8	167.2	
01/31/1990	191.0	190.0	0.0	0.0	0.0	9
10/04/1990	191.0	190.0	166.8	24.2	165.8	
02/13/1991	191.0	190.0	206.1	-15.1	205.1	
10/07/1991	191.0	190.0	169.2	21.8	168.2	
02/04/1992	191.0	190.0	190.1	0.9	189.1	
10/07/1992	191.0	190.0	171.5	19.5	170.5	
01/27/1993	191.0	190.0	176.8	14.2	175.8	
10/06/1993	191.0	190.0	172.9	18.1	171.9	
01/27/1994	191.0	190.0	0.0	0.0	0.0	9
10/11/1994	191.0	190.0	188.9	2.1	187.9	
01/27/1995	191.0	190.0	0.0	0.0	0.0	9
10/05/1995	191.0	190.0	166.1	24.9	165.1	
01/23/1996	191.0	190.0	257.2	-66.2	256.2	
10/11/1996	191.0	190.0	0.0	0.0	0.0	3

03/10/1997	191.0	190.0	0.0	0.0	0.0	9
10/27/1997	191.0	190.0	0.0	0.0	0.0	9
03/11/1998	191.0	190.0	0.0	0.0	0.0	9
10/14/1998	191.0	190.0	0.0	0.0	0.0	9
02/01/1999	191.0	190.0	0.0	0.0	0.0	9
11/17/1999	191.0	190.0	0.0	0.0	0.0	9
03/07/2000	191.0	190.0	0.0	0.0	0.0	9

[\[Return to Well Location Map\]](#)

[\[Groundwater Home | Division of Planning and Local Assistance Home | Department of Water Resources Home \]](#)

For more information, please contact our office:

*Department of Water Resources, San Joaquin District
Water Management Section
3374 East Shields Avenue
Fresno, CA 93726*

Phone: 559-230-3326

Fax: 559-230-3301

Please send any comments to [Eric Senter](#)

Document: AllWellData.cfm

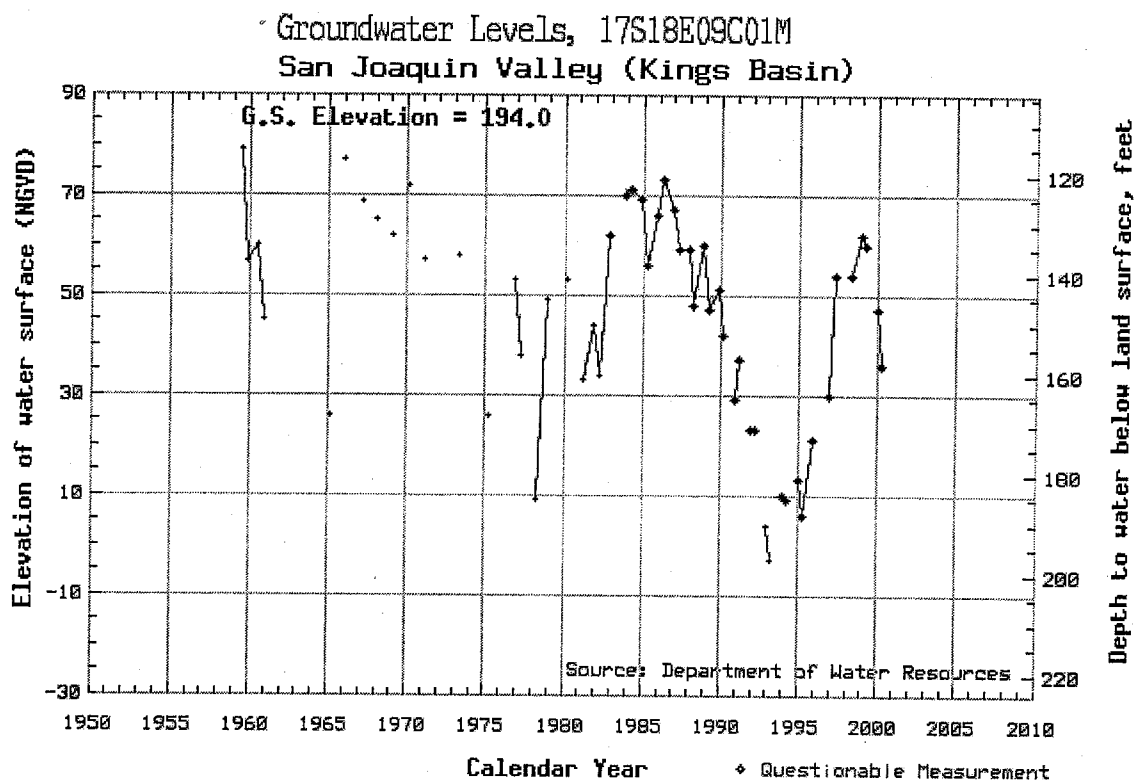
Revised: March 3, 2000

California Department of Water Resources
Division of Planning and Local Assistance



Groundwater Level Query Results for '17S18E09C01M'

The query for the well you selected returned 61 records. The data are listed in the table below. The table headings and records contain several codes and abbreviations.



Graphics created using fly.

Meas. Date	R.P.Elev	G.S.Elev	RPWS	WSE	GSWS	QMC	NMC
10/30/1958	194.0	194.0	0.0	0.0	0.0		3
05/06/1959	194.0	194.0	115.0	79.0	115.0		
10/16/1959	194.0	194.0	137.3	56.7	137.3		
05/18/1960	194.0	194.0	134.2	59.8	134.2		
10/14/1960	194.0	194.0	148.8	45.2	148.8		
12/21/1964	194.0	194.0	168.0	26.0	168.0		
12/13/1965	194.0	194.0	117.0	77.0	117.0		
12/29/1966	194.0	194.0	125.5	68.5	125.5		
12/18/1967	194.0	194.0	129.0	65.0	129.0		
12/27/1968	194.0	194.0	132.0	62.0	132.0		
12/15/1969	194.0	194.0	122.0	72.0	122.0		
01/04/1971	194.0	194.0	137.0	57.0	137.0		
02/16/1972	194.0	194.0	0.0	0.0	0.0		

1

ERWINENGINEERING - FIGURE 4B

03/14/1973	194.0	194.0	136.0	58.0	136.0		
03/15/1974	194.0	194.0	0.0	0.0	0.0		1
02/20/1975	194.0	194.0	168.0	26.0	168.0		
10/20/1976	194.0	194.0	141.0	53.0	141.0		
02/03/1977	194.0	194.0	156.0	38.0	156.0		
10/12/1977	194.0	194.0	0.0	0.0	0.0		1
02/03/1978	194.0	194.0	185.0	9.0	185.0		
10/12/1978	194.0	194.0	145.0	49.0	145.0		
10/03/1979	194.0	194.0	0.0	0.0	0.0		1
02/06/1980	194.0	194.0	141.0	53.0	141.0		
10/03/1980	194.0	194.0	0.0	0.0	0.0		1
02/18/1981	194.0	194.0	161.0	33.0	161.0		
09/29/1981	194.0	194.0	150.0	44.0	150.0		
02/02/1982	194.0	194.0	160.0	34.0	160.0		
10/08/1982	194.0	194.0	132.0	62.0	132.0	9	
03/28/1983	194.0	194.0	0.0	0.0	0.0		9
10/12/1983	194.0	194.0	124.0	70.0	124.0	9	
02/15/1984	194.0	194.0	123.0	71.0	123.0	9	
10/25/1984	194.0	194.0	125.0	69.0	125.0	9	
02/21/1985	194.0	194.0	138.0	56.0	138.0	9	
10/30/1985	194.0	194.0	128.0	66.0	128.0	9	
02/24/1986	194.0	194.0	121.0	73.0	121.0	9	
10/08/1986	194.0	194.0	127.0	67.0	127.0	9	
02/25/1987	194.0	194.0	135.0	59.0	135.0	9	
10/19/1987	194.0	194.0	135.0	59.0	135.0	9	
02/18/1988	194.0	194.0	146.0	48.0	146.0	9	
10/13/1988	194.0	194.0	134.0	60.0	134.0	9	
02/17/1989	194.0	194.0	147.0	47.0	147.0	9	
10/10/1989	194.0	194.0	143.0	51.0	143.0	9	
01/30/1990	194.0	194.0	152.0	42.0	152.0	9	
10/10/1990	194.0	194.0	165.0	29.0	165.0	9	
01/11/1991	194.0	194.0	157.0	37.0	157.0	9	
10/22/1991	194.0	194.0	171.0	23.0	171.0	9	
01/17/1992	194.0	194.0	171.0	23.0	171.0	9	
10/26/1992	194.0	194.0	190.0	4.0	190.0		
02/16/1993	194.0	194.0	197.0	-3.0	197.0		
10/22/1993	194.0	194.0	184.0	10.0	184.0	9	
02/16/1994	194.0	194.0	185.0	9.0	185.0	9	
11/16/1994	194.0	194.0	181.0	13.0	181.0	3	
02/23/1995	194.0	194.0	188.0	6.0	188.0	3	
10/18/1995	194.0	194.0	173.0	21.0	173.0	9	
10/22/1996	194.0	194.0	164.0	30.0	164.0	9	
02/19/1997	194.0	194.0	140.0	54.0	140.0	9	
03/26/1998	194.0	194.0	140.0	54.0	140.0	9	
10/20/1998	194.0	194.0	132.0	62.0	132.0	9	
02/04/1999	194.0	194.0	134.0	60.0	134.0	9	
10/19/1999	194.0	194.0	147.0	47.0	147.0	9	
02/09/2000	194.0	194.0	158.0	36.0	158.0	9	

[\[Return to Well Location Map\]](#)

[\[Groundwater Home | Division of Planning and Local Assistance Home | Department of Water Resources Home \]](#)

For more information, please contact our office:

*Department of Water Resources, San Joaquin District
Water Management Section
3374 East Shields Avenue*

WELL COMPLETION REPORT

Refer to Instruction Pamphlet

DWR USE ONLY - DO NOT FILL IN

STATE WELL NO./STATION NO.

LATITUDE LONGITUDE

APN/ITS/OTHER

Page 1 of 1

Owner's Well No.

No. 814938

Date Work Began 1-7-2000, Ended 1-14-2000

Local Permit Agency Fresno County

Permit No. 19711

Permit Date 1-3-00

GEOLOGIC LOG

WELL OWNER

ORIENTATION () ☒ VERTICAL ☐ HORIZONTAL ☐ ANGLE (SPECIFY)

DEPTH FROM SURFACE

FLUID

DESCRIPTION

Describe material, grain size, color, etc.

Name F. N. S. Inc. Marc Frelles

Mailing Address P.O. Box 1267

CITY Hollister, CA 95024-1267

WELL LOCATION

Address 1/2 Mile South of Elkhorn, 50' East of Howard

City

County Fresno

APN Book 050 Page 160 Parcel 16

Township 17 S Range 18 Section 5-6

Latitude DEG. MIN. SEC. NORTH Longitude DEG. MIN. SEC. WEST

LOCATION SKETCH

Elkhorn

50'

Howard

Mt. Whitney

Illustrate or Describe Distances of Well from Roads, Buildings, Fences, Rivers, etc. and attach a map. Use additional paper if necessary. PLEASE BE ACCURATE & COMPLETE.

DEPTH FROM SURFACE	FL.	to	FL.	DESCRIPTION
0	25			Brown clay
25	80			Sand
80	130			Clay
130	170			Sand
170	200			Clay
200	220			Sand & Gravel & Clay
220	250			Clay
250	260			Sand & Clay
260	310			Clay
310	337			Sand
337	339			Clay
339	349			Sand
349	353			Clay
353	365			Sand
365	370			Clay
370	376			Sand
376	385			Clay
385	392			Sand
392	408			Clay
408	418			Sand
418	424			Clay
424	450			Sand
450	467			Clay
467	506			Sand
506	523			Clay
523	554			Sand
554	590			Clay - Sand

TOTAL DEPTH OF BORING 590 (Feet)

TOTAL DEPTH OF COMPLETED WELL 570 (Feet)

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER (Feet) BELOW SURFACE

DEPTH OF STATIC WATER LEVEL (Feet) & DATE MEASURED

ESTIMATED YIELD (GPM) & TEST TYPE

TEST LENGTH (Hrs.) TOTAL DRAWDOWN (Feet)

* May not be representative of a well's long-term yield.

DEPTH FROM SURFACE	BORE-HOLE DIA. (Inches)	CASING (S)							DEPTH FROM SURFACE	ANNULAR MATERIAL				
		TYPE (X)				MATERIAL GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS		SLOT SIZE IF ANY (Inches)	TYPE			
Fl. to Fl.		BLANK	SCREEN	COIL DOCTOR	FILL PIPE								Fl. to Fl.	CE- MENT (X)
0' 50'	44"			X		Steel	30"	5/16		0' 50'	XX			Six Sack
0' 280'	28"	X				Steel	16"OD	.312		0' 590'			XX	5/16 X 2
280' 560'	28"		X			Steel	16"OD	.312	.060					
560' 570'	28"	X				Steel	16"OD	.312						

ATTACHMENTS ()

Geologic Log

☒ Well Construction Diagram

Geophysical Log(s)

Soil/Water Chemical Analyses

Other

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

NAME Myers Bros. Well Drilling, Inc. RV 6

(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

8650 E. Lacey Blvd. Hanford, CA 93230-4844

ADDRESS CITY STATE ZIP

Signed DATE SIGNED 1-29-00 548214

WELL DRILLER/AUTHORIZED REPRESENTATIVE C-57 LICENSE NUMBER

101--Armona loam, partially drained, 0 to 1 percent slopes. This very deep, poorly drained soil is on floodplains. It formed in alluvium derived dominantly from granitic rock. Elevation is 175 to 215 feet. The mean annual precipitation is 7 to 8 inches, the mean annual temperature is 62 to 64 degrees F, and the frost-free period is 250 to 275 days.

Typically, the surface layer is grayish brown loam about 14 inches thick. The subsoil to a depth of 60 inches or more is stratified light brownish gray and gray loam and clay loam. It is saline-sodic or sodic in some part. It is calcareous throughout. Redoximorphic features occur below a depth of 14 inches.

Included in this unit are 5 percent small areas of Tachi clay, 2 percent small areas of Gepford clay, 2 percent small areas of Elnido sandy loam, and 1 percent small areas of Bisgani sandy loam. Also included are 3 percent small areas which flood on rare occasions, located primarily near the Fresno Slough and the Kings County line and near the San Joaquin River and the Merced County line. Included areas make up about 15 percent of the total acreage.

Permeability of this Armona soil is moderately slow. Available water capacity is moderate or high due to varying levels of salinity. Effective rooting depth of the crops commonly grown in the area is limited by a high water table that is at a depth of 60 to 72 inches. Runoff is negligible, and the hazard of water erosion is slight.

Most areas of this unit are used for irrigated crops, mainly cotton and alfalfa. Some areas are used for home site development.

If this unit is used for irrigated crops, the limitations are the saline-sodic or sodic condition of the soil, moderately slow permeability, and a seasonal high water table.

If this unit is used for irrigated crops, salinity and the high water table influences the choice of crops. Intensive management is required to reduce the salinity and maintain soil productivity. Content of toxic salts can be reduced by applying proper amounts of soil amendments, leaching, and returning crop residue to the soil. Gypsum, sulfur and sulfuric acid are among the soil amendments that can be used to reclaim this soil. If sulfur or sulfuric acid is used, lime should be present in the surface layer. If the saline-sodic condition is significantly reduced by reclamation, the permeability and available water capacity increase.

Furrow, border and sprinkler irrigation systems are suited to this unit. Because of the moderately slow permeability of this soil, the length of runs should be adjusted to permit adequate infiltration of water. The application of water should be regulated so that water does not stand on the surface and damage the crops. Subsoiling increases the infiltration of water and the permeability of this soil.

Drainage can be provided by using tile systems to intercept water from higher lying areas. Tile or open drains can be used to remove excess water and salts from the soil, if a suitable outlet is available.

A cropping system that includes crop rotation and return of crop residue to the soil or regular addition of other organic matter improves fertility, reduces crusting and increases the water intake rate.

If this unit is used for home site development, the main limitations are the saline-sodic or sodic condition of the soil, moderately slow permeability, and a seasonal high water table. The saline-sodic condition causes high corrosivity to steel and concrete. Treated steel pipe and sulfate-resistant concrete should be used. Selection of salt and sodium tolerant plants is important for the establishment of lawns, shrubs, trees and vegetable gardens. The moderately slow permeability and the seasonal high water table increase the possibility of failure of septic tank absorption fields. Use of long absorption lines and sandy backfill for the trench helps to compensate for this. Onsite investigation is needed to determine whether the area considered for a septic tank absorption field is underlain by a high water table. If a high water table is present, other specially designed sewage disposal systems may be required.

This map unit is in capability unit IIIw-6, irrigated, and capability subclass V IIw, nonirrigated. The MLRA is 17.

130--Gepford clay, 0 to 1 percent slopes. This very deep, poorly drained, saline-sodic soil is on flood plains. It formed in alluvium derived from igneous and sedimentary rock. Elevation is 175 to 212 feet. The mean annual precipitation is 7 to 8 inches, the mean annual air temperature is 62 to 63 degrees F, and the frost-free period is 250 to 260 days.

Typically, the upper 16 inches of the surface layer is gray and olive gray clay. The upper 17 inches of the underlying material is gray, light olive gray and pale olive silty clay loam. The lower part to a depth of 65 inches is light yellowish brown and light greenish gray silt loam. Gleyed colors with mottles occur below a depth of 16 inches. The profile is calcareous throughout, and it is saline-sodic in some part. Gypsum crystals occur below a depth of 58 inches. In some areas the surface layer is clay loam.

Included in this unit are small areas of Tachi and Lillis clays, Armona loam and Lethent clay loam. Also included are small areas of soil which is not saline-sodic, does not have a high perched water table or does not flood. Included areas make up about 10 percent of the total acreage.

Permeability of this Gepford soil is very slow. Available water capacity is moderate to high because of varying levels of salinity. Effective rooting depth of the crops commonly grown in the area is limited by an apparent water table that occurs from 30 to 48 inches from the soil surface. This unit is considered to be partially drained because of the presence of dams and reservoirs in the Sierra Nevada, pumping from the water table, use of tile and interceptor drains and the filling and leveling of the sloughs in the vicinity. Runoff is ponded, and the hazard of water erosion is slight. This soil is subject to very long periods of flooding in January through March in years of above normal precipitation.

This unit is used mainly for irrigated crops. It is also used for pasture and home site development.

This unit is best suited to irrigated, saline-sodic tolerant crops. It is limited mainly by the saline-sodic condition of the soil, a high perched water table, very slow permeability and very long periods of flooding in years of above normal precipitation.

If this unit is irrigated, salinity influences the choice of crops. Intensive management is required to reduce the salinity and maintain soil productivity. Content of toxic salts can be reduced by applying proper amounts of soil amendments, leaching and returning crop residue to the soil. Gypsum, sulfur and sulfuric acid are among the soil amendments that can be used to reclaim this soil. If sulfur or sulfuric acid is used, lime should be present in the surface layer. Tile drainage can be used to lower the water table if a suitable outlet is available.

Furrow, border and sprinkler irrigation systems are suited to this unit. Because of the very slow permeability of this soil, the application of water should be regulated so that water does not stand on the surface and damage the crops. The risk of flooding can be reduced by the use of levees, canals and diversions.

A cropping system that includes crop rotation and return of crop residue to the soil or regular addition of other organic matter improves fertility, reduces crusting and increases water intake rate.

If this unit is used for hay and pasture, the main limitations are the saline-sodic conditions of the soil, a high perched water table and very long periods of flooding in years of above normal precipitation. The concentration of salts and sodium in the surface layer limits the production of plants suitable for hay and pasture. Leaching the salts from the surface layer is limited by the high water table. Drainage and irrigation water management reduce the concentration of salts. Salt-tolerant species are most suitable for planting. Gypsum, sulfur and sulfuric acid are among the soil amendments that can be used to reclaim this soil. If sulfur or sulfuric acid is used, lime should be present in the surface layer. The risk of flooding can be reduced by the use of levees, canals and diversions.

Irrigation water can be applied by the sprinkler and border methods. Leveling helps to insure the uniform application of water. Proper stocking rates, pasture rotation and restricted grazing during wet periods help to keep the pasture in good condition and to protect the soil from erosion. Use of nitrogen and phosphorus fertilizer promotes good growth of forage plants.

Population growth has resulted in increased construction of homes on this soil. If this unit is used for home site development, the main limitations are a high perched water table, the saline-sodic condition of the soil, very slow permeability, high potential of shrinking and swelling, and very long periods of flooding in years of above normal precipitation.

Deep drainage reduces wetness. Tile drainage can be used to lower the water table if a suitable outlet is available. Plants that tolerate a seasonal high water table and droughtiness should be selected unless drainage and irrigation are provided. The saline-sodic condition causes high corrosivity to steel and concrete. Treated steel pipe and sulfate-

resistant concrete should be used. Content of toxic salts can be reduced by applying proper amounts of soil amendments, leaching and returning crop residue to the soil. Selection of adapted vegetation is critical for the establishment of lawns, shrubs, trees and vegetable gardens.

Very slow permeability and the high water table increase the possibility of failure of septic tank absorption fields. Absorption lines should be placed below the very slow permeable layer. Increasing the size of the absorption area helps to compensate for the levees, canals and diversions permeability. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has low shrink-swell potential. The risk of flooding can be reduced by the use of levees, canals and diversions.

This map unit is in capability unit IIIW-6, irrigated, and capability subclass VIw, nonirrigated. The MLRA is 17

282--Tachi clay, 0 to 1 percent slopes. This very deep, very poorly drained, saline-sodic soil is on flood plains and in basins. It formed in alluvium derived dominantly from igneous and sedimentary rock. Elevation is 125 to 205 feet. The mean annual precipitation is about 7 to 8 inches, the mean annual air temperature is 62 to 64 degrees F, and the frost-free period is 245 days to 255 days.

Typically, the surface layer is very dark gray, dark gray, and olive gray clay about 14 inches thick. The underlying material to a depth of 60 inches is dark gray, olive gray, light olive gray, light gray and gray clay. Redoximorphic features are present in all layers below a depth of 14 inches. Tachi soils are calcareous throughout and are saline-sodic in some parts of the soil profile.

Small areas of Lillis soil are included along the western edge of this unit. Also included, near Fresno Slough, are small areas of coarser textured, stratified soil. In the N 1/2 of the NE 1/4 of sec. 8, T.14 S., R.15 E., there are small areas of Tachi soil with a 3 to 10-inch overwash of silt loam or silty clay loam texture. Included areas make up about 7 percent of the total acreage.

Permeability of this Tachi soil is very slow. The water infiltration rate is high when the soil is dry and the cracks are open. As the soil becomes wet and the cracks close, the infiltration rate greatly decreases. The available water capacity is moderate or high. Effective rooting depth of the crops commonly grown in the area is limited by saline-sodic conditions and an apparent water table at a depth of 4 to 6 feet. Runoff is ponded and the hazard of water erosion is slight. These soils are purposefully flooded in the Mendota Wildlife Management Area from October through April for recreational and wildlife habitat purposes.

This unit is used mainly for wildlife habitat and recreation. It is also used for irrigated crops.

This unit is suited to irrigated, saline-sodic tolerant crops. It is limited mainly by saline-sodic conditions, an apparent water table, and very slow permeability. Intensive management is required to reduce the salinity and maintain soil productivity. Reduction of high salinity may be achieved by applying specific soil amendments and returning crop residue to the soil. Gypsum, sulfur and sulfuric acid are among the soil amendments that can be used to reclaim this soil. If sulfur or sulfuric acid is used, lime should be present in the surface layer.

A cropping system that includes crop rotation and the return of crop residue to the soil or the regular addition of other organic matter improves fertility, reduces crusting and increases the water intake rate. Furrow, border and sprinkler irrigation systems are suited to this unit. Because of the very slow permeability of this soil, the application of water should be regulated so that water does not stand on the surface and damage the crops. Subterranean Tile drainage may be used to lower the water table if a suitable outlet is available.

This map is in capability unit IIIw-6, irrigated, and capability subclass VIIw, nonirrigated. The MLRA is 17.

APPENDIX B

NUTRIENT MANAGEMENT PLAN

NUTRIENT MANAGEMENT PLAN

FNS Investments Dairy
Elkhorn Avenue and Howard Avenue
Fresno County, California

Project No. 42-302-19
April 12, 2002

Prepared by:

ERWIN ENGINEERING

Geotechnical/Environmental Consultants
1625 Howard Road, Ste 301
Fresno, California 93637
(559) 673-0923

ERWIN ENGINEERING

Geotechnical/Environmental Consultants
1625 Howard Road, Ste 301, Fresno, Ca., 93637
(559) 673-0923 Fax 673-0923

April 12, 2002

FNS Investments Incorporated
P.O. Box 1267
Hollister, CA 95024-1267

Attention: Mr. Marc Frelie

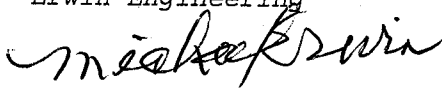
RE: Nutrient Management Plan
FNS Investments Dairy
Elkhorn Avenue and Howard Avenue
Fresno County, California

Pursuant to your request, Erwin Engineering has completed a Nutrient Management Report for the above-referenced subject property. The attached report summarizes the details of our findings.

Should you have any questions or if we may be of some additional service, please contact me at (559) 673-0923.

Respectfully submitted,

Erwin Engineering



Michael Erwin, PE
CE18625
GE297

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FIGURES

Figure 1

Vicinity Map

APPENDICES

Appendix A

Calculations

1.0 INTRODUCTION

This report presents the findings of Erwin Engineering's Nutrient Management Plan for the proposed subject dairy located near the intersection of Elkhorn Avenue and Howard Avenue in Fresno County, California (Figure 1). The subject site is located in the west half of section 31 of T16S, R18E, and sections 5 and the west half of sections 6 of T17S, R18E, MDB&M.

At the time of the investigation, the property was developed for agricultural production and encompasses approximately 1,242 acres. The Site Map (Figure 1) shows the approximate location of the subject site.

2.0 PURPOSE AND SCOPE OF SERVICES

The purpose of the Nutrient Management Investigation is to evaluate the proposed manure waste volume, its management and the nutrient uptake by the proposed crops for the subject site.

This report includes the following items:

- Site plan and vicinity map showing the approximate location of the site (Fig 1);
- The proposed animal count and the calculate the animal units;
- The dairy manure volume calculations;
- Development of a nutrient management plan;
- Calculations of storage volumes and management plan for the waste and rain runoff volumes;
- Present conclusions of the calculations supporting the above items;

3.0 PROPOSED DAIRY

The proposed dairy encompasses approximately 1,242 gross acres. The net farmable acreage includes approximately 1,132 acres. The proposed dairy facility including buildings will occupy the remaining approximately 110 acres. The Site Map (Figure 1) shows the approximate location of the subject dairy.

The proposed ponds includes 4 separation ponds. The four ponds will be approximately 50 feet wide and 18 feet deep with 1 to 1 slopes. Two will be 580 feet long and the other two 530 feet in length. One main pond and a stand by main pond are proposed. They will be approximately 200 feet wide by 1235 feet long and 20 feet deep with 1 to 1 slopes. The stand by main pond's excavated material will be used during the dairies construction. It is not planned to use the pond except during an emergency situation. The pond volumes noted in this report do not include that of the stand by pond.

The dairy site is not located in a flood zone. It is located in the "C" zone. This a special flood hazard area which is not subject to a 100 year flood event.

The following table summarizes the animal unit calculations. They are based on California Regional Water Quality Control Board's (CRWQCB) criteria.

TABLE I HERD SIZE			
	Animal Count	Factor	Animal Units
Milk Cows	3200	1.40	4480
Dry Cows	480	1.12	538
Heifers 1-2 yr	960	1.02	979
Heifers 3mo-1yr	1100	0.49	539
Calves	380	0.29	110
Total	6,1120	--	6,646

3.1 Dairy Manure

The quantity of the manure wastewater and solids will vary depending on the number of animals but will be approximately the numbers noted in Table I. The manure water will pass through a solids separator prior to pond storage. The cow traffic lanes will be flushed with recycled water from the main pond.

The manure water is routed to the separation ponds where suspended matter will be partially removed and then pumped to the main pond. The separation ponds and the main pond with a 2 foot free board will have a total capacity of approximately 4,921,060 cubic feet. The ponds have sufficient capacity to store for 120 days a 24 hour - 25 year storm event, the normal rain runoff and the waste water generated by the animal units noted in Table I. Refer to the Pond Capacity calculations in the appended of this report.

The proposed ponds will have in excess of the required minimum of 10 feet between the bottom of the ponds and the water table. Erwin Engineering's February 18, 2001 Geological-Hydrological Report noted the highest anticipated depth of ground water to be approximately 150 feet below the surface. This separates the bottom of the ponds and the water table by approximately 125 feet.

3.2 Dairy Dry Manure

The manure water will pass through a solids separator prior to pond storage. Solids will typically be removed drained with seepage returning to the storage pond. The solids and the excess manure in corrals would be stockpiled for acreage distribution as a fertilizer or soil amendment.

Solids accumulation in the corrals will partially be used for bedding in the corrals. Several inches of solid manure will be used in a composed state for animal bedding. The near surface soils occupy the dairy site as noted in Erwin Engineering's February 18, 2001 Geological-Hydrological Report noted that the near surface soil have approximately 35 percent of clay size soils. The proposed sloped corrals with fine grained soils commingle with the composed manure material will provide minimal opportunity for seepage to pass through the surface.

4.0 NUTRIENT MANAGEMENT PLAN

Wastewater temporarily stored in the storage pond will be used as a fertilizer for the proposed crops grown on the dairies acreage. The wastewater will be commingle with fresh water during irrigation applications to the subject acreage. The proposed cropping will include double cropping with wheat silage and corn silage on approximately half the agricultural acreage or approximately 566 acres. Alfalfa is planned for the remaining 566 acres.

4.1 Irrigation Requirements

The double cropping of wheat and corn silage on approximately half the acreage and alfalfa on the remain acreage will require approximately 3,962 ac.ft. of annual irrigation water. The annual rain water runoff and a 25 year, 24 hour storm event after evaporation will accumulate approximately 31.62 ac.ft. or 1,377,300 ac.ft.. The annual storm water will provide only a small percentage of the annual water needs of the proposed crops. The agricultural irrigation requirements calculations in the appendix also notes that the annual manure and barn wash volumes represents approximately 243 acre feet per year. This also represents only a small percentage of the annual water needs of the proposed crops.

4.2 Nutrient Uptake

The available nitrogen produced by both the liquid and sold manure is approximately 307,588 pounds per year. The proposed dairy has approximately 1,132 acres available for crop cultivation. Present planning calls for approximately half the available cultivation acreage to be use for both the alfalfa and the double cropped wheat and corn silage. These crops would use approximately 650,900 pounds of nitrogen annually. This represents approximately a nitrogen shortage of 343,321 pounds per year. Refer to the appendix for sample calculations of the nitrogen production and plant up take.

The total salt produced by the animal waste from the dairy operation is estimated to by approximately 3,077,475 pounds per year. The available 1,132 acreage cultivated would assimilate approximately 3,396,000 pounds of salt. This is based on the CRWQCB's allowance of a maximum loading rate of 3,000 pounds per acre for double cropping. As for the nitrogen noted above, the salt loading will be assimilated by the cultivated acreage with an excess of approximately 318,525 pounds.

5.0 CONCLUSIONS

The following summary of the information developed during the preparation of this report that shows the proposed number of dairy animals and their waste products can be managed with the proposed acreage.

- Total Animal Units proposed equals 6,646.
- The main pond and the four separation ponds, with a 2 foot free board will have a capacity of approximately 4,921,060 cubic feet.
- The quantity of manure wastewater, barn wash water and rain runoff for 120 days can be stored in the proposed ponds.
- Solids accumulation from the dairy will be used partially for the subject acreage cultivation and for corral bedding material.
- The nitrogen and salt loading by both liquid and solid waste will be assimilated by the proposed cultivated acreage

It is Erwin Engineering's opinion that based on the information presented in this report that the proposed animal units can be managed on the acreage of this dairy.

Should you have any questions or if we may be of some additional service, please contact me at (559) 673-0923.

Respectfully submitted,

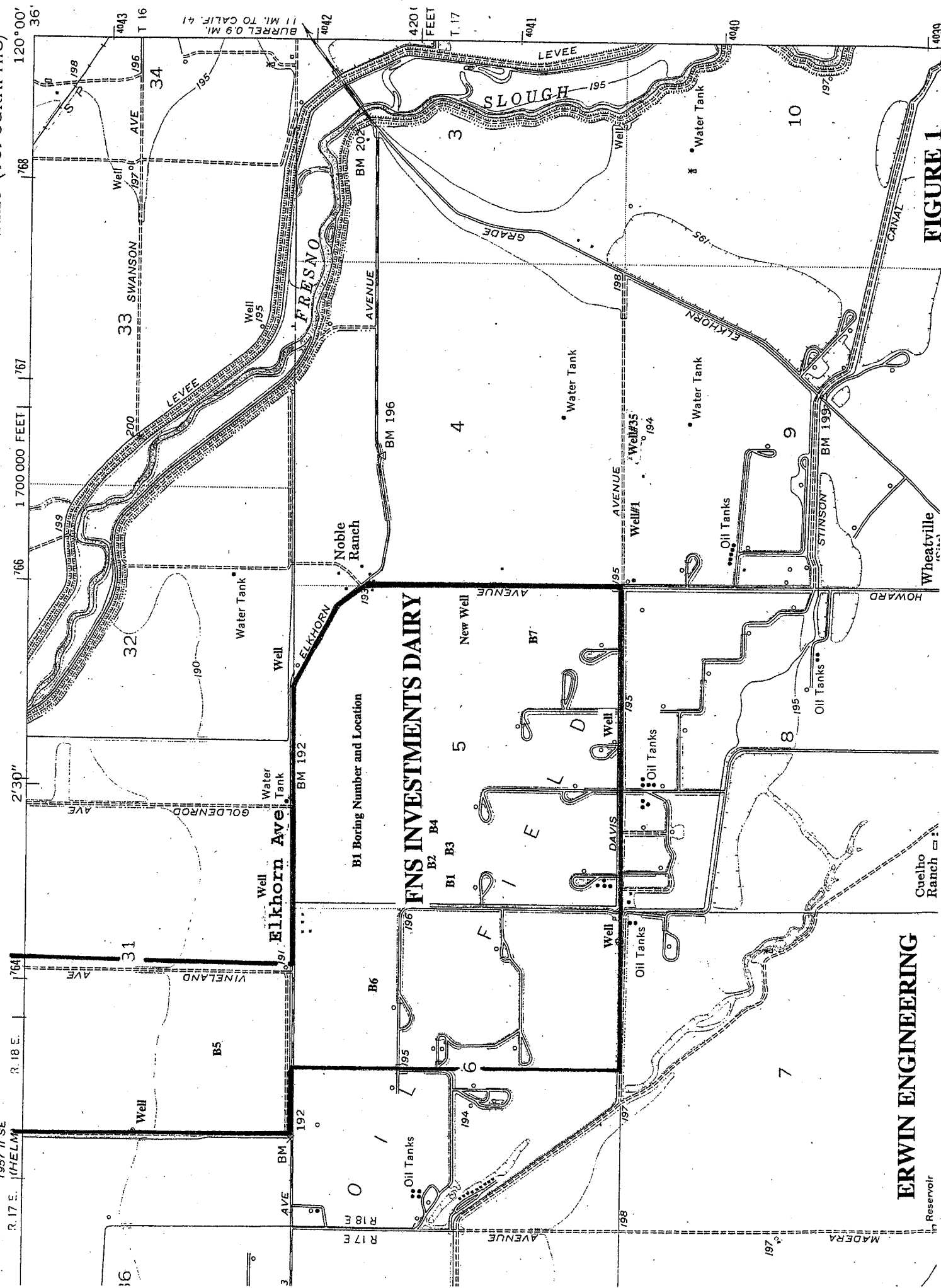


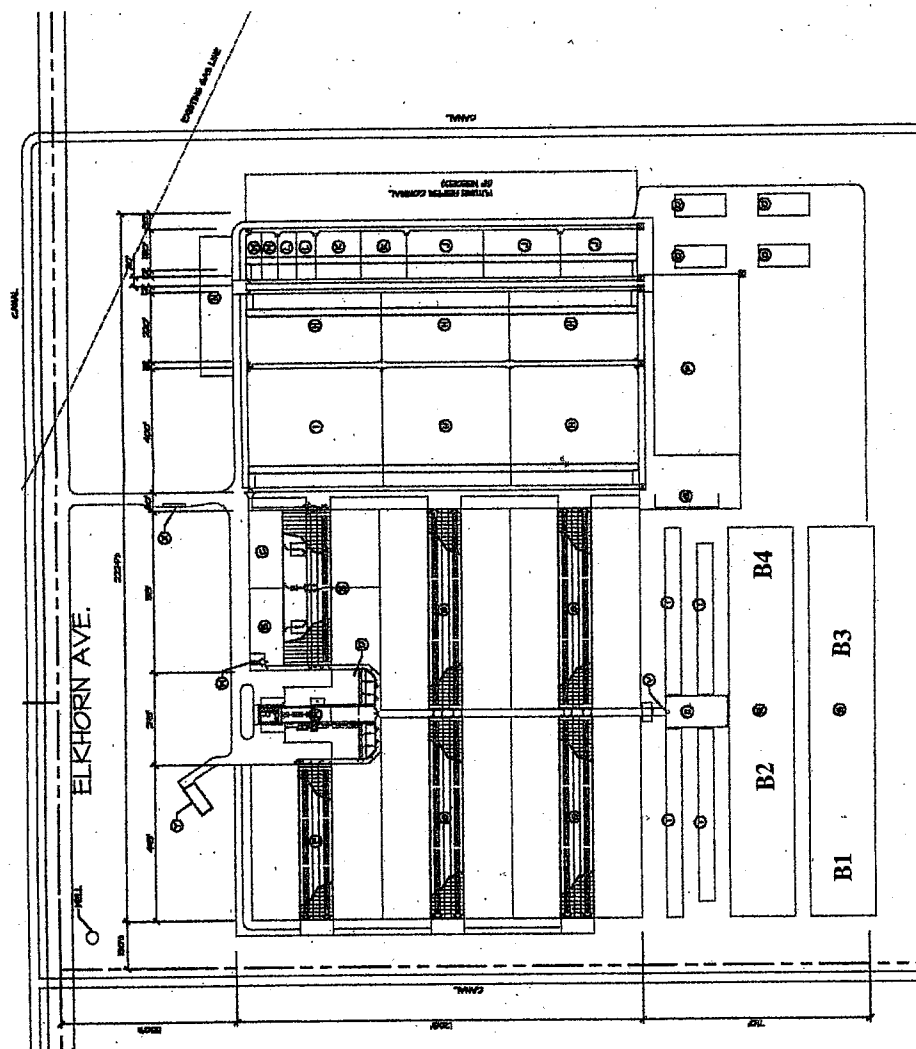
Erwin Engineering
Michael Erwin, PE,
CE18625, GE297

ERWIN ENGINEERING

REFERENCES

- A Compilation of Water Quality Goals, a Staff Report of the California Regional Water Quality Control Board, Central Valley Region, Prepared by John B. Marshack, D. Env., September 1991
- Barclays Official California Code of Regulations, Title 23. Waters, Published by Barclays Law Publishers, 1990
- Chemistry for Environmental Engineering, Third Edition, by Clair N. Sawyer and Perry L. McCarty, McGraw-Hill Inc, 1978
- Groundwater, by R. Allan Freeze and John A. Cherry, Prentice Hall, 1979
- Groundwater and Wells, Second Edition, by Fletcher G. Driscoll, Johnson Filtration Systems Inc, 1986
- Water Supply and Pollution Control, Fourth Edition, by Warren Viessman, Jr and Mark J. Hammer, Harper & Row Publishers, 1985
- Water Quality Control Plan, The (Basin Plan) for the Central Valley Regional Water Quality Control Board, (Region 5), Second Edition, by Regional Board Staff
- Soil Survey, Fresno Area California, USDA Soil Conservation Service, December 1990
- Department of Water Resources, Internet Sites of Well Records, Groundwater Level Retrieval Map Interface @ (www.water.ca.gov)
- Department of Water Resources, Historical Groundwater Records for Lines of Equal Elevation of Water in Wells
- Department of Water Resources, Historical Groundwater Records for Lines of Equal Depth to water in Wells
- California Regional Water Quality Control Board, Application for Dairies, Central Valley Region, Tulare Lake Basin





B1 Boring Number and Location

FNS INVESTMENTS DAIRY LAYOUT
SEALS, 1/2007

RECEIVED: 11-20-07

CANAL

ERWIN ENGINEERING

FIGURE 2

FNS Investment Dairy
April 12, 2002

APPENDIX A

TABLE II MANURE PRODUCED						
	Head	Factor	AU	AU Flushed	Total Wet Manure	Total Dry Manure
Milk Cows	3200	1.4	4480	4480 *	3584 **	896
Dry Cows	480	1.12	538	538 *	323 ***	215
Heifers 1-2 yrs.	960	1.02	979	979 *	587 ***	392
Heifers 3 to 12 months	1100	0.49	539	539 *	323 ***	216
Calves	380	0.29	110	0 *	0	0
Total	6120		6646	6536 *	4817	1719

* 100% flushed, 0% for calves

** 80% collected flush

*** 60% collected flush

TABLE III Nitrogen - Wet Manure					
	AU	Nitrogen Excretion value/day	Total Nitrogen Produced	75% Denitrification Anaerobic Pond	Nitrogen Produced
Milk Cows	3584	0.56	714,506	535,880	178,626
Dry Cows & Heifers	1233	0.45	197,527	148,145	49,382
Total	4817	--	--	--	228,008

0% Denitrification, solid separator

Required Acreage = 536 ac @ 425 #N/ac

TABLE IV Salts - Wet Manure				
Total AU	Salts Produced rate/day	Total Salts	Separator removed Salts	Salt Production (lbs.)
4,817	1.29	2,268,084	0	2,268,084

Required Acreage = 756 ac @ 3,000 #salt/ac

TABLE V Nitrogen - Dry Manure						
	AU	Nitrogen excretion value/day	Total Nitrogen Produced	Nitrogen @ Solids Separator	75 % Denitrification	Nitrogen Produced
Milk Cows	896	0.56	183,142	0	137,357	45,786
Dry Cows & Heifers	823	0.45	135,178	0	101,383	33,794
Total	1,719	--	--	--	--	79,580

TABLE VI Salts - Dry Manure				
Total AU	Salts rate/day	Total Salts Produced (lb)	Separator Removed Salts	Net Salts Produced (lb)
1,719	1.29	809,391	0	809,391

CROP NUTRIENT UTILIZATION

Potential Crop Nutrient Uptake;

NITROGEN

Total Nitrogen from AU = $228,008 + 79,580 = 307,588$ lbs/yr

Alfalfa, 566 acres @ 480 lbs of nitrogen/acre/year = 271,680 lbs. nitrogen

Wheat Silage (double cropped), 566 acres @ 420 lbs of nitrogen/acre/year = 237,720 lbs. nitrogen

Corn Silage (double cropped), 566 acres @ 250 lbs of nitrogen/acre/year = 141,500 lbs. nitrogen

Total Nitrogen from AU = 307,588 lbs/yr nitrogen

Total Nitrogen Crop Uptake = $271,680 + 237,720 + 141,500 = 650,900$ lbs/yr nitrogen

Excess Nitrogen Uptake = $650,900 - 307,588 = 343,312$ lbs/yr nitrogen

SALTS

Total Salts from AU = $2,268,084 + 809,391 = 3,077,475$ lbs/yr

Total Salts Crop Uptake, as per CRWQCB (double crop) @ 3,000 lbs/acre/year

Crop Salts Uptake = $3,000 \text{ lbs/acre/year} \times 1,132 \text{ acres} = 3,396,000$

Excess Salts Uptake = $3,396,000 - 3,077,475 = 318,525$ lbs/yr salts

MANURE AND WATER STORAGE

ANIMAL UNITS

TABLE I HERD SIZE			
	Animal Count	Factor	Animal Units
Milk Cows	3200	1.40	4480
Dry Cows	480	1.12	538
Heifers 1-2 yr	960	1.02	979
Heifers 3mo-1yr	1100	0.49	539
Calves	380	0.29	110
Total	6,1120	--	6,646

MANURE VOLUME

Daily Waste Water Production = 1.37 cu. ft. per AU per day;

Settling basin removes 40% of the daily waste (by volume);

Total Manure = 6,646 AU X 1.37 X 60% X 120 days = 655,561 cu ft

BARN WASH WATER

Total per day = 176,000 gal

Storage Period @ 120 days = 2,824,000 cu ft

RAINFALL RUNOFF VOLUME

Area of East Fresno County

Rainfall

Unpaved

120 day (Dec-Mar) Rainfall in inches = 6.40 average inches (6.4)(13%) = 0.83 inches

25 yr., 24 hr. storm rainfall in inches = 2.40 inches (2.4)(60%) = 1.44 inches

Total Rainfall = 8.80 inches 2.27 inches

Areas of Runoff	Total Areas (sq ft)
Concrete	593,800
Roof area	275,000
Ponds	342,660
Corrals	3,580,140
TOTALS	4,791,600

Rain on Ponds = $(342,660)(8.80/12) =$ 250,800 cu ft

Rain on Impervious = $(593,800 + 275,000)(8.8/12) =$ 637,120 cu ft

Rain on Unpaved = $(3,580,140)(2.27/12) =$ 677,243 cu ft

Evaporation = $(342,660)(6.58/12) =$ (-) 187,890 cu ft

Rain Total 1,377,300 cu ft = 31.62 ac ft

Total Storage Required = Manure + Barn Wash Water + Runoff - Evaporation =

Total Storage Required = $655,560 + 2,824,000 + 1,377,300 = 4,856,860$ cu ft

POND CAPACITY

$$\text{Storage Volume (ft}^3\text{)} = (\text{LW} \times \text{LL} \times \text{LD}) - [(\text{S} \times \text{LD}^2) \times (\text{LW} + \text{LL})] + (4 \times \text{S}^2 \times \text{LD}^3 / 3)$$

Separation Ponds 2 proposed

$$\text{EW} = 50 \quad \text{EL} = 580 \quad \text{ED} = 18 \quad \text{S} = 1.0$$

$$\text{LW} = 46 \quad \text{LL} = 576 \quad \text{LD} = 16$$

$$\text{Storage Volume (ea)} = 270,165 \text{ (ft}^3\text{)}, \quad \text{Total for 2 ponds} = 540,330 \text{ (ft}^3\text{)}$$

Separation Ponds 2 proposed

$$\text{EW} = 50 \quad \text{EL} = 530 \quad \text{ED} = 18 \quad \text{S} = 1.0$$

$$\text{LW} = 46 \quad \text{LL} = 526 \quad \text{LD} = 16$$

$$\text{Storage Volume (ea)} = 246,165 \text{ (ft}^3\text{)} \quad \text{Total for 2 ponds} = 492,330 \text{ (ft}^3\text{)}$$

Main Pond 1 proposed

$$\text{EW} = 200 \quad \text{EL} = 1235 \quad \text{ED} = 20 \quad \text{S} = 1.0$$

$$\text{LW} = 196 \quad \text{LL} = 1231 \quad \text{LD} = 18$$

$$\text{Storage Volume} = 3,888,400 \text{ (ft}^3\text{)}$$

$$\text{TOTAL STORAGE CAPACITY} = 540,330 + 492,330 + 3,888,400 = 4,921,060 \text{ ft}^3$$

Unit Abbreviations:

LW = liquid width, ft.	EW = earth basin width, ft.
FB = freeboard, ft.	S = side slope, ft. (amount of run for 1 ft fall)
LL = liquid length, ft.	EL = earth basin length, ft.
LD = liquid depth, ft.	ED = earth basin depth, ft.

ERWIN ENGINEERING

AGRICULTURAL IRRIGATION REQUIREMENTS

Alfalfa Annual Irrigation Requirements = 3.5 ac-ft/yr/ac

Wheat Annual Irrigation Requirements = 1.5 ac-ft/yr/ac

Corn Annual Irrigation Requirements = 2.0 ac-ft/yr/ac

Total Irrigation Requirements for Acreage = $3.5(.5 \times 1132) + 1.5(.5 \times 1132) +$
 $2.0(.5 \times 1132) = 3,962 \text{ ac.ft./yr.}$

Annual Manure and Barn Wash Volumes = $[(655,560 \text{ ft}^3 + 2,824,000 \text{ ft}^3)/120 \text{ day}](365) =$
 $10,583,700 \text{ ft}^3/\text{yr} = 243 \text{ ac.ft./yr.}$

DEPOTS
CLOVIS
KINGSBURG
REEDLEY
SANGER
WESTSIDE

Consolidated Mosquito Abatement District

DISTRICT OFFICE
2425 FLORAL AVENUE
MAIL: P. O. BOX 278
SELMA, CALIFORNIA 93662
(559) 896-1085
(559) 888-2619
FAX (559) 896-6425

PLANNING

February 3, 2006

Elena Nuño

San Joaquin Valley Air Pollution Control District

1990 East Gettysburg Avenue

Fresno CA 93726

FEB 06 2006
San Joaquin Valley Unified
Air Pollution Control District

Re: Initial Study Notice of Preparation, Charles Van Der Kooi Dairy.

Dear Ms. Nuño:

The Consolidated Mosquito Abatement District (District) is responsible for protecting the public from nuisance and disease caused by mosquitoes within our jurisdiction and the Charles Van Der Kooi Dairy is located in our territory.

Dairy wastewater ponds have the potential to produce tremendous numbers of mosquito species which are both severe public health pests and potential vectors of St. Louis encephalitis, Western equine encephalitis, and West Nile virus. The California Health and Safety Code defines a vector as "any animal capable of transmitting the causative agent of human disease or capable of producing human discomfort or injury, including, but not limited to, mosquitoes...". The District has developed Requirements for the proper design and management of dairy wastewater ponds that if followed will minimize mosquito production in wastewater ponds.

The Central Valley Regional Water Quality Control Board (RWQCB) has a copy of our Requirements on file and they have been notifying the District when proposed dairy wastewater ponds fail to meet our design criteria. In the case of the Van Der Kooi Dairy, RWQCB has already required that Mr. Van Der Kooi obtain our approval prior to accepting his Report of Waste Discharge. This process has been very helpful for the District. By requiring that the Dairy owner obtain District approval, we have an opportunity to inform and educate the owner of the potentially significant adverse effects associated with mosquito breeding in dairy wastewater ponds.

We respectfully request, that as the lead agency, the San Joaquin Valley Air Pollution Control District also require all confined animal facilities to obtain approval from the local mosquito abatement district, with regard to wastewater storage ponds, so that appropriate mitigation measures can be implemented during construction of the facilities.

I am enclosing a copy of our District's *Requirements for Construction and Management of Dairy Wastewater Systems* as well as regional maps and contact information for mosquito abatement districts in the San Joaquin Valley. Thank you for the opportunity to comment on this project. If you have any questions, please call me at (559) 896-1085.

Sincerely,



Mark Amorino
Source Reduction Specialist

Exhibit A

Consolidated Mosquito Abatement District

Requirements for Construction and Management of Dairy Wastewater Systems

1. Wastewater holding ponds shall not exceed 150 feet in width.
2. All dairy wastewater holding and solid separator ponds shall be surrounded by lanes at least fourteen feet in width and nothing (e.g., calf pens, utility lines, hay stacks, silage, tires, ag equipment, etc.) shall be placed in the area of the holding ponds which would prevent passage or use of vector control equipment.
3. Any fencing placed around the wastewater and solids ponds shall be placed on the outside of the fourteen foot lanes and gates provided for access.
4. All interior banks of holding and separation ponds shall be graded 1:1 or steeper for the first ten feet, soil type permitting, but not greater than 1:2 (horizontal : vertical).
5. All wastewater designs shall include a solids separation system. If separator ponds are the exclusive means of solids removal, two or more separator ponds are required. These ponds shall not be more than sixty feet in width.
6. No drainage lines shall by-pass the separator ponds, except those which provide for normal corral run-off. All such drain inlets must be sufficiently graded to prevent solids accumulation in the holding ponds.
7. Floatage of any solid substance which could provide harborage for immature mosquito stages shall be kept out of all wastewater holding ponds.
8. The owner shall be responsible for keeping vegetation growth from all areas of the wastewater and solids separation ponds. This includes access lanes, interior pond embankments, and any weed growth that might become established on the pond surface.
9. Dairy wastewater discharged for irrigation purposes shall be managed so it does not stand for more than three days.
10. Any variance desired from these requirements must be submitted to the District for prior review and approval.

No. San Joaquin Valley Region

East Side MAD	2000 Santa Fe Avenue	Modesto	95357	Lloyd Douglass	209/522-1841	(209/522-4098)	esmad@sbcglobal.net
Merced County MAD	Post Office Box 909	Merced	95341	Allan D. Inman	209/722-1527	(209/722-3051)	mcomadmanager@mercednet.com
Saddle Creek Community Svcs Dist.	1000 Saddle Creek Dr.	Calaveras	95228	Greg Hebard	209/785-0100	(209/785-6260)	sccsd@caltel.com
San Joaquin County MVCD	7759 S. Airport Way	Stockton	95206	John R. Stroh	209/982-4675	(209/982-0120)	slcmvcd@worldnet.att.net
Turlock MAD	4412 North Washington Road	Turlock	95380	Jerry M. Davis	209/634-1234	(209/634-4103)	mosquito@cwnet.com

AGENCY MAILING LIST - 2005

Agency

Address City

Zip Manager

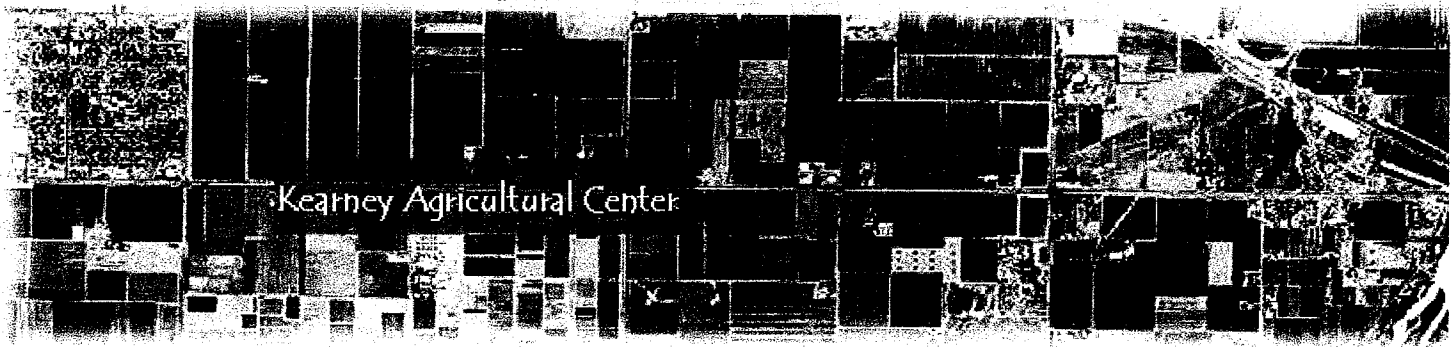
Telephone

Fax

E-Mail

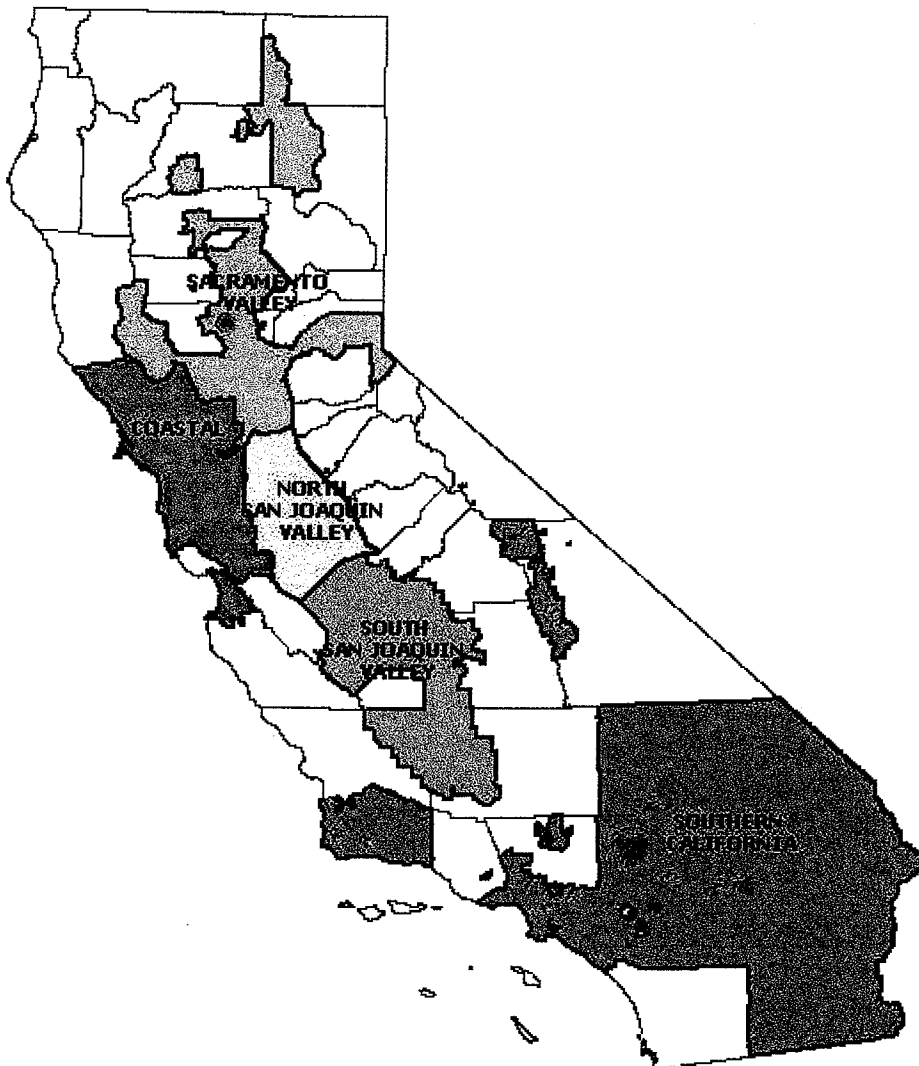
So. San Joaquin Valley Region

Coalinga-Huron MAD	Post Office Box 447	Coalinga	93210	Ralph Baiza	559/935-1250		
Consolidated MAD	Post Office Box 278	Selma	93662	Steve Mulligan	559/896-1085	(559/896-6425)	commad@pacbell.net
Delano MAD	Post Office Box 220	Delano	93216	Gary M. Johnson	661/725-3114	(661/725-3179)	dmad@lightspeed.net
Delta VCD	Post Office Box 310	Visalia	93279	Michael W. Alburn	559/732-8606	(559/732-7441)	deltavcd@sbcglobal.net
Fresno MVCD	2338 E. McKinley Ave	Fresno	93703	David G. Farley	559/268-6565	(559/268-8918)	fmvcd@pacbell.net
Fresno Westside MAD	Post Office Box 125	Firebaugh	93622	Elizabeth A. Cline	559/659-2437	(559/659-2193)	lizcline@inreach.com
Kern MVCD	4705 Allen Road	Bakersfield	93314	Robert A. Quiring	661/589-2744	(661/589-4913)	robertquiring@sbcglobal.net
Kings MAD	Post Office Box 907	Hanford	93232	Lue Casey	559/584-3326	(559/584-3310)	kingsmad@attglobal.net
Madera County MVCD	900 North Gateway Dr	Madera	93637	Kevin Pinion	559/674-6729	(559/674-6004)	maderamosquito@netscape.net
Tulare MAD	Post Office Box 1476	Tulare	93275	Marshall Norgaard	559/686-6628	(559/686-2013)	tmad@lightspeed.net
West Side MVCD	Post Office Box 205	Taft	93268	Don W. Black	661/763-3510	(661/763-5793)	wsm.mosq@verizon.net



California Mosquito Districts Mapping Project [Click on Region Name to View Map](#)

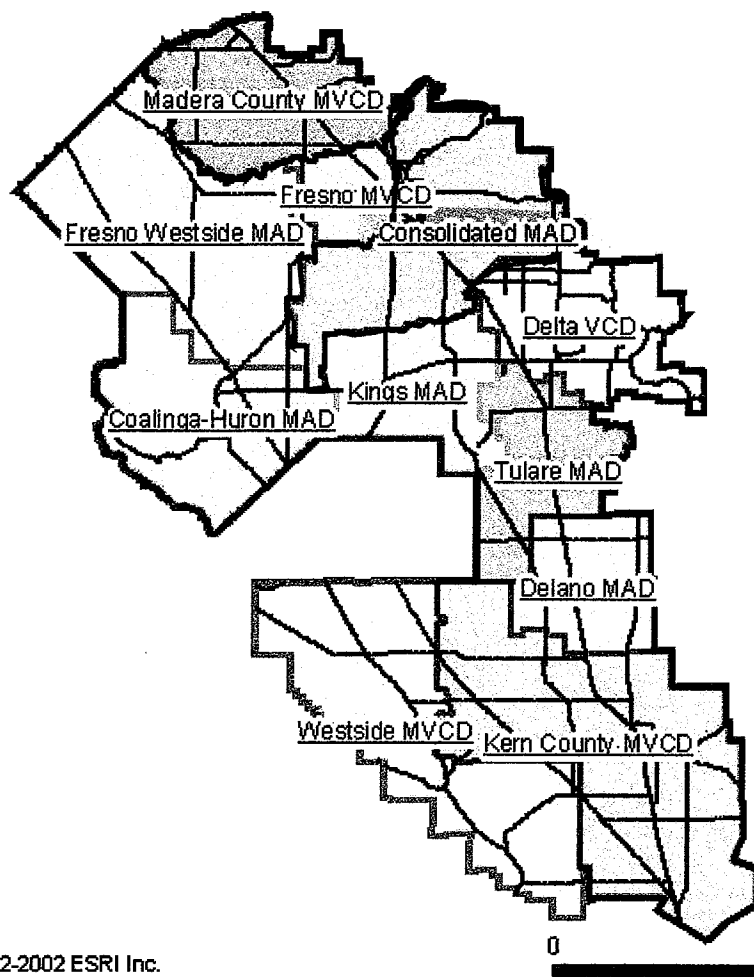
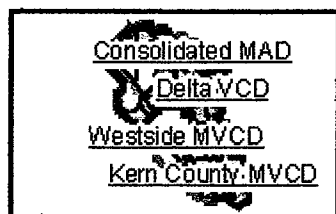
Instructions



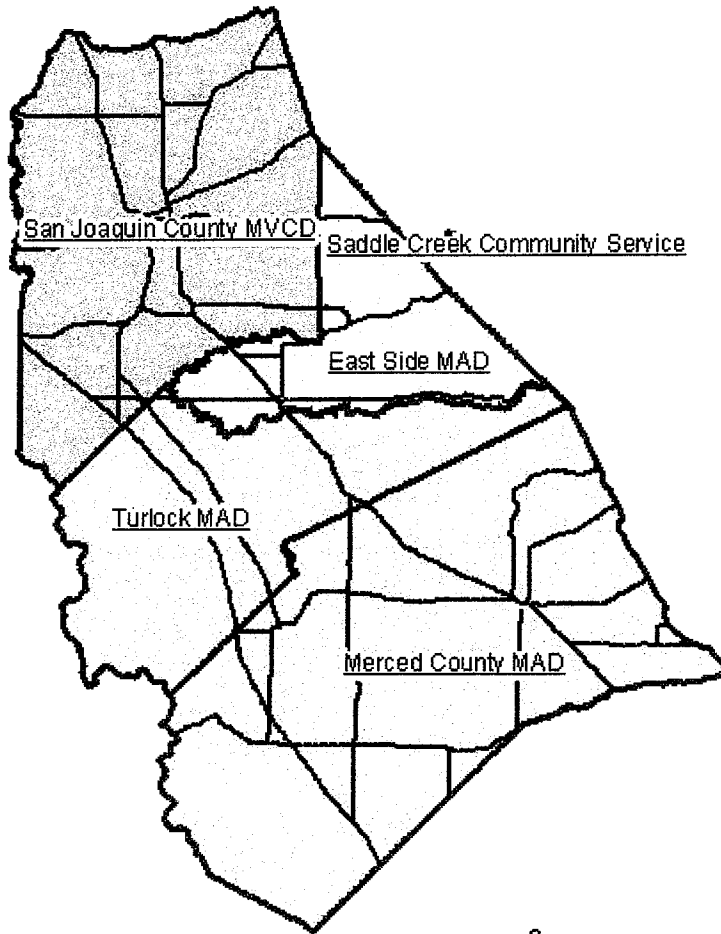
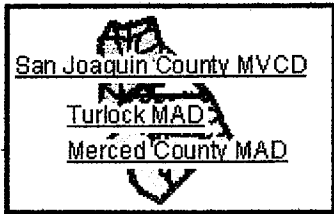
GISHome
Projects

Site developed and maintained by UC Kearney Ag Center GIS Facility
UC Regents; last updated 01/27/2006

South San Joaquin Valley Districts



Map created with ArcIMS - Copyright (C) 1992-2002 ESRI Inc.



Map created with ArcIMS - Copyright (C) 1992-2002 ESRI Inc.

0 38 Miles

**County of Fresno****DEPARTMENT OF COMMUNITY HEALTH
EDWARD L. MORENO, M.D., M.P.H.
DIRECTOR-HEALTH OFFICER**FA0277877
LU0011380
PE 2600

March 3, 2006

San Joaquin Valley Air Pollution Control District
Attn: Elena Nuño
1990 east Gettysburg Avenue
Fresno, CA 93726-0244

Dear Ms. Nuño:

**SUBJECT: Initial Study/ Notice of Preparation for Charles Van Der Kooi Dairy
LOCATION: Area bisected by Elkhorn Avenue and west of Howard Avenue**

The Fresno County Department of Community Health, Environmental Health System has reviewed the above subject document, and offers the following comments:

- Environmental Evaluation 3.1, VII a) b) Response: This section indicates that the hazardous materials utilized on site will be essentially unchanged from the current agricultural use that is subject to regulation by the Fresno County Agricultural Commissioner. The present use of agricultural chemical on the subject parcels is indeed regulated by the Fresno County Agricultural Commissioner, however, it is likely that the hazardous materials utilized by the dairy for maintenance and operations will include hazardous materials other than agricultural chemicals. The following comments apply to Hazards/Hazardous Materials:
 - Prior to occupancy, the applicant shall complete and submit either a Hazardous Materials Business Plan or a Business Plan Exemption form to the Fresno County Department of Community Health, Environmental Health Division. Contact the Certified Unified Program Agency at (559) 445-3271 for more information.
 - All hazardous waste shall be handled in accordance with requirements set forth in the California Health and Safety Code, Chapter 6.5. This chapter discusses proper labeling, storage and handling of hazardous wastes.
- Prior to issuance of building permits, the applicant shall submit complete dairy facility plans and specifications to the Fresno County Department of Community Health, Environmental Health Division, for review and approval. Contact the Milk and Dairy Inspection Program at (559) 445-3392 for more information.

Dedicated to Community Health1221 Fulton Mall / P.O. Box 11867, Fresno, California 93775 / (559) 445-3200/ FAX (559) 445-3370
Equal Employment Opportunity • Affirmative Action • Disabled Employer
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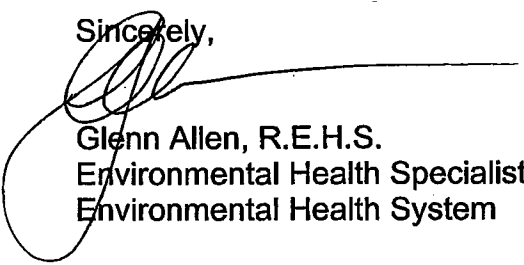
Elena Nuño
SJVAPCD Charles Van Der Kooi Dairy IS-NOP
March 3, 2006
Page 2 of 2

- Prior to operation, the applicant shall apply for and obtain a permit to operate a dairy facility from the Fresno County Department of Community Health, Environmental Health Division. A permit, once issued, is nontransferable. Contact the Milk and Dairy Inspection Program at (559) 445-3392 for more information.
- Prior to issuance of building permits, the applicant may be required to submit complete construction plans and specifications to the California Department of Food and Agriculture, for review and approval. Contact the Milk and Dairy Foods Safety Branch at (559) 445-5506 for more information.

Plus add the haz mat BP standard comment. Let John know that this document was received and be sure that we reference the FA# for scanning purposes! Thanks.

If I can be of further assistance, please contact me at (559) 445-3357.

Sincerely,



Glenn Allen, R.E.H.S.
Environmental Health Specialist II
Environmental Health System

ga

cc: John Smith, Environmental Health System
Vince Mendes, Environmental Health Division

SJVAPCD Charles Van Der Kooi Dairy IS-NOP

CENTER ON RACE, POVERTY & THE ENVIRONMENT

1224 JEFFERSON STREET, SUITE 25
DELANO, CA 93215

PHONE: (661) 720-9140
FAX: (661) 720-9483

RALPH SANTIAGO ABASCAL (1934-1997)
DIRECTOR 1990-1997

LUKE W. COLE
DIRECTOR

ARMANDO NIETO
MANAGING DIRECTOR

CAROLINE FARRELL
DIRECTING ATTORNEY

LAUREL FIRESTONE
EQUAL JUSTICE WORKS FELLOW/STAFF ATTORNEY

AVINASH KAR
RALPH SANTIAGO ABASCAL FELLOW

BRENT NEWELL
STAFF ATTORNEY

SUSANA DE ANDA
COMMUNITY ORGANIZER

Feb 16, 2006

Elena Nuño
San Joaquin Valley Air Pollution Control District
1190 East Gettysburg Avenue
Fresno, CA 93726
Tel. 559-230-6000

Re: EIR Preparation for the Van Der Kooi Dairy

Dear Ms. Nuño:

The Center on Race, Poverty & the Environment submits these comments in regard to the preparation of the Draft Environmental Impact Report for the Van Der Kooi Dairy. We have attached numerous studies documenting the significant impact that dairy facilities, such as the proposed Van Der Kooi facility, have on air, water, and local human health. We request that these concerns be thoroughly analyzed in the Draft Environmental Impact Report as potentially significant impacts of the proposed facility.

1. Substantial Evidence of Air Impacts

We believe that the air quality impacts of the proposed facility would be potentially significant with regard to VOCs, PM-10, PM 2.5, ammonium, hydrogen sulfide, methane, and odor given the large body of evidence presented below.

VOCs, PM-10, and PM 2.5

The San Joaquin Valley Air Basin is classified as a serious non-attainment area for the

health-based eight-hour federal ozone (smog) standard, a serious non-attainment area for the PM-10 (fine Particulate matter) standard, and a non-attainment area for the new PM 2.5 (ultra-fine particulate matter) standard.¹ Dairies are one of the largest sources of smog-forming volatile organic compounds and of fine particulate matter in the San Joaquin Valley.²

The air pollution generated from this proposed facility, as well as cumulatively from similar proposals, will drastically impact human health, the environment and the economy.³ In California, respiratory illness caused or made worse by airborne particulate matter (PM) are responsible for 9,300 deaths, 16,000 hospital visits, 600,000 asthma attacks and five million lost work days each year.⁴

For a 3,200-cow dairy, the size proposed for the Van der Kooi facility, approximately 30.9 tons per year of VOCs are emitted.⁵ That is more than three times the significance threshold set by the San Joaquin Valley Air Pollution Control District.⁶ Given the state of the air in the region of the proposed Van der Kooi dairy, the air quality impacts of the proposed facility must be evaluated through an EIR.⁷

Ammonia and Hydrogen Sulfide

The anaerobic decomposition of manure generates ammonia and hydrogen sulfide. Ammonia in large concentrations can irritate the eyes, ears and throat. Ammonia can also react with nitrates and sulfates in the air and form ammonium nitrate, which is a particulate less than or equal to 2.5 microns (PM_{2.5}). Hydrogen sulfide has a rotten egg odor and in higher concentrations can cause headaches, nausea, dizziness and breathing difficulties.

While no state and federal significance levels have been set for the release of ammonia, the Air Toxics "Hot Spots" Information and Assessment Act lists ammonia, ammonium nitrate and

¹San Joaquin Valley Air Pollution Control District, *Air Pollution Control Officer's Determination of VOC Emission Factors for Dairies*, Aug. 1, 2005.

²*Id.*

³Sharp, Renee & Bill Walker, *Particle Civics; How Cleaner Air in California Will Save Lives and Save Money*, Environmental Working Group.

⁴*Id.*

⁵San Joaquin Valley Unified Air Pollution Control District, *Air Pollution Control Officer's Determination of VOC Emission Factors for Dairies*, Aug. 1, 2005.

⁶Available at, <http://www.valleyair.org/transportation/ceqaanalysislevels.htm>

⁷*See*, American Lung Association, *State of the Air 2005; Protect the Air You Breathe*, Spring, 2005.

hydrogen sulfide as chemicals which must be quantified. That is, facility operators must estimate the type and quantity of toxic substances released by the facility over the threshold amount (10 tons per year). An EIR should evaluate the amount and impact of ammonia and hydrogen sulfide emissions from the proposed Van der Kooi dairy.

Methane

Ruminant livestock and manure decomposition emit methane, an odorless greenhouse gas. The five major anthropogenic sources of methane in the United States have been identified to be (in order of contribution) landfills, domesticated livestock, natural gas and oil production, coal mining, and livestock manure. Methane released from domestic ruminant livestock accounts for about 20 percent (80 million metric tons per year) of the anthropogenic methane created in the United States. Dairy cattle, in particular, generate about 1.5 million metric tons of methane per year, or about two percent of the total ruminant livestock methane generated. The anaerobic decomposition of livestock manure generates approximately 26 million metric tons per year of methane.

Although there are no established federal, state or local regulatory requirements for the reduction or control of methane emissions, the EPA, however, does prepare methane emission source inventories on an ongoing basis, as required by the 1990 and 1997 Clean Air Act Amendments. In addition, methane has been determined to be the second most significant greenhouse gas that contributes to global warming, which has been recognized as a worldwide problem and international efforts are being made to reduce the emission of these gases. An EIR should evaluate the amount and impact of methane emissions from the proposed Van der Kooi dairy.

Odor

Cow manure stinks. The odor from cow manure and containment ponds is not only a highly offensive odor, but actually has an impact on a person's emotional and mental health. In a 1995 study published in *Brain Research Bulletin*, Dr. Susan Schiffman concluded that odors from a hog AFO had chronic negative effects on people's moods. "The main finding of this study is that persons living near the swine operations who experienced the odors had significantly more tension, more depression, more anger, less vigor, more fatigue, and more confusion than control subjects as measured by the Profile of Mood States."⁸ Odors from hog operations are similar to odors from dairy cow operations. This is an impact that should be investigated through the EIR.

2. Significant Evidence of Water Impacts

The Draft EIR must thoroughly analyze the potentially significant impact that this project would have on water quality. As the studies cited below indicate, dairies of the size of the proposed

⁸ Susan S. Schiffman, "The Effect of Environmental Odors Emanating from Commercial Swine Operations on the Mood of Nearby Residents," 37 *Brain Research Bulletin*, 369 (1995).

facility contaminate groundwater, and the current regulations in place are ineffective in protecting against such pollution.

All large dairies pose a significant threat to water quality.

Agriculture is the number one source of water pollution in the United States, according to the U.S. Environmental Protection Agency's 1994 National Water Quality Inventory. Contamination of surface and groundwater is not uncommon for AFOs. Seventeen states have experienced groundwater contamination from livestock feedlots.⁹ AFO manure disposal practices, such as storage in open-air waste lagoons or application to cropland, result in leaks, spills and runoff that pollute ground and surface water.¹⁰ When the amount of manure solids and wastewater exceeds the uptake of feed crops, groundwater and surface water contamination inevitably result.¹¹

The RWQCB itself, in a 1995 report, determined that "[i]ndividually and cumulatively, [dairies] pose a significant threat to surface and groundwater."¹² A 1996 report by the RWQCB stated that dairy cows are responsible for poisoning hundreds of square miles of underground water, rivers and streams.¹³ The typical dairy cow creates the amount of waste of 20 humans. A 1,000 cow dairy generates 120,000 pounds of manure per day, equivalent to the sewage output of a city with a population of 20,000 people.¹⁴ The dairies in the Central Valley generate more waste than the entire human population of Texas.¹⁵

⁹ Sierra Club factsheet, *Water Contamination from Factory Farms*. Hereafter "*Water Contamination*."

¹⁰ Sierra Club factsheet, "Protect America's Water From Factory Farm Pollution." Hereafter "*Factory Farm Pollution*."

¹¹ Ken Silvertstein, "Meat Factories," *Sierra* (January-February, 1999). Hereafter "*Meat Factories*."

¹² See Elliot Diringer, "In Central Valley, Defiant Dairies Foul the Water," *San Francisco Chronicle*, July 7, 1997 at A1.

¹³ Marla Cone, "State Dairy Farms Try to Clean Up their Act," *Los Angeles Times*, April 28, 1998 at A1.

¹⁴ Statement of Michael Cook, Director of the Office of Wastewater Management and Elaine Stanley, Director of the Office of Compliance at the U.S. Environmental Protection Agency before the Subcommittee on Livestock, Dairy and Poultry and the Subcommittee on Forestry, Resource Conservation and Research of the Committee on Agriculture U.S. House of Representatives, May 13, 1998, "Reducing Water Pollution from Animal Feeding Operations." Hereafter "Cook Testimony."

¹⁵ *Meat Factories*, supra.

Even Well-Run Dairies Contaminate Groundwater

A study by Harter *et al.*, published in the Journal of Contaminant Hydrology, studied 44 shallow wells beneath five Stanislaus and Merced County dairies over four years.¹⁶ Dairies were selected to determine what usually occurs under typical, *well run* dairies. The size of the dairies monitored averaged 1000 animals per facility.

The national maximum contamination level (MCL), which is the national maximum safe level for drinking water, of nitrate as nitrogen is 10 mg/l. Water samples at the dairies averaged 59.8 mg/l.¹⁷

- Wells beneath corrals averaged 65.0mg/l.
- Wells near waste water containment ponds averaged 55.4 mg/l.
- Wells beneath fields fertilized with waste water and fertilizer averaged 61.7 mg/l.
- Wells off-site consistently provided nitrate as nitrogen levels below the MCL.¹⁸

The Harter study demonstrates that even well-run dairies are capable of causing serious groundwater contamination. According to Louis Pratt, a RWQCB inspector, “we put wells on dairies we believed to be in compliance. We found the groundwater dramatically impacted under every one.”¹⁹ The *average* nitrate as nitrogen level found in groundwater beneath the dairies is over five times the MCL.

Additionally, a new study has just found that dairies produce much more nitrate than

¹⁶Harter, Thomas et al., *Shallow Groundwater quality on dairy farms with irrigated forage crops*, Journal of Contaminant Hydrology 55 (2002) 287-315.

¹⁷*Id.* at 308.

¹⁸ *Id.*

¹⁹ Richard T. Estrada, “Commotion over manure; Dangerous side of dairy farms; Nitrate-laden waste water poses hazards to residents’ health,” *The Fresno Bee*, December 28, 1997 at C1.

originally thought.²⁰ The study also explores best management practices to manage that nitrogen.²¹ The recommendations of this study must be incorporated into the EIR of the proposed facility.

The Chino Basin: Learning from History

In 1990, the Chino Basin in Riverside County had the highest concentration of dairies in the world.²² Approximately 60 percent of the basin's groundwater is contaminated with nitrates, salt and total dissolved solids (TDS). Dairies are the greatest source of groundwater contamination in the basin, with an estimated 97 percent of the salt and nitrate contamination coming from agricultural sources, with dairies responsible for 88% of the total agricultural wasteload.²³

The groundwater contamination is significant in that it migrates into the Santa Ana River and ultimately becomes part of the Orange County Municipal Water supply. Desalination is required to mitigate the effects of the contamination. The Santa Ana Region's report estimates the cost of groundwater treatment to be \$8.8 million annually.²⁴ To build a water desalination facility, the regional board accepted a low bid of \$11.467 million on April 28, 1998. It is clear the cost of groundwater remediation is extremely high, and should be considered in the evaluation of mitigation measures.

The report recommended that waste discharge requirements for dairy operators in the Chino Basin be revised as follows:

- a) Prohibit the disposal of manure and washwater, and their application as fertilizer or irrigation water, in the Chino Basin; and
- b) Incorporate an offset provision, whereby the dairy operator could offset the water quality impacts of continued manure and/or washwater disposal/application

²⁰“Managing Dairy Manure in the Central Valley of California,” (June 2005) University of California Division of Agriculture and Natural Resources Committee of Experts on Dairy Manure Management, available at http://www.waterboards.ca.gov/centralvalley/available_documents/dairies/uc-committee-of-experts-rpt.pdf

²¹Id.

²² Regional Water Quality Control Board Santa Ana Region, *Dairies and their Relationship to Water Quality Problems in the Chino Basin, California* (July 1990), at I-1.

²³ Id. at I-24.

²⁴ Id. at IV-6.

practices.²⁵

The regional board adopted the recommendations as part of the Water Quality Control Plan in 1994.

The severity of the groundwater contamination problem cannot be overstated. The regional board recognized increasing dairy operations in the San Jacinto Basin and recommended an adoption of similar waste discharge requirements in the basin.²⁶ Dairy operations are growing and many dairies are relocating from the Chino Basin to the San Joaquin Valley, where regulations are less strict and enforcement is almost non-existent.

Cows Equal Pollution

Animal waste is the largest contributor of pollution to 60 percent of the rivers and streams classified as “impaired” by the EPA.²⁷ According to a RWQCB Staff Report from December 2004,

Each dairy site represents a significant waste load and, thus, a potential threat to groundwater quality. ... A 1,300-cow dairy generates approximately 27,000 tons of manure 475,000 lbs of nitrogen, and almost one (1) million lbs of inorganic salts each year. If these constituents are not properly managed, the threat to groundwater from this waste load is very high.²⁸

The Chino Basin is now undergoing a cleanup of groundwater at a staggering price. The water quality impacts from the Van der Kooi Dairy, and the cumulative water impacts from other similar facilities, must be evaluated in the EIR before similar irreparable damage occurs in Fresno County.

Current waste management regulations are ineffective to protect groundwater

According to a study commissioned by the State Water Resources Control Board, the “current Title 27 requirements are insufficient to prevent groundwater contamination from confined animal facilities.”²⁹ The Study further cautions,

²⁵*Id.* at IV-17.

²⁶*Id.* at IV-27.

²⁷ *Meat Factories, supra.*

²⁸ Central Valley Regional Water Quality Control Board, *Staff Report: Administrative Draft NPDES General Permit for Milk Cow Dairies*. Dec. 2004.

²⁹ Brown Vence & Associates, *Review of Animal Waste Management Regulations; Task 2 Report: Evaluate Title 27 Effectiveness to Protect Groundwater Quality*. San Jose State

Because Title 27 does not require that site-specific information be submitted to the RWQCB as part of a ROWD, it follows that the RWQCB cannot reliably evaluate the nature and possible water quality consequences of animal waste discharges, and therefore cannot rationally implement the applicable Basin Plan and the State's Antidegradation Policy requirements.³⁰

Given that the current waste discharge requirements set out in Title 27 do not adequately protect groundwater, the Van der Kooi dairy operating under these regulations may cause a significant adverse impact on groundwater quality.

3. Substantial Evidence of Potential Health Effects

Water contamination from cow waste poses significant health effects. Among the most significant are methemoglobinemia, cryptosporidiosis and the increased threat of pfiesteria. Methemoglobinemia is the condition describing the human blood's inability to transport oxygen within the body. Cryptosporidiosis is a diarrhea-like bacterial infection that can be particularly deadly to people with compromised immune systems, including the elderly, people undergoing chemotherapy and people with AIDS. Pfiesteria is an algae deadly to fish and dangerous to humans.

Methemoglobinemia

Cow manure is a significant source of nitrates. Humans produce nitrite in the mouth and the pharynx by bacterial reduction of nitrate by saliva.³¹ Methemoglobinemia, or "blue-baby syndrome," is the condition describing the blood's loss of oxygen carrying capacity. Nitrite directly oxidizes the hemoglobin ferrous ion (FE^{2+}) to the ferric state (FE^{3+}) so that it cannot bind with oxygen.³²

Acute toxicity may result after nitrate is reduced to nitrite in the stomach and saliva. Nitrite reacts with the oxygen-carrying protein, hemoglobin, reducing it to methemoglobin, which is unable to transport oxygen to the tissues. Methemoglobin

University Foundation Oct. 2003. See Brown Vence & Associates, *Review of Animal Waste Management Regulations; Task 3 Report: Comparison of Regulations Designed to Protect Groundwater Quality from Releases of Confined Animal Facilities*. San Jose State University Foundation Oct. 2003.

³⁰Id.

³¹ Anna M. Fan *et al*; "Evaluation of the Nitrate Drinking Water Standard with Reference to Infant Methemoglobinemia and Potential Reproductive Toxicity," *Regulatory Toxicology and Pharmacology*, 135, 136-137 (1987).

³² *Meat Factories, supra*.

levels above 10% may result in clinical anoxia, and levels above 60% can cause stupor, coma and death if the condition is not quickly treated.³³

If a pregnant woman drinks nitrate-contaminated water, her fetus may develop methemoglobinemia. Children and infants are more susceptible to methemoglobinemia because of a greater water-intake-to-body-weight ratio. In the United States, there have been no reported cases of methemoglobinemia where the contamination was less than the MCL for nitrate as nitrogen (10 mg/l).³⁴ While all *reported* cases have been above the MCL, there have been reported cases below the MCL in other parts of the world.

In addition, other potential health concerns regarding nitrate-contaminated drinking water exist beyond methemoglobinemia. "Recent epidemiologic data have suggested an association between developmental effects in [human] offspring and the maternal ingestion of nitrate from drinking water, but a definite conclusion of the cause and effect relationship cannot be drawn."³⁵ However, the LaGrange County Health Department in Indiana identified a cluster of women living near an AFO who all suffered miscarriages after drinking water from their own wells with high levels of nitrates.³⁶

Cryptosporidiosis

An outbreak of cryptosporidium infection represents a significant health concern. In Milwaukee, Wisconsin during the spring of 1993 there was a widespread outbreak of acute watery diarrhea. Symptoms included stomach cramping, vomiting, nausea and fever. The outbreak affected over 400,000 people.³⁷ Cryptosporidium infection happens after consuming water contaminated with animal or human fecal matter.

In healthy people, the infection is self-limited. That is to say, it runs its course. In people

³³ L. Knobeloch *et al*; "Methemoglobinemia in an Infant - Wisconsin, 1992," 42 *Morbidity and Mortality Weekly Report*, 217.

³⁴ Anna M. Fan and Valerie E. Steinberg, "Health Implications of Nitrate and Nitrite in Drinking Water: An update on Methemoglobinemia Occurrence and Reproductive and Developmental Toxicity," 23 *Regulatory Toxicology and Pharmacology* 35, 36-37 (1996).

³⁵ *Id.* at 41.

³⁶ *Water Contamination*, at 1963.

³⁷ William R. MacKenzie, *et al*; "A Massive Outbreak in Milwaukee of Cryptosporidium Infection Transmitted through the Public Water Supply," 331 *The New England Journal of Medicine*, 161 (1994).

who are immunocompromised, the infection can be “unrelenting and fatal.”³⁸ This threatened population includes the elderly, people undergoing chemotherapy, and people with AIDS. A 1997 study in the *American Journal of Public Health* analyzed cryptosporidiosis-associated mortality in Milwaukee during the two years following the outbreak. Between April 1, 1991 and March 31, 1995 there were 58 cryptosporidiosis-associated deaths.³⁹ Four deaths occurred in the two years prior to the outbreak while 54 occurred in the post-outbreak period. The report recommends “to prevent future loss of life from waterborne cryptosporidium outbreaks, it is essential to ensure that all person have access to safe drinking water.”⁴⁰

Pfiesteria

Pfiesteria is a deadly type of dinoflagellate, an algae, that has been linked to severe environmental effects in waterways on the east coast, particularly in North Carolina and Maryland. Pfiesteria produces a toxin lethal to fish and dangerous to humans. Since the mid-1980s, pfiesteria has caused huge fish kills in North Carolina coastal estuaries, including 10 million fish in 1995. Hundreds of fishers, swimmers and researchers have become seriously ill from contact with pfiesteria. Symptoms include nausea, migraines, skin sores that do not heal, and even acute learning and memory problems so severe that the condition has been misdiagnosed as Alzheimer’s disease. According to research from North Carolina State University, pfiesteria thrives in waterways overloaded with nitrogen and phosphorus, often the result of AFO pollution. Pfiesteria’s appearance in North Carolina has paralleled the growth of factory farms and AFOs. Because of the environmental effects of pfiesteria, Maryland has become the first state to regulate livestock waste, and the EPA has announced a national strategy to do the same.⁴¹

The likely contamination of surface water that will result from the waste generated by the proposed dairy could cause a pfiesteria problem in the San Joaquin Valley. Even the possibility of such an occurrence is an environmentally significant impact.

4. Substantial Evidence of Significant Impact from Insects

Multiple complaints have been filed Central Valley regulatory agencies, complaining about

³⁸ Neil J. Hoxie, *et al*; “Cryptosporidiosis-Associated Mortality Following a Massive Waterborne Outbreak in Milwaukee, Wisconsin,” 87 *American Journal of Public Health*, 2032 (1997).

³⁹ *Id.* at 2033.

⁴⁰ *Id.* at 2034.

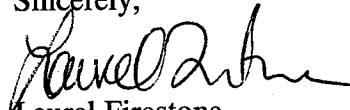
⁴¹ Sharon Guynup, “Cell From Hell,” (sidebar in “Meat Factories”) *Sierra* (January-February, 1999).

flies from dairies. Dairies have been shown to be conducive to fly breeding.⁴² However, an integrated pest management plan applied to a dairy can decrease fly abundance by 50%.⁴³ Fresno County residents need to know that their homes will not become infested with swarms of insects.

The EIR must analyze the potentially significant impacts to air, water, and human health.

The Draft EIR should incorporate the studies and concerns cited above in order to fully analyze the potentially significant impacts to air, water and human health due to the proposed Van Der Kooi facility. We look forward to working with you through this process. Please keep us informed of any additional opportunities for participation. Should you have any questions please feel free to call me at (661) 720-9140 or Avinash Kar at (415) 346-4179.

Sincerely,



Laurel Firestone
Attorney at Law

⁴²Axtell, Richard C., *Fly Control in Confined Livestock and Poultry Production*. CIBA-CEIGY Corporation (1985) 1-59.

⁴³Id.; Mary Woodsen, *2003 Excellence in IPM Award Winner: Donald Rutz.*, New York State Integrated Pest Management Program, available at, www.nysipm.cornell.edu/reports/awards/awards03/index.html.

Appendix B
SJVAPCD Rules 3190 and 4550,
Conservation Management Practices

SAN JOAQUIN VALLEY UNIFIED AIR POLLUTION CONTROL DISTRICT

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 CMP Applications and Plan 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 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).

SAN JOAQUIN VALLEY UNIFIED AIR POLLUTION CONTROL DISTRICT

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

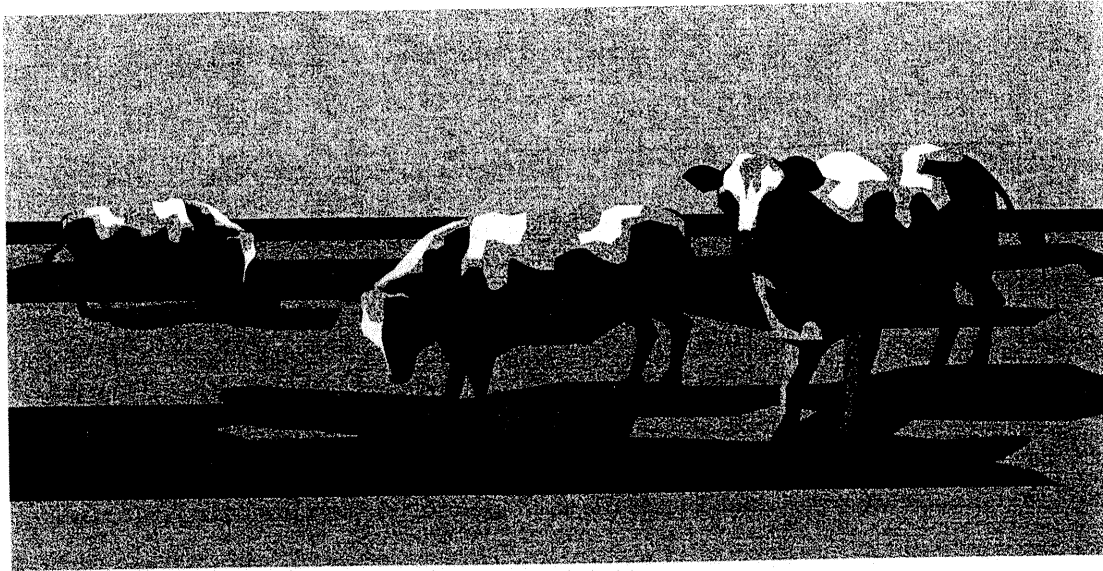
Unless otherwise noted, all provisions of this rule shall be effective on and after May 20, 2004.

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.

Appendix C
More Than Milk; CARES, October, 2001

MORE THAN MILK



A report on the California dairy industry's contribution
to employment and the economy

October 2001

An economic analysis prepared by Applied Development Economics of Sacramento, Calif., and sponsored by the
Community Alliance for Responsible Environmental Stewardship.



About the study

The Community Alliance for Responsible Environmental Stewardship was formed earlier this year. As an early order of business, CARES members saw an urgent need to assist policymakers by filling information gaps about the role the dairy industry plays in California's economy, and in particular, how dairies relate to job growth.

Unlike previous studies, which have documented direct dairy employment, this study is designed to document the entire economic benefit of California's dairy industry. Milk doesn't stay on the farm. And where it goes, jobs and economic activity follow – to processing plants, where not only the state's famous cheese is made, but ice cream, yogurt and dozens of other retail dairy products and ingredients for manufacture of many other foods. That leads to more jobs: for truckers, packaging makers, food marketers and many others.

Producing milk doesn't start at the dairy farm, either. Dairies mean jobs for people who grow and ship feed like alfalfa, and for those who provide veterinary, livestock and other farm services, insurance, book-keeping, banking and more. Finally, like all of us, employees of the dairy industry buy goods and services. Groceries. Gifts. Automobiles. Clothing. That means jobs for the people who provide these goods and services.

This report is essentially a snapshot of the California dairy industry and related economic activity as it stood in 1998. For the purposes of this report, 1998 is the most recent year for which a complete data set is available to conduct this sophisticated analysis. Between 1998 and 2000, California milk production increased more than 8 percent.

About CARES

CARES is a coalition of dairies and dairy industry organizations, business and community leaders from around California. Our membership includes about 75 groups, companies and individuals, in turn representing thousands of Californians. While most of our membership comes from the dairy industry or closely allied business sectors, CARES is observing growing support from those who recognize the industry's contributions to jobs and the economy, and see a need for wisdom and balance as local and regional planners and policymakers decide the future of dairies and other land use issues in the rapidly growing Central Valley and across California.

The CARES mission includes promoting dairy industry environmental practices that allow for long-term sustainability while protecting jobs, communities and the environment. CARES supports local dairy siting decisions that balance economic and environmental sustainability. For more about CARES, visit www.dairycares.com.

About ADE

This report was prepared by Applied Development Economics (ADE), an award-winning economic development and planning consulting firm, with offices in Berkeley and Sacramento. Since its founding in 1985, ADE has established a distinguished body of project work that has resulted in tangible benefits to its clients. ADE specializes in economic and market research, strategic planning, fiscal and project impact analysis, tourism and retail leakage analyses, industrial and target industry studies, downtown revitalization, real estate feasibility analysis, labor market analysis, and grant funding services. The firm's client base encompasses a diverse range of public and private sector partners, spanning the western United States and the Pacific.

California Dairy Industry

Economic Impact Study

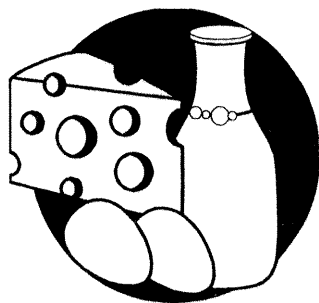
MILK...THE STATE'S #1 AGRICULTURAL COMMODITY

California's 2,246 dairies and their 1.4 million milk cows produce 3.5 billion gallons of milk each year. Milk production represents about 13% of all agricultural production in California—over \$4 billion in cash receipts at the farm gate in 1998.*

However, in addition to the value of milk production, dairies create other economic impacts through their supply purchases and purchases by their employees. These "multiplier effects" add significant

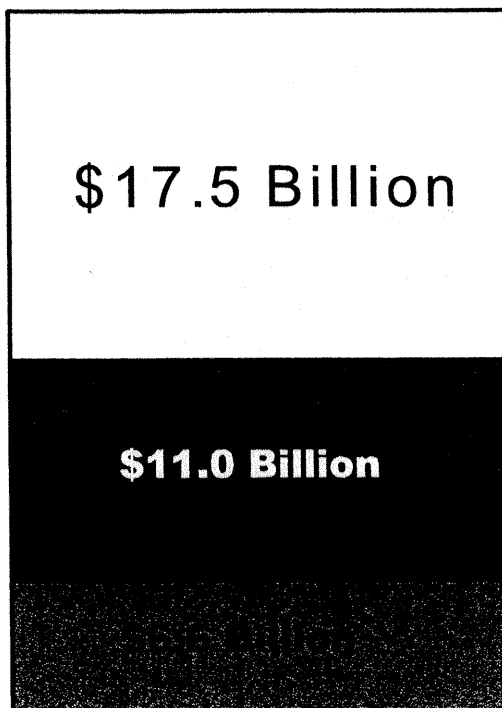
contribution to the state's economy. Furthermore, 86% of that milk goes directly to California's 133 processing plants to become whole milk, skim milk, nonfat milk, cheese,

butter, ice cream, yogurt, sour cream and other products. Some also becomes ingredients in sauces, bread, soft drinks, pharmaceuticals, potato chips and a myriad of other products. The direct and multiplier impacts of the dairy processing industry can also be attributed to milk production in the state. The Dairy Industry total economic impact is tremendous...and growing!



* Latest input/output model data available at time of analysis was 1998

Total Impact (with multiplier) \$ Billion

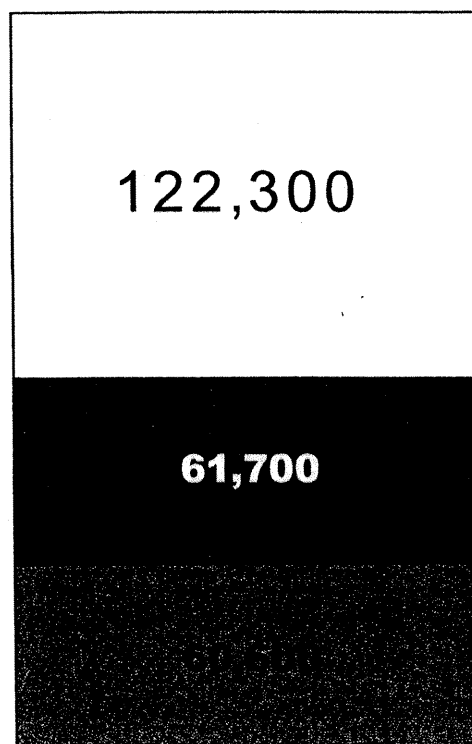


□ Dairy Industry
State Total

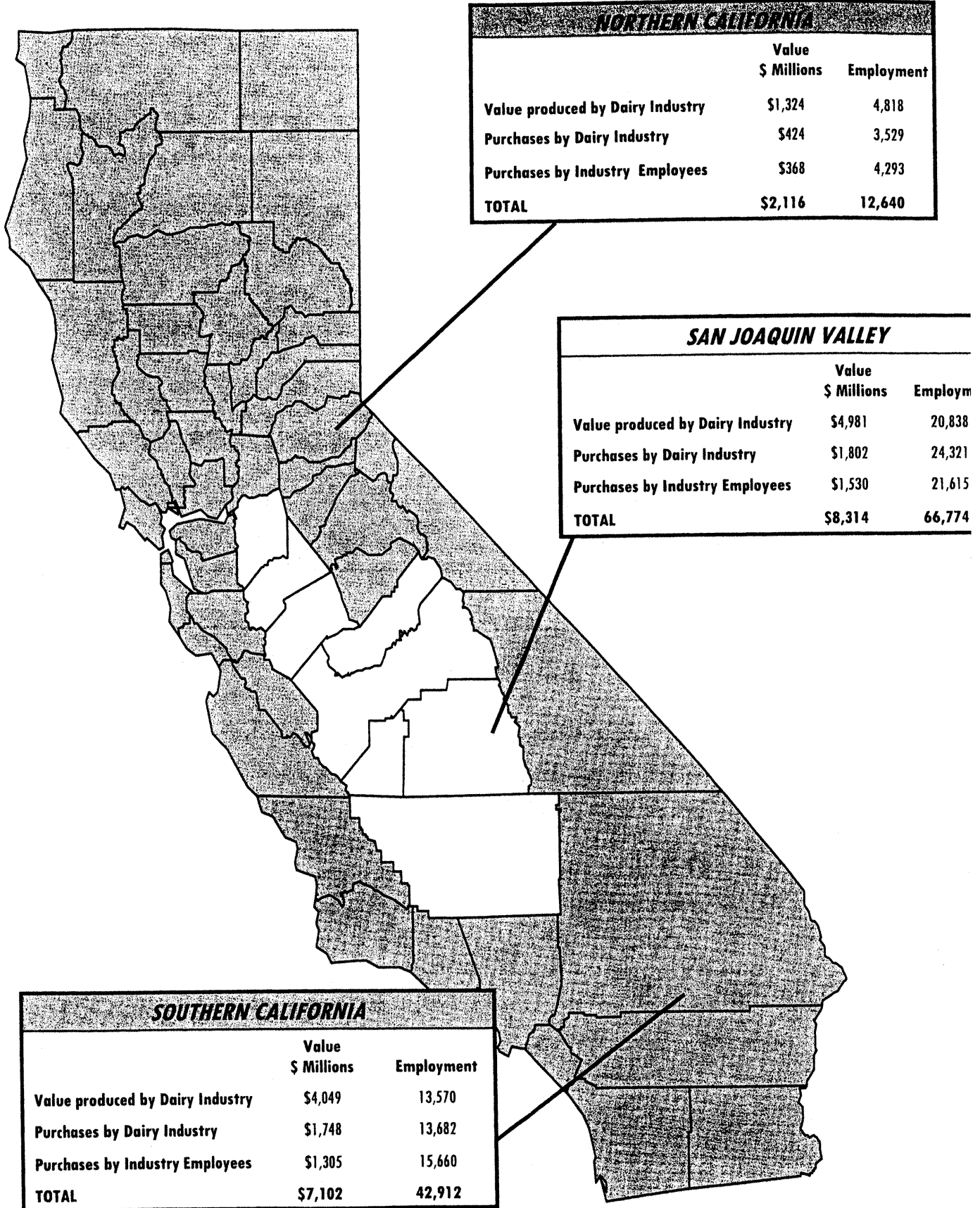
■ Dairy Processing
(in the plant)

■ Dairy Production
(on the farm)

Total Employment (with multiplier) # Jobs



Dairy Industry Impacts by Region, 1998



Note: All numbers are rounded

Dairy Farm Impacts by Region, 1998

California's leading dairy counties
(Ranked by milk production):

Tulare
Merced
San Bernardino
Stanislaus
Kings
Riverside

NORTHERN CALIFORNIA		
	Value \$ Millions	Employment
Value produced by Dairy Farms	\$312.4	2,179
Purchases by Dairy Farms	\$66.2	780
Purchases by Dairy Employees	\$127.2	1,485
TOTAL	\$505.8	4,444

SAN JOAQUIN VALLEY		
	Value \$ Millions	Employment
Value produced by Dairy Farms	\$2,921.1	16,209
Purchases by Dairy Farms	\$ 775.1	13,834
Purchases by Dairy Employees	\$960.3	13,568
TOTAL	\$4,656.4	43,611

California's leading dairy counties
(Ranked by number of dairies):

Merced
Stanislaus
Tulare
San Bernardino
San Joaquin
Kings
Humboldt

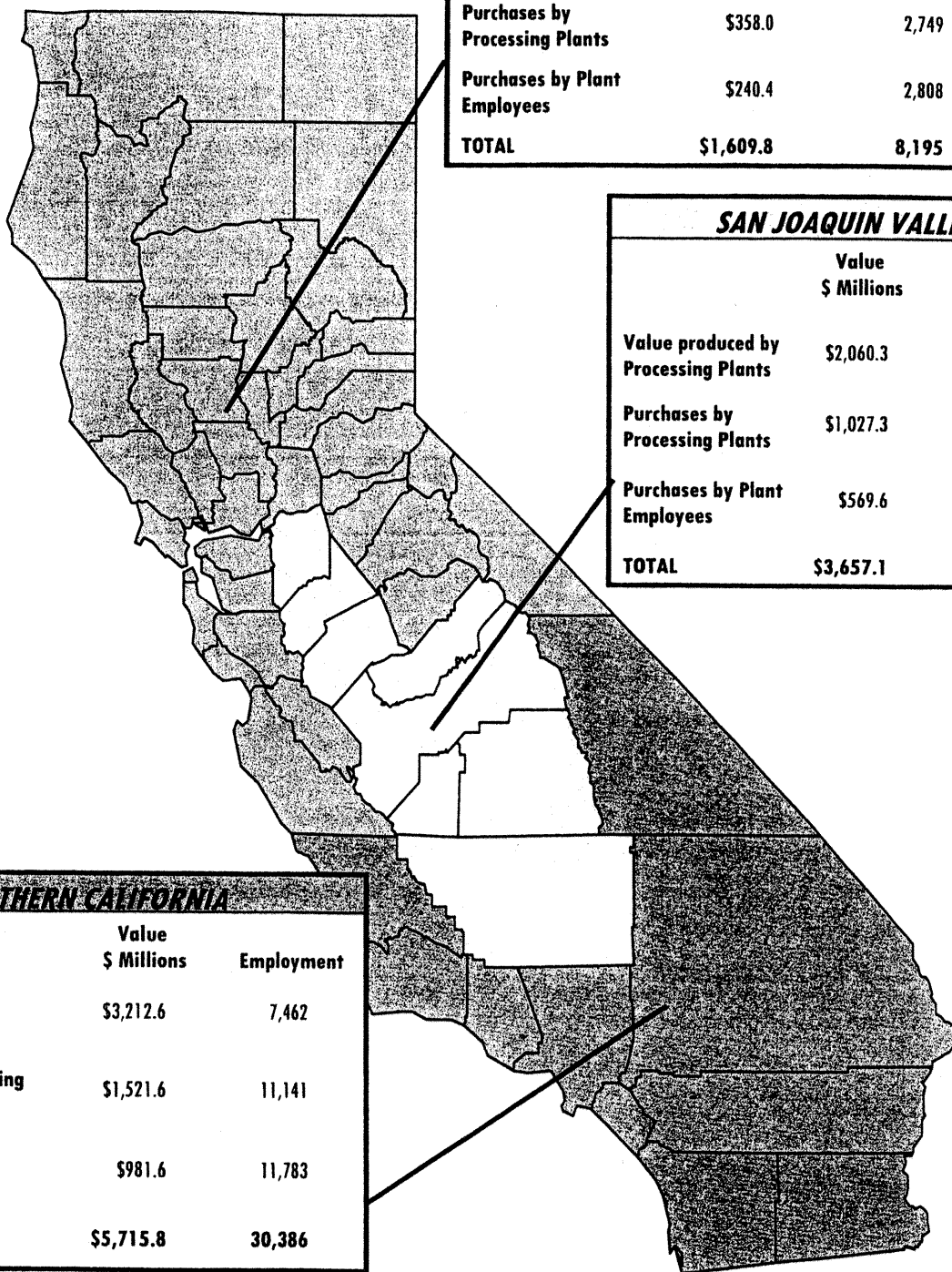
SOUTHERN CALIFORNIA		
	Value \$ Millions	Employment
Value produced by Dairy Farms	\$836.0	6,108
Purchases by Dairy Farms	\$ 226.8	2,541
Purchases by Dairy Employees	\$323.0	3,877
TOTAL	\$1,385.9	12,526

Note: All numbers are rounded

Dairy Processing Impacts by Region, 1999

California's leading milk processing counties
(Ranked by number of processing plants):

Los Angeles
Orange
San Diego
Alameda
Sacramento
Santa Clara
Stanislaus



NORTHERN CALIFORNIA		
	Value \$ Millions	Employment
Value produced by Processing Plants	\$1,011.5	2,639
Purchases by Processing Plants	\$358.0	2,749
Purchases by Plant Employees	\$240.4	2,808
TOTAL	\$1,609.8	8,195

SAN JOAQUIN VALLEY		
	Value \$ Millions	Employment
Value produced by Processing Plants	\$2,060.3	4,629
Purchases by Processing Plants	\$1,027.3	10,487
Purchases by Plant Employees	\$569.6	8,047
TOTAL	\$3,657.1	23,163

SOUTHERN CALIFORNIA		
	Value \$ Millions	Employment
Value produced by Processing Plants	\$3,212.6	7,462
Purchases by Processing Plants	\$1,521.6	11,141
Purchases by Plant Employees	\$981.6	11,783
TOTAL	\$5,715.8	30,386

Note: All numbers are rounded

**MULTIPLIER EFFECTS OF DAIRY FARM PRODUCTION
SAN JOAQUIN REGION, 1998**

Economic Measure	Direct Impact	Indirect Impact	Induced Impact	Total
Industry Output	\$2,921,122,304	\$775,091,088	\$960,339,319	\$4,656,400,000
Employment	16,209	13,834	13,568	43,611

**SUMMARY OF INDIRECT MULTIPLIER EFFECTS
SAN JOAQUIN REGION, 1998
(from industry purchases)**

Supplier Industries	Industry Output	Employment
Total	\$775,091,088	13,834
Agricultural Services ¹	\$ 100,984,728	5,227
Hay and Pasture	\$73,575,561	3,243
Wholesale Trade ²	\$148,193,984	1,487
Motor Freight Transport and Warehousing	\$56,146,244	531
Maintenance and Repair Other Facilities	\$27,851,600	454
Other Food Processing	\$84,519,424	348
Real Estate	\$51,908,456	281
Feed Grains	\$18,715,844	280
Personnel Supply Services	\$3,641,833	188
Railroads and Related Services	\$27,041,082	134
Credit Agencies	\$5,493,380	102
Other Medical and Health Services	\$5,677,502	98
Accounting, Auditing and Bookkeeping	\$3,236,349	89
Banking	\$9,715,637	75
All Other Supplier Industries	\$158,389,464	1,296

¹ Agricultural services includes veterinary, livestock services (including dairy herd improvement associations and dairy heifer replacement farms), farm labor contractors and farm management services.

² Wholesale trade includes cattle sales and livestock auction dealers.

**SUMMARY OF INDUCED MULTIPLIER EFFECTS
SAN JOAQUIN REGION, 1998
(from employee purchases)**

Local-Serving Industries	Industry Output	Employment
Total	\$960,339,319	13,568
Food and Beverage	\$50,385,396	1,513
Miscellaneous Retail	\$34,436,012	913
Hospitals	\$53,081,416	835
Doctors and Dentists	\$63,826,832	750
Food Stores	\$24,869,426	573
General Merchandise Stores	\$19,230,202	571
Automotive Dealers & Service Stations	\$29,010,264	516
Wholesale Trade	\$44,023,836	442
Nursing and Protective Care	\$14,129,112	420
Real Estate	\$61,170,360	331
Banking	\$34,986,212	270
Insurance Carriers	\$30,222,206	269
Personnel Supply Services	\$4,953,523	256
Labor and Civic Organizations	\$4,510,819	230
Amusement and Recreation Services	\$5,585,644	218
Misc. Social Services	\$9,482,061	210
Other Medical and Health Services	\$12,136,029	209
All Other Industries	\$464,299,969	5,042

**MULTIPLIER EFFECTS OF DAIRY FARM PRODUCTION
SOUTH REGION, 1998**

Economic Measure	Direct Impact	Indirect Impact	Induced Impact	Total
Industry Output	\$836,022,592	\$226,837,851	\$323,000,439	\$1,385,900,000
Employment	6,108	2,541	3,877	12,526

**SUMMARY OF INDIRECT MULTIPLIER EFFECTS
SOUTH REGION, 1998
(from industry purchases)**

Supplier Industries	Industry Output	Employment
Total	\$226,837,851	2,541
Agricultural Services	\$18,910,782	811
Wholesale Trade	\$58,946,552	495
Hay and Pasture	\$4,657,276	173
Motor Freight Transport and Warehousing	\$15,054,724	143
Other Food Processing	\$33,383,090	127
Maintenance and Repair Other Facilities	\$7,364,744	109
Real Estate	\$13,523,631	61
Personnel Supply Services	\$1,310,246	57
Credit Agencies	\$3,236,946	46
Other Medical and Health Services	\$2,182,677	34
Railroads and Related Services	\$6,703,542	34
Computer and Data Processing Services	\$3,534,081	29
Accounting, Auditing and Bookkeeping	\$1,319,125	25
Other Business Services	\$1,887,171	21
All Other Supplier Industries	\$54,823,264	376

**SUMMARY OF INDUCED MULTIPLIER EFFECTS
SOUTH REGION, 1998
(from employee purchases)**

Local-Serving Industries	Industry Output	Employment
Total	\$323,000,439	3,877
Eating & Drinking	\$15,262,305	393
Miscellaneous Retail	\$9,792,728	237
Hospitals	\$14,490,622	211
Doctors and Dentists	\$18,434,488	206
Wholesale Trade	\$19,005,764	160
General Merchandise Stores	\$4,992,530	135
Food Stores	\$6,728,693	133
Automotive Dealers & Service Stations	\$8,233,497	120
Amusement and Recreation Services	\$2,970,171	92
Nursing and Protective Care	\$2,923,062	83
Colleges, Universities, Schools	\$2,674,509	81
Domestic Services	\$855,595	75
All Other Industries	\$216,636,475	1,951

**MULTIPLIER EFFECTS OF DAIRY FARM PRODUCTION
NORTH REGION, 1998**

Economic Measure	Direct Impact	Indirect Impact	Induced Impact	Total
Industry Output	\$312,423,104	\$66,228,357	\$127,165,737	\$505,800,000
Employment	2,179	780	1,485	4,444

**SUMMARY OF INDIRECT MULTIPLIER EFFECTS
NORTH REGION, 1998
(from industry purchases)**

Supplier Industries	Industry Output	Employment
Total	\$66,228,357	780
Agricultural Services	\$6,425,036	241
Wholesale Trade	\$17,309,652	126
Hay and Pasture	\$2,800,491	109
Motor Freight Transport and Warehousing	\$4,421,871	42
Maintenance and Repair Other Facilities	\$2,331,888	32
Other Food Processing	\$6,593,779	24
Real Estate	\$4,034,048	19
Credit Agencies	\$979,735	17
Feed Grains	\$968,956	13
Personnel Supply Services	\$369,437	13
Railroads and Related Services	\$2,099,853	11
All Other Supplier Industries	\$17,893,611	134

**SUMMARY OF INDUCED MULTIPLIER EFFECTS
NORTH REGION, 1998
(from employee purchases)**

Local-Serving Industries	Industry Output	Employment
Total	\$127,165,737	1,485
Eating Places	\$6,201,197	158
Miscellaneous Retail	\$4,015,290	95
Doctors and Dentists	\$7,571,982	86
Hospitals	\$5,836,651	77
Food Stores	\$2,745,845	55
Wholesale Trade	\$7,491,361	54
Automotive Dealers & Service Stations	\$3,323,766	48
General Merchandise Stores	\$1,852,073	47
Amusement and Recreation Services	\$984,943	35
Real Estate	\$6,462,331	30
Domestic Services	\$351,489	28
All Other Industries	\$80,328,809	773

MULTIPLIER EFFECTS OF DAIRY PROCESSING SAN JOAQUIN REGION, 1998				
Economic Measure	Direct Impact	Indirect Impact	Induced Impact	Total
Industry Output	\$2,060,298,496	\$1,027,262,188	\$569,563,518	\$3,657,124,202
Employment	4,629	10,487	8,047	23,163

MULTIPLIER EFFECTS OF DAIRY PROCESSING SOUTH REGION, 1998				
Economic Measure	Direct Impact	Indirect Impact	Induced Impact	Total
Industry Output	\$3,212,642,816	\$1,521,593,361	\$981,609,028	\$5,715,845,205
Employment	7,462	11,141	11,783	30,386

MULTIPLIER EFFECTS OF DAIRY PROCESSING NORTH REGION, 1998				
Economic Measure	Direct Impact	Indirect Impact	Induced Impact	Total
Industry Output	\$1,011,419,584	\$358,011,531	\$240,405,061	\$1,609,836,176
Employment	2,639	2,749	2,808	8,195

MULTIPLIER EFFECTS OF DAIRY PROCESSING CALIFORNIA, 1998				
Economic Measure	Direct Impact	Indirect Impact	Induced Impact	Total
Industry Output	\$6,284,360,896	\$2,906,867,080	\$1,791,577,607	\$10,982,805,583
Employment	14,730	24,377	22,637	61,744

SUMMARY OF DAIRY PROCESSING PURCHASES FROM DAIRY FARMS BY REGION CALIFORNIA, 1998				
Region	Dairy Processing Employment	1998 Total Dairy Farm Commodity Purchases	Percentage Purchased Within Region	Total Regional Dairy Commodity Purchases
Statewide	14,730	\$2,256,310,000	85.9%	\$1,938,310,181
Northern Region	2,639	\$365,340,000	36.1%	\$131,924,274
San Joaquin Region	4,629	\$773,980,000	92.6%	\$716,498,827
Southern Region	7,462	\$1,116,990,000	54.2%	\$605,729,156

Sources for all tables: Applied Development Economics, data from California Dept. of Food and Agriculture, IMPLAN input-output model, MIG ES202 county employment database, and Dun and Bradstreet Marketplace® Jul-Sep 2001.

Note: Indirect impacts for processing Multiplier Effects tables do not include dairy farm production.

INPUT / OUTPUT MODELS

Input-output models are useful tools for identifying buyer-supplier relationships in a regional economy, and for estimating the contributions that different industries make to the regional economy. In the analysis of dairy industries in the three regions in California, the input-output model calculated multiplier effects from related economic activity. These effects are typically classified as indirect and induced multipliers. An indirect effect comes from activity generated by supplier purchases (or inputs), while induced effects reflect demand for local goods and services made by employees. The input-output model used in the analysis is the IMPLAN Impro Professional 2.0 application. The model was developed by IMPLAN with data from BEA, BLS, and the ES202 employment database.

The dairy industry analysis uses county-specific datasets from 1998. In addition, the model allows the user to update and otherwise make changes to study data and relational assumptions. Because the model makes several calculations based on large national datasets, it is ideal to recalibrate the model whenever more specific data is available. For the dairy analysis, some of the model parameters were modified because county-specific information from the crop reports was available.

NOTE

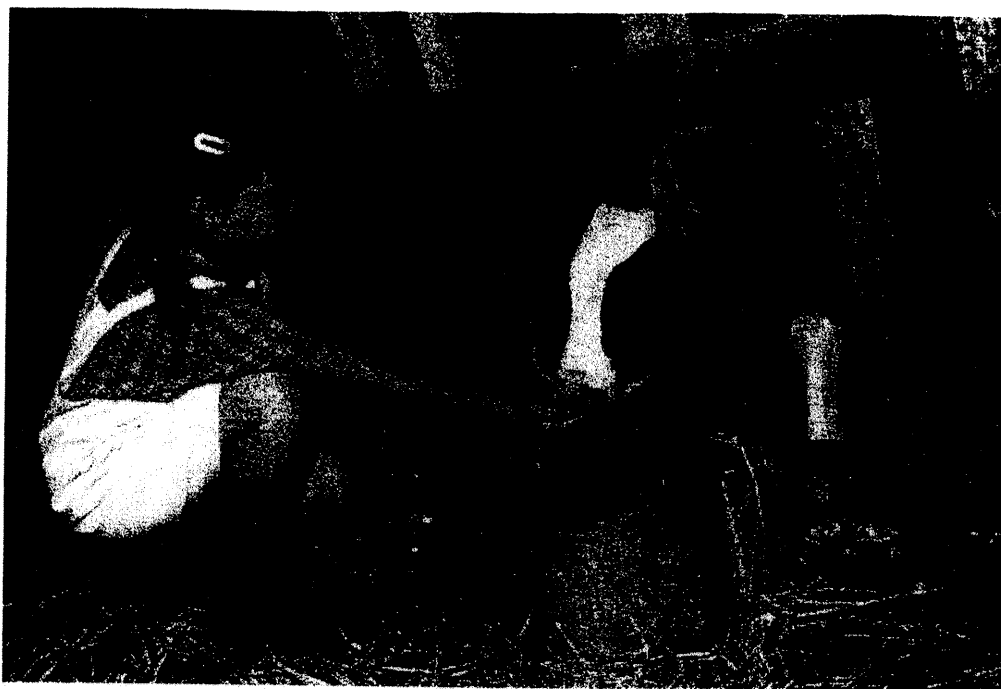
Although the model creates data to the nearest dollar and nearest job, the data are only useful to three significant figures. Any apparent addition errors are due either to rounding or to variations generated by multiple runs of the input/output model.

GLOSSARY OF TERMS

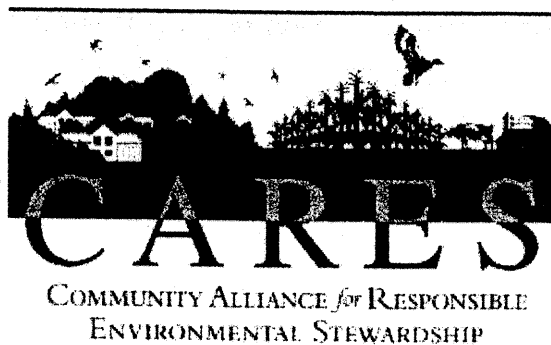
Industry Output = Value produced = Direct Impact. This term includes the net dollar value created by the companies in the industry being studied, including sales, income to proprietors, tax benefits, and the value of labor inputs. This term bears no relation to corporate income, which is included in the output value, but is not extractable in any way.

Indirect Multiplier Effects means the value of those goods and services purchased directly by the companies in the industry being studied in order to produce the goods and services they themselves sell.

Induced Multiplier Effects means the value of those goods and services purchased/used by employees of companies in the industry being studied. Induced employment is the number of jobs created as a result of those purchases.



***We invite you to consider joining CARES!
Learn more at www.dairycares.com***



Community Alliance for Responsible Environmental Stewardship
915 L Street, #C-438, Sacramento, CA 95814
(916) 441-3318
(916) 441-4132
www.dairycares.com

Appendix D

SWRCB Waste Discharge Requirements

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER NO. 96-270

GENERAL WASTE DISCHARGE REQUIREMENTS
FOR
MILK COW DAIRIES

The California Regional Water Quality Control Board, Central Valley Region, (hereafter Board) finds that:

1. Pursuant to Section 13263 of the Water Code, the Board regulates the disposal of wastes to ensure protection of the beneficial uses of both surface and ground waters and the prevention of nuisances. The dairy industry represents a significant source of wastes in the Central Valley.
2. Dairies generate wastes that include, but are not limited to: manure, wash water, corral runoff, storm water runoff, irrigation tailwater, spoiled feed materials, runoff from feeds, dead animals, bedding, and cleaning compounds. This Order only addresses wastes generated at the dairy.
3. Waste generated at dairies is stored in corrals, on waste piles, and/or in waste ponds. The wastes are then applied to on-site cropland or transported elsewhere. The wastes can provide water and nutrients to crops, but if improperly managed can create nuisance conditions and cause pollution of surface and groundwaters.
4. Discharges of dairy waste, as regulated under the Water Code, include, but are not limited to: (1) the application of wastes to land, (2) the movement of waste constituents from application and storage areas into the soil, and (3) movement of waste or water containing wastes into surface waters.
5. Title 23 of the California Code of Regulations, sections 2560 and following, address storage and discharge of waste to land at confined animal facilities. This Order implements these regulations.
6. The Board adopted Resolution No. 82-036 which waives waste discharge requirements (WDRs) for specific types of discharge including those from confined animal facilities. This waiver is conditional and may be terminated at any time.
7. To date, individual waste discharge requirements have been adopted by the Board for some of the milk cow dairies that do not meet waiver conditions in Resolution No. 82-036.
8. The Regional Board has adopted Water Quality Control Plans (Basin Plans) for the Central Valley Region. The third edition of the Basin Plan for the Sacramento River and San Joaquin River Basins was adopted in 1994 and the second edition of the Basin Plan for the Tulare Lake Basin was adopted in 1995. The Basin Plans specify water quality objectives and beneficial uses for surface and groundwaters in the Central Valley Region. Beneficial uses of waters in the Central Valley Region that could be impacted by the discharge of dairy wastes include: municipal and domestic supply, agricultural supply, industrial service supply, industrial process supply, groundwater recharge, freshwater replenishment, navigation, hydropower generation,

GENERAL WASTE DISCHARGE REQUIREMENTS
FOR MILK COW DAIRIES

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water contact recreation, non-contact water recreation, commercial and sport fishing, aquaculture, warm freshwater habitat, cold freshwater habitat, estuarine habitat, wildlife habitat, preservation of biological habitats of special significance, rare, threatened or endangered species, migration of aquatic organisms, spawning reproduction and/or early development and shellfish harvesting. This Order is consistent with the Basin Plans.

9. The Board has considered the antidegradation policy in State Water Resources Control Board Resolution No. 68-16, and finds that the requirements herein are consistent with this policy.
10. To expedite application of and compliance with water quality regulations regarding dairies, and leverage limited staff resources, the Board intends that this general order be issued administratively as specified herein whenever an owner and/or operator applies with a "Notice of Intent (NOI)" for a specific dairy facility and Executive Officer finds it applicable. Further, where a dairy has not or refuses to submit a NOI for a specific dairy facility, the Board itself may direct that the Discharger comply with this Order.
11. The Board will issue individual WDRs when it determines that it is not appropriate to apply the general WDRs or grant a waiver of WDRs.
12. The Board, through its Executive Officer, may vary the monitoring program required by this Order to address the specific circumstances at a dairy facility.
13. This Order shall only be applied to dairy facilities that fall into the following categories:
 - a. Where issuance of waste discharge requirements to the facility is exempt from the provisions of the California Environmental Quality Act (Public Resources Code Section 21000, et. seq.) in accordance with Section 15301, Title 14, of the California Code of Regulations; or
 - b. Where Food and Agricultural Code Section 33487 prohibits the Board from requiring an environmental impact report for a dairy farm constructed after 1983 under all of the following circumstances:
 - (1) When the proposed dairy will be constructed and operated in accordance with the minimum standards established under Chapter 5, Division 15 of the Food and Agricultural Code.
 - (2) Where the applicable local public agencies have completed all necessary reviews and approvals, including the provisions of Division 13 (commencing with Section 21000) of the Public Resources Code (CEQA), where applicable.
 - (3) Where a permit for construction has been issued by the appropriate local agency or agencies, and construction undertaken.

GENERAL WASTE DISCHARGE REQUIREMENTS FOR MILK COW DAIRIES

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- c. Where an environmental impact report or negative declaration determines there will be no significant adverse affects provided the dairy facility complies with the terms of this Order.
14. The Board has notified interested agencies and persons of its intent to prescribe General Waste Discharge Requirements for Milk Cow Dairies and has provided them with an opportunity for a public hearing and an opportunity to submit their written views and recommendations.
15. The term Discharger refers to owners and operators of those milk cow dairies that have submitted a complete NOI or that have been specified by the Board.

IT IS HEREBY ORDERED that all Dischargers specified by the Board and all Dischargers that have submitted a complete Notice of Intent, their agents, successors and assigns, in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted thereunder, shall comply with the following:

A. Discharge Prohibitions:

1. The discharge of water containing waste from property under the control of the Discharger is prohibited except where runoff results from a storm exceeding a 25-year, 24-hour frequency.
2. The disposal of dead animals at this facility is prohibited unless a Report of Waste Discharge for the disposal has been submitted and waste discharge requirements have been issued or waived.
3. The discharge of hazardous waste at this facility is prohibited.

B. Waste Discharge Specifications:

1. Neither the storage nor the discharge of waste shall create a condition of nuisance or pollution as defined by Section 13050 of the California Water Code.
2. For Surface Water Protection:
 - a. Confined animal facilities shall be designed, constructed, and operated to retain (1) all facility wastewater generated by washing animals, equipment, and facilities; and (2) all precipitation, and drainage that comes into contact with feed or manured areas except runoff which results from a storm exceeding a 25-year, 24-hour frequency. If a discharge to a surface water drainage course is made under this exception, the discharge shall be controlled to not impact beneficial uses of the receiving waters.
 - b. Liquid wastes in retention ponds and other storage facilities shall not be discharged in surface waters or to drainage courses that are tributary to surface waters.

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GENERAL WASTE DISCHARGE REQUIREMENTS FOR MILK COW DAIRIES

- c. All precipitation and surface drainage outside of manured areas, including that collected from roofed areas, and runoff from tributary areas during the storm events described in Waste Discharge Specification B.2.a., shall be diverted away from manured areas, unless such drainage is fully retained. Precipitation and surface runoff that has not come into contact with animal feed material, manure, or other waste material may be discharged to cropland or surface water drainage courses.
 - d. Retention ponds and manured areas at dairies in operation before August 1975 shall be protected from inundation or washout by overflow from any stream channel during 20-year peak stream flows. Facilities constructed after August 1975 shall be protected against 100-year stream flows. Facilities in operation before August 1975 that are protected against 100-year peak stream flows must continue to provide such protection. The determination of peak stream flows shall be from data provided by a recognized federal, state, local, or other agency.
 - e. Discharges of facility wastewater to crop land shall not result in runoff to surface waters or to drainage courses that are tributary to surface waters. Mixtures of irrigation water and facility wastewater shall be managed as facility wastewater.
 - f. Animals at a confined animal facility shall be prevented from entering any surface water within the confined area.
3. For Groundwater Protection:
- a. Liquid wastes that remain in one location for more than five days shall be stored in either: (1) retention ponds that are built and operated in compliance with this order; (2) in facilities that are designed, built and operated to prevent pollution of groundwater (see Provision C.9. regarding the technical report that must be submitted regarding these facilities); or (3) in above ground tanks. Liquid waste includes but is not limited to wash water and rainfall runoff that has come into contact with manure or feed.
 - b. Retention ponds shall be lined with or underlain by soils which contain at least 10 percent clay and not more than 10 percent gravel or artificial materials of equivalent impermeability.
 - c. Application of manure and wastewater to disposal fields or crop land shall be at rates which are reasonable for the crop, soil, climate, special local situations, management system, and type of manure.
 - d. Discharges of facility wastewater to disposal fields shall be managed to minimize percolation to groundwater.
 - e. Manured areas including but not limited to corrals and manure storage areas shall be managed to minimize infiltration of water into underlying soils.

GENERAL WASTE DISCHARGE REQUIREMENTS
FOR MILK COW DAIRIES

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- f. Waste retention ponds in the Tulare Lake Basin constructed after 17 August 1995 shall be sited, designed, constructed, and operated to ensure that wastes will be at least five feet above the highest anticipated elevation of underlying groundwater. Waste retention ponds in the Tulare Lake Basin constructed prior to 17 August 1995 and in other Basins of the Region shall be sited, designed, constructed and operated to ensure that wastes will be above the highest anticipated elevation of underlying groundwater.
- g. The salt in animal rations should be limited to that required to maintain animal health and optimum production.

C. Provisions:

1. Dischargers that want to be regulated under this Order shall submit a completed Notice of Intent form (Attachment A), an appropriate filing fee, and other information deemed necessary by the Executive Officer. After receiving and reviewing a complete submittal, the Executive Officer shall advise the Discharger that the facility is covered by this Order or that individual waste discharge requirements will be prepared.
2. Pursuant to Section 13267 of the California Water Code, the Discharger shall prepare, and update as necessary, a Water Pollution Prevention Plan containing the information listed in Attachment B. The Discharger must complete this Plan within 60 days of being directed to comply with this Order and will retain a copy at the facility for review by Board staff during inspections.
3. Pursuant to Section 13267 of the California Water Code, the Discharger shall comply with the Monitoring and Reporting Program specified by the Executive Officer and any subsequent amendments made thereto by the Executive Officer.
4. Individual Monitoring and Reporting Programs (MRP) may be required by the Executive Officer on a case-by-case basis. An individual MRP may be in addition to, or may supersede, the monitoring and reporting requirements of this Order.
5. Any Discharger who has not submitted a Report of Waste Discharge and/or filing fee with the Regional Board shall submit a complete Report of Waste Discharge with the appropriate filing fee within 30 days of being directed to comply with this Order.
6. If wastes such as, but not limited to, whey, cannery wastes, septage, sludge, biosolids and ash are proposed to be brought onto the dairy facility for the purpose of discharging it to land or to holding ponds, the Discharger shall submit a Report of Waste Discharge and receive a waste-specific waiver or waste discharge requirements from the Board prior to receiving the waste.
7. The Discharger may be required to submit technical reports as directed by the Executive Officer.

GENERAL WASTE DISCHARGE REQUIREMENTS
FOR MILK COW DAIRIES

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8. Prior to the use of any new waste retention ponds, the Discharger shall submit a report verifying that the excavation meets all requirements of this Order. Waste shall not be placed into a retention pond until after the Executive Officer notifies the Discharger in writing that the report is acceptable.
9. If liquid waste is stored at sites other than waste retention ponds meeting the provisions of this Order or in above ground tanks, the Discharger shall submit a written report completed by a registered engineer or engineering geologist verifying that the storage facility will not result in a discharge to groundwater at rates that adversely impact beneficial uses. The Discharger shall submit a work plan for the preparation of this report within 60 days of being directed to comply with this Order or as specified by the Executive Officer. The report must be completed and submitted within six months of approval of the work plan.
10. If plans for animal waste disposal include application onto property not under the control of the Discharger, a copy of the written agreement regarding use of the disposal area shall be provided to the Board along with details on how the property is managed.
11. The Discharger shall allow representatives of the Regional Water Quality Control Board, upon presentation of credentials, at reasonable hours, to:
 - a. enter premises where wastes are treated, stored, or discharged and facilities in which any required records are kept;
 - b. copy any records required to be kept under terms and conditions of this Order;
 - c. inspect facilities, monitoring equipment, practices, or operations regulated or required by this Order; and
 - d. sample, photograph or video tape any discharge, waste, waste management unit or monitoring device.
12. A copy of this Order shall be maintained at the discharge facility and be available at all times to operating personnel. Key operating personnel shall be familiar with its content.
13. The filing of a request by the Discharger for modification, revocation and reissuance, or termination of this Order, or notification of planned changes or anticipated noncompliance, does not stay any condition of this Order.
14. The provisions of this Order are severable. If any provision of this Order is found invalid, the remainder of this Order shall not be affected.
15. This Order is not transferable to any person except after notice to the Board. The 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.

GENERAL WASTE DISCHARGE REQUIREMENTS
FOR MILK COW DAIRIES

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16. Except for data determined to be confidential, all reports prepared in accordance with terms of this Order shall be available for public inspection at the offices of the Board.
17. The fact that it would have been necessary for the Discharger to halt or reduce the permitted activity in order to comply with this Order shall not be a defense for violating this Order.
18. 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(s) or operator(s) of the existence of this Order by letter, a copy of which shall be forwarded to the Board.
19. All discharges from the facility must comply with lawful requirements of the municipalities, counties, irrigation districts, drainage districts, and other local agencies regarding discharges of water to storm drain systems or other water courses under their jurisdiction.
20. The requirements prescribed herein do not authorize the commission of any act causing injury to the property of another; protect the Discharger from liability under federal, state, or local laws; or guarantee the Discharger a capacity right in the receiving waters.
21. The Discharger shall give advance notice to the Board of any planned changes in the permitted facility or activity that may result in noncompliance with this Order.
22. Safeguard to electric power failure:
 - a. The Discharger shall provide safeguards to assure that, should there be reduction, loss, or failure of electric power, the discharge shall comply with the terms and conditions of this Order.
 - b. Upon written request by the Board, the Discharger shall submit a written description of safeguards. Such safeguards may include alternate power sources, standby generators, standby pumps, retention capacity, operating procedures, or other means. The adequacy of the safeguards is subject to the approval of the Board.
 - c. Should the storage and disposal systems not include safeguards against reduction, loss, or failure of electric power, or should the Board not approve the existing safeguards, the Discharger shall, within ninety days of having been advised in writing by the Board that the existing safeguards are inadequate, provide to the Board a schedule of compliance for providing safeguards such that in the event of reduction, loss, or failure of electric power, the Discharger shall comply with the terms and conditions of this Order. The schedule of compliance shall, upon approval of the Board, become a condition of this Order.

GENERAL WASTE DISCHARGE REQUIREMENTS
FOR MILK COW DAIRIES

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23. The Discharger shall retain records of all monitoring information for a minimum of five years from the date of the sample, measurement, report, or application. This period may be extended during the course of any unresolved litigation regarding this discharge or when requested by the Regional Board Executive Officer.

The records of monitoring information shall include:

- a. the date, exact place, and time of sampling or measurements,
 - b. the individuals(s) who performed the sampling of measurements,
 - c. the date(s) analyses were performed,
 - d. the individual(s) who performed the analyses,
 - e. the laboratory which performed the analyses,
 - f. the analytical techniques or methods used, and
 - g. the results of such analyses.
24. Any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this Order, including monitoring reports or reports of compliance or noncompliance shall, upon conviction, be punished by a fine of not more than \$10,000 per violation, or by imprisonment for not more than two years per violation, or by both.

All reports shall be signed by a person identified below:

- a. For a corporation: by a principal executive officer of at least the level of senior vice-president.
- b. For a partnership or sole proprietorship: by a general partner or the proprietor, respectively.
- c. For a municipality, state, federal or other public agency: by either a principal executive officer or ranking elected or appointed official.
- d. A duly authorized representative of a person designated in 24a, 24b or 24c, of this requirement, if:
 - (1) the authorization is made in writing by a person described in 24a, 24b, or 24c of this provision:
 - (2) the authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of manager, superintendent, or position of equivalent responsibility. (A duly authorized representative may thus be either a named individual or any individual occupying a named position), and
 - (3) the written authorization is submitted to the Board.

GENERAL WASTE DISCHARGE REQUIREMENTS FOR MILK COW DAIRIES

Each person signing a report required by this Order or other information requested by the Board shall make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

The Discharger shall mail a copy of each monitoring report and any other reports required by this Order to:

California Regional Water Quality Control Board
Central Valley Region
3443 Routier Road, Suite A
Sacramento, CA 95827-3098

25. **WAIVER OF WASTE DISCHARGE REQUIREMENTS:** A Discharger that has been placed under this Order may request a waiver of WDRs following a minimum of three years of consecutive compliance with this Order and proof of attendance of at least one educational program approved by the Executive Officer.

I, WILLIAM H. CROOKS, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Valley Region, on 25 October 1996.

WILLIAM H. CROOKS, Executive Officer

ldj/amended 25 October 1996

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM NO. 96-270-01
FOR
MILK COW DAIRIES

MONITORING

1. The Discharger shall inspect waste holding and disposal areas and note any discharges made off of property under the control of the Discharger. Inspections will be made daily when wastewater and/or manure are being applied to cropland and weekly during other periods.
2. Within one year of the effective date of this order, the Discharger shall prepare a nutrient and irrigation water management plan. The plan shall provide site-specific information on the use of animal waste and other nutrients on cropland at the facility and shall be designed to show how the facility will be operated in compliance with the Waste Discharge Requirements. Upon completion of the plan, the Discharger shall maintain any records needed to determine compliance with the plan.

REPORTING

1. Notification of Release or Discharge:

The Discharger shall notify the Regional Board by telephone within 72 hours of any off-property discharge of facility wastewater containing manure. This notification will be followed by a written report which shall be submitted to the Regional Board within two weeks of the discharge. The written report will contain:

- a. date discharge began;
- b. duration of discharge;
- c. point of discharge;
- d. specific source of waste discharge (e.g., overflow from holding pond, rainfall runoff from manure storage areas, etc.);
- e. steps taken to prevent runoff in the future.

2. Annual Reports

An annual written report covering the 12 month period beginning 1 November and ending 31 October of the following year shall be submitted to the Regional Board by 30 November. The report shall certify that the Water Pollution Prevention Plan is current and being followed and shall provide the following information:

MONITORING AND REPORTING PROGRAM
MILK COW DAIRIES

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- a. Maximum number of animal units (AU) at the site during the year. The following table should be used to calculate AUs. Multiply the number of head in each category by the given factor to obtain the number of AUs in each category. Add the AUs from each category to get the total for the facility.

	<u>Head</u>		<u>Factor</u>		<u>Animal Units (AU)</u>
Milk Cows	_____	x	1.0	=	_____
Dry Cows	_____	x	0.75	=	_____
Bred Heifers	_____	x	0.75	=	_____
Heifers (1 year - breeding)	_____	x	0.7	=	_____
Calves (3 mos. - 1 year)	_____	x	0.4	=	_____
Baby calves	_____	x	0.25	=	_____
Total head	_____				Total AUs: _____

- b. Breed of cow at the dairy.
- c. Logs of inspections made during the year.
- d. A statement indicating that the facility was operated according to the nutrient and irrigation water management plan or an explanation of how the operation varied from the plan.
- e. Any changes in the facility or farming operation which may influence waste management. Include a copy of any new or updated nutrient and irrigation water management plans.

The Discharger shall implement the above monitoring program upon the effective date of this Order.

Ordered by: William H. Crooks
WILLIAM H. CROOKS, Executive Officer

25 October 1996
(Date)

NOTICE OF INTENT
TO COMPLY WITH THE TERMS OF THE
GENERAL WASTE DISCHARGE REQUIREMENTS FOR
MILK COW DAIRIES
ORDER NO. _____

FACILITY

NAME OF FACILITY: _____

ADDRESS OF FACILITY: _____

COUNTY: _____

CONTACT PERSON: _____

TELEPHONE NO.: _____

NAME OF LEGAL OWNER OF FACILITY: _____

ADDRESS OF LEGAL OWNER OF FACILITY: _____

CONTACT PERSON: _____

TELEPHONE NO.: _____

NAME OF BUSINESS OPERATING FACILITY: _____

ADDRESS OF BUSINESS OPERATING FACILITY: _____

CONTACT PERSON: _____

TELEPHONE NO.: _____

OPERATION AND DISPOSAL INFORMATION

COMPLETE AND ATTACH A COPY OF THE FORM TITLED "DAIRY/FEEDLOT WASTE DISCHARGE STANDARD QUESTIONNAIRE"

CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA) COMPLIANCE

HAS ANY CEQA DOCUMENT BEEN PREPARED FOR THIS PROJECT? _____ YES _____ NO

IF "YES", PLEASE ENCLOSE A COPY

IF "NO", WILL ANY CEQA DOCUMENT BE PREPARED? _____ YES _____ NO

WILL A NEGATIVE DECLARATION BE PREPARED? _____ YES _____ NO

IF "YES", WHO WILL PREPARE THE NEGATIVE DECLARATION? _____ APPROXIMATE DATE OF COMPLETION _____

CERTIFICATION

I HEREBY CERTIFY UNDER PENALTY OF PERJURY THAT THE INFORMATION PROVIDED IN THIS NOTICE OF INTENT AND IN ANY ATTACHMENTS IS TRUE AND ACCURATE TO THE BEST OF MY KNOWLEDGE. IN ADDITION, I CERTIFY THAT THE PROVISIONS OF THE ORDER, INCLUDING THE MONITORING AND REPORTING PROGRAM, AND THE DEVELOPMENT AND IMPLEMENTATION OF A WATER POLLUTION PREVENTION 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 _____

CENTRAL REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

GENERAL WASTE DISCHARGE REQUIREMENTS FOR
MILK COW DAIRIES

WATER POLLUTION PREVENTION PLAN

Each facility covered by the Order must prepare a written Water Pollution Prevention Plan containing the following information:

1. A list of all points from which wastewater, stormwater runoff and irrigation runoff containing manure or feed wastes can leave property under control of the Discharger.
2. A list of all areas other than waste retention ponds or crop land (such as corrals, yards, ditches, etc.) where wastewater and stormwater containing manure can infiltrate into underlying soils.
3. Sketches and/or maps showing the locations listed pursuant to paragraphs 1 and 2. Also show the locations of all ditches, drains, creeks and pipelines. Indicate direction of slope of all fields.
4. An explanation of how wastewater, stormwater and irrigation water containing manure are prevented from leaving property under control of the Discharger.
5. An explanation how constituents in manure and feed wastes are managed to reduce movement to groundwater to acceptable levels.
6. If wastes leave property under control of the Discharger or migrate into ground water in violation of the Order, outline measures that will be implemented to bring the dairy facility and/or farm into compliance with the Order.

A copy of this plan should be maintained at the dairy so that it can be reviewed during site inspections. Copies shall also be submitted to the Regional Board upon request.

Appendix E

SB 700 (Florez) – An act to amend Section 4231 of, and to add Sections 39011.5, 40724, 39023.3, 40724.5, 40724.6, 40724.7, 40731, 42301.17, 42301.18, 44559.9 to Health and Safety Code, relating to air quality

CHAPTER 479

FILED WITH SECRETARY OF STATE SEPTEMBER 22, 2003
APPROVED BY GOVERNOR SEPTEMBER 22, 2003
PASSED THE SENATE SEPTEMBER 11, 2003
PASSED THE ASSEMBLY SEPTEMBER 10, 2003
AMENDED IN ASSEMBLY SEPTEMBER 9, 2003
AMENDED IN ASSEMBLY SEPTEMBER 4, 2003
AMENDED IN ASSEMBLY AUGUST 21, 2003
AMENDED IN ASSEMBLY JULY 14, 2003
AMENDED IN ASSEMBLY JULY 2, 2003
AMENDED IN ASSEMBLY JUNE 26, 2003
AMENDED IN SENATE MAY 13, 2003
AMENDED IN SENATE MAY 7, 2003
AMENDED IN SENATE APRIL 24, 2003

INTRODUCED BY Senators Florez and Sher

FEBRUARY 21, 2003

An act to amend Section 42310 of, and to add Sections 39011.5, 39023.3, 40724, 40724.5, 40724.6, 40724.7, 40731, 42301.16, 42301.17, 42301.18, and 44559.9 to, the Health and Safety Code, relating to air quality.

LEGISLATIVE COUNSEL'S DIGEST

SB 700, Florez. Air quality: emissions: stationary sources: agricultural operations.

(1) Existing law authorizes the board of every air quality management district and air pollution control district to establish a permit system that requires any person that uses certain types of equipment that may cause the emission of air contaminants to obtain a permit. Existing law exempts vehicles and certain types of equipment from those permit requirements.

This bill would eliminate that exemption for any equipment used in agricultural operations in the growing of crops or the raising of fowl or animals. To the extent that the bill would increase the number of permits that a district board, electing to establish a permit system prior to January 1, 2004, would be required to issue, the bill would impose a state-mandated local program.

(2) Existing law defines various terms governing the construction of air pollution control laws in the state, and authorizes the state board to revise those definitions to conform with federal law.

This bill would define the terms "agricultural source of air pollution" and "fugitive emissions," and would prohibit, notwithstanding the existing authority, the state board from revising those definitions.

(3) The existing federal Clean Air Act requires districts to adopt local programs for issuing operating permits to major stationary sources of air pollutants. The existing act defines a stationary source as any building, structure, facility, or installation that emits or may emit any air pollutant.

This bill would require each district that is designated a serious federal nonattainment area for an applicable ambient air quality standard for particulate matter as of January 1, 2004, to adopt, implement, and submit for inclusion in the state implementation plan, a rule or regulation requiring best available control measures

(BACM) and best available retrofit control technology (BARCT) for agricultural practices at agricultural sources of air pollution to reduce air pollutants from those sources for which that technology is applicable for agricultural practices by the earliest feasible date, but not later than January 1, 2006, and would require each district subject to those requirements to comply with a schedule for public hearing, adoption, and implementation of the final rule.

The bill would require each district that is designated a moderate federal nonattainment area or an applicable ambient air quality standard for particulate matter as of January 1, 2004, to adopt and implement control measures necessary to reduce emissions from agricultural practices by the earliest feasible date, but no later than January 1, 2007, unless the district determines that those sources do not significantly cause or contribute to a violation of state or federal standards.

The bill would require, by January 1, 2005, the state board to review all available scientific information and develop a definition of a "large confined animal facility."

The bill would require, by July 1, 2006, each district that is designated as a federal nonattainment area for ozone as of January 1, 2004, to adopt, implement, and submit for inclusion in the state implementation plan, a rule or regulation that requires the owner or operator of a large confined animal facility as that term is defined by the state board to obtain a permit to reduce, to the extent feasible, emissions of air contaminants from the facility. The bill would require the district to perform an assessment of the impacts of the rule or regulation prior to its adoption. The bill would authorize a permit holder to appeal any district determination or decision related to that permit.

The bill would require a district that is designated as being in attainment for the federal ambient air quality standard for ozone as of January 1, 2004, to adopt the same rule or regulation required of nonattainment districts, by July 1, 2006, unless the district board makes a determination that large confined animal facilities will not contribute to a violation of any state or federal ambient air quality standard. The bill would provide the rule or regulation is not required to be submitted for inclusion into the state implementation plan.

The bill would require the California Air Pollution Control Officers Association, in consultation with the state board and other interested parties, by January 1, 2005, to develop a clearinghouse of available control measures and strategies for agricultural sources of air pollution and emissions of air contaminants from agriculture operations.

The additional duties for districts under the bill would impose a state-mandated local program.

(4) Existing law establishes the Capital Access Loan Program for Small Businesses, administered by the California Pollution Control Financing Authority, which provides loans through participating financial institutions to entities authorized to conduct business in the state and whose primary business location is in the state.

This bill would require the authority to expand the program to include outreach to financial institutions that service agricultural interests in the state for the purposes of funding air pollution control measures.

(5) Under existing law, any person who violates a rule, regulation, permit, or order of a district is guilty of a misdemeanor. Because this bill would increase the number of people who are subject to that provision, it would expand the scope of a crime, thereby imposing a state-mandated local program.

(6) The California Constitution requires the state to reimburse local agencies and school districts for certain costs mandated by the state. Statutory provisions establish procedures for making that

reimbursement.

This bill would provide that no reimbursement is required by this act for specified reasons.

THE PEOPLE OF THE STATE OF CALIFORNIA DO ENACT AS FOLLOWS:

SECTION 1. (a) The Legislature finds and declares all of the following:

(1) Agricultural operations necessary for growing crops or raising animals are a significant source of directly emitted particulates, and precursors of ozone and fine particulate matter. These emissions have a significant adverse effect on the ability of areas of the state, including, but not limited to, the San Joaquin Valley, to achieve health-based state and federal ambient air quality standards.

(2) Since 1999, the agriculture industry has reduced emissions of oxides of nitrogen (NOx) by more than 2000 tons per year, emissions of particulate matter of 10 microns in diameter (PM 10) by more than 500 tons per year, and emissions of volatile organic compounds (VOCs) from agricultural chemicals by more than 20 percent. According to the state board, however, agricultural sources of air pollution still contribute twenty-six percent of the smog-forming emissions in the San Joaquin Valley.

(3) In the San Joaquin Valley, a large portion of the sources of particulate emissions are areawide sources whose emissions are directly related to growth in population and the resulting vehicle miles traveled. According to the State Air Resources Board, however, agricultural sources of air pollution account for over fifty percent of the directly emitted particulate air pollution generated in the valley during the fall, amounting to over 170 tons per day of emissions.

(4) All parties living or operating a business in an area that has been classified as being a nonattainment area with respect to the attainment of federal or state ambient air quality standards share the responsibility of reducing emissions from air pollutants.

(5) The federal Clean Air Act (42 U.S.C. Sec. 7401 et seq.) prohibits the state from adopting emission standards or limitations less stringent than those established under the federal act, including limitations on emissions from agricultural sources.

(6) Division 26 (commencing with Section 39000) of the Health and Safety Code establishes numerous policies and programs to reduce air pollutants for the protection of public health.

(7) The purpose of the act adding this section is to establish a new set of programs at the state and regional levels to reduce air emissions from agricultural sources in order to protect public health and the environment.

(b) It is therefore the intent of the Legislature to require the State Air Resources Board and air quality management districts and air pollution control districts in the state to regulate stationary, mobile, and area sources of agricultural air pollution.

SEC. 2. Section 39011.5 is added to the Health and Safety Code, to read:

39011.5. (a) "Agricultural source of air pollution" or "agricultural source" means a source of air pollution or a group of sources used in the production of crops, or the raising of fowl or animals located on contiguous property under common ownership or control that meets any of the following criteria:

(1) Is a confined animal facility, including, but not limited to, any structure, building, installation, barn, corral, coop, feed storage area, milking parlor, or system for the collection, storage, treatment, and distribution of liquid and solid manure, if

domesticated animals, including, but not limited to, cattle, calves, horses, sheep, goats, swine, rabbits, chickens, turkeys, or ducks are corralled, penned, or otherwise caused to remain in restricted areas for commercial agricultural purposes and feeding is by means other than grazing.

(2) Is an internal combustion engine used in the production of crops or the raising of fowl or animals, including, but not limited to, an engine subject to Article 1.5 (commencing with Section 41750) of Chapter 3 of Part 4 except an engine that is used to propel implements of husbandry, as that term is defined in Section 36000 of the Vehicle Code, as that section existed on January 1, 2003. Notwithstanding subdivision (b) of Section 39601, the state board may not revise this definition for the purposes of this section.

(3) Is a Title V source, as that term is defined in Section 39053.5, or is a source that is otherwise subject to regulation by a district pursuant to this division or the federal Clean Air Act (42 U.S.C. Sec. 7401 et seq.).

(b) Any district rule or regulation affecting stationary sources on agricultural operations adopted on or before January 1, 2004, is applicable to an agriculture source.

(c) Nothing in this section limits the authority of a district to regulate a source, including, but not limited to, a stationary source that is an agricultural source, over which it otherwise has jurisdiction pursuant to this division, or pursuant to the federal Clean Air Act (42 U.S.C. Sec. 7401 et seq.) or any rules or regulations adopted pursuant to that act that were in effect on or before January 1, 2003, or to exempt an agricultural source from any requirement otherwise applicable under Sections 40724 or 42301.16, based upon a finding by the district in a public hearing that the aggregate emissions from that source do not exceed a de minimus level of more than one ton of particulate matter, nitrogen oxides or volatile organic compounds per year.

SEC. 3. Section 39023.3 is added to the Health and Safety Code, to read:

39023.3. "Fugitive emissions" mean those emissions that cannot reasonably pass through a stack, chimney, vent, or other functionally equivalent opening. Notwithstanding subdivision (b) of Section 39601, the state board may not revise this definition for the purposes of this section.

SEC. 4. Section 40724 is added to the Health and Safety Code, to read:

40724. (a) Each district that is designated as a serious federal nonattainment area for an applicable ambient air quality standard for particulate matter as of January 1, 2004, shall adopt, implement, and submit for inclusion in the state implementation plan, a rule or regulation requiring best available control measures (BACM) for sources for which those measures are applicable and best available retrofit control technology (BARCT) to reduce air pollutants from sources for which that technology is applicable for agricultural practices, including, but not limited to, tilling, discing, cultivation, and raising of animals, and for fugitive emissions from those agricultural practices a manner similar to other source categories by the earliest feasible date, but not later than January 1, 2006. The rule or regulation shall also include BACM and BARCT to reduce precursor emissions in a manner commensurate to other source categories that the district show cause or contribute to a violation of an ambient air quality standard. Each district that is subject to this subdivision shall comply with the following schedule with respect to the rule or regulation imposing BACM and BARCT:

(1) On or before September 1, 2004, notice and hold at least one public workshop for the purpose of accepting public testimony on the proposed rule or regulation.

(2) On or before July 1, 2005, adopt the final rule or regulation

at a noticed public hearing.

(3) On or before January 1, 2006, commence implementation of the rule or regulation.

(b) Nothing in this section shall delay or otherwise affect any action taken by a district to reduce emissions of air contaminants from agricultural sources, or any other requirements imposed on a district or a source of air pollution pursuant to the federal Clean Air Act (42 U.S.C. Sec. 7401 et seq.).

(c) In adopting a rule or regulation pursuant to this section, a district shall do all of the following:

(1) Ensure the size and duration of use of an internal combustion engine subject to BARCT pursuant to this section is commensurate to the size and duration of use of internal combustion engines subject to regulation by a district or the state board regulated at other stationary sources.

(2) Ensure that BARCT established pursuant to this section for an internal combustion engine is similar to BARCT for other stationary source engines subject to regulation by a district or the state board.

(3) Ensure that the cost-effectiveness of BARCT for an internal combustion engine subject to this section is similar to the cost-effectiveness of BARCT for other internal combustion engines subject to regulation by a district or the state board.

(4) Compare the cost-effectiveness of BARCT for an internal combustion engine subject to this section to the list of available and proposed control measures prepared pursuant to Section 40922.

(5) Adopt control measures pursuant to this section in order of their cost-effectiveness, unless a district determines that a different order of adoption is necessary due to the enforceability, public acceptability, or technological feasibility of a given control measure, or to expeditiously attain or maintain a national or state ambient air quality standard.

(6) Except as otherwise provided under this section, ensure that any rule or regulation adopted pursuant to this section complies with all applicable requirements of this division, including, but not limited to, any applicable requirements established pursuant to Sections 40703, 40727, 40728.5, and 40920.6.

(7) Hold at least one public meeting that is conducted at a time and location that the district determines is convenient to the public at which the district reviews the comparison prepared pursuant to paragraph (4).

(d) Nothing in this section limits the authority of a district to regulate a source including, but not limited to, a stationary source that is an agricultural source over which it otherwise has jurisdiction pursuant to this division or the federal Clean Air Act (42 U.S.C. Sec. 7401 et seq.) or any rules or regulations adopted pursuant to that act. Nothing in this section shall delay or otherwise affect any action taken by a district to reduce emissions of air contaminants from agricultural sources, or any other requirements imposed upon a district or a source of air pollution pursuant to the federal Clean Air Act. This section may not be interpreted to delay or otherwise affect the adoption, implementation, or enforcement of any measure that was adopted, or included in a rulemaking calendar or air quality implementation plan that was adopted, by the district prior to January 1, 2004.

SEC. 5. Section 40724.5 is added to the Health and Safety Code, to read:

40724.5. (a) By the earliest feasible date, but no later than January 1, 2007, each district that is designated a moderate federal nonattainment area for an applicable ambient air quality standard for particulate matter as of January 1, 2004, and that is not subject to the requirements of Section 40724, shall adopt and implement control measures necessary to reduce emissions from agricultural practices,

including, but not limited to, tilling, discing, cultivation, and raising of animals, and from fugitive emissions in a manner similar to other source categories from those activities by the earliest feasible date. Control measures adopted and implemented pursuant to this section shall also be implemented by the district to reduce precursor emissions in a manner commensurate to other source categories that the district show cause or contribute to a violation of an ambient air quality standard.

(b) A district is not required to adopt and implement control measures pursuant to this section if it determines in a public hearing that agricultural practices do not significantly cause or contribute to a violation of state or federal standards.

(c) In adopting a rule or regulation pursuant to this section, a district shall do all of the following:

(1) Ensure the size and duration of use of an internal combustion engine subject to BARCT pursuant to this section is commensurate to the size and duration of use of internal combustion engines subject to regulation by a district or the state board regulated at other stationary sources.

(2) Ensure that BARCT established pursuant to this section for an internal combustion engine is similar to BARCT for other stationary source engines subject to regulation by a district or the state board.

(3) Ensure that the cost-effectiveness of BARCT for an internal combustion engine subject to this section is similar to the cost-effectiveness of BARCT for other internal combustion engines subject to regulation by a district or the state board.

(4) Compare the cost-effectiveness of BARCT for an internal combustion engine subject to this section to the list of available and proposed control measures prepared pursuant to Section 40922.

(5) Adopt control measures pursuant to this section in order of their cost-effectiveness, unless a district determines that a different order of adoption is necessary due to the enforceability, public acceptability, or technological feasibility of a given control measure, or to expeditiously attain or maintain a national or state ambient air quality standard.

(6) Except as otherwise provided under this section, ensure that any rule or regulation adopted pursuant to this section complies with all applicable requirements of this division, including, but not limited to, any applicable requirements established pursuant to Sections 40703, 40727, 40728.5, and 40920.6.

(7) Hold at least one public meeting that is conducted at a time and location that the district determines is convenient to the public at which the district reviews the comparison prepared pursuant to paragraph (4).

(d) Nothing in this section limits the authority of a district to regulate a source including, but not limited to, a stationary source that is an agricultural source over which it otherwise has jurisdiction pursuant to this division or the federal Clean Air Act (42 U.S.C. Sec. 7401 et seq.) or any rules or regulations adopted pursuant to that act. Nothing in this section shall delay or otherwise affect any action taken by a district to reduce emissions of air contaminants from agricultural sources, or any other requirements imposed upon a district or a source of air pollution pursuant to the federal Clean Air Act. This section may not be interpreted to delay or otherwise affect the adoption, implementation, or enforcement of any measure that was adopted, or included in a rulemaking calendar or air quality implementation plan that was adopted, by the district prior to January 1, 2004.

(e) Nothing in this section shall delay or otherwise affect any action taken by a district to reduce emissions of air contaminants from agricultural sources, or any requirements imposed on a district or a source of air pollution pursuant to the federal Clean Air Act

(42 U.S.C. Sec. 7401 et seq.).

SEC. 6. Section 40724.6 is added to the Health and Safety Code, to read:

40724.6. (a) On or before July 1, 2005, the state board shall review all available scientific information, including, but not limited to, emissions factors for confined animal facilities, and the effect of those facilities on air quality in the basin and other relevant scientific information, and develop a definition for the source category of a "large confined animal facility" for the purposes of this section. In developing that definition, the state board shall consider the emissions of air contaminants from those sources as they may affect the attainment and maintenance of ambient air quality standards.

(b) Not later than July 1, 2006, each district that is designated as a federal nonattainment area for ozone as of January 1, 2004, shall adopt, implement, and submit for inclusion in the state implementation plan, a rule or regulation that requires the owner or operator of a large confined animal facility, as defined by the state board pursuant to subdivision (a), to obtain a permit from the district to reduce, to the extent feasible, emissions of air contaminants from the facility.

(c) A district may require a permit for a large confined animal facility with actual emissions that are less than one-half of any applicable emissions threshold for a major source in the district for any air contaminant, including, but not limited to, fugitive emissions in a manner similar to other source categories, if prior to imposing that requirement the district makes both of the following determinations in a public hearing:

(1) A permit is necessary to impose or enforce reductions in emissions of air pollutants that the district show cause or contribute to a violation of a state or federal ambient air quality standard.

(2) The requirement for a source or category of sources to obtain a permit would not impose a burden on those sources that is significantly more burdensome than permits required for other similar sources of air pollution.

(d) The rule or regulation adopted pursuant to subdivision (b) shall do all of the following:

(1) Require the owner or operator of each large confined animal facility to submit an application for a permit within six months from the date the rule or regulation is adopted by the district that includes both of the following:

(A) The information that the district determines is necessary to prepare an emissions inventory of all regulated air pollutants emitted from the operation, including, but not limited to, precursor and fugitive emissions, using emission factors approved by the state board in a public hearing.

(B) An emissions mitigation plan that demonstrates that the facility will use reasonably available control technology in moderate and serious nonattainment areas, and best available retrofit control technology in severe and extreme nonattainment areas, to reduce emissions of pollutants that contribute to the nonattainment of any ambient air quality standard, and that are within the district's regulatory authority.

(2) Require the district to act upon an application for permit submitted pursuant to paragraph (1) within six months of a completed application, as determined by the district.

(3) Require the owner or operator to implement the plan contained in the permit approved by the district, and shall establish a reasonable period, of not more than three years, after which each permit shall be reviewed by the district and updated to reflect changes in the operation or the feasibility of mitigation measures. The updates required by this paragraph are not required to be

submitted for inclusion into the state implementation plan.

(4) Establish a reasonable compliance schedule for facilities to implement control measures within one year of the date on which the permit is approved by the district, and shall provide for 30 days public notice and comment on any draft permit.

(d) Prior to adopting a rule or regulation pursuant to subdivision (b), a district shall, to the extent data are available, perform an assessment of the impacts of the rule or regulation. The district shall consider the impacts of the rule or regulation in a public hearing, and make a good faith effort to minimize any adverse impacts. The assessment shall include all of the following:

(1) The category of sources affected, including, but not limited to, the approximate number of affected sources, and the size of those sources.

(2) The nature and quantity of emissions from the category, and the significance of those emissions in adversely affecting public health and the environment and in causing or contributing to the violation of a state or federal ambient air quality standard.

(3) The emission reduction potential.

(4) The impact on employment in, and the economy of, the region affected.

(5) The range of probable costs to affected sources and businesses.

(6) The availability and cost-effectiveness of alternatives.

(7) The technical and practical feasibility.

(8) Any additional information on impacts that is submitted to the district board for consideration.

(e) Nothing in this section shall delay or otherwise affect any action taken by a district to reduce emissions of air contaminants from agricultural sources, or any other requirements imposed on a district or a source of air pollution pursuant to the federal Clean Air Act (42 U.S.C. Sec. 7401 et seq.).

(f) In adopting a rule or regulation pursuant to this section, a district shall comply with all applicable requirements of this division, including, but not limited to, the requirements established pursuant to Section 40703, 40727, and 40728.5.

(g) A permitholder may appeal any district determination or decision required by this section pursuant to Section 42302.1, in addition to any other applicable remedy provided by law.

(h) Nothing in this section authorizes a district to adopt a rule or regulation that is duplicative of a rule or regulation adopted pursuant to Sections 40724 and 40724.5.

(i) Nothing in this section limits the authority of a district to regulate a source including, but not limited to, a stationary source that is an agricultural source over which it otherwise has jurisdiction pursuant to this division or the federal Clean Air Act (42 U.S.C. Sec. 7401 et seq.) or any rules or regulations adopted pursuant to that act. Nothing in this section shall delay or otherwise affect any action taken by a district to reduce emissions of air contaminants from agricultural sources, or any other requirements imposed upon a district or a source of air pollution pursuant to the federal Clean Air Act. This section may not be interpreted to delay or otherwise affect adoption, implementation, or enforcement of any measure that was adopted, or included in a rulemaking calendar or air quality implementation plan that was adopted, by the district prior to January 1, 2004.

SEC. 7. Section 40724.7 is added to the Health and Safety Code, to read:

40724.7. (a) A district that is designated as being in attainment for the federal ambient air standard for ozone shall adopt a rule or regulation as described in Section 40724.6 shall fulfill both of the following conditions:

(1) The regulation shall be adopted not later than July 1, 2006,

unless a district board makes a determination in a public hearing, based on substantial scientific evidence in the record, that large confined animal facilities will not contribute to a violation of any state or federal ambient air quality standard.

(2) The regulation may not be submitted for inclusion in the state implementation plan.

(b) Nothing in this section shall delay or otherwise affect any action taken by a district to reduce emissions of air contaminants from agricultural sources, or any other requirements imposed on a district or a source of air pollution pursuant to the federal Clean Air Act (42 U.S.C. Sec. 7401 et seq.).

(c) In adopting a rule or regulation pursuant to this section, a district shall comply with all applicable requirements of this division, including, but not limited to, the requirements established pursuant to Section 40703, 40727, and 40728.5.

(d) Nothing in this section authorizes a district to adopt a rule or regulation that is duplicative of a rule or regulation adopted pursuant to Section 40724.

(e) The rule or regulation adopted by a district pursuant to this section is not required to be submitted for inclusion into the state implementation plan.

SEC. 8. Section 40731 is added to the Health and Safety Code, to read:

40731. In order to assist in the development of the BACM, RACM, and BARCT measures specified in Sections 40724, 40724.5, and 40724.6, and to reduce or eliminate emissions of regulated air pollutants and their precursors, the California Air Pollution Control Officers Association, in consultation with the state board and other interested parties, shall, not later than January 1, 2005, develop a clearinghouse of available control measures and strategies for agricultural sources of air pollution and emissions from agricultural operations, including, but not limited to, the following sources:

(a) Operations that create fugitive dust emissions, including, but not limited to, discing, tilling, material handling and storage, and travel on unpaved roads.

(b) Confined animal facilities, including, but not limited to, any structure, building, installation, barn, corral, coop, feed storage area, or milking parlor, including, but not limited to, a system for the collection, storage, treatment, and distribution of liquid or solid manure from domestic animals, including, but not limited to, cattle, calves, horses, sheep, goats, swine, rabbits, chickens, turkeys, or ducks, if those animals are corralled, penned, or otherwise caused to remain in restricted areas for commercial agricultural purposes, and feeding is by means other than grazing.

(c) Internal combustion engines used in the production of crops or the raising of animals or fowl, except an engine that is used to propel an implement of husbandry, as that term is defined in Section 36000 of the Vehicle Code, as that section existed on January 1, 2003.

(d) Other equipment, operations, or activities associated with the growing of crops or the raising of fowl or animals, that emit, or cause to be emitted, any regulated air pollutant, or any precursor to any regulated air pollutant.

SEC. 9. Section 42301.16 is added to the Health and Safety Code, to read:

42301.16. (a) In addition to complying with the requirements of this chapter, a permit system established by a district pursuant to Section 42300 shall ensure that any agricultural source that is required to obtain a permit pursuant to Title I (42 U.S.C. Sec. 7401 et seq.) or Title V (42 U.S.C. Sec. 7661 et seq.) of the federal Clean Air Act is required by district regulation to obtain a permit in a manner that is consistent with the federal requirements.

(b) Except as provided in subdivision (c), a district shall

require an agricultural source of air pollution to obtain a permit unless it makes all of the following findings in a public hearing:

(1) The source is subject to a permit requirement pursuant to Section 40724.6.

(2) A permit is not necessary to impose or enforce reductions of emissions of air pollutants that the district show cause or contribute to the violation of state or federal ambient air quality standard.

(3) The requirement for the source or category of sources to obtain a permit would impose a burden on those sources that is significantly more burdensome than permits required for other similar sources of air pollution.

(c) Prior to requiring a permit for an agricultural source of air pollution with actual emissions that are less than one-half of any applicable emissions threshold for a major source in the district, for any air contaminant, but excluding fugitive dust, a district shall, in a public hearing, make all of the following findings:

(1) The source is not subject to a permit requirement pursuant to Section 40724.6.

(2) A permit is necessary to impose or enforce reductions of emission of air pollutants that the district show cause or contribute to a violation of a state or federal ambient air quality standard.

(3) The requirement for a source or category of sources to obtain a permit would not impose a burden on those sources that is significantly more burdensome than permits required for other similar sources of air pollution.

SEC. 10. Section 42301.17 is added to the Health and Safety Code, to read:

42301.17. (a) A district may adopt by regulation a program under which the district does not require a permit to be obtained by an agricultural source of air pollution that the district may otherwise require to obtain a permit if the owner or operator of the source has taken the following actions to reduce emissions from the source:

(1) Removed all internal combustion engines used in the production of crops or the raising of fowl or animals, except an engine that is used to propel implements of husbandry, at the source and replaced them with engines that meet or exceed the most stringent standards adopted by the state board and the United States Environmental Protection Agency for new internal combustion engines.

(2) Reduced or mitigated emissions from all agricultural activities, including, but not limited to, tilling, discing, cultivation, the raising of livestock and fowl, and similar activities, to a level that the district determines does not cause, or contribute to, a violation of a state or federal ambient air standard, toxic air contaminant, or other air emission limitation.

(3) Reduced or mitigated all emissions from any farm equipment, underground petroleum fuel tanks, or other similar equipment used in agricultural activities to a level that the district determines does not cause or contribute to a violation of a state or federal ambient air standard, toxic air contaminant, or other air emission limitation.

(4) Complied with any other conditions required by state or federal law or district rule or regulation for the source.

(b) Subdivision (a) does not apply to those permits required to be issued pursuant to Title I (42 U.S.C. Sec. 7401 et seq.) or Title V (42 U.S.C. Sec. 7661 et seq.).

SEC. 11. Section 42301.18 is added to the Health and Safety Code, to read:

42301.18. (a) Any agricultural source that existed prior to January 1, 2004, that becomes subject to a permit requirement pursuant to a district rule or regulation that was adopted prior to that date shall be permitted as an existing source and not as a new

source.

(b) Any agricultural source that is an existing source pursuant to subdivision (a) shall be permitted by the district based upon its maximum potential to emit air contaminants, to the extent that level can be determined, as of January 1, 2004.

(c) A district may not require an agricultural source to obtain emissions offsets for criteria pollutants for that source if emissions reductions from that source would not meet the criteria for real, permanent, quantifiable, and enforceable emission reductions.

SEC. 12. Section 42310 of the Health and Safety Code is amended to read:

42310. (a) A permit shall not be required for any of the following:

(1) Any vehicle.

(2) Any structure designed for and used exclusively as a dwelling for not more than four families.

(3) An incinerator used exclusively in connection with a structure described in subdivision (b).

(4) Barbecue equipment that is not used for commercial purposes.

(5) (A) Repairs or maintenance not involving structural changes to any equipment for which a permit has been granted.

(B) As used in this subdivision, maintenance does not include operation.

(b) Nothing in this section shall affect any requirements imposed on a district or a source of air pollution, including, but not limited to, an agricultural source, pursuant to the federal Clean Air Act (42 U.S.C. Sec. 7401 et seq.).

SEC. 13. Section 44559.9 is added to the Health and Safety Code, to read:

44559.9. The authority shall expand the Capital Access Loan Program established by this article to include outreach to financial institutions that service agricultural interests in the state for the purpose of funding air pollution control measures.

SEC. 14. The provisions of the act adding this section are severable. If any provision of this act or its application is held invalid, that invalidity shall not affect other provisions or applications that can be given effect without the invalid provision or application.

SEC. 15. No reimbursement is required by this act pursuant to Section 6 of Article XIII B of the California Constitution for certain costs that may be incurred by a local agency or school district because in that regard this act creates a new crime or infraction, eliminates a crime or infraction, or changes the penalty for a crime or infraction, within the meaning of Section 17556 of the Government Code, or changes the definition of a crime within the meaning of Section 6 of Article XIII B of the California Constitution.

In addition, no reimbursement is required by this act pursuant to Section 6 of Article XIII B of the California Constitution for certain other costs that may be incurred by a local agency or school district because a local agency or school district has the authority to levy service charges, fees, or assessments sufficient to pay for the program or level of service mandated by this act, within the meaning of Section 17556 of the Government Code.

Appendix F
Settlement Agreement, Western United
Dairymen/SJVAPCD

SETTLEMENT AGREEMENT

This Settlement Agreement ("Agreement") is made as of this _____ day of September 2004, by and among the parties Western United Dairymen and Alliance of Western Milk Producers, Inc (collectively "Plaintiffs"), on the one hand, and San Joaquin Valley Air Pollution Control District and David Crow (collectively "District") on the other. Plaintiff and District are referred to (collectively as the "Parties"), and (individually as a "Party"). This Agreement is made with reference to the following the facts:

RECITALS

A. WHEREAS, following the passage of SB 700 by the California State Legislature, District determined that it must require certain new and existing dairies to obtain certain permits for the construction, expansion or operation of such dairies ("Dairy Permitting Requirements");

B. WHEREAS, Plaintiffs assert that the District does not have the lawful authority and jurisdiction to impose the Dairy Permitting Requirements and that any permitting of dairy operations should be limited to the permitting authorized under Health & Safety Code § 40724.6; District disputes this contention and asserts it has full legal authority to impose Dairy Permitting Requirements;

C. WHEREAS, even if the District has the lawful authority to impose Dairy Permitting Requirements, pursuant to Health & Safety Code § 42301.16(c), the District is prohibited under existing major source thresholds from imposing Dairy Permitting Requirements on dairies that emit less than 12.5 tons of non-exempt volatile organic compounds ("VOCs") per year unless it conducts certain hearings and makes certain findings in accordance with that section;

D. WHEREAS, the District has not conducted the hearings and made the findings described in § 43201.16 (c) to impose Dairy Permitting Requirements on dairies which fall under the 12.5 ton threshold; and the District does not have any immediate plans to conduct such hearings;

E. WHEREAS, the District has decided that it will use, and has used, a previously existing emission factor to determine which dairies are above the 12.5 ton threshold; such emission factor is based on the assumption that each milking cow will emit 12.8 lbs. of VOCs each year (such emission factor will be hereinafter referred to as the Interim Emission Factor);

F. WHEREAS, Plaintiffs assert that the Interim Emission Factor is not a reliable or credible basis to estimate dairy emissions and is not based on the best available science; District disputes that assertion and contends use of the Interim Emission Factor is appropriate and in compliance with law;

G. WHEREAS, the Parties believe that the District's consideration of additional scientific and technical information, some of which is not now available, may result in a more accurate emission factor for dairies;

H. WHEREAS, the District has commenced the preparation of a proactive Dairy BACT Guidance in anticipation of issuing permits for new and expanding dairies;

I. WHEREAS, Plaintiffs assert that certain developing technologies, such as anaerobic digesters, should not be considered BACT for dairies at this time;

J. WHEREAS, the parties believe that a more accurate Dairy Emission Factor and the collection and evaluation of additional information regarding control technologies will be helpful in developing a final BACT Guidance document;

K. WHEREAS Plaintiffs have filed suit in Fresno County Superior Court, Dept. 72, *Western United Dairymen et al. v. San Joaquin Valley Air Pollution Control District, et al. Case No. 04CECG01596* alleging, inter alia, that the District has exceeded its lawful authority in issuing the Dairy Permitting Requirements and, even if it had such authority, that the District is unlawfully requiring permits for those below the 12.5 ton threshold by using the Interim Emission Factor (hereinafter the "Litigation"); District disputes Plaintiff's contentions and asserts it is correctly applying permitting requirements to dairies in accordance with law;

L. WHEREAS, Plaintiffs and District wish to end the Litigation and reach an amicable resolution of the disputes between them related to the Dairy Permitting Requirements and foster a constructive and collaborative process by which the scientific and technical issues relating to dairy permitting can be jointly addressed;

AGREEMENT

NOW, THEREFORE, in consideration of the mutual promises, covenants and representations herein, and for good and other valuable consideration, the Parties mutually agree as follows:

1. Definitions.

1.1 The term "dairies" means "confined animal facilities" as that term is defined in Health & Safety Code 39011.5(a) (1) in which cattle are kept and raised for purposes of commercial milk production and shall also include any source operation or article, machine, equipment or other contrivance, as those terms are used or defined by the District, that is associated, contained in or used by dairies.

1.2 The term "Dairy Emission Factor" means the method by which the District determines the actual non-exempt VOC emissions annually emitted from an existing dairy, and its individual units, or which will be emitted, as the result of the construction of a new dairy or

modification of an existing dairy.

1.3 “BACT” shall mean best available control technology as defined by District Rule 2201 and as determined by the District’s BACT policy.

1.4 “Manure Lagoon” means any pond, lagoon, or other similar area for the collection, storage treatment or distribution of liquid manure.

1.5 “Existing Dairy” means any dairy for which construction was completed or commenced prior to January 1, 2004 and which is otherwise not subject to New Source Review as a New Dairy as described in Section 7.

1.6 “New Dairy” means any dairy for which construction was not commenced prior to January 1, 2004 and which is subject to New Source Review as described in Section 7.

2. Dismissal of Lawsuit.

2.1 Within ten (10) days of the execution of this Settlement Agreement, Plaintiffs will dismiss its lawsuit without prejudice and each of the Parties shall bear their own costs and attorneys fees.

3. Dairy Permitting Advisory Group

3.1 Immediately following the execution of this Settlement Agreement, the District’s Air Pollution Control Officer (“APCO”) will establish a Dairy Permitting Advisory Group (“DPAG”) comprised of representatives from District, Plaintiffs, and others with expertise and interest in dairies and dairy air quality issues as may be nominated by Plaintiffs and/or the APCO as agreed by the Parties. The DPAG will work together in a collaborative manner as a clearinghouse for scientific and technical information pertaining to the permitting and regulation of dairies in San Joaquin Valley providing recommendations and advice to the APCO for use in permitting and regulating dairies within the District. . The APCO may, from time to time, substitute members of the DPAG provided that Plaintiffs concur with any substitution of its nominees.

3.2 DPAG shall meet no less than once a month, or as agreed by the DPAG, with the goal of completing the matters covered by this Agreement as soon as practicable but in any event no later than December 31, 2005. DPAG shall allow all interested parties to provide meaningful input into the manner in which the District implements its dairy permitting program and may hold public meetings and workshops. The issues to be addressed by the DPAG include, but are not limited to, the development of a new Dairy Emission Factor, BACT requirements, and technical guidance as to when modifications at an existing dairy should trigger new source review. Meetings of the DPAG shall be open and public to the extent required by the Brown Act, California Government Code sections 54950 et seq.

4. Dairy Emission Factor.

4.1 The DPAG will work to provide the APCO with recommendations and advice for a more accurate Dairy Emission Factor than the current Interim Emission Factor. Several efforts to develop additional information on accurate and reliable Dairy Emission Factors are currently underway. Scientific studies of dairy air emissions are currently underway at U.C. Davis and Fresno State University. The preliminary results of those studies should be available for review within six to eight months. California Air Resources Board ("CARB") will be commencing its efforts to review dairy emission information, and develop a definition of Large Confined Animal Facilities, as required by SB 700. CARB's initial report is expected to be completed by March 2005 and must be adopted by July 1, 2005. The USDA has also convened a panel of experts to review available scientific information for purposes of creating an interim dairy VOC emission factor. This project is endorsed by U.S. EPA, and is scheduled to be completed by the end of 2004. The DPAG will evaluate the information developed in each of the foregoing projects in order to develop a means for determining the volume of VOC emissions from individual dairies, including the development of a Dairy Emission Factor or Dairy Emission Factors for the dairy facility as a whole and, and to the extent possible, for individual units that may be part of individual dairy operations, such as manure lagoons. The DPAG will issue a written report recommending a Dairy Emission Factor no later than April 15, 2005, such report will include a discussion of the scientific information considered and evaluated by the DPAG. The DPAG will meet with the APCO and deputy APCO to present the report and its findings. Thereafter, the APCO will adopt no later than July 1, 2005, the Dairy Emission Factor after considering the information and recommendations developed by the DPAG. The APCO reserves the right to adopt a Dairy Emission Factor other than that recommended by the Dairy Permitting Advisory Group if the APCO determines that the best available science shows that the Dairy Emission Factor is more accurate than recommended by the DPAG. Before adopting a Dairy Emission Factor, the APCO will conduct a public workshop or workshops to discuss and consider the available science and recommendations of the DPAG and any other science considered by the APCO. Upon the adoption of the Dairy Emission Factor, the APCO will promptly issue a report that explains the APCO's findings which support such adoption. The Dairy Emission Factor adopted will be used in implementing the District's Dairy permitting program including permitting threshold and BACT determinations.

4.2 Plaintiffs expressly reserve their right to challenge a new Dairy Emission Factor and nothing in this agreement shall preclude the Plaintiffs from communicating their objections and concerns to the District Governing Board in accordance with the Brown Act, requesting a hearing before the District Governing Board or seeking any other recourse permitted by law or under this Agreement.

4.3 The District will continue to use the Interim Emission Factor as an interim placeholder until a more accurate Dairy Emission Factor is adopted as provided above. The Interim Emission Factor will be used in the manner currently set forth on the District's website, including its emission calculator. Nothing herein, however, will prevent the District from

adopting another interim emission factor if the best available science indicates that such an emission factor should be adopted. However, neither the use of the Interim Emission Factor by the District as provided herein, the acquiescence in such use by Plaintiffs, or by the dairy industry, nor this Settlement Agreement, shall be used in any way to suggest or contend, in any forum, that the Interim Emission Factor has been accepted or is acceptable to the dairy industry or Plaintiffs. The District shall not communicate, directly or indirectly, that the Interim Emission Factor has been accepted or agreed upon in any way, other than as outlined in this agreement, by the regulated community.

4.4 Upon the adoption of the new Dairy Emission Factor, the District will use the new Dairy Emission Factor for purposes of determining the applicability of the 12.5-ton exemption threshold for all pending permit applications.

4.5 Existing, New and Expanding Dairies, that have already been permitted based on the Interim Emission Factor, but whose uncontrolled VOC emissions fall below the 12.5 ton threshold as a result of the new Dairy Emission Factor shall be notified by the District that under the new Dairy Emission Factor, they are no longer subject to the permitting requirements of the District and that their permits are no longer required and the conditions therein will no longer have any legal effect unless such Existing Dairy elects otherwise. ("Uncontrolled emissions" for purposes of this paragraph shall mean the actual emission of VOCs which could have occurred but for controls implemented by the dairy as a condition to its permit.) Such notice will be provided by the District within sixty (60) days of adoption of the new Dairy Emission Factor. Such dairy may elect to keep its permit by notifying the District of same within thirty (30) days of receiving the District's notice. Actual permit fees shall be refunded by the District to those who do not elect to keep the permit within ninety (90) days of the District's adoption of the new Dairy Emission Factor; however, all other regulatory compliance costs will be borne by the applicant. The District shall not be liable for any refunds for which a determination of permit exemption is made after , December 31, 2005. Any dairies required to obtain emission offsets will be relieved of their obligation to do so.

4.6 Expanding Dairies who are otherwise above the 12.5 ton threshold (uncontrolled emissions) with the new Dairy Emission Factor but whose expansion falls below the new source review trigger as set forth in Rule 2201 as a result of the new Dairy Emission Factor shall be notified by the District that under the new Dairy Emission Factor they are no longer subject to new source review requirements of the District for the expansion in question and no longer subject to any BACT imposed on such facility's permit for the expansion in question.

5. Development of Best Available Control Technology Guidance.

5.1 The Parties recognize that an accurate understanding of the quantity and source of potential or actual VOC emissions from new or expanding dairies is a critical element in any BACT determination, including the preparation of a proactive Dairy BACT Guidance document ("BACT Guidance"). The District will not promulgate in final form any proactive dairy BACT guidance document until the work described in Section 4 has been completed and a new Dairy

Emission Factor has been established. The DPAG will use the new Dairy Emission Factor to further develop and reevaluate the current draft BACT Guidance and make recommendations and provide advice to the APCO regarding a final BACT Guidance. Any new or additional information regarding the feasibility of technologies or practices for controlling emissions from new dairies will also be considered by the DPAG in making recommendations to the APCO regarding a final dairy BACT Guidance. Such recommendations may include recommendations for different BACT for new dairies versus expanding dairies. The APCO shall work with the DPAG, the regulated community and other interested parties in adopting a BACT Guidance after considering the foregoing information, including the Dairy Emission Factor and new or additional information developed regarding the costs, operating parameters and operational history of technologies for controlling emissions and the recommendations made by DPAG. The APCO or his authorized representative shall meet with the DPAG to discuss its findings and recommendations regarding the BACT Guidance. The APCO shall reserve the right to adopt a different BACT Guidance than recommended by DPAG if the APCO determines the best available scientific and technical information warrants different BACT determinations and such BACT determinations are in accordance with District policy, and state and federal law. The APCO will conduct at least one additional public workshop after the recommendations have been issued by the DPAG but before adopting the final BACT Guidance. If disagreement over the final BACT Guidance remains, Plaintiffs expressly reserve their right to challenge any BACT Guidance or determination and nothing in this agreement shall preclude the Plaintiffs from communicating their objections and concerns to the District Governing Board in accordance with the Brown Act, requesting a hearing before the District Governing Board or seeking any other recourse permitted by law or this Agreement.

5.2 Due to the development of additional information as provided above, the APCO will not make any achieved in practice determinations for individual dairy permits or for the dairy BACT Guidance until the final BACT Guidance has been adopted by the APCO as provided in 5.1.

5.3 To the extent any permit applications for New Dairies require individual BACT determinations before the completion of a final BACT Guidance as described above, the APCO will not require the immediate installation of a lagoon cover or digester as BACT, but may require that the applicant install an anaerobic treatment lagoon pursuant to the specifications set forth in U.S. Department of Agriculture-Natural Resources Conservation Service Field Office Technical Guide, Practice Standards No. 359. Nothing will prevent the District from allowing a permit applicant to install an anaerobic digester if it volunteers to do so. In the initial permit, the District may also require the applicant to later install a lagoon cover or digester after the date a final Dairy BACT Guidance is issued to the extent it is consistent with the District's BACT Guidance. However such requirement will be subject to the District's later determination, following the date the final Dairy BACT Guidance is issued, that the anaerobic digester will provide effective VOC control consistent with the assumptions contained in the initial permit. The permit assumptions will include the quantity of VOC emissions which the District expects will be controlled as a result of installing a digester, the Interim Emission Factor (unless another emission factor is adopted as provided above) and the VOC destruction rate. If the assumptions

prove to be inaccurate, the permit applicant will be relieved of any obligation to install a lagoon cover or digester however, the District may reopen the permit and make a new BACT determination as to the manure lagoon based on the final BACT Guidance.

6. Existing Dairies

6.1 Until the District conducts the rule-making required under Health & Safety Code § 40724.6 for the development of Best Available Retrofit Control Technology (BARCT) or any other control measures to be adopted under § 40724.6, permits for Existing Dairies will not require BARCT, conditions for the control of VOC emissions, or any other conditions relating to the control of air emissions other than those specific conditions under the prohibitory rules contained in Regulation IV and Regulation VIII which would otherwise be applicable to the Dairy, whether or not it obtains a permit.

7. New Source Review Trigger

7.1 Dairies where Construction Commenced Prior to January 1, 2004. All sources (including source operations, articles, equipment, machines, contrivances, buildings, structures, facilities, installations and any sources contained therein) contained within a permit unit for which construction commenced for any source included within the permit unit prior to January 1, 2004 shall be considered grandfathered and shall not be subject to New Source Review. The permit unit, and all sources within such permit unit, shall be deemed as having commenced construction if any of the following applies to any source within the permit unit: (1) Begun, or caused to begin, a continuous program of actual onsite construction of the source to be completed within a reasonable time; or (2) Entered into binding agreements or contractual obligations, which cannot be canceled or modified without substantial loss to the owner or operator, to undertake a program of actual construction of the source to be completed within a reasonable time. For purposes of this paragraph, a "permit unit" shall refer to any and all sources (including source operations, articles, equipment, machines, contrivances, buildings, structures, facilities, installations and any sources contained therein), contained within one of the following five categories of dairy operations: (1) Cow Housing and Feeding (2) Dairy Waste Treatment Lagoon (3) Milking Center (4) Dairy Manure Storage and (5) Dairy Manure Land Application. For example, all building, structures, articles, equipment, machines and operations relating to Cow Housing and Feeding will comprise one permit unit. There shall be no more than five (5) permit units at any one Dairy.

7.2 Modifications Commencing after January 1, 2004. Modifications commencing after January 1, 2004 necessitating a change in permit conditions may trigger NSR pursuant to Rule 2201. DPAG will work towards providing advice and recommendations to the APCO regarding how and when modifications at existing dairies, in which construction of modifications commenced after January 1, 2004, would trigger new source review, if at all, in a manner consistent with Rule 2201, and state and federal law.

8. Covenant not to Sue

8.1 Except for claims expressly reserved in this Agreement, Plaintiffs agree to not sue the District for any claims asserted in the Litigation. Notwithstanding the foregoing, nothing herein shall prevent Plaintiff from asserting the claims asserted in the Litigation if the District fails to comply with, or breaches, any material terms and conditions of this Agreement and/or the District cannot comply with the such terms and conditions for any reason whatsoever, whether within or outside of its control. . Nothing herein shall prevent Plaintiffs from intervening or filing cross-claims in any action filed by a third party nor shall this agreement be construed in a manner which limits any persons right to challenge permitting actions as provided in Health and Safety Code section 42302.1. The District shall not sue any person to enforce any requirement that is contrary to the terms of this Agreement. The District agrees that any applicable statute of limitations or other time related deadline or defense for the filing of any claims asserted in the Litigation shall be tolled for a period of one year from the date the Litigation is dismissed.

9. No Admission.

9.1 This Settlement Agreement is a compromise of disputed claims in an effort to develop a collaborative working arrangement between the District and Plaintiffs. Nothing herein shall be construed as an admission as to any legal position, claim, defense or other issue in the Litigation or otherwise related to the matters addressed herein.

10. Authority to Sign.

10.1 Each signatory of this Agreement expressly represents and warrants that he or she is authorized to act for and on behalf of each of the Parties for which he or she is executing this Agreement, as shown on the signature page herein. Each Party represents and warrants that it has the authority to enter into this Agreement, that it has performed all acts necessary to enter into this Agreement and that the Agreement is legally binding and enforceable against it.

11. Consultation With Attorney/.

11.1 By executing this Agreement, each signatory asserts that he or she has consulted with their respective attorneys who have described the legal effect of this Agreement prior to the execution of this Agreement.

12. Litigation Expenses.

12.1 As between them, each Party to this Agreement shall bear its own attorney's fees, investigation expenses, costs and the like in connection with Dispute and the Litigation and this Agreement.

13. Modifications.

13.1 This Agreement may be modified only by an agreement in writing signed by the Parties at the time of the modification.

14. Governing Law.

14.1 This Agreement shall be governed by and construed in accordance with the laws of the State of California. This Agreement shall in all respects be interpreted, enforced and governed by and under the laws of the State of California. Any action to enforce this Agreement shall be filed in the Superior Court for the County of Fresno. The language in all parts of this Agreement shall be in all cases construed as a whole according to its meaning and not strictly for or against any Party. In addition, each of the Parties has cooperated in the drafting and preparation of this Agreement and therefore agrees that any law, legal decision or rule of construction of contracts including, without limitation, Civil Code Section 1654, resolving ambiguities against the drafting Party shall be inapplicable to this Agreement.

15. Counterpart Signatures.

15.1 This Agreement may be executed in two or more counterparts, and shall become fully valid and binding upon all Parties hereto when the last of such signatures is affixed. Each of the counterparts shall be deemed to be an original and shall constitute one instrument.

15.2 The signature of any signatory may be executed through the use of a facsimile transmission. In such case, a facsimile signature on the appropriate lines of this Agreement shall be effective as if the original signature were affixed hereto.

16. Further Cooperation.

16.1 Each Party will and whenever and as often as it shall be requested to do so by one or more of the other Parties shall use best efforts to perform all acts as may be necessary or appropriate to carry out the intent and purposes of this Agreement.

17. Notice.

17.1 All notices required or permitted hereunder shall be in writing, and may be given by personal service; by certified or registered mail, return receipt requested; by national overnight courier service; or by facsimile to the person, address and telecopier number stated below. Notices and other communications shall be deemed received by the earlier of: (a) if personally delivered, the date of delivery to the address of the person to receive such notice, (b) if mailed, three (3) days after posting by the United States Post Office, (c) if sent by national overnight courier service, one (1) business day after delivery to such courier service, or (d) if given by facsimile, when sent and receipt is confirmed. Any notice, request, demand, direction or other communication by facsimile must be confirmed within twenty-four (24) hours by a letter

mailed or delivered in accordance with the foregoing.

18. Third Party Beneficiary

18.1 Dairies who are affected by the District's Dairy Permitting Requirements are intended to benefit from the performance of this Agreement and are third party beneficiaries.

19. Integration

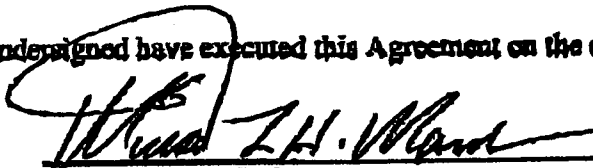
19.1 This Agreement contains the entire agreement between the Parties relating to the subject matter hereof and supersedes all prior discussions, negotiations, correspondence and drafts pertaining to the matters set forth herein. Any oral modifications or representations concerning this Agreement shall be of no force and effect.

20. Construction of Captions and Headings

20.1 Captions or headings of the sections of this Agreement are for convenience and reference only. The words in the captions or headings in no way explain, modify, amplify, or interpret this Agreement.

IN WITNESS WHEREOF, the undersigned have executed this Agreement on the date subscribed next to their names.

Dated: September 16, 2004


Western United Dairymen

By: (Print Name) Michael L. H. Marsh

Its: Chief Executive Officer

Dated: September __, 2004

Alliance of Western Milk Producers, Inc.

By: _____

Its: _____

Dated: September __, 2004

San Joaquin Valley Air Pollution Control District

By: _____

Its: _____

Dated: September __, 2004

David Crow

By: _____

Its: _____

mailed or delivered in accordance with the foregoing.

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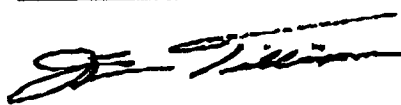
Dated: September __, 2004

Western United Dairymen

By: [Print Name] _____

Its: _____

Dated: September 16, 2004


Alliance of Western Milk Producers, Inc.

By: James E. Tillison _____

Its: Exec. VP/CEO _____

Dated: September __, 2004

San Joaquin Valley Air Pollution Control District

By: _____

Its: _____

mailed or delivered in accordance with the foregoing.

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IN WITNESS WHEREOF, the undersigned have executed this Agreement on the date subscribed next to their names.

Dated: September __, 2004

Western United Dairymen

By: [Print Name] _____

Its: _____

Dated: September __, 2004

Alliance of Western Milk Producers, Inc.

By: _____

Its: _____

Dated: September __, 2004

Barbara Patrick

San Joaquin Valley Air Pollution Control District

By: *Barbara Patrick* _____

Its: *Chairman* _____

Dated: September __, 2004

David Crow

By: _____

Its: _____

mailed or delivered in accordance with the foregoing.

18. Third Party Beneficiary

18.1 Dairies who are affected by the District's Dairy Permitting Requirements are intended to benefit from the performance of this Agreement and are third party beneficiaries.

19. Integration.

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IN WITNESS WHEREOF, the undersigned have executed this Agreement on the date subscribed next to their names.

Dated: September __, 2004

Western United Dairymen

By: [Print Name] _____

Its: _____

Dated: September __, 2004

Alliance of Western Milk Producers, Inc.

By: _____

Its: _____

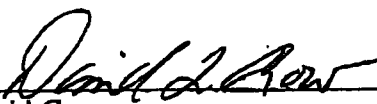
Dated: September __, 2004

San Joaquin Valley Air Pollution Control District

By: _____

Its: _____

Dated: September 29 2004


David Crow

By: DAVID L. CROW

Its: APCCO / Exec. Director

Appendix G

Vapor/Particulate Emissions Health Impacts

EXCERPTED FROM
"DAIRY EMISSIONS EVALUATION FOR MERCED COUNTY"

Montgomery Watson Harza (MWH)

January 9, 2002

3.4 PUBLIC HEALTH IMPACTS

This section presents an evaluation of the potential public health impacts posed by vapor and particulate emissions from dairy operations within Merced County. A summary of the available toxicological information for vapors and particulates potentially emitted from dairies is presented in Section 3.3.1, along with applicable public health criteria and regulatory standards. Evaluation of the potential public health impacts of regional emissions of these vapors and particulates is presented in Section 3.3.2.

3.4.1 *Toxicological Profiles – Vapors and Particulates*

Toxicological profiles providing descriptions of the potential human health effects of vapors and particulates in air were prepared for the primary air contaminants related to dairy operations and are presented in Appendix D. The primary air contaminants that may result from dairy emissions include ammonia, hydrogen sulfide, methane, nitrogen oxides, PM_{2.5} and PM₁₀. These substances result directly, or indirectly, from dairy waste production.

Other potential emissions from dairy operations include ozone and carbon monoxide, as discussed previously (Section 3.2). However, the most prevalent sources of ozone and carbon monoxide are

motorized vehicles, energy production, wildfires, and controlled burning activities. Although on-road and off-road motor vehicles and farm equipment used by the dairy industry may contribute to total ozone and carbon monoxide emissions, these represent only minor sources in comparison to public and commercial transportation, and other sources.

3.4.1.1 Vapors

Potential vapors associated with dairy waste production include ammonia, hydrogen sulfide, methane, and nitrogen oxides. Potential human health effects and applicable public health criteria are summarized in the following toxicology profiles for these substances.

Ammonia

Ammonia is a colorless gas or liquid with a strong irritating odor. Exposure to ammonia as a liquid, gas or in solutions produces irritation to the skin, eyes and respiratory tract.

Acute accidental exposure to high concentration of ammonia may result in epidermal blistering, severe irritation, and edema to the nasopharyngeal passages and pulmonary tissues. Airway obstruction induced by ammonia toxicity results in reduced ventilation, pulmonary oxygen transfer, and fluid accumulation (White, 1971).

High concentrations of ammonia produce irritation and damage to the eye ranging from irritation to acute corneal injury. Gaseous and/or liquid ammonia can cause burns to the cornea and iris, death to the corneal epithelium and lens, and, in some cases, blindness.

Ammonia exposure to experimental animals in acute and subchronic exposure scenarios resulted in increased respiratory rates and mild to severe irritation of the respiratory tract (Mayan and Merilan, 1972). Rats, guinea pigs, rabbits, dogs and primates exposed to repeated 8 hour per day, 5 days per week exposure for 6 weeks showed symptoms ranging from mild irritation to eye irritation at doses of 125 mg/m³ to death at doses of 470 mg/m³. Death resulted from related respiratory problems (Coon et al., 1970).

Experimental ammonia exposure to human volunteers resulted in development of olfactory thresholds between 10 and 20 ppm and irritation tolerances of between 100 and 150 ppm (Ferguson et al., 1977). In a paired exposure experiment involving knowledgeable and lay subjects, there were significant differences in threshold responses to ammonia vapors, although all subjects expressed eye and nasal irritation, general discomfort and headache. All volunteers terminated their exposures at a level of 140 ppm (Verberk, 1977).

Workers have been occupationally exposed to ammonia gas in large concentrations often through accidental, uncontrolled releases from storage tanks, refrigeration systems, or ruptured lines (White, 1971;

Hatton et al. 1979; Montague and MacNiel, 1980). Accidental exposures in such cases have resulted in occasional fatalities.

There is currently no evidence to indicate that ammonia creates problems in reproduction in laboratory animals or humans. In addition, there are no reported instances of ammonia-induced carcinogenicity in humans or animals. However, there has been speculation about possible carcinogenicity in certain industrial settings, where there are mixtures of coal gases, ammonia, and isobutyl oils (Bittersohl, 1971). The USEPA does not currently classify ammonia as a carcinogen.

The United States Occupational Safety and Health Administration (OSHA) has established an 8-hour Time Weighted Average (TWA) Permissible Exposure Limit (PEL) of 35 mg/m³ for ammonia vapors in the workplace (29 CFR - 1910.1000, Subpart Z).

Hydrogen Sulfide

Hydrogen sulfide is a colorless, flammable gas with a highly offensive odor of rotten eggs. It is widely utilized as a reagent in chemical synthesis and in the manufacture of deuterium. Major occupational exposures to hydrogen sulfide occur in the petroleum industry, natural gas, soil, sewer gas, and as a chemical by-product.

Hydrogen sulfide has a strong odor; the threshold for detection by humans is on the order of 0.025 ppm (0.035 mg/m³). Levels in the range of 3 – 5 ppm (4 – 7 mg/m³) cause an offensive odor. The most common symptoms of low-level hydrogen sulfide exposure in humans are nervousness, cough, nausea, headache and insomnia (Poda, 1966). Hydrogen sulfide concentrations in the range of 50 – 250 ppm (70 – 350 mg/m³) may cause eye and mucous membrane irritation, pulmonary edema, and pneumonia. At concentrations of 500 to 1000 ppm, hydrogen sulfide acts as a systemic poison, causing sudden fatigue, headache, dizziness, intense anxiety, loss of olfactory function, nausea, convulsions, pulmonary edema, respiratory arrest, unconsciousness, cardiac failure, and death.

Chronic effects in humans do not generally occur, due to the strong odor of this chemical. Subchronic exposure of laboratory mice to concentrations of 80 ppm (110 mg/m³) resulted in inflammation of the nasal mucosa and respiratory epithelium, reductions in body weight gain, and decreased organ weights. This study served as the basis for a chronic reference concentration (RfC) developed by the United States Environmental Protection Agency (USEPA) for hydrogen sulfide (IRIS, 2001).

There is currently no evidence to indicate that hydrogen sulfide is genotoxic. In addition, there are no reported instances of hydrogen sulfide-induced carcinogenicity in humans or animals, and the USEPA does not currently classify this chemical as a carcinogen.

The United States Occupational Safety and Health Administration (OSHA) does not currently cite a Permissible Exposure Limit (PEL) for hydrogen sulfide. However, the American Conference of

Governmental Industrial Hygienists (ACGIH) has recommended an 8-hour Time Weighted Average (TWA) Threshold Limit Value (TLV) of 10 ppm (14 mg/m³) for hydrogen sulfide vapors in the workplace (ACGIH, 1980). An acceptable ceiling concentration of 20 ppm (28 mg/m³) for occupational exposures to hydrogen sulfide has been established by federal OSHA.

A National Ambient Air Quality Standard (NAAQS) has not been developed for hydrogen sulfide for public health exposures. However, the California Office of Environmental Health Hazard Assessment (OEHHA) has established an Acute Reference Exposure Level (REL) for hydrogen sulfide of 0.042 mg/m³ based on mild respiratory irritation effects. The California State Ambient Air Quality Standard (SAAQS) for hydrogen sulfide has also been set at 0.042 mg/m³, averaged over one hour. A Chronic REL of 0.010 mg/m³ has been established by OEHHA based on respiratory system effects. For purposes of human health risk assessment, the USEPA has established a chronic inhalation reference concentration (RfC) for hydrogen sulfide of 0.001 mg/m³ based on an experimental subchronic no-observed-adverse-effect-level (NOAEL) of 0.042 mg/m³ in mice, divided by an uncertainty factor of 1,000.

Methane

Methane is an odorless, colorless gas, or a liquid under pressure. It is the principal component of natural gas. It is used in the manufacture of other organic chemicals such as acetylene, hydrogen cyanide, and hydrogen (NJDHSS). Methane is combustible, and mixtures of about 5 to 15 percent in air are explosive. Methane is considered to be one of several greenhouse gases that contribute to the problem of global warming. This odorless gas absorbs and reflects radiation from the surface of the earth, and as a result may contribute to the overall warming of the earth's surface temperature (Martin, 1997).

Methane results from both anthropogenic and non-anthropogenic sources. One-fourth of the anthropogenic production of methane is from fossil fuel use. Methane is also produced for industrial uses. In the U.S. alone, annual production is greater than 1 million pounds. Biological fermentation is another major manner in which methane is produced. This occurs with anaerobic conditions such as those often found in (in order of contribution) landfills, domesticated livestock, natural gas and oil production, coal mining, and livestock manure (Entrix, 2001).

Methane released directly from domesticated ruminant animals accounts for about 20 percent of the anthropogenic methane generated in the United States (Entrix, 2001). Methane emissions from dairies in Merced County are calculated as 26,600 tons per year, using an emission factor of 0.34 pounds/animal unit/day (Entrix, 2001).

Methane released from the anaerobic decomposition of livestock manure accounts for seven percent of the total anthropogenic methane produced in the United States (Entrix, 2001). Other sources of methane generation include rice farming, natural gas and petroleum use, coal mining, biomass burning, landfills and municipal wastewater treatment facilities

Methane is a simple asphyxiant, and is not generally associated with systemic toxicity (Casarett and Doull, 1980). Methane and other simple asphyxiants act by excluding oxygen from the lungs. Displacement of oxygen to one-third of its normal amount (partial pressure) in air may be necessary before appreciable symptoms are observed. This, in turn, requires the presence of the asphyxiant in a concentration of 33 percent (%) in the mixture of air and gas (Sax, 1979). When the asphyxiant reaches a concentration of 50%, marked symptoms are observed; and a concentration of 75% is fatal in a matter of minutes. Methane has been implicated in fatalities in the mining industry, and as a result of residential and industrial natural gas leaks.

There are currently no state or federal ambient air quality standards established for methane because it is only toxic at concentrations above explosive levels. The National Institute of Occupational Safety and Health (NIOSH) recommends a lower explosive limit (LEL) for methane of 5.3% in air (Sax, 1979).

Nitrogen Oxides

Nitrogen oxides (NO_x) are colored gases formed by the combustion of nitrogen-containing fossil fuels, and thermal or biological fixation of nitrogen. On-road motor vehicles and other mobile sources such as boats, aircraft, and trains are significant sources of NO_x emissions. In addition, farm equipment and stationary sources of fuel combustion, such as oil and gas production and industrial sources, contribute are the primary contributors to total NO_x emissions within this air basin. In agriculture, nitrous oxides are released from the nitrification of ammonia in livestock waste, but more is released directly from soil (Eckard et. al.). NO_x may also be an important indoor air pollutant where unventilated gas stoves or kerosene heaters are used (Casarett and Doull, 1991).

Nitric oxide (NO) is a by-product of high temperature combustion processes, and results from the combination of nitrogen and oxygen. NO can be easily converted to nitrogen dioxide (NO₂) as a result of atmospheric processes. For example, NO₂ is formed in the atmosphere as a result of the reaction of nitric oxide (NO) and oxygen or ozone (O₃). NO₂ can react with oxidants to form nitric acid (HNO₃). HNO₃ can then react with ammonia to form ammonium nitrate.

NO₂ is a deep lung irritant, and may cause pulmonary edema when inhaled in sufficient quantities. It is an oxidant gas, similar to ozone, and deposits in the lung in an area only slightly proximal to the site of ozone deposition. However, it is a less potent irritant than ozone. Levels of NO₂ needed to produce effects are in general far greater than levels that occur in ambient air (Casarett and Doull, 1991).

Chronic exposures to NO₂ may cause pulmonary damage, decreased pulmonary function, and increased susceptibility to respiratory infection. Such exposures can be a practical problem for farmers, as sufficient amounts can be released by ensilage to produce the symptoms of pulmonary damage known as 'silo-fillers' disease. Studies in laboratory animals simulating the twice-a-day spike in NO_x levels related to automobile pollution have demonstrated significant decreases in end-expiratory volume and vital

capacity. Other studies have shown that short-term or long-term exposures to NO_x can increase susceptibility to respiratory infection by bacterial pneumonia or influenza virus. Asthmatics are not more sensitive than normal subjects to NO₂ (Casarett and Doull, 1991).

Nitrogen oxides have not been associated with carcinogenic health effects in laboratory animals or humans, and are not classified as carcinogens by the United States Environmental Protection Agency (USEPA).

Federal OSHA has established an 8-hr TWA-TLV of 9,000 µg/m³ for NO₂ vapors in the workplace. This occupational standard is also applicable to NO.

NO₂ is a criteria pollutant for which state and federal air quality standards have been set. The federal annual average standard is set at 100 µg/m³, and the State of California has set a one-hour standard at 470 µg/m³. Currently, the San Joaquin Valley Unified Air Pollution Control District is in attainment for the state and federal NO₂ standards. This means that concentrations of NO₂ fall below the threshold levels established by the EPA and the State of California. The USEPA measured the releases of NO_x from Merced County in 1999 as 10,332 tons (USEPA, 1999).

Reactive Organic Gases/Total Organic Gases

Reactive organic gases (ROG) are a subset of total organic gases (TOG) that form ozone. ROG are created by the incomplete combustion of fuels or other carbon sources. ROG are composed of hydrocarbons which react with nitrogen oxides and form ozone. Not all hydrocarbons contribute equally to ozone formation.

Their reactivity depends on their chemical structure and the atmospheric conditions to which they are subjected. The current California Air Resources Board (CARB) definition of Reactive Organic Gases is any compound of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, ammonium carbonate, methane, methylene chloride, 1,1,1-trichloroethane, freons, methylated siloxanes and certain perfluorocarbons. The U.S. EPA have also exempted the following low-reactive organic compounds: acetone, ethane, methyl acetate, perchloroethylene and parachlorobenzotrifluoride (CARB, 2000). California's air pollution control districts report TOG to the CARB. The CARB derives a value for ROG by multiplying TOG by a fraction based on the source of the TOG (CARB, 2000).

The toxicity of organics depends on their structure. Most hydrocarbons are nontoxic at low concentrations. Some low-molecular-weight aldehydes are carcinogens and some monocyclic and polycyclic aromatic hydrocarbons (PAH) are suspected or known carcinogens. Ozone causes respiratory irritation, and long term respiratory problems.

3.4.1.2 Particulates

PM_{2.5}

PM_{2.5} is atmospheric particulate matter having a particle size less than 2.5 microns (μm) in diameter. There are three primary origins of PM_{2.5}: (1) primary solid particulate matter that is emitted directly in the solid phase; (2) primary condensable particulate matter that can be emitted at high temperature in the gas phase, but condenses into the solid phase upon dilution and cooling; and (3) secondary particulate matter that is formed through atmospheric reactions of gaseous SO₂ and NO_x precursor emissions (USEPA, 1999).

Primary solid particulate matter results largely from combustion of fossil fuels or biomass, with contributions from certain industrial processes. Sources of primary particulate also include fugitive dust emissions from paved and unpaved roads, crustal material from construction activities, agricultural tilling and wind erosion (USEPA, 1999).

Primary condensable particulate matter is largely comprised of semivolatile organic compounds that condense at ambient temperatures to form aerosols.

Secondary PM_{2.5} forms through chemical reactions that convert common gaseous pollutants into very small particles. Secondary PM is dominated by sulfur and nitrogen species, but in some locations there can also be significant contributions from secondary organic aerosol (USEPA, 1999).

Exposure to elevated levels of particulate matter causes irritation of the eyes and respiratory system. The nature of impacts to the respiratory system are related to the size of the individual particles (USEPA, 2001). Particulate matter having particle diameters greater than 10 μm tend to deposit in the nasopharyngeal region of the respiratory tract and are not carried into the deeper airways and lungs. Airborne particles of diameter about 2.5 – 10 μm deposit in the trachea and upper bronchi due to impaction. Those airborne particles of diameter 0.3 – 0.5 μm undergo the least respiratory tract deposition due to impaction and are carried into the deeper alveolar (i.e., gas exchange) regions of the lung.

Brief exposures to approximately 100 ug/m^3 particulate matter results in increased mucociliary clearance in healthy humans (USEPA, 2001). Exposures to greater than about 400 ug/m^3 causes bronchoconstriction in asthmatics. Acute exposures to approximately 1000 ug/m^3 did not cause airway inflammation in healthy adults, but may cause bronchiolar hyperreactivity in sensitive subjects. Because of the potential to cause bronchiolar hyperreactivity, brief exposures to high concentrations of particulate matter may result in respiratory distress including asthma attacks in individuals with pre-existing respiratory illness.

Longer-term exposure to particulate matter is associated with chronic respiratory inflammation, rhinitis, asthma, increased susceptibility to respiratory tract infections, and increased mortality (USEPA, 2001). Relative risk of mortality is highest in the elderly and those individuals with pre-existing respiratory

conditions (e.g., asthma). While previous reports of mortality associated with exposure to high levels of particulate matter focused on respiratory effects, more recent data suggests that cardiac failure may be a more important contributor to particulate matter-related mortality (USEPA, 2001).

Increased mortality and/or morbidity associated with fine particulate matter indicators (e.g., $PM_{2.5}$, sulfates, etc.) in U.S. and Canadian cities indicates a 2.0 – 8.5% increase in total deaths per 25 ug/m^3 increase in 24-hour $PM_{2.5}$ concentration (USEPA, 2001). A study by Jonathon Levy et al. (2000) of the Harvard School of Public Health suggests that the particulate matter-mortality relationship is stronger in locations with higher $PM_{2.5}/PM_{10}$ ratios, supporting the hypothesized role of fine particles in mortality. However, a study by Dr. Morton Lippmann and colleagues from the New York University School of Medicine found that relative risks for $PM_{10-2.5}$, and the coarse particle fraction of PM_{10} , were similar to those for $PM_{2.5}$ and even higher in the case of ischemic heart disease and stroke. These results suggest that the effects of the coarse particle fraction of PM_{10} on potential morbidity and mortality associated with particulate matter should not be overlooked.

A National Ambient Air Quality Standard (NAAQS) of 65 ug/m^3 (24-hr) and 15 ug/m^3 (annual arithmetic mean) has been proposed for $PM_{2.5}$ (USEPA, 2001). The California State Air Resources Board has not proposed a separate standard for $PM_{2.5}$.

PM_{10}

PM_{10} is atmospheric particulate matter with an aerodynamic diameter (not necessarily particle diameter) less than 10 μm . Because of surface area to mass ratios, atmospheric particles range in their aerodynamic as well as their chemical properties. Primary sources of PM_{10} include soil, dried dairy manure, soot from gasoline and diesel engines, salt particles from sea spray, and particles resulting from ozone, ammonia and other chemical reactions. Smaller diameter particles can also combine with fog to form PM_{10} .

Exposure to elevated levels of particulate matter causes irritation of the eyes and respiratory system. The nature of impacts to the respiratory system are related to the size of the individual particles (USEPA, 2001). Particulate matter having particle diameters greater than 10 μm tend to deposit in the nasopharyngeal region of the respiratory tract and are not carried into the deeper airways and lungs. Airborne particles of diameter about 2.5 – 10 μm deposit in the trachea and upper bronchi due to impaction. Those airborne particles of diameter 0.3 – 0.5 μm undergo the least respiratory tract deposition due to impaction and are carried into the deeper alveolar (i.e., gas exchange) regions of the lung.

The Health Effects Institute, which is jointly funded by the USEPA and industry, commissioned a nationwide study of the effects of air pollution on human health known as the National Morbidity, Mortality and Air Pollution Study, or NMMAPS (Samet et al., 2000). In an analysis of the 90 largest U.S. cities, overall mortality increased by 0.5% for every 10 ug/m^3 increase in PM_{10} measured the day before death. The effects were more pronounced for deaths due to heart and lung disease than for total deaths. The study also indicated an association between elevated PM_{10} concentrations and increased

hospital admissions. For each 10 ug/m³ increase in PM₁₀, there was approximately a 1% increase in hospital admissions for cardiovascular disease, and about a 2% increase in admissions for pneumonia and chronic obstructive pulmonary disease.

A study by Jonathon Levy et al. (2000) of the Harvard School of Public Health suggests that the particulate matter-mortality relationship is stronger in locations with higher PM_{2.5} / PM₁₀ ratios, supporting the hypothesized role of fine particles in mortality. However, a study by Dr. Morton Lippmann and colleagues from the New York University School of Medicine found that relative risks for PM_{10-2.5}, the coarse particle fraction of PM₁₀, were similar to those for PM_{2.5}, and even higher in the case of ischemic heart disease and stroke. These results suggest that the effects of the coarse particle fraction of PM₁₀ on potential morbidity and mortality associated with particulate matter should not be overlooked.

The National Ambient Air Quality Standard (NAAQS) for PM₁₀ has been set at 150 ug/m³ (24-hr), and 50 ug/m³ (annual arithmetic mean). The California State Ambient Air Quality Standard (SAAQS) for PM₁₀ has been set at 50 ug/m³ (24-hr) and 30 ug/m³ (annual geometric mean). Citing reported associations between increased PM₁₀ concentrations and childhood asthma, and adult risk of heart attack, the San Joaquin Valley Air Pollution Control District (SJVAPCD) proposed amendments to Regulation VIII (Fugitive PM₁₀ Prohibitions) setting a visible emission standard of 20% opacity rather than the currently allowable 40% (SJVAPCD, 2001). The proposed new rules would apply to construction, landfills, government-owned roads, oil production facilities, and off-field agricultural sources (i.e., unpaved roads and equipment storage areas). The proposed rules do not apply to agricultural tilling, land preparation, and harvesting.

3.4.2 Potential Public Health Impacts of Regional Vapor and Particulate Emissions

This section provides an evaluation of the potential for regional concentrations of the vapors and particulates described in the previous section to cause adverse public health impacts. The methods used in this public health evaluation are described in Section 3.4.2.1, and the results are presented in Section 3.4.2.2.

3.4.2.1 Methods

The vapors and particulates potentially emitted by dairy operations, and described in Section 3.4.2, are not currently considered by the USEPA to be carcinogenic substances. Instead, these substances are associated with various noncarcinogenic human health effects ranging from irritation to respiratory decrements and reports of increased mortality. The potential for noncarcinogenic substances to produce human health effects are generally quantified as the hazard quotient (HQ) (USEPA, 1989). The HQ is a quantitative estimate of the likelihood of noncarcinogenic health effects resulting from chronic exposures

to a substance. In general the HQ is any observable health effect that could vary, for example, from watery eyes, flaking skin (minor, temporary, reversible conditions) to alcohol-induced cirrosis of the liver(a chronic effect and not reversible).

The HQ may be calculated as follows:

$$HQ \text{ (Unitless)} = \frac{C_{air}}{RfC}$$

Where:

C_{air} = Average concentration in ambient air (ug/m³)
 RfC = Reference concentration in ambient air (ug/m³)

The reference concentration (RfC) is equal to the level of a substance in ambient air that is not likely to result in adverse human health effects following chronic exposures to the substance. As such, an estimated HQ less than or equal to unity (i.e., 1.0) suggests that chronic exposures to a given concentration in air are not anticipated to result in human health effects. An estimated HQ greater than 1.0 suggests that there is a *potential* for adverse effects to occur.

The ambient air concentration (C_{air}) used in the calculation of HQ estimates for a substance may be directly measured or modeled. The California Air resources Board (CARB) has tabulated air monitoring results for Modesto and other monitoring locations within the San Joaquin Valley. These regional concentrations are presented as 24-hour maximum average concentrations or 1-hour maximum average concentrations over the period 1995 to 1999. These data are presented in Tables B-1 and B-2 in Appendix B.

In addition, there are a limited number of studies that report ambient air levels in the immediate vicinity of a dairy or cattle operation (e.g., Luebs et al., 1974). However, these studies are generally older and may not reflect current dairy practices or alternate sources of emissions (e.g., automotive or industrial emissions). It is also possible to model air concentrations that may result directly from dairy operations, as presented in Appendix C. However, models that are capable of simulating *regional* concentrations resulting from *multiple* and diffuse emission sources are highly complex and are difficult to validate.

In the absence of site-specific measured or modeled data, regional air concentrations were used to calculate HQ estimates for vapor and particulate emissions in Merced County. The following decision points were used in deriving ambient air concentrations for this evaluation:

- CARB concentrations measured within the San Joaquin Valley over the period 1995 – 1999 were used in preference to older data (e.g., Luebs et al., 1974);

- 24-hour maximum average concentrations were used in preference to 1-hour maximum average levels; and
- When a range of concentrations was presented, the higher end of the range was used.

The ambient air concentrations used in the calculation of HQ estimates for vapor and particulate emissions in Merced County are presented in Table B-2 (Appendix B).

The USEPA has not established inhalation RfCs for use in evaluating potential public health impacts associated with dairy emissions. However, other federal and State agencies have developed criteria that represent acceptable limits in air for chronic public exposures to the vapors and particulates evaluated in this section. Sources of such exposure limits include the following:

- State of California Ambient Air Quality Standards (SAAQS);
- National Ambient Air Quality Standards (NAAQS);
- U.S. Occupational Safety and Health Administration (OSHA) Time Weighted Average Permissible Exposure Limits (TWA-PELs);
- American Conference of Governmental Industrial Hygienists (ACGIH) Time Weighted Average Threshold Limit Values (TWA-TLVs); and
- California Office of Environmental Health Hazard Assessment (OEHHA) Chronic Reference Exposure Limits (RELs).

Available ambient air criteria for the vapors and particulates evaluated in this section are summarized in Table B-2 (Appendix B). In the absence of USEPA inhalation RfCs, the lowest (i.e., most protective) of the above criteria were used to quantify potential public health impacts for these substances in the form of HQ estimates.

3.4.2.2 Results

Potential public health impacts in the form of HQ estimates that may be associated with vapor and particulate emissions in Merced County are presented in Table B-2 (Appendix B). All of the regional vapor emissions were associated with HQ estimates of less than 1.0. These HQ estimates imply a low likelihood of adverse health impacts associated with chronic exposures of the general public to current levels of these vapors. It is possible that isolated members of the public may have higher exposures as a result of their proximity to specific sources of vapor emissions. However, the air monitoring data that are currently available (i.e., regional data) do not support a more site-specific health evaluation, and air models that are capable of predicting such concentrations are beyond the present scope of this document. These potential limitations are discussed further in the following section.

The HQ estimate for PM₁₀ is 1.0, and the HQ for PM_{2.5} is 3.4. These HQ estimates imply that there is a potentially greater likelihood of adverse health effects from chronic public exposures to particulate matter

than to vapors. These results are not surprising, given the fact that the San Joaquin Valley Air Basin is currently in non-attainment for PM_{10} and the attainment status for $PM_{2.5}$ has not been designated. However, it should also be noted that the primary sources of particulate matter emissions, including PM_{10} and $PM_{2.5}$, are unpaved roads, wind erosion of natural soils, agricultural production, and construction activities. Consequently, dairy emissions are likely to contribute only slightly to the above HQ estimates and current non-attainment status for PM_{10} .

3.4.3 Data Gaps

Limitations and data gaps in the evaluation of public health impacts posed by vapor and particulate emissions from dairy operations within Merced County include (1) chronic human health effects data for the substances evaluated in this assessment are limited; and (2) the contribution of dairy emissions to total regional ambient air vapor and particulate concentrations are difficult to ascertain.

In regard to limitations in the chronic health effects data, it should be noted that the available toxicology information suggest that the vapors evaluated in this study produce symptoms at concentrations significantly higher than those generally occurring in ambient air. These substances are either highly reactive and therefore produce primarily acute effects at high levels (e.g., ammonia and hydrogen sulfide), or are readily metabolized by humans (e.g., methane). Consequently, it is highly unlikely that there are unknown chronic health effects associated with these substances. In the case of particulates, a substantial number of recent studies suggest that PM_{10} and $PM_{2.5}$ may be associated with chronic health effects. These studies have been incorporated into the current health assessments and ambient air quality criteria for these substances. Consequently, the criteria used in this evaluation are believed to be reasonable surrogates for USEPA inhalation RfC values that are currently lacking.

The contribution of dairy emissions to total regional ambient air vapor and particulate concentrations is not currently known. Detailed air monitoring could be performed at dairy operations to evaluate the contribution of dairy emissions to total regional ambient air concentrations of these substances. However, such monitoring is expensive and would have to control for other sources of emissions. Complex dispersion modeling could be used to estimate receptor point concentrations at varying distances from point sources; however, the reliability of results is directly related to a thorough knowledge of the facility's operations and sources of pollutants. Although emission generation rates are available based on the number of animal units per facility and facility size (in acres), these rates must be translated into pollutant concentrations in order to effectively model impacts to receptors at specified distances from facility operations. Such concentrations would be highly uncertain for receptors at discrete locations, and even more uncertain for the general public, which receives exposures to lower concentrations from multiple diffuse sources.

Appendix H
SJVAPCD Dust Control Plan

SAN JOAQUIN VALLEY UNIFIED AIR POLLUTION CONTROL DISTRICT

**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 (½) 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 I

Air Quality Methodology and Assumptions

Air Quality Methodology and Assumptions

*Van Der Kooi Dairy
Fresno County, California*

Prepared for:

**Quad Knopf, Inc.
5110 West Cypress Avenue
Visalia, CA 93278**

Prepared by:

Castle Environmental Consulting, LLC
**10829 Westminster Avenue
Los Angeles, CA 90034**

November 1, 2006

Introduction

The emissions associated with the proposed project are primarily area sources. Area source emissions occur over a considerable geographical area and are generally not constrained by vents, flues, or stacks. A subset of area sources is fugitive sources, where emissions are not caught by a capture system and are due to equipment leaks, evaporative processes, or windblown disturbance. Most dairy-related emissions are fugitive.

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 (NH₃) and methane (CH₄) have a much greater uncertainty than other pollutants because of their relatively recent identification as pollutants of concern.

This appendix describes each emission source associated with the existing site and proposed project, and the methodology used to estimate the emissions. The detailed emission calculation worksheets are attached as Tables 1 through 42.

Agricultural Emission Sources

The 1,242-acre project site is currently in agricultural production and therefore is an existing source of emissions. Under baseline conditions, approximately 1,130 acres have been in active agricultural production. The production consists of 550 acres of corn, 80 acres of wheat, and 500 acres of oats. The remaining 112 acres are fallow.

The proposed project would include 1,132 acres of agricultural production. The production would consist of 566 acres of double-cropped corn and wheat, and 566 acres of alfalfa. The remaining 110 acres of the project site would be used for the dairy facilities.

Below is a discussion of the air emissions associated with the existing and proposed agricultural activities on the project site. The emissions include farm equipment exhaust; and fugitive dust (PM₁₀ and PM_{2.5}) from land preparation, agricultural harvesting, windblown dust, and unpaved road travel.

Farm Equipment

The sum of county-wide emissions from farm equipment in Fresno County was taken from the California Air Resources Board's 2005 emission inventory for area sources (CARB, 2005). This

sum was divided by the most recent estimate of the harvested agricultural acreage in Fresno County, as provided by the U.S. Department of Agriculture (USDA, 2002)¹. As a result, the following generalized emission factors for farm equipment in Fresno County were generated:

VOC	1.41 lb/year/acre
NO _x	10.05 lb/year/acre
PM ₁₀	0.67 lb/year/acre
PM _{2.5}	0.62 lb/year/acre

Multiplying the above emission factors by 1,130 acres and converting to tons/year provides the following emission estimates for the existing site:

VOC	0.80 tons/year
NO _x	5.68 tons/year
PM ₁₀	0.38 tons/year
PM _{2.5}	0.35 tons/year

Multiplying the above factors by 1,132 acres and converting to tons/year provides the following emission estimates for the proposed project:

VOC	0.80 tons/year
NO _x	5.69 tons/year
PM ₁₀	0.38 tons/year
PM _{2.5}	0.35 tons/year

This approach is conservative for future project emissions beyond the initial year of operation, as it does not account for the gradual reduction in farm equipment emission factors with time due to the normal replacement of older equipment with newer, cleaner burning equipment (fleet turnover).

Table 1 shows the derivation of the generalized emission factors for farm equipment in Fresno County. Table 2 shows the calculation of emission rates from farm equipment for the existing site and proposed project.

Land Preparation

Land preparation emissions are particulate matter emissions produced during the preparation of agricultural lands for planting and after-harvest activities. Operations include discing, tilling, leveling, chiseling, plowing, and other mechanical operations used to prepare the soil. The methodology used was developed by the California Air Resources Board as part of the statewide emissions inventory (CARB, 2003c). Particulate emissions from land preparation are computed by multiplying a crop-specific emission factor by the number of acres being farmed.

The PM₁₀ emission factors for crops produced on the project site are:

¹ The USDA conducts an agriculture census every five years. The most recent census was conducted in 2002 and was therefore used in this study.

Corn Silage	6.9 lb/acre/year
Wheat Silage	3.7 lb/acre/year
Oats	3.7 lb/acre/year
Alfalfa	4.0 lb/acre/year

The existing agricultural use on the project site is 550 acres of corn silage, 80 acres of wheat silage, and 500 acres of oats. Multiplying these acreages by their corresponding emission factors and summing the results yields an estimated annual PM₁₀ emission rate of 3.0 tons per year for the existing site.

The agricultural use for the proposed project would be double cropping of corn silage and wheat silage on one-half of the acreage (566 acres), and alfalfa on the remaining acreage (566 acres). Multiplying the above factors for corn silage, wheat silage, and alfalfa by 566 acres and summing the results yields an estimated annual PM₁₀ emission rate of 4.1 tons per year for the proposed project.

Tables 3 and 4 show the calculation of emission rates from land preparation for the existing site and proposed project, respectively.

Harvesting

The activities used to harvest agricultural commodities entrain soil and plant material into the air. These emissions may occur from vehicles traveling over the soil, the mechanical processing of the plant material and underlying soil, or the actual blowing or sweeping of the crop to remove waste materials. The methodology used to calculate emissions was developed by the California Air Resources Board as part of the statewide emissions inventory (CARB, 2003d). Particulate emissions from harvesting are computed by multiplying a crop-specific emission factor by the number of acres being farmed.

The PM₁₀ emission factors for crops produced on the project site are:

Corn Silage	0.17 lb/acre/year
Wheat Silage	5.8 lb/acre/year
Oats	5.8 lb/acre/year
Alfalfa	0.0 lb/acre/year

Multiplying the existing crop acreages of corn, wheat, and oats by their corresponding emission factors and summing the results yields an estimated annual PM₁₀ emission rate of 1.7 tons per year for the existing site. Multiplying the above factors for corn silage and wheat silage by 566 acres and summing the results yields an estimated annual PM₁₀ emission rate of 1.7 tons per year for the proposed project. The PM₁₀ emission factor for alfalfa harvesting is zero.

Tables 3 and 4 show the calculation of emission rates from harvesting for the existing site and proposed project, respectively.

Wind Erosion

Wind blowing across exposed agricultural land 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 farmed acres within the project site by an emission factor of 0.013761 tons/acre/year for non-pasture agricultural lands in Fresno County. Multiplying the emission factor by the existing and proposed project agricultural acreages provides estimated PM₁₀ emission rates of 15.5 tons per year for the existing site and 15.6 tons per year for the proposed project.

Table 5 shows the calculation of emission rates from agricultural wind erosion for the existing site and proposed project.

Unpaved Road Dust

Unpaved road dust emissions 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 PM₁₀ emission rates are 5.6 tons per year for the existing site and 5.6 tons per year for the proposed project.

Table 6 shows the calculation of emission rates from unpaved agricultural road dust for the existing site and proposed project.

Dairy Emission Sources

Cattle Housing

The movement of dairy animals would generate fugitive dust (PM₁₀) emissions. Uncontrolled emissions from animal movement were estimated using emission factors compiled by the SJVAPCD (2006b). The PM₁₀ emission factors for dairy cattle are:

Milk or Dry Cow – Freestall with Exercise Pens	1.37 lb/head/year
Milk or Dry Cow – Open Corrals with No Shade Structure	5.46 lb/head/year
Heifers – Open Corrals with No Shade Structure	10.55 lb/head/year
Calves – Individual Pens or Open Corrals	1.27 lb/head/year

These emission factors are considered uncontrolled because they do not account for the implementation of dust control measures at the dairy. Multiplying the emission factors by the Phase II animal population (stratified by animal type and housing type) yields an annual uncontrolled PM₁₀ emission rate of 12.7 tons per year.

As part of the air permitting process, the SJVAPCD has determined that the following dust control measures would be required as Best Available Control Technology (BACT) for the expanded dairy:

- Downwind shelterbelts consisting of trees or shrubs as a windbreak (12.5 percent PM₁₀ reduction).
- Shaded areas in open corrals (8.3 percent PM₁₀ reduction for heifers and calves; 16.7 percent PM₁₀ reduction for dry cows).
- Sprinkling of open corrals at least once per day (15 percent PM₁₀ reduction).
- Feeding of young stock near dusk (10 percent PM₁₀ reduction).

These control measures would be applied both to the proposed project (Phase II) and to the baseline dairy (Phase I). Application of these control measures would reduce PM₁₀ emissions at the dairy by 5.1 tons per year compared to uncontrolled emissions. As a result, the controlled PM₁₀ emissions from cattle housing after implementation of Phase II would be 7.7 tons per year greater than the uncontrolled Phase I emissions.

Tables 7 through 9 show the baseline (Phase I) animal population, the proposed project (Phase II) animal population, and the total animal population from Phases I and II combined. Tables 10 through 12 show the calculation of the uncontrolled and controlled PM₁₀ emission rates from cattle housing for the proposed project. Tables 13 through 15 show the calculation of the uncontrolled and controlled PM₁₀ emission rates from cattle housing for the Sixty Percent Head Alternative. Tables 16 through 18 show the calculation of the uncontrolled and controlled PM₁₀ emission rates from cattle housing for the Forty Percent Head Alternative.

Manure Decomposition and Cattle Digestion

Uncontrolled VOC emissions from manure decomposition and cattle digestion were estimated using emission factors by animal type, as compiled by the SJVAPCD (2006c). The VOC emission factors are:

Milk Cow – Freestall Housing	21.0 lb/head/year
Dry Cow – Open Corral Housing	11.9 lb/head/year
Heifer (15-24 months) – Open Corral Housing	8.3 lb/head/year
Heifer (7-14 months) – Open Corral Housing	7.2 lb/head/year
Heifer (4-6 months) – Open Corral Housing	6.6 lb/head/year
Calf (under 3 months) – Open Corral Housing	6.2 lb/head/year

These emission factors are considered uncontrolled because they do not account for the implementation of VOC control measures at the dairy. Multiplying these factors by the proposed Phase II animal population (stratified by animal type) yields an annual uncontrolled VOC emission rate of 25.6 tons per year.

As part of the air permitting process, the SJVAPCD has determined that the following VOC control measures would be required as BACT for the expanded dairy:

- Cattle Housing: flush feedlanes, walkways, etc. at least four times daily (47.7 percent VOC reduction)
- Milking Center: flush or spray down milking area with each batch milked; flush holding pen and wash pens at least four times daily (75 percent VOC reduction).

- Liquid Manure: Use phototrophic (red) lagoon and associated nutrient management practices (40 percent VOC reduction for both the lagoon and land application).

These control measures would be applied to both the proposed project (Phase II) and the baseline dairy (Phase I). To determine their effectiveness, the reductions were applied only to that portion of the VOC emissions attributed to the sources being controlled. For example, the VOC emission factor for milk cows in the cattle housing area is 4.8 lb/head/year, roughly one-fourth of the dairy-wide VOC emission factor of 21.0 lb/head/year for milk cows. The reduction factor of 47.7 percent for the cattle housing control measure was applied only to the 4.8 lb/head/year emission factor, rather than to the entire 21.0 lb/head/year emission factor.

The source-specific VOC emission factors for milk cows were provided by the SJVAPCD (2006d). They were stratified to the other animal types using excreted manure ratios for cattle, also provided by the SJVAPCD (2004). The excreted manure ratios by animal type are presented in Table 19.

Application of these control measures would reduce VOC emissions at the dairy by 11.7 tons per year compared to uncontrolled emissions. As a result, the controlled VOC emissions from manure decomposition and cattle digestion after implementation of Phase II would be 13.9 tons per year greater than the uncontrolled Phase I emissions.

Tables 20 through 24 show the calculation of uncontrolled and controlled VOC emission rates associated with manure decomposition and cattle digestion for the proposed project. Tables 25 through 28 show the calculation of uncontrolled and controlled VOC emission rates associated with manure decomposition and cattle digestion for the Sixty Percent Head Alternative. Tables 29 through 32 show the calculation of uncontrolled and controlled VOC emission rates associated with manure decomposition and cattle digestion for the Forty Percent Head Alternative.

Ammonia emissions from manure decomposition and cattle digestion were estimated using emission factors by animal type, as provided by the SJVAPCD (2006a). The ammonia emission factors are:

Milk Cow	74.0 lb/head/year
Dry Cow	45.4 lb/head/year
Heifer (15-24 months)	31.8 lb/head/year
Heifer (7-14 months)	27.8 lb/head/year
Heifer (4-6 months)	25.1 lb/head/year
Calf (under 3 months)	23.6 lb/head/year

Multiplying these factors by the number of animals in each size category yields a total annual ammonia emission rate of 93.4 tons per year.

Tables 20, 25, and 29 show the calculation of ammonia emissions associated with manure decomposition and cattle digestion for the proposed project, Sixty Percent Head Alternative, and Forty Percent Head Alternative, respectively.

Emissions of methane from manure decomposition were estimated using an emission factor of 112.56 lb/head/year for a 1,400 lb mature cow (Dickson, 1988). The factors were stratified by animal size using the same relative scaling that the SJVAPCD used for the ammonia emission factors. The stratified methane emission factors are:

Milk Cow	112.56 lb/head/year
Dry Cow	69.1 lb/head/year
Heifer (15-24 months)	48.4 lb/head/year
Heifer (7-14 months)	42.3 lb/head/year
Heifer (4-6 months)	38.2 lb/head/year
Calf (under 3 months)	35.9 lb/head/year

Multiplying these factors by the number of animals in each size category yields a total annual methane emission rate of 142.0 tons per year.

Emissions of methane from cattle digestion (also known as enteric fermentation) were estimated by multiplying the number of animals, stratified by type, by emission factors developed by the U.S. Environmental Protection Agency (EPA, 1998). Emission factors provided by the EPA vary not only by animal size, but also by location within the nation, due to variation in diet. Emission factors for animals in the western U.S. were selected for the proposed project. The emission factors for methane are:

Mature cows	262.5 lb/head/year
Replacements (12-24 months)	134.6 lb/head/year
Replacements (0-12 months)	45.5 lb/head/year

Multiplying these factors by the number of animals in each size category yields a total annual methane emission rate of 318.8 tons per year.

Table 33 shows the calculation of methane emissions from manure decomposition for the proposed project. Table 34 shows the calculation of methane emissions from cattle digestion for the proposed project.

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, corral scraping, etc. Relative to baseline (Phase I) dairy operations, the proposed project (Phase II) would require the equivalent of one additional 150-horsepower (hp) tractor operating 12 hours per day.

Diesel exhaust emission factors for dairy equipment in the San Joaquin Valley Air Basin were derived from the California Air Resources Board's URBEMIS2002 program, version 8.7.0 (CARB, 2004b). The following emission factors for dairy equipment in the 121-175 horsepower (hp) range for the year 2007 were generated:

VOC	1.00 grams per horsepower-hour (g/hp-hr)
NO _x	5.93 g/hp-hr
PM ₁₀	0.19 g/hp-hr

These emission factors were applied to a 150-hp tractor operating 12 hours per day with an average load factor of 0.465 (CARB, 2004b). The resulting diesel exhaust emissions from on-site dairy equipment associated with the proposed project were estimated to be:

VOC	0.34 tons/year
NO _x	2.00 tons/year
PM ₁₀	0.06 tons/year

This approach is conservative for project emissions beyond 2007, as it does not account for the gradual reduction in dairy equipment emission factors with time due to the normal replacement of older equipment with newer, cleaner burning equipment (fleet turnover).

Table 35 shows the derivation of the generalized emission factors for dairy equipment. Table 36 shows the calculation of emission rates from dairy equipment for the proposed project.

Wind Erosion

Wind blowing across unpaved areas on the dairy would result 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, 1997c). PM₁₀ emissions from windblown dust were calculated by multiplying the number of unpaved acres (including roads and non-roads) within the dairy site by an emission factor of 201.5 lb/acre/year for Fresno County. Cattle housing areas were excluded from this calculation because the PM₁₀ emission factors for cattle housing already account for windblown dust (SJVAPCD, 2006e).

Based on the dairy site plan, the proposed dairy would contain approximately 4 unpaved acres, excluding cattle housing. Multiplying the emission factor by the unpaved acreage provides an estimated PM₁₀ emission rate of 0.4 tons per year for the proposed dairy.

Table 37 shows the calculation of emission rates from wind erosion at the proposed dairy.

Unpaved Road Dust

During project operation, fugitive dust emissions would occur from the movement of mobile dairy equipment (such as tractors) over unpaved roads and other unpaved surfaces at the dairy. Unpaved road dust emissions were estimated using methodology developed by the SJVAPCD as reported in the *Western Regional Air Partnership (WRAP) Fugitive Dust Handbook* (Western Governors' Association, 2006). This method assumes that the vehicle miles traveled (VMT) on unpaved surfaces, and hence the road dust emissions, are proportional to the number of animals at the dairy. This method uses PM₁₀ emission factors of 0.369 lb/head/year for unpaved roads and 0.123 lb/head/year for other unpaved surfaces. Multiplying these two emission factors by the total number of Phase II animals and summing the results gives a PM₁₀ emission rate of 1.0 tons per year for the proposed project.

Table 38 shows the calculation of emission rates from unpaved road dust at the dairy for the proposed project.

On-Road Vehicles

Truck Trips

The EMFAC2002 mobile source emission factor program (CARB, 2004) was used to calculate truck emissions associated with the existing site and the proposed project. EMFAC2002 is the latest emissions program for California vehicles developed by the California Air Resources Board². Per-mile emission factors for heavy-duty trucks were obtained for a vehicle fleet representative of the San Joaquin Valley Air Basin. Emission factors were computed for the year 2006 for the existing site and 2007 for the proposed project. Emission factors in subsequent years would gradually decline with time due to normal vehicle fleet turnover.

The VOC emission estimates from EMFAC2002 include contributions from engine start-up, running exhaust, evaporative running losses, and evaporative hot soak after engine shut-off. The NO_x emission estimates include contributions from engine start-up and running exhaust. The PM₁₀ emission estimates include contributions from engine start-up, running exhaust, tire wear, and brake wear. In addition, an entrained paved road dust emission factor of 4.49 grams of PM₁₀ per mile of travel (CARB, 1997c) was added to the EMFAC2002 emissions.

Truck emissions for the existing site were estimated based on the following trip generation rates and average trip lengths:

- Fertilizer trucks: 756 round trips per year (based on 13,610 tons/year of fertilizer and an 18 ton truck capacity), and an average one-way trip length of 7.5 miles.
- Crop harvest trucks: 1,716 round trips per year (based on 23,600 tons/year of crop material and a 13.75 ton truck capacity), and an average one-way trip length of 7.5 miles.

Truck emissions for the proposed project were estimated based on the following trip generation rates and average trip lengths:

- Milk trucks: 3 round trips per day, and an average one-way trip length of 20 miles.
- Manure haul-off trucks: 255 round trips per year (based on 4,583 tons/year of manure and an 18 ton truck capacity), and an average one-way trip length of 7.5 miles.
- Crop harvest trucks: 2,346 round trips per year (based on 32,262 tons/year of crop material and a 13.75 ton truck capacity), and an average one-way trip length of 0.5 miles from the farm to the dairy.

² The CARB plans to release a revised version of EMFAC on or after November 1, 2006. At the time this air quality analysis was conducted, EMFAC2002 was the most recent publicly available version.

An average speed of 35 miles per hour was assumed for trucks. Trucks were also assumed to idle for 30 minutes per round trip.

The annual emission rates from truck trips associated with the existing site were calculated to be 0.05 tons per year for VOC, 0.51 tons per year for NO_x, and 0.20 tons per year for PM₁₀. The annual emission rates from truck trips associated with the proposed project were calculated to be 0.07 tons per year for VOC, 0.66 tons per year for NO_x, and 0.27 tons per year for PM₁₀.

Table 39 presents the derivation of the vehicle emission factors from the URBEMIS2002 output. Tables 40 and 41 present the calculation of truck emissions for the existing site and proposed project, respectively.

Employee and Visitor Trips

The EMFAC2002 program was also used to calculate vehicle emissions from employee and visitor trips associated with the proposed project. All employee and visitor vehicles were conservatively assumed to be light-duty trucks. Per-mile emission factors for light-duty trucks were obtained for a vehicle fleet representative of the San Joaquin Valley Air Basin. Emission factors were computed for the year 2007. Emission factors in subsequent years would gradually decline with time due to normal vehicle fleet turnover.

The VOC emission estimates from EMFAC2002 include contributions from engine start-up, running exhaust, evaporative running losses, and evaporative hot soak after engine shut-off. The NO_x emission estimates include contributions from engine start-up and running exhaust. The PM₁₀ emission estimates include contributions from engine start-up, running exhaust, tire wear, and brake wear. In addition, an entrained paved road dust emission factor of 4.49 grams of PM₁₀ per mile of travel (CARB, 1997c) was added to the EMFAC2002 emissions.

Vehicle emissions for the proposed project were estimated based on the following trip generation rates and average trip lengths:

- Employee trips: 12 round trips per day, and an average one-way trip length of 8.7 miles.
- Visitor trips: 2 round trips per day, and an average one-way trip length of 18 miles.

An average speed of 45 miles per hour was assumed for employee and visitor trips.

The annual emission rates from employee and visitor trips associated with the proposed project were calculated to be 0.06 tons per year for VOC, 0.07 tons per year for NO_x, and 0.51 tons per year for PM₁₀.

Table 39 presents the derivation of the vehicle emission factors from the URBEMIS2002 output. Table 41 presents the calculation of employee and visitor trip emissions for the proposed project.

PM_{2.5} Emissions

Particulate emission factors are generally provided for total suspended particulate or PM₁₀. The establishment of a national ambient air quality standard 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 are currently developing methods and techniques to address PM_{2.5} emissions, but the state of knowledge regarding emission factors for this pollutant is several years behind that for PM₁₀.

PM_{2.5} emissions were calculated by adjusting 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, 2003b). The factors vary by source type, as each source has a different particulate matter profile. Table 42 summarizes the calculation of the PM_{2.5}/PM₁₀ ratio for each source type.

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Attachments

Emission Calculation Worksheets Tables 1 through 42

Table 1. Emission Factors for Diesel and Gasoline Powered Farm Equipment in Fresno County

Emission Source	Fresno County Farm Equipment Emissions (ton/day) ^a				Fresno County Acres Harvested ^b	Derived Emission Factors (lb/acre/year)		
	VOC	NO _x	PM ₁₀	PM _{2.5}		VOC	NO _x	PM _{2.5}
Farm Equipment	2.09	14.86	0.99	0.91	1,078,900	1.41	10.05	0.67
								0.62

^a Source: CARB. Almanac Emission Projection Data. 2005 Estimated Annual Average Emissions. Fresno County. Other Mobile Sources. Farm Equipment.

^b Source: USDA. 2002 Census of Agriculture. Harvested Cropland by Size of Farm and Acres Harvested. Fresno County.

Table 2. Emissions Associated with Farm Equipment

Project Scenario	Cultivated Acres	Annual Emissions (ton/yr)			
		VOC	NO _x	PM ₁₀	PM _{2.5}
Existing Site	1,130	0.80	5.68	0.38	0.35
Proposed Project	1,132	0.80	5.69	0.38	0.35

Table 3. Emissions Associated with Land Preparation and Harvesting Existing Site

Crop Type ^c	Activity	Cultivated Acres	Annual Crops	PM ₁₀ Emission Factor (lb/acre/yr) ^a	PM _{2.5} Emission Factor (lb/acre/yr) ^b	Annual Emissions (ton/yr)	
						PM ₁₀	PM _{2.5}
Corn Silage	Land Preparation	550	1	6.90	1.53	1.9	0.4
	Harvesting	550	1	0.17	0.04	0.0	0.0
Wheat Silage	Land Preparation	80	1	3.70	0.82	0.1	0.0
	Harvesting	80	1	5.80	1.29	0.2	0.1
Oats	Land Preparation	500	1	3.70	0.82	0.9	0.2
	Harvesting	500	1	5.80	1.29	1.5	0.3
Alfalfa	Land Preparation			4.00	0.89	0.0	0.0
	Harvesting			0.00	0.00	0.0	0.0
Total						4.7	1.0

^a Source: CARB, *Emission Inventory Procedural Manual Volume III: Methods for Assessing Area Source Emissions*, Section 7.4, Agricultural Land Preparation, January 2003; and Section 7.5, Agricultural Harvest Operations, January 2003.

^b The PM_{2.5} emission factor is scaled from the PM₁₀ factor according to the relative emission rate for agricultural tilling as reported in CARB, *California Emission Inventory and Reporting System (CEIDARS)*, 2002.

^c The total farmed acreage under baseline conditions was 1,130 acres (550 acres corn, 80 acres wheat, and 500 acres oats. The remaining 112 acres of the project site was fallow during baseline conditions.

Table 4. Emissions Associated with Land Preparation and Harvesting Proposed Project

Crop Type ^c	Activity	Cultivated Acres	Annual Crops	PM ₁₀ Emission Factor (lb/acre/yr) ^a	PM _{2.5} Emission Factor (lb/acre/yr) ^b	Annual Emissions (ton/yr)	
						PM ₁₀	PM _{2.5}
Corn Silage	Land Preparation	566	1	6.90	1.53	2.0	0.4
	Harvesting	566	1	0.17	0.04	0.0	0.0
Wheat Silage	Land Preparation	566	1	3.70	0.82	1.0	0.2
	Harvesting	566	1	5.80	1.29	1.6	0.4
Oats	Land Preparation			3.70	0.82	0.0	0.0
	Harvesting			5.80	1.29	0.0	0.0
Alfalfa	Land Preparation	566	1	4.00	0.89	1.1	0.3
	Harvesting	566	1	0.00	0.00	0.0	0.0
Total						5.8	1.3

^a Source: CARB, *Emission Inventory Procedural Manual Volume III: Methods for Assessing Area Source Emissions*, Section 7.4, Agricultural Land Preparation, January 2003; and Section 7.5, Agricultural Harvest Operations, January 2003.

^b The PM_{2.5} emission factor is scaled from the PM₁₀ factor according to the relative emission rate for agricultural tilling as reported in CARB, *California Emission Inventory and Reporting System (CEIDARS)*, 2002.

^c Wheat silage and corn silage would be alternated/double-cropped on 50 percent of the cultivated acreage (566 acres). Alfalfa would be grown on the remaining 566 acres.

Table 5. Emissions Associated with Wind Erosion on Farmland

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}
Existing Site	1,130	0.013761	0.003050	15.5	3.4
Proposed Project	1,132	0.013761	0.003050	15.6	3.5

^a Source: CARB, Emission Inventory Procedural Manual Volume III: Methods for Assessing Area Source Emissions, Section 7.12, updated July 1997. Nonpasture Agricultural Lands. Fresno 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)*, 2003.

Table 6. Emissions Associated with Unpaved Road Dust on Farmland

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}
Existing Site	1,130	2.27	0.48	4.38	5.6	1.2
Proposed Project	1,132	2.27	0.48	4.38	5.6	1.2

^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)*, 2002.

Table 7. Baseline Animal Population (Phase I)

Animal Type	No. of Head	
	Freestalls	Open Corrals
Milk Cows	1,750	
Dry Cows		250
Heifers (15-24 months)		
Heifers (7-14 months)		
Heifers (4-6 months)		
Calves (0 to 3 months)		
Total	1,750	250

Animals are Holsteins (1,400 lb mature weight).

Table 8. Proposed Project Animal Population (Phase II)

Animal Type	No. of Head	
	Freestalls	Open Corrals
Milk Cows	1,450	
Dry Cows		230
Heifers (15-24 months)		860
Heifers (7-14 months)		960
Heifers (4-6 months)		240
Calves (0 to 3 months)		380
Total	1,450	2,670

Animals are Holsteins (1,400 lb mature weight).

Table 9. Total Animal Population - Phases I and II

Animal Type	No. of Head	
	Freestalls	Open Corrals
Milk Cows	3,200	
Dry Cows		480
Heifers (15-24 months)		860
Heifers (7-14 months)		960
Heifers (4-6 months)		240
Calves (0 to 3 months)		380
Total	3,200	2,920

Animals are Holsteins (1,400 lb mature weight).

Table 10. Uncontrolled Emissions Associated with Cattle Housing Proposed Project

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) ^c	Annual Emissions (ton/yr)	
					PM ₁₀	PM _{2.5}
Milk & Dry Cows	Freestall with exercise pens	1,450	1.37	0.16	1.0	0.1
Milk & Dry Cows	Open corrals with no shade structure	230	5.46	0.62	0.6	0.1
Heifers	Open corrals with no shade structure	2,060	10.55	1.20	10.9	1.2
Calves	Individual pens or open corrals	380	1.37	0.16	0.3	0.0
Total		4,120			12.7	1.5

^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 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)*, 2002.

Table 11. PM10 Control Measures Applied to the Proposed Project

Animal Type	Type of Housing	No. of Animals ^a	Control Measure Effectiveness ^b					Annual PM10 Emission Reductions (ton/yr)
			Downwind Shelterbelts	Corral Shades	Corral Sprinkling	Youngstock Near Dusk	Total - All Measures Combined	
Milk & Dry Cows	Freestall with exercise pens	3,200	12.5%				13%	-0.3
Milk & Dry Cows	Open corrals	480	12.5%	16.7%	15%		38%	-0.5
Heifers	Open corrals	2,060	12.5%	8.3%	15%	10%	39%	-4.2
Calves	Individual pens or open corrals	380	12.5%	8.3%	15%	10%	39%	-0.1
Total		6,120						-5.1

^a Control measures would be applied to both Phase I and Phase II animals.

^b Source: SJVAPCD, "Dairy/Feedlot PM10 Mitigation Practices and their Control Efficiencies." Office Memo from Sheraz Gill to Permit Services Staff. April 18, 2006.

Table 12. Controlled Emissions Associated with Cattle Housing Proposed Project

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	Freestall with exercise pens	1.0	-0.3	0.7	0.1	-0.03	0.1
Milk & Dry Cows	Open corrals	0.6	-0.5	0.1	0.1	-0.06	0.0
Heifers	Open corrals	10.9	-4.2	6.7	1.2	-0.48	0.8
Calves	Individual pens or open corrals	0.3	-0.1	0.2	0.0	-0.01	0.0
Total		12.7	-5.1	7.7	1.5	-0.6	0.9

**Table 13. Uncontrolled Emissions Associated with Cattle Housing
Sixty Percent Head Alternative**

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) ^c	Annual Emissions (ton/yr)	
					PM ₁₀	PM _{2.5}
Milk & Dry Cows	Freestall with exercise pens	870	1.37	0.16	0.6	0.1
Milk & Dry Cows	Open corrals with no shade structure	138	5.46	0.62	0.4	0.0
Heifers	Open corrals with no shade structure	1,236	10.55	1.20	6.5	0.7
Calves	Individual pens or open corrals	228	1.37	0.16	0.2	0.0
Total		2,472			7.6	0.9

^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 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)*, 2002.

Table 14. PM10 Control Measures Applied to the Sixty Percent Head Alternative

Animal Type	Type of Housing	No. of Animals ^a	Control Measure Effectiveness ^b					Annual PM10 Emission Reductions (ton/yr)
			Downwind Shelterbelts	Corral Shades	Corral Sprinkling	Feed Youngstock Near Dusk	Total - All Measures Combined	
Milk & Dry Cows	Freestall with exercise pens	2,620	12.5%				13%	-0.2
Milk & Dry Cows	Open corrals	388	12.5%	16.7%	15%		38%	-0.4
Heifers	Open corrals	1,236	12.5%	8.3%	15%	10%	39%	-2.5
Calves	Individual pens or open corrals	228	12.5%	8.3%	15%	10%	39%	-0.1
Total		4,472						-3.2

^a Control measures would be applied to both Phase I and Phase II animals.

^b Source: SJVAPCD, "Dairy/Feedlot PM10 Mitigation Practices and their Control Efficiencies." Office Memo from Sheraz Gill to Permit Services Staff. April 18, 2006.

**Table 15. Controlled Emissions Associated with Cattle Housing
Sixty Percent Head Alternative**

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	Freestall with exercise pens	0.6	-0.2	0.4	0.1	-0.03	0.0
Milk & Dry Cows	Open corrals	0.4	-0.4	0.0	0.0	-0.05	0.0
Heifers	Open corrals	6.5	-2.5	4.0	0.7	-0.29	0.5
Calves	Individual pens or open corrals	0.2	-0.1	0.1	0.0	-0.01	0.0
Total		7.6	-3.2	4.4	0.9	-0.4	0.5

**Table 16. Uncontrolled Emissions Associated with Cattle Housing
Forty Percent Head Alternative**

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) ^c	Annual Emissions (ton/yr)	
					PM ₁₀	PM _{2.5}
Milk & Dry Cows	Freestall with exercise pens	580	1.37	0.16	0.4	0.0
Milk & Dry Cows	Open corrals with no shade structure	92	5.46	0.62	0.3	0.0
Heifers	Open corrals with no shade structure	824	10.55	1.20	4.3	0.5
Calves	Individual pens or open corrals	152	1.37	0.16	0.1	0.0
Total		1,648			5.1	0.6

^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 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)*, 2002.

Table 17. PM10 Control Measures Applied to the Forty Percent Head Alternative

Animal Type	Type of Housing	No. of Animals ^a	Control Measure Effectiveness ^b					Annual PM10 Emission Reductions (ton/yr)
			Downwind Shelterbelts	Corral Shades	Corral Sprinkling	Youngstock Near Dusk	Total - All Measures Combined	
Milk & Dry Cows	Freestall with exercise pens	2,330	12.5%				13%	-0.2
Milk & Dry Cows	Open corrals	342	12.5%	16.7%	15%		38%	-0.4
Heifers	Open corrals	824	12.5%	8.3%	15%	10%	39%	-1.7
Calves	Individual pens or open corrals	152	12.5%	8.3%	15%	10%	39%	0.0
Total		3,648						-2.3

^a Control measures would be applied to both Phase I and Phase II animals.

^b Source: SJVAPCD, "Dairy/Feedlot PM10 Mitigation Practices and their Control Efficiencies." Office Memo from Sheraz Gill to Permit Services Staff. April 18, 2006.

**Table 18. Controlled Emissions Associated with Cattle Housing
Forty Percent Head Alternative**

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	Freestall with exercise pens	0.4	-0.2	0.2	0.0	-0.02	0.0
Milk & Dry Cows	Open corrals	0.3	-0.4	-0.1	0.0	-0.04	0.0
Heifers	Open corrals	4.3	-1.7	2.7	0.5	-0.19	0.3
Calves	Individual pens or open corrals	0.1	0.0	0.1	0.0	0.00	0.0
Total		5.1	-2.3	2.8	0.6	-0.3	0.3

Table 19. Ratio of Excreted Manure

Type of Cow	Avg Weight (lbs)	Body Weight Factor	Ratio of weight %	ratio of manure %	Total Manure (lbs/day)
*Milking Cow	1,400	1.4	1.00	1.00	132
**Dry Cow	1,500	1.5	1.07	0.61	81
***Heifer (15-24 months)	975	0.98	0.70	0.43	57
***Heifer (7-14 months)	575	0.58	0.41	0.37	50
***Heifer (4-6 months)	314	0.31	0.22	0.34	45
***Calf (under 3 months)	164	0.16	0.12	0.32	42

*Total Wet Manure (kg) = (Milk Weight in Kg x 0.647) + 43.212 (This calculation based on 2002

CDFA Daily average of 57.5 lb milk produced per cow/day

**Total Wet Manure (kg) = (Body weight in Kg x 0.022) + 21.844

***Total Wet Manure (kg) = (Body weight in Kg x 0.018) + 17.817

Reference for heifer weight (based on experience) from Farmers

Bulletin No. 2176. Animal Husbandry Research Division, ARS, USDA, October 1961.

Calculations based on proposal for American Society of Agricultural Engineers (ASAE) D384.1,

Manure Production and Characteristics approved in December 2003.

Holstein Cows

Source: Sheraz Gill/SJVAPCD. December 17, 2004.

Table 20. Uncontrolled Emissions Associated with Cattle Digestion and Manure Decomposition Proposed Project

Animal Type	No. of Animals	VOC Emission Factor (lb/hd/yr) ^{a,b}	NH ₃ Emission Factor (lb/hd/yr) ^c	Annual Emissions (ton/yr)	
				VOC	NH ₃
Milk Cows	1,450	21.0	74.0	15.2	53.7
Dry Cows	230	11.9	45.4	1.4	5.2
Heifers (15-24 months)	860	8.3	31.8	3.6	13.7
Heifers (7-14 months)	960	7.2	27.8	3.5	13.3
Heifers (4-6 months)	240	6.6	25.1	0.8	3.0
Calves (0 to 3 months)	380	6.2	23.6	1.2	4.5
Total	4,120			25.6	93.4

^a Source: SJVAPCD, "Breakdown of Dairy VOC Emission Factor by Type of Cow & Housing", May 16, 2006.

^b The VOC emission factor for "freestall housing" was used for milk cows. The VOC emission factors for "open corral housing" were used for all other animal types.

^c The NH₃ emission factors by animal type were provided by Sheraz Gill/SJVAPCD, June 14, 2006.

Table 21. Uncontrolled VOC Emission Factors From Cattle Digestion and Manure Decomposition by Dairy Location

Animal Type	Housing (lb/hd/yr)	Milking Center (lb/hd/yr)	Lagoon (lb/hd/yr)	Land Application (lb/hd/yr)	
Milk Cows	4.8	0.2	2.7	5.0	
Dry Cows	2.9		1.4	2.3	
Heifers (15-24 months)	2.1		1.0	1.6	
Heifers (7-14 months)	1.8		0.9	1.4	
Heifers (4-6 months)	1.6		0.8	1.3	
Calves (0 to 3 months)	1.5		0.7	1.2	

Note: Emission factors for milk cows are from the SJVAPCD, Appendix B - Emission Reduction Analysis for Proposed Rule 4570 (Confined Animal Facilities). Table 4: Emissions from Dairy Locations. May 18, 2006. Emission factors for other animal types are scaled from the milk cow emission factors by the ratios of excreted manure.

Table 22. VOC Control Measures Applied to the Proposed Project

Animal Type	VOC Control Measure Effectiveness ^a			
	Housing ^b	Milking Center ^c	Lagoon ^d	Land Application ^d
Milk Cows	47.7%	75%	40%	40%
Dry Cows	47.7%		40%	40%
Heifers (15-24 months)	47.7%		40%	40%
Heifers (7-14 months)	47.7%		40%	40%
Heifers (4-6 months)	47.7%		40%	40%
Calves (0 to 3 months)	47.7%		40%	40%

^a Source for control measure effectiveness: SJVAPCD, August 8, 2006.

^b Control measure includes: flush feedlines, walkways, etc. at least 4 times daily.

^c Control measure includes: flush or spray down milking area with each batch milked, flush holding pen and wash pens at least 4 times daily.

^d Control measure includes: use of phototrophic (red) lagoon and associated nutrient management practices.

Table 23. VOC Emission Reductions Associated with Control Measures Proposed Project

Animal Type	No. of Animals ^a	Annual VOC Emission Reductions (ton/yr)			
		Housing ^b	Milking Center ^c	Lagoon ^d	Land Application ^d
Milk Cows	3,200	-3.7	-0.2	-1.7	-3.2
Dry Cows	480	-0.3	0.0	-0.1	-0.2
Heifers (15-24 months)	860	-0.4	0.0	-0.2	-0.3
Heifers (7-14 months)	960	-0.4	0.0	-0.2	-0.3
Heifers (4-6 months)	240	-0.1	0.0	0.0	-0.1
Calves (0 to 3 months)	380	-0.1	0.0	-0.1	-0.1
Total	6,120	-5.1	-0.2	-2.3	-4.1

^a Control measures would be applied to both Phase I and Phase II animals.

^b Control measure includes: flush feedlines, walkways, etc. at least 4 times daily.

^c Control measure includes: flush or spray down milking area with each batch milked, flush holding pen and wash pens at least 4 times daily.

^d Control measure includes: use of phototrophic (red) lagoon and associated nutrient management practices.

Table 24. Controlled VOC Emissions Associated with Cattle Digestion and Manure Decomposition Proposed Project

Animal Type	Annual VOC Emissions (ton/yr)	
	Before Controls	Control Measure Reductions After Controls
Milk Cows	15.2	-8.8
Dry Cows	1.4	-0.7
Heifers (15-24 months)	3.6	-0.9
Heifers (7-14 months)	3.5	-0.9
Heifers (4-6 months)	0.8	-0.2
Calves (0 to 3 months)	1.2	-0.3
Total	25.6	-11.7

**Table 25. Uncontrolled Emissions Associated with Cattle Digestion and Manure Decomposition
Sixty Percent Head Alternative**

Animal Type	No. of Animals	VOC Emission Factor (lb/hd/yr) ^{a,b}	NH ₃ Emission Factor (lb/hd/yr) ^c	Annual Emissions (ton/yr)	
				VOC	NH ₃
Milk Cows	870	21.0	74.0	9.1	32.2
Dry Cows	138	11.9	45.4	0.8	3.1
Heifers (15-24 months)	516	8.3	31.8	2.1	8.2
Heifers (7-14 months)	576	7.2	27.8	2.1	8.0
Heifers (4-6 months)	144	6.6	25.1	0.5	1.8
Calves (0 to 3 months)	228	6.2	23.6	0.7	2.7
Total	2,472			15.4	56.0

^a Source: SJVAPCD, "Breakdown of Dairy VOC Emission Factor by Type of Cow & Housing", May 16, 2006.

^b The VOC emission factor for "freestall housing" was used for milk cows. The VOC emission factors for "open corral housing" were used for all other animal types.

^c The NH₃ emission factors by animal type were provided by Sheraz Gill/SJVAPCD, June 14, 2006.

Table 26. VOC Control Measures Applied to the Sixty Percent Head Alternative

Animal Type	VOC Control Measure Effectiveness ^a			
	Housing ^b	Milking Center ^c	Lagoon ^d	Land Application ^d
Milk Cows	47.7%	75%	40%	40%
Dry Cows	47.7%		40%	40%
Heifers (15-24 months)	47.7%		40%	40%
Heifers (7-14 months)	47.7%		40%	40%
Heifers (4-6 months)	47.7%		40%	40%
Calves (0 to 3 months)	47.7%		40%	40%

^a Source for control measure effectiveness: SJVAPCD, August 8, 2006.

^b Control measure includes: flush feedlanes, walkways, etc. at least 4 times daily.

^c Control measure includes: flush or spray down milking area with each batch milked, flush holding pen and wash pens at least 4 times daily.

^d Control measure includes: use of phototrophic (red) lagoon and associated nutrient management practices.

**Table 27. VOC Emission Reductions Associated with Control Measures
Sixty Percent Head Alternative**

Animal Type	No. of Animals ^a	Annual VOC Emission Reductions (ton/yr)			
		Housing ^b	Milking Center ^c	Lagoon ^d	Land Application ^d
Milk Cows	2,620	-3.0	-0.2	-1.4	-2.6
Dry Cows	388	-0.3	0.0	-0.1	-0.2
Heifers (15-24 months)	516	-0.3	0.0	-0.1	-0.2
Heifers (7-14 months)	576	-0.2	0.0	-0.1	-0.2
Heifers (4-6 months)	144	-0.1	0.0	0.0	0.0
Calves (0 to 3 months)	228	-0.1	0.0	0.0	-0.1
Total	4,472	-3.9	-0.2	-1.8	-3.2

^a Control measures would be applied to both Phase I and Phase II animals.

^b Control measure includes: flush feedlanes, walkways, etc. at least 4 times daily.

^c Control measure includes: flush or spray down milking area with each batch milked, flush holding pen and wash pens at least 4 times daily.

^d Control measure includes: use of phototrophic (red) lagoon and associated nutrient management practices.

^e Uncontrolled VOC emission factors from manure decomposition by dairy location are provided in Table 21.

**Table 28. Controlled VOC Emissions Associated with Cattle Digestion and Manure Decomposition
Sixty Percent Head Alternative**

Animal Type	Annual VOC Emissions (ton/yr)		
	Before Controls	Control Measure Reductions	After Controls
Milk Cows	9.1	-7.2	1.9
Dry Cows	0.8	-0.6	0.3
Heifers (15-24 months)	2.1	-0.5	1.6
Heifers (7-14 months)	2.1	-0.5	1.6
Heifers (4-6 months)	0.5	-0.1	0.4
Calves (0 to 3 months)	0.7	-0.2	0.5
Total	15.4	-9.1	6.2

**Table 29. Uncontrolled Emissions Associated with Cattle Digestion and Manure Decomposition
Forty Percent Head Alternative**

Animal Type	No. of Animals	VOC Emission Factor (lb/hd/yr) ^{a,b}	NH ₃ Emission Factor (lb/hd/yr) ^c	Annual Emissions (ton/yr)	
				VOC	NH ₃
Milk Cows	580	21.0	74.0	6.1	21.5
Dry Cows	92	11.9	45.4	0.5	2.1
Heifers (15-24 months)	344	8.3	31.8	1.4	5.5
Heifers (7-14 months)	384	7.2	27.8	1.4	5.3
Heifers (4-6 months)	96	6.6	25.1	0.3	1.2
Calves (0 to 3 months)	152	6.2	23.6	0.5	1.8
Total	1,648			10.2	37.4

^a Source: SJVAPCD, "Breakdown of Dairy VOC Emission Factor by Type of Cow & Housing", May 16, 2006.

^b The VOC emission factor for "freestall housing" was used for milk cows. The VOC emission factors for "open corral housing" were used for all other animal types.

^c The NH₃ emission factors by animal type were provided by Sheraz Gill/SJVAPCD, June 14, 2006.

Table 30. VOC Control Measures Applied to the Forty Percent Head Alternative

Animal Type	VOC Control Measure Effectiveness ^a			
	Housing ^b	Milking Center ^c	Lagoon ^d	Land Application ^d
Milk Cows	47.7%	75%	40%	40%
Dry Cows	47.7%		40%	40%
Heifers (15-24 months)	47.7%		40%	40%
Heifers (7-14 months)	47.7%		40%	40%
Heifers (4-6 months)	47.7%		40%	40%
Calves (0 to 3 months)	47.7%		40%	40%

^a Source for control measure effectiveness: SJVAPCD, August 8, 2006.

^b Control measure includes: flush feedlines, walkways, etc. at least 4 times daily.

^c Control measure includes: flush or spray down milking area with each batch milked, flush holding pen and wash pens at least 4 times daily.

^d Control measure includes: use of phototrophic (red) lagoon and associated nutrient management practices.

**Table 31. VOC Emission Reductions Associated with Control Measures
Forty Percent Head Alternative**

Animal Type	No. of Animals ^a	Annual VOC Emission Reductions (ton/yr)			
		Housing ^b	Milking Center ^c	Lagoon ^d	Land Application ^d
Milk Cows	2,330	-2.7	-0.2	-1.3	-2.3
Dry Cows	342	-0.2	0.0	-0.1	-0.2
Heifers (15-24 months)	344	-0.2	0.0	-0.1	-0.1
Heifers (7-14 months)	384	-0.2	0.0	-0.1	-0.1
Heifers (4-6 months)	96	0.0	0.0	0.0	0.0
Calves (0 to 3 months)	152	-0.1	0.0	0.0	0.0
Total	3,648	-3.3	-0.2	-1.5	-2.8

^a Control measures would be applied to both Phase I and Phase II animals.

^b Control measure includes: flush feedlanes, walkways, etc. at least 4 times daily.

^c Control measure includes: flush or spray down milking area with each batch milked, flush holding pen and wash pens at least 4 times daily.

^d Control measure includes: use of phototrophic (red) lagoon and associated nutrient management practices.

^e Uncontrolled VOC emission factors from manure decomposition by dairy location are provided in Table 21.

**Table 32. Controlled VOC Emissions Associated with Cattle Digestion and Manure Decomposition
Forty Percent Head Alternative**

Animal Type	Annual VOC Emissions (ton/yr)		
	Before Controls	Control Measure Reductions	After Controls
Milk Cows	6.1	-6.4	-0.3
Dry Cows	0.5	-0.5	0.1
Heifers (15-24 months)	1.4	-0.4	1.1
Heifers (7-14 months)	1.4	-0.3	1.0
Heifers (4-6 months)	0.3	-0.1	0.2
Calves (0 to 3 months)	0.5	-0.1	0.4
Total	10.2	-7.8	2.4

Table 33. Methane Emissions Associated with Manure Decomposition Proposed Project

Animal Type	No. of Animals	CH ₄ Emission Factor (lb/hd/yr) ^a	CH ₄ Annual Emission (ton/yr)
Milk Cows	1,450	112.56	81.6
Dry Cows	230	69.1	7.9
Heifers (15-24 months)	860	48.4	20.8
Heifers (7-14 months)	960	42.3	20.3
Heifers (4-6 months)	240	38.2	4.6
Calves (0 to 3 months)	380	35.9	6.8
Total	4,120		142.0

^a The CH₄ emission factor of 112.56 lb/hd/yr for milk cows was published in *Evaluation of Emissions from Selected Uninventoried Sources in the State of California*, Dickson, Ronald J., Radian Corporation, 1988. The emission factor for milk cows was scaled to the other animal classifications using the same relative proportions as the NH₃ emission factors.

Table 34. Methane Emissions Associated with Cattle Digestion Proposed Project

Animal Type	No. of Animals	CH ₄ Emission Factor (lb/hd/yr) ^a	CH ₄ Annual Emission (ton/yr)
Milk Cows	1,450	262.5	190.3
Dry Cows	230	262.5	30.2
Heifers (1 to 2 years)	960	134.6	64.6
Heifers (3 months to 1 year)	1,100	45.5	25.0
Calves (0 to 3 months)	380	45.5	8.6
Total	4,120		318.8

^a Source: U.S. EPA, *Compilation of Air Pollutant Emission Factors*, Fifth Edition, Section 14.4, (AP-42), 1998. Enteric Fermentation, dairy cattle, western U.S.

Table 35. Emission Factors for Diesel Powered Dairy Equipment

Emission Source	Diesel Offroad Equipment Emission Factor ^a (g/hp-hr)			
	VOC	NO _x	PM ₁₀	PM _{2.5} ^b
Dairy Tractor - Year 2007	1.00	5.93	0.19	0.18

^a Source: URBEMIS2002 version 8.7.0. Generalized emission factors in units of g/hp-hr are derived from the URBEMIS2002 output for a 165-hp rubber-tired loader in the San Joaquin Valley Air Basin in the year 2007.

^b The PM_{2.5} emission factor is scaled from the PM₁₀ factor according to the relative emission rate for diesel vehicle exhaust as reported in CARB, *California Emission Inventory and Reporting System (CEIDARS)*, 2002.

Table 36. Emissions Associated with Diesel Powered Dairy Equipment Proposed Project

Emission Source	Horsepower (hp)	Load Factor ^a	Hours of Operation (hr/day)	Annual Emissions (ton/yr)			
				VOC	NO _x	PM ₁₀	PM _{2.5}
Dairy Tractor - Year 2007	150	0.465	12	0.34	2.00	0.06	0.06

^a Source: URBEMIS2002 version 8.7.0.

Table 37. Emissions Associated with Wind Erosion at the Dairy Proposed Project

Emission Source	Unpaved Area (acres) ^c	PM ₁₀ Emission Factor (lb/acre/yr) ^a	PM _{2.5} Emission Factor (lb/acre/yr) ^b	Annual Emissions (ton/yr)	
				PM ₁₀	PM _{2.5}
Unpaved Roads and other Unpaved Areas at Dairy	4.0	201.5	42.7	0.4	0.1

^a Source: CARB, Emission Inventory Procedural Manual Volume III: Methods for Assessing Area Source Emissions, Section 7.13, Windblown Dust - Unpaved Roads. Updated August 1997. Table 2, Fresno County. PM10 is assumed to be 50% of TSP.

^b The PM2.5 emission factor is scaled from the PM10 factor according to the relative emission rate for windblown dust - unpaved areas as reported in CARB, *California Emission Inventory and Reporting System (CEIDARS)*, 2003.

^c In this table, the unpaved area of the dairy excludes cattle housing, because the emission factors for cattle housing in Table 10 already account for windblown dust (SJVAPCD, personal communication with Jonah Aiyabei, 10/30/06).

Table 38. Emissions Associated with Unpaved Road Dust at the Dairy Proposed Project

Emission Source	Phase II Total Animal Population (head)	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}
Unpaved Roads at Dairy	4,120	0.369	0.078	0.8	0.2
Unpaved Areas (non-roads) at Dairy	4,120	0.123	0.026	0.3	0.1
Total				1.0	0.2

^a Source: Western Governors' Association. *Western Regional Air Partnership (WRAP) Fugitive Dust Handbook*. 9/7/06. Table 13-1.

^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)*, 2003.

Table 39. Emission Factors for Vehicle Trips

Vehicle Category	Study Year	Running Exhaust (g/VMT)				Idle (g/hr) ^e				Starting + Hot Soak Emissions (g/trip) ^d				Evap. Running Loss (g/min) ^f
		VOC	NO _x	PM ₁₀ ^a	PM _{2.5}	VOC	NO _x	PM ₁₀ ^a	PM _{2.5}	VOC	NO _x	PM ₁₀	PM _{2.5}	
Light-Duty Trucks ^b	2006	0.189	0.593	4.526	0.778	n/a	n/a	n/a	n/a	2.219	0.919	0.026	0.024	0.094
	2007	0.169	0.538	4.526	0.778	n/a	n/a	n/a	n/a	2.059	0.866	0.026	0.024	0.089
Heavy-Duty Trucks ^c	2006	0.721	10.039	4.776	0.996	5.007	69.082	1.573	1.447	5.757	3.448	0.010	0.009	0.036
	2007	0.668	9.249	4.759	0.981	4.988	69.227	1.493	1.374	5.291	3.302	0.009	0.008	0.035

^a Includes contributions from engine exhaust, tire wear, brake wear, and paved road dust. The first three components are estimated by EMFAC2002. The emission factor for paved road dust (4.49 g/VMT) is provided by CARB, *Emission Inventory Procedural Manual Volume III: Methods of Assessing Area Source Emissions*, Section 7.9, July 1997.

^b Emission factors represent an average trip speed of 45 mph.

^c Emission factors represent an average trip speed of 35 mph.

^d Starting and hot soak emission factors are conservatively based on the pre-trip resting times (for starting emissions) and trip durations (for hot soak emissions) that yield the highest EMFAC2002 emission factors.

^e Non-incidental idling (i.e., during load transfer) is assumed for trucks only.

^f Evaporative running loss emission factors are based on approximate travel times of 25 minutes for light duty trucks and 60 minutes (or greater) for heavy duty trucks (which assumes that the trucks would likely keep the engine running at the idling level between one-way trips).

Source: California Air Resources Board, Emfac2002, Version 2.2. 2002.

**Table 40. Emissions From Vehicle Trips
Existing Site**

Emission Source	Hauled Material (ton/yr)	Truck Capacity (ton)	One-Way Trips (trips/yr)	One-Way Trip Length (mi/trip)	Annual VMT (VMT/yr)	Idling Time per Round Trip (hr)	Avg Speed During Transit (mph)	Transit Time per One-Way Trip (min)	Annual Emissions (ton/yr)			
									VOC	NO _x	PM ₁₀	PM _{2.5}
Fertilizer Trucks	13,610	18	1,512	7.5	11,342	0.5	35	13	0.02	0.16	0.06	0.01
Crop Harvest Trucks	23,600	13.75	3,433	7.5	25,745	0.5	35	13	0.04	0.36	0.14	0.03
Total			4,945		37,087				0.05	0.51	0.20	0.04

Notes:

1. For heavy duty trucks, starting and hot soak emissions are applied to round trips rather than one-way trips because the trucks are assumed to remain idling between the arriving and departing trip.
2. Fertilizer and crop harvest trucks are assumed to be heavy-duty trucks.
3. Existing site conditions are assumed to be 2006.

**Table 41. Emissions From Vehicle Trips
Proposed Project**

Emission Source	Hauled Material (ton/yr)	Truck Capacity (ton)	One-Way Trips (trips/yr)	One-Way Trip Length (mi/trip)	Annual VMT (VMT/yr)	Idling Time per Round Trip (hr)	Avg Speed During Transit (mph)	Transit Time per One-Way Trip (min)	Annual Emissions (ton/yr)			
									VOC	NO _x	PM ₁₀	PM _{2.5}
Milk Trucks	n/a	n/a	2,190	20	43,800	0.5	35	34	0.04	0.49	0.23	0.05
Manure Haul-off Trucks	4,583	18	509	7.5	3,819	0.5	35	13	0.01	0.05	0.02	0.00
Crop Harvest Trucks	32,262	13.75	4,693	0.5	2,346	0.5	35	1	0.02	0.12	0.01	0.00
Employee Trips	n/a	n/a	8,760	8.7	76,212	n/a	45	12	0.04	0.05	0.38	0.07
Visitor Trips	n/a	n/a	1,460	18	26,280	n/a	45	24	0.01	0.02	0.13	0.02
Total			17,612		152,457				0.13	0.73	0.78	0.15

Notes:

1. For heavy duty trucks, starting and hot soak emissions are applied to round trips rather than one-way trips because the trucks are assumed to remain idling between the arriving and departing trip.
2. For light-duty trucks, starting and hot soak emissions are applied to one-way trips because the trucks are assumed to shut off after each one-way trip.
3. Milk, manure, and crop harvest trucks are assumed to be heavy-duty trucks.
4. All employees and visitors are conservatively assumed to drive light-duty trucks.
5. Proposed Project conditions are assumed to be 2007.

Table 42. 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 Factor
Land Preparation	Agricultural Tilling	417	0.45	0.10	0.22
Crop Harvesting	Agricultural Tilling	417	0.45	0.10	0.22
Windblown Dust - Farms	Windblown Dust-Agric. Lands	418	0.45	0.10	0.22
Cattle in Corrals	Livestock Operations Dust	423	0.48	0.06	0.11
Unpaved Road Dust	Unpaved Road Dust	470	0.59	0.13	0.21
Paved Road Dust	Paved Road Dust	471	0.46	0.08	0.17
Windblown Dust - Dairy	Dust - Unpaved Areas	416	0.59	0.13	0.21
Truck Exhausts	Diesel Vehicle Exhaust	425	1.00	0.92	0.92
Employee Travel	Gasoline Vehicles-Catalyst	400	0.97	0.90	0.93

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

Air Quality Base Data
Van Der Kooi Dairy (Revised November 2006)
Fresno County

Holstein cows: 1,400 lb. animals

A. Animals

Milk Cows: 3,200
 Dry cows and support Stock: 2,920

RWQCB Animal Units: 6,646

See attached Comprehensive Nutrient Management Plan for animal housing

B. Land

Currently farmed, row crops: 1,130 acres
 After dairy development, farmed, row crops: 1,132 acres
 Dairy Facilities: 110 acres
 Flushed Corrals: 40 acres

C. Existing Traffic

Fertilizer Trucks =

550	x	250 lbs/acre (corn)=	137500 lbs
80	x	385 lbs/acre (wheat)=	30800 lbs
500	x	480 lbs/acre (alfalfa)=	240000 lbs
			408,300 total lbs
			204.15 tons N

at 1-1/2%N = 13610 tons
 at 18 tons/truck = 756.111 trucks x 2 = 1512.22222 truck trips
 at 7.5 miles/trip = 11,342 miles

4,14307458 truck trips per day

Crop harvest =

550	x	28 tons/acre (corn)=	15400
80	x	15 tons/acre (wheat)=	1200
500	x	14 tons/acre (oats)=	7000
			23,600 total tons

at 13.75 tons/truck = 1,716 trucks
 at 7.5 miles/trip = 12,873 miles x2 = 25,745 miles

9,40473225 truck trips per day

TOTAL EXISTING = 37,087 miles
 13,5478068 Total Existing Trips Per Day

D. New Traffic

Manure hauled offsite = 4,583 tons 254,611 trucks 1,395,129 truck trips per day
at 18 tons/truck = 7.5 miles/trip = 1,909,583 miles
x 2 = 3,819 miles

Milk trucks = 3 per day x 365 days = 1,095 6 truck trips per day
Average mileage = 20 miles x 1095 trips/year = 21,900 43,800 miles

Crop Harvest =

566	x	28 tons/acre (corn)=	15,848
566	x	15 tons/acre (wheat)=	8,490
566	x	14 tons/acre (alfalfa)=	7,924
			32,262 total tons

at 13.75 tons/ truck= 2,346 trucks 12,856,587 truck trips per day
0.5 miles/trip = 1,173 miles x 2 = 2,346 miles

Passenger vehicles/ pickup trucks = 12 employees x 365 = 4,380 miles/employee
104.4 x 365 = 38,106 miles
8.7 average miles = 104.4 miles/employee
x 2 = 76,212 miles 24 auto trips per day

Salesmen, visitors = 2 per day x 365 days = 730 visitors per year
18 miles/trip = 13,140 miles
x 2 = 26,280 miles 4 auto trips per day

TOTAL PROPOSED = 152,457 miles

NET CHANGE = 115,370 miles

48,251,712 Total new trips per day
20,251,712 Total new truck trips per day
34,703,910 Net total trips per day
6,703,910 Net truck trips per day

Appendix J

Existing Agricultural records



Lockwood Seed and Grain

28777 CHOWCHILLA BLVD., CHOWCHILLA, CALIF. 93610-
(559) 865-6702 FAX (559) 865-4211

INVOICE NUMBER:

0071775-JN

INVOICE DATE:

06/02/05

SALESPERSON:

BOB

SALES TAX CODE:

CHARLIE VANDER-KOOI

CUSTOMER NO:

00-0000

CUSTOMER P.O.:

SHIP VIA:

MARNY / LEO

TERMS:

NET 30 DAYS

CONTACT:

SALES CD	DESCRIPTION	QUANTITY	PRICE	AMOUNT
006902RRNC	0962 RR MF16 CORN SEEDS	120.00	95.4000	11,448.00
	LOT NUMBER 7430410	120.00		
006413RRNC	06413 RR MF16 CORN SEEDS	120.00	95.0000	11,400.00
	LOT NUMBER 6636416	120.00		

Paid in Full
7/28/05

NET INVOICE:

22,848.00

FREIGHT:

.00

SALES TAX:

.00

WE THANK YOU IN ADVANCE FOR MAKING PROMPT PAYMENTS
NET 30 DAYS

TOTAL:

22,848.00

Invoice

GR[®]TECH, INC.

P.O. Box 19095, Fresno, CA 93790-0095

DATE	INVOICE #
5/31/2005	705

BILL TO
CHARLIE VAN DER KOOI DAIRY 8315 Merrill Ave. Chino, CA 91710

					TERMS	DUE DATE
					Net 30	6/30/2005
REF. NO.	DATE	ACRES	DESCRIPTION	RATE/ACRE	AMOUNT	
234229	5/21/2005	131	Field 5-2 (Howard & Elkhorn) Gypsum: 3 tons/ac: 393 tons	9.50	1,244.50	
		118	Field 5-4 (Howard & Elkhorn) Gypsum: 3 tons/ac: 354 tons	9.50	1,121.00	
234232	5/27/2005	311	Field 6-1 (96 ac) Field 31-5 (105 ac) Field 31-6 (110 ac) Howard & Elkhorn Gypsum: 3 tons/ac: 933 tons	9.50	2,954.50	
PAID 6/20/05						
Thank you for your business.					Total	\$5,320.00

Four Corners Custom Farming, Inc.

P.O. Box 355
Five Points, CA. 93624
Office: 559-866-5341
Fax: 559-866-5342

Invoice

Date	Invoice #
11/29/2005	2368

Bill To

Charlie Vandercoy
8315 Merrill Ave.
Chino, CA 91710

		P.O. No.	Terms	Project
Description	HOURS/ACRES	Rate	Amount	
PLANT WHEAT				
SECTION 31-6	110	13.75	1,512.50	
SECTION 31-5	109	13.75	1,498.75	
SECTION 6-1	101	13.75	1,388.75	
SECTION 5-2	129.1	13.75	1,775.13	
SECTION 5-4	120	13.75	1,650.00	
<i>Paid</i> <i>1/11/06</i>				
			Total	\$7,825.13
			Payments/Credits	\$0.00
			Balance Due	\$7,825.13

Thank you for your business.
Please make checks payable to:
Four Corners Custom Farming, Inc.
Please note invoice # on your check.

PRIORITY HAY CO.
P. O. BOX 116
RIVERDALE, CA 93656

Invoice

Date	Invoice #
9/15/2006	77

Bill To
CHARLES VAN DER KOOI 8315 MERRILLA CHINO, CA 91710

EIN # 38-3733545

DATE	TON/BALES/ACRES	DESCRIPTION	LOCATION	Rate	Amount
8/21/2006	333.46	OAT STRAW	772 STRAW BALES	50.00	16,773.00
Oat straw was sold to offset cost of Baling the straw					
Total					\$16,773.00

PRIORITY HAY CO.
P. O. BOX 116
RIVERDALE, CA 93656

Invoice

Date	Invoice #
9/15/2006	77

Bill To
CHARLES VAN DER KOOI 8315 MERRILLA CHINO, CA 91710

EIN # 38-3733545

DATE	TON/BALES/ACRES	DESCRIPTION	LOCATION	Rate	Amount
8/21/2006	603.59	OAT STRAW	1412 BALES OF OAT STRAW	23.00	13,882.57
8/21/2006	57.6	WHEAT	128 BALES WHEAT	35.00	2,016.00
<i>Paid by selling off part of oat straw</i>					

Total

\$15,898.57

Lockwood Seed and Grain

044734

DATE	INVOICE NO	COMMENT	AMOUNT	DISCOUNT	NET AMOUNT
06/28/06	71283	BULK F/R MONTEZUMA OATS	5,508.30	.00	5,508.30
06/28/06	71286	BULK F/R MONTEZUMA OATS	4,509.75	.00	4,509.75
06/28/06	71289	BULK F/R MONTEZUMA OATS	4,940.25	.00	4,940.25
06/29/06	71292	BULK F/R MONTEZUMA OATS	5,029.50	.00	5,029.50
06/29/06	71298	BULK F/R MONTEZUMA OATS	4,927.65	.00	4,927.65
06/29/06	71301	BULK F/R MONTEZUMA OATS	4,803.75	.00	4,803.75
06/29/06	71305	BULK F/R MONTEZUMA OATS	5,203.80	.00	5,203.80
06/29/06	71312	BULK F/R MONTEZUMA OATS	5,497.80	.00	5,497.80
06/29/06	71316	BULK F/R MONTEZUMA OATS	5,546.10	.00	5,546.10
06/30/06	71323	BULK F/R MONTEZUMA OATS	4,824.75	.00	4,824.75
06/30/06	71325	BULK F/R MONTEZUMA OATS	5,120.85	.00	5,120.85
06/30/06	71334	BULK F/R MONTEZUMA OATS	5,116.65	.00	5,116.65
06/30/06	71336	BULK F/R MONTEZUMA OATS	5,129.25	.00	5,129.25
06/30/06	71345	BULK F/R MONTEZUMA OATS	5,651.10	.00	5,651.10
06/30/06	71350	BULK F/R MONTEZUMA OATS	5,003.25	.00	5,003.25

CHECK: 044734 07/06/06 VANDER-KOOI RANCH

Bob Samuelson

CONTINUED

Lockwood Seed and Grain

044735

DATE	INVOICE NO	COMMENT	AMOUNT	DISCOUNT	NET AMOUNT
06/30/06	71351	BULK F/R MONTEZUMA OATS	5,029.50	.00	5,029.50
06/30/06	71360	BULK F/R MONTEZUMA OATS	5,304.60	.00	5,304.60
06/30/06	71367	BULK F/R MONTEZUMA OATS	2,279.55	.00	2,279.55

CHECK: 044735 07/06/06 VANDER-KOOI RANCH

CHK TOTAL: 89,426.40

SEED SETTLEMENT
(THESE ARE FARM DOLLARS)
DATE: 07/2006

PURCHASED FROM: VANDER-KOOI RANCH

BUYER: LOCKWOOD SEED AND GRAIN
26777 CHOWCHILLA BLVD.
CHOWCHILLA, CA 93610

CONTRACT: 10616 COMMODITY: SWAN OATS

CONTRACT DATE: 01/30/2006

DATE	WT. CERT#	GROSS WT.	PRICE	TOTAL
7/3/2006	71355	46120	10.50	\$4,842.60
7/3/2006	71357	45480	10.50	\$4,775.40
7/3/2006	71361	45300	10.50	\$4,756.50
7/3/2006	71366	43760	10.50	\$4,594.80
7/3/2006	71372	23860	10.50	\$2,505.30
7/3/2006	71373	51280	10.50	\$5,384.40
7/5/2006	71378	47040	10.50	\$4,939.20
7/5/2006	71380	49560	10.50	\$5,203.80
7/5/2006	71384	47270	10.50	\$4,963.35
7/5/2006	71387	53340	10.50	\$5,600.70
7/5/2006	71390	48350	10.50	\$5,076.75
7/6/2006	71393	45790	10.50	\$4,807.95
7/6/2006	71395	48360	10.50	\$5,077.80
		595510		\$62,528.55

=====

\$62,528.55

Appendix K
Ambient Air Quality Analysis (AAQA) and Risk
Management Review (RMR)



San Joaquin Valley

AIR POLLUTION CONTROL DISTRICT

September 27, 2006

Jackie Neuffer
QUAD KNOPF
5110 W. Cypress Avenue
Visalia, CA 93277

Dear Ms. Neuffer:

Enclosed is the San Joaquin Valley Air Pollution Control District's Ambient Air Quality Analysis (AAQA) and Risk Management Review (RMR) results for the Charles Van Der Kooi Dairy. Please include this analysis in the Draft EIR in the appendices.

As stated in the conclusion of the report, the project is approved without Toxic Best Available Control Technology (T-BACT) meaning that toxics are a less than significant impact for the proposed project. However, please note that Hydrogen Sulfide was not quantified in the analysis because there is no accurate emission factor. The conclusion also states that the present PM10 project emissions cause the project to fail the AAQA. This would be a significant impact. In order to mitigate this impact to less than significant the applicant will need to offset the project's PM10 emissions, so that the PM10 emissions from the project are 2,455 lbs/year (1.2 tons). This is the PM10 emission rate that was determined to pass the AAQA. If you have any questions regarding the RMR/AAQA please contact Jonah Aiyabei at (559) 230-5910.

Sincerely,

A handwritten signature in black ink, appearing to read "Elena Nuño", with a stylized flourish at the end.

Elena Nuño
Air Quality Specialist
Central Region

enclosure

c: Harry Tow

Northern Region
4800 Enterprise Way
Modesto, CA 95356-8718
Tel: (209) 557-6400 FAX: (209) 557-6475

Central Region (Main Office)
1990 E. Gettysburg Avenue
Fresno, CA 93726-0244
Tel: (559) 230-6000 FAX: (559) 230-6061
www.valleyair.org

Southern Region
2700 M Street, Suite 275
Bakersfield, CA 93301-2373
Tel: (661) 326-6900 FAX: (661) 326-6985

San Joaquin Valley Air Pollution Control District

Risk Management Review

To: Jonah Aiyabei, AQE – Permit Services
From: Matthew Cegielski, AQS – Technical Services
Date: September 19, 2006
Facility Name: Charles Van Der Kooi Dairy
Location: 13695 W Elkhorn Riverdale CA
Application #(s): C-7013-1-1, 2-1, 3-1,4-1
Project #: C-1053434

AAQA/RMR REPORT

I. Project Description

Technical Services received a request on September 19, 2006, to perform an Ambient Air Quality Analysis (AAQA) and a Risk Management Review (RMR) due to changes in emissions and to determine the PM₁₀ emission rate that will pass the EPA's significance level for the Ambient Air Quality Standards (AAQS).

II. Analysis

Technical Services performed modeling for PM₁₀ to determine at what level of emissions the federal or state AAQS would not be violated. A new RMR was conducted due to the change in emission rates. The prioritization score (0.1) did not change from the RMR done on May 9, 2006.

The following parameters were used for the RMR:

Analysis Parameters C-7013 Project 1053434			
Total Equivalent Cows		1,426	
Total VOC Increase lb/yr	27,528	Total VOC Increase lb/hr	3.14
Total NH3 Increase lb/yr	194,804	Total NH3 Increase lb/hr	22.2
Total PM10 Increase lb/yr	15,357	Total PM10 Increase lb/hr	1.753

The following PM10 emission rate was determined to pass the AAQA:

PM10 Emissions	0.28025 lb/hr	2,455 lb/yr
	PM 24 Hour	PM Annual
Facility Totals $\mu\text{g}/\text{m}^3$	4.99	0.58
EPA's Significance Level $\mu\text{g}/\text{m}^3$	5.0	1.0

III. Conclusion

The prioritization score is less than 1.0. **In accordance with the District's Risk Management Policy, the project is approved without Toxic Best Available Control Technology (T-BACT).**

The AAQA fails because the project's emissions will contribute significantly to a violation of the 24-hour and annual AAQS for PM₁₀.

These conclusions are based on the data provided by the applicant and the project engineer. Therefore, this analysis is valid only as long as the proposed data and parameters do not change.

Attachments:

- A. Prioritization score with toxic emissions summary
- B. ISCST 3 PM₁₀ Concentration Plots
- C. AAQA/RMR request from the project engineer

PRIORITIZATION FOR

CHARLES VAN DER KOOI Project # 1053434 Region (C) Facility (7013)

DEVICE NUMBER 1

DEVICE NAME Milk Parlor

DEVICE NAME		Milk Parlor		Emissions and Potency				Despersion Adjustment			
CAS NUMBER	POLLUTANT NAME	LBS/YEAR	LBS/HOUR	Method		Method		Method		Method	
				Prioritization Scores		Prioritization Scores		Prioritization Scores		Prioritization Scores	
				Cancer	CHRONIC	ACUTE	Cancer	CHRONIC	ACUTE	Cancer	CHRONIC
1210	Xylenes (mixed)	1.71E+00	1.95E-04		8.39E-08	2.66E-08		4.62E-08		1.46E-08	
9960	SULFATES	9.95E+00	1.14E-03		1.37E-05	2.85E-05		7.52E-06		1.57E-05	
50000	Formaldehyde	3.78E-01	4.32E-05	7.71E-06	4.33E-06	1.38E-06	4.19E-06	2.38E-06		7.58E-07	
56235	Carbon tetrachloride	5.60E-02	6.37E-06	8.00E-06	4.81E-08	1.01E-08	4.35E-06	2.64E-08		5.53E-09	
67630	Isopropyl alcohol	1.54E+00	1.76E-04		7.55E-09	1.65E-07		4.15E-09		9.08E-08	
67663	Chloroform	1.24E-01	1.42E-05	2.23E-06	1.42E-08	2.84E-07	1.21E-06	7.81E-09		1.56E-07	
71432	Benzene	3.03E-01	3.46E-05	2.99E-05	1.73E-07	7.98E-08	1.62E-05	9.54E-08		4.39E-08	
74873	Methyl chloride {Chloromethane}	7.54E-01	8.61E-05								
75003	Ethyl chloride {Chlorethane}	2.28E-01	2.60E-05		2.61E-10			1.44E-10			
75070	Acetaldehyde	2.29E+00	2.62E-04	2.10E-05	8.75E-06		1.14E-05	4.81E-06			
75150	Carbon disulfide	2.37E+00	2.70E-04		0.00E+00	1.31E-07		0.00E+00		7.19E-08	
75694	Trichlorofluoromethane {Freon 11}	0.00E+00	1.17E-08		0.00E+00			0.00E+00			
78933	Methyl ethyl ketone {2-Butanone}	1.39E+01	1.59E-03		4.77E-07	3.67E-07		2.62E-07		2.02E-07	
79005	1,1,2-Trichloroethane	2.15E-01	2.46E-05	1.17E-05			6.36E-06				
79345	1,1,2,2-Tetrachloroethane	8.00E-03	9.48E-07	1.58E-06			8.57E-07				
91203	Naphthalene	1.11E+00	1.26E-04	1.28E-04	4.22E-06		6.95E-05	2.32E-06			
95501	1,2-Dichlorobenzene	5.22E-01	5.95E-05								
96128	1,2-Dibromo-3-chloropropane	4.70E-02	5.36E-06	3.20E-04	8.07E-06		1.74E-04	4.44E-06			
96184	1,2,3-Trichloropropane	2.63E-01	3.00E-05								
98828	Cumene	5.30E-02	6.10E-06								
100414	Ethyl benzene	3.30E-01	3.77E-05		5.67E-09			3.12E-09			
100425	Styrene	3.42E-01	3.90E-05		1.30E-08	5.57E-09		7.18E-09		3.06E-09	
100447	Benzyl chloride	2.75E-01	3.14E-05	4.58E-05	7.87E-07	3.93E-07	2.49E-05	4.33E-07		2.16E-07	
106467	p-Dichlorobenzene	4.94E-01	5.63E-05	1.85E-05	2.12E-08		1.00E-05	1.17E-08			
106934	Ethylene dibromide {EDB}	2.91E-01	3.32E-05	7.02E-05	1.25E-05		3.82E-05	6.87E-06			
107062	Ethylene dichloride {EDC}	5.60E-02	6.40E-06	4.00E-06	4.81E-09		2.17E-06	2.64E-09			

PRIORITIZATION FOR

CHARLES VAN DER KOOI Project # 1053434 Region (C) Facility (7013)

107131	Acrylonitrile	2.31E-01	2.63E-05	2.28E-04	1.59E-06	1.24E-04	8.73E-07	
108054	Vinyl acetate	1.87E+00	2.14E-04		3.21E-07		1.77E-07	
108101	Methyl isobutyl ketone (Hexone)	6.74E-01	7.70E-05					
108883	Toluene	1.02E+00	1.17E-04		1.17E-07	9.49E-09	6.43E-08	5.22E-09
108907	Chlorobenzene	2.59E-01	2.95E-05		8.89E-09		4.89E-09	
110543	Hexane	7.73E-01	8.82E-05		3.79E-09		2.09E-09	
110827	Cyclohexane	6.50E+00	7.42E-04					
120821	1,2,4-Trichlorobenzene	7.41E-01	8.46E-05					
123728	Butyraldehyde	1.08E-01	1.24E-05					
123911	1,4-Dioxane	1.34E+00	1.53E-04	3.51E-05	1.54E-08	1.53E-07	8.44E-09	8.42E-08
127184	Perchloroethylene (Tetrachloroethene)	6.19E-01	7.07E-05	1.24E-05	6.07E-07	1.06E-08	3.34E-07	5.83E-09
541731	1,3-Dichlorobenzene	4.66E-01	5.32E-05					
764410	1,4-Dichloro-2-butene	8.49E-01	9.69E-05					
4170303	Crotonaldehyde	1.35E-01	1.54E-05					
7429905	Aluminum	2.87E+01	3.30E-03					
7439921	Lead	4.14E-02	4.75E-06	1.69E-06		9.18E-07		
7439965	Manganese	7.57E-01	8.68E-05		1.30E-04		7.15E-05	
7440020	Nickel	3.26E-02	3.74E-06	2.88E-05	2.24E-05	1.87E-06	1.23E-05	1.03E-06
7440224	Silver	1.63E-02	1.87E-06					
7440382	Arsenic	6.27E-03	7.20E-07	7.03E-05	7.18E-06	1.14E-05	3.95E-06	6.25E-06
7440393	Barium	5.83E-01	6.70E-05					
7440439	Cadmium	1.13E-02	1.30E-06	1.61E-04	1.94E-05	8.77E-05	1.07E-05	
7440484	Cobalt	3.76E-03	4.32E-07					
7440508	Copper	1.07E-01	1.22E-05		1.53E-06	3.66E-07	8.42E-07	2.01E-07
7440622	Vanadium (fume or dust)	1.43E-01	1.64E-05			1.64E-06		9.02E-07
7440666	Zinc	2.95E-01	3.38E-05		2.89E-07		1.59E-07	
7631869		8.85E+01	1.02E-02		1.01E-03		5.57E-04	
7664417	Ammonia	1.19E+04	1.36E+00		2.04E-03	1.28E-03	1.12E-03	7.01E-04
7726956	Bromine	4.89E-02	5.62E-06		9.88E-07		5.43E-07	
7782492	Selenium	7.53E-03	8.64E-07		1.29E-08		7.11E-09	
7782505	Chlorine	8.04E+00	9.23E-04		1.38E-03	1.32E-05	7.59E-04	7.25E-06

CHARLES VAN DER KOOIJ
Project # 1053434
Region (C) Facility (7013)

DEVICE NUMBER	2
DEVICE NAME	Cow Housing

PRIORITIZATION FOR

CHARLES VAN DER KOOI Project # 1053434 Region (C) Facility (7013)

106934	Ethylene dibromide {EDB}	4.56E+00	5.21E-04	1.10E-03	1.96E-04	5.98E-04	1.08E-04
107062	Ethylene dichloride {EDC}	8.79E-01	1.00E-04	6.28E-05	7.55E-08	3.41E-05	4.15E-08
107131	Acrylonitrile	3.62E+00	4.13E-04	3.57E-03	2.49E-05	1.94E-03	1.37E-05
108054	Vinyl acetate	2.93E+01	3.35E-03		5.03E-06		2.77E-06
108101	Methyl isobutyl ketone {Hexone}	1.06E+01	1.21E-03				
108883	Toluene	1.60E+01	1.83E-03		1.83E-06	1.48E-07	1.01E-06
108907	Chlorobenzene	4.05E+00	4.63E-04		1.39E-07		7.65E-08
110543	Hexane	1.21E+01	1.38E-03		5.94E-08		3.26E-08
110827	Cyclohexane	1.02E+02	1.16E-02				
120821	1,2,4-Trichlorobenzene	1.16E+01	1.33E-03				
123728	Butyraldehyde	1.70E+00	1.94E-04				
123911	1,4-Dioxane	2.10E+01	2.40E-03				
127184	Perchloroethylene {Tetrachloroethene}	9.70E+00	1.11E-03	5.50E-04	2.40E-07	2.99E-04	1.32E-07
541731	1,3-Dichlorobenzene	7.31E+00	8.34E-04	1.95E-04	9.52E-06	1.06E-04	5.23E-06
764410	1,4-Dichloro-2-butene	1.33E+01	1.52E-03				
4170303	Crotonaldehyde	2.11E+00	2.41E-04				
7429905	Aluminum	4.50E+02	5.16E-02				
7439921	Lead	6.49E-01	7.44E-05	2.65E-05		1.44E-05	
7439965	Manganese	1.19E+01	1.36E-03		2.04E-03		1.12E-03
7440020	Nickel	5.11E-01	5.87E-05	4.52E-04	3.51E-04	2.46E-04	1.93E-04
7440224	Silver	2.56E-01	2.93E-05				1.61E-05
7440382	Arsenic	9.83E-02	1.13E-05	1.10E-03	1.13E-04	5.99E-04	6.19E-05
7440393	Barium	9.14E+00	1.05E-03				
7440439	Cadmium	1.77E-01	2.03E-05	2.53E-03	3.04E-04	1.37E-03	1.67E-04
7440484	Cobalt	5.90E-02	6.77E-06				
7440508	Copper	1.67E+00	1.92E-04				
7440622	Vanadium (fume or dust)	2.24E+00	2.57E-04		2.39E-05	5.75E-06	1.31E-05
7440666	Zinc	4.62E+00	5.30E-04		4.53E-06	2.57E-05	3.16E-06
7631869		1.39E+03	1.59E-01		1.59E-02		2.49E-06
7664417	Ammonia	1.83E+05	2.09E+01		3.15E-02	1.96E-02	8.73E-03
7726956	Bromine	7.67E-01	8.80E-05		1.55E-05		1.73E-02
							8.52E-06
							1.08E-02
							1.41E-05
							9.80E-05
							1.61E-05
							1.32E-06
							9.16E-08
							8.16E-08
							7.65E-08
							3.26E-08
							1.01E-06
							1.37E-05
							2.77E-06
							1.94E-03
							4.15E-08
							5.98E-04
							1.08E-04
							1.32E-07
							5.23E-06
							1.61E-05
							9.80E-05
							1.41E-05
							3.16E-06
							2.49E-06
							8.73E-03
							1.73E-02
							1.08E-02
							8.52E-06

PRIORITIZATION
FOR

CHARLES VAN DER KOOI
Project # 1053434
Region (C) Facility (7013)

7782492	Selenium	1.18E-01	1.35E-05	2.03E-07	1.11E-07
7782505	Chlorine	1.26E+02	1.45E-02	2.16E-02	1.19E-02
18540299	Chromium, hexavalent (& compounds)	7.86E-02	9.02E-06	4.01E-02	2.18E-02
				1.35E-05	7.43E-06

TOTALS FOR DEVICE 2 5.90E-02 7.27E-02 2.05E-02 3.21E-02 4.00E-02 1.13E-02

DEVICE NUMBER 3
DEVICE NAME Lagoon West

		Emissions and Potency Method			Despersion Adjustment Method		
		Prioritization Scores			Prioritization Scores		
CAS NUMBER	POLLUTANT NAME	LBS/YEAR	LBS/HOUR	Cancer	CHRONIC	ACUTE	ACUTE
1210	Xylenes (mixed)	7.85E+00	8.95E-04		3.85E-07	1.22E-07	2.12E-07
56235	Carbon tetrachloride	1.43E+01	1.63E-03	2.04E-03	1.23E-05	2.57E-06	1.11E-03
67663	Chloroform	7.13E+00	8.15E-04	1.28E-04	8.16E-07	1.63E-05	6.98E-05
71432	Benzene	7.13E+00	8.15E-04	7.03E-04	4.08E-06	1.88E-06	3.82E-04
71556	Methyl chloroform {1,1,1-TCA}	2.85E+01	3.26E-03		9.79E-07	1.44E-07	5.38E-07
75252	Bromoform	3.17E+02	3.61E-02				
75694	Trichlorofluoromethane {Freon 11}	1.57E+01	1.79E-03		7.70E-07		4.24E-07
76131	Chlorinated fluorocarbon {CFC-113}	1.43E+01	1.63E-03		7.02E-07		3.86E-07
78933	Methyl ethyl ketone {2-Butanone}	1.74E+02	1.99E-02		5.98E-06	4.59E-06	3.29E-06
79016	Trichloroethylene	7.13E+00	8.15E-04	4.85E-05	4.08E-07		2.64E-05
95501	1,2-Dichlorobenzene	1.01E+03	1.15E-01				
95636	1,2,4-Trimethylbenzene	7.13E+00	8.15E-04				
100425	Styrene	9.98E+00	1.14E-03		3.81E-07	1.63E-07	2.09E-07
106467	p-Dichlorobenzene	1.78E+01	2.04E-03	6.66E-04	7.64E-07		3.62E-04
106990	1,3-Butadiene	7.13E+00	8.15E-04	4.12E-03	1.22E-05		2.24E-03
108054	Vinyl acetate	7.13E+01	8.14E-03		1.22E-05		6.73E-06
108101	Methyl isobutyl ketone {Hexone}	4.06E+01	4.64E-03				
108883	Toluene	8.56E+01	9.77E-03		9.80E-06	7.92E-07	5.39E-06
110827	Cyclohexane	7.13E+00	8.15E-04				
115071	Propylene	9.27E+01	1.06E-02				
541731	1,3-Dichlorobenzene	1.78E+01	2.04E-03		1.06E-06		5.84E-07

PRIORITIZATION FOR

CHARLES VAN DER KOOI Project # 1053434 Region (C) Facility (7013)

DEVICE NUMBER 4		TOTALS FOR DEVICE 3									
DEVICE NAME Lagoon East											
		Emissions and Potency Method				Despersion Adjustment Method					
CAS NUMBER	POLLUTANT NAME	LBS/YEAR	LBS/HOUR	Prioritization Scores			Prioritization Scores				
				Cancer	CHRONIC	ACUTE	Cancer	CHRONIC	ACUTE		
1210	Xylenes (mixed)	7.85E+00	8.95E-04		3.85E-07	1.22E-07		2.12E-07	6.71E-08		
56235	Carbon tetrachloride	1.43E+01	1.63E-03	2.04E-03	1.23E-05	2.57E-06	1.11E-03	6.75E-06	1.42E-06		
67663	Chloroform	7.13E+00	8.15E-04	1.28E-04	8.16E-07	1.63E-05	6.98E-05	4.49E-07	8.97E-06		
71432	Benzene	7.13E+00	8.15E-04	7.03E-04	4.08E-06	1.88E-06	3.82E-04	2.24E-06	1.03E-06		
71556	Methyl chloroform {1,1,1-TCA}	2.85E+01	3.26E-03		9.79E-07	1.44E-07		5.38E-07	7.91E-08		
75252	Bromoform	3.17E+02	3.61E-02								
75694	Trichlorofluoromethane {Freon 11}	1.57E+01	1.79E-03		7.70E-07			4.24E-07			
76131	Chlorinated fluorocarbon {CFC-113}	1.43E+01	1.63E-03		7.02E-07			3.86E-07			
78933	Methyl ethyl ketone {2-Butanone}	1.74E+02	1.99E-02		5.98E-06	4.59E-06		3.29E-06	2.53E-06		
79016	Trichloroethylene	7.13E+00	8.15E-04	4.85E-05	4.08E-07		2.64E-05	2.24E-07			
35501	1,2-Dichlorobenzene	1.01E+03	1.15E-01								
35636	1,2,4-Trimethylbenzene	7.13E+00	8.15E-04								
100425	Styrene	9.98E+00	1.14E-03		3.81E-07	1.63E-07		2.09E-07	8.96E-08		
106467	p-Dichlorobenzene	1.78E+01	2.04E-03	6.66E-04	7.64E-07		3.62E-04	4.20E-07			
106990	1,3-Butadiene	7.13E+00	8.15E-04	4.12E-03	1.22E-05		2.24E-03	6.73E-06			
108054	Vinyl acetate	7.13E+01	8.14E-03		1.22E-05			6.73E-06			
108101	Methyl isobutyl ketone {Hexone}	4.06E+01	4.64E-03								
108883	Toluene	8.56E+01	9.77E-03		9.80E-06	7.92E-07		5.39E-06	4.36E-07		
110827	Cyclohexane	7.13E+00	8.15E-04								
115071	Propylene	9.27E+01	1.06E-02		1.06E-06			5.84E-07			
341731	1,3-Dichlorobenzene	1.78E+01	2.04E-03								
		TOTALS FOR DEVICE 4									
				7.71E-03	6.29E-05	2.66E-05	4.19E-03	3.46E-05	1.46E-05		

**PRIORITIZATION
FOR**

CHARLES VAN DER KOOI

Project # 1053434

Region (C) Facility (7013)

**Emissions and Potency
Method**

Prioritization Scores	
Cancer	ACUTE
7.82E-02	2.19E-02

TS = Total Score
t = Specific Toxic Substance
EYR = Emissions Lbs / Year
EHR = Emissions Lbs / Hour
NF = Normalization Factor (Cancer = 1700, Acute = 1500, Chronic = 150)
URF = Unit Risk Factor
AREL = Acute Reference Exposure Level
CREL = Chronic Reference Exposure Level
RP = Receptor Proximity Adjustment Factor
R = Receptor Distance

RP	
0m < R < 100m	1.0
100m < R < 250m	0.25
250m < R < 500m	0.04
500m < R < 1000m	0.011
1000m < R < 1500m	0.003
1500m < R < 2000m	0.002
R > 2000m	0.001

Cancer Score:

$$TS(t) = EYR(t) * URF(t) * RP * 1700$$

Acute Score:

$$TS(t) = [EHR(t) / AREL(t)] * RP * 1500$$

Chronic Score:

$$TS(t) = \{ ([EYR(t) / \text{Hours Of Operation}] / CREL(t)) * RP * 150 \}$$

**Dispersion Adjustment
Method**

Prioritization Scores	
Cancer	ACUTE
4.25E-02	1.21E-02

TS = Total Score
t = Specific Toxic Substance
EYR = Emissions Lbs / Year
EHR = Emissions Lbs / Hour
NF = Normalization Factor (Cancer = 28, Acute = 25, Chronic = 2.5)
URF = Unit Risk Factor
AREL = Acute Reference Exposure Level
CREL = Chronic Reference Exposure Level
SHA = Stack Height Adjustment (< 20m = 60, < 45m = 9, >= 45m = 1)
RP = Receptor Proximity Adjustment Factor
R = Receptor Distance
H = Stack Height

For Stack - 0m <= H < 20m		For Stack - 20m <= H < 45m		For Stack - >= H < 45m	
RP		RP		RP	
0m < R < 100m	1.0	0m < R < 100m	1.0	0m < R < 100m	1.0
100m < R < 250m	0.25	100m < R < 250m	0.85	100m < R < 250m	1.0
250m < R < 500m	0.04	250m < R < 500m	0.22	250m < R < 500m	0.90
500m < R < 1000m	0.011	500m < R < 1000m	0.064	500m < R < 1000m	0.40
1000m < R < 1500m	0.003	1000m < R < 1500m	0.018	1000m < R < 1500m	0.13
1500m < R < 2000m	0.002	1500m < R < 2000m	0.009	1500m < R < 2000m	0.066
R > 2000m	0.001	R > 2000m	0.006	R > 2000m	0.042

Cancer Score:

$$TS(t) = EYR(t) * URF(t) * RP * SHA * 28$$

Acute Score:

$$TS(t) = [EHR(t) / AREL(t)] * RP * SHA * 25$$

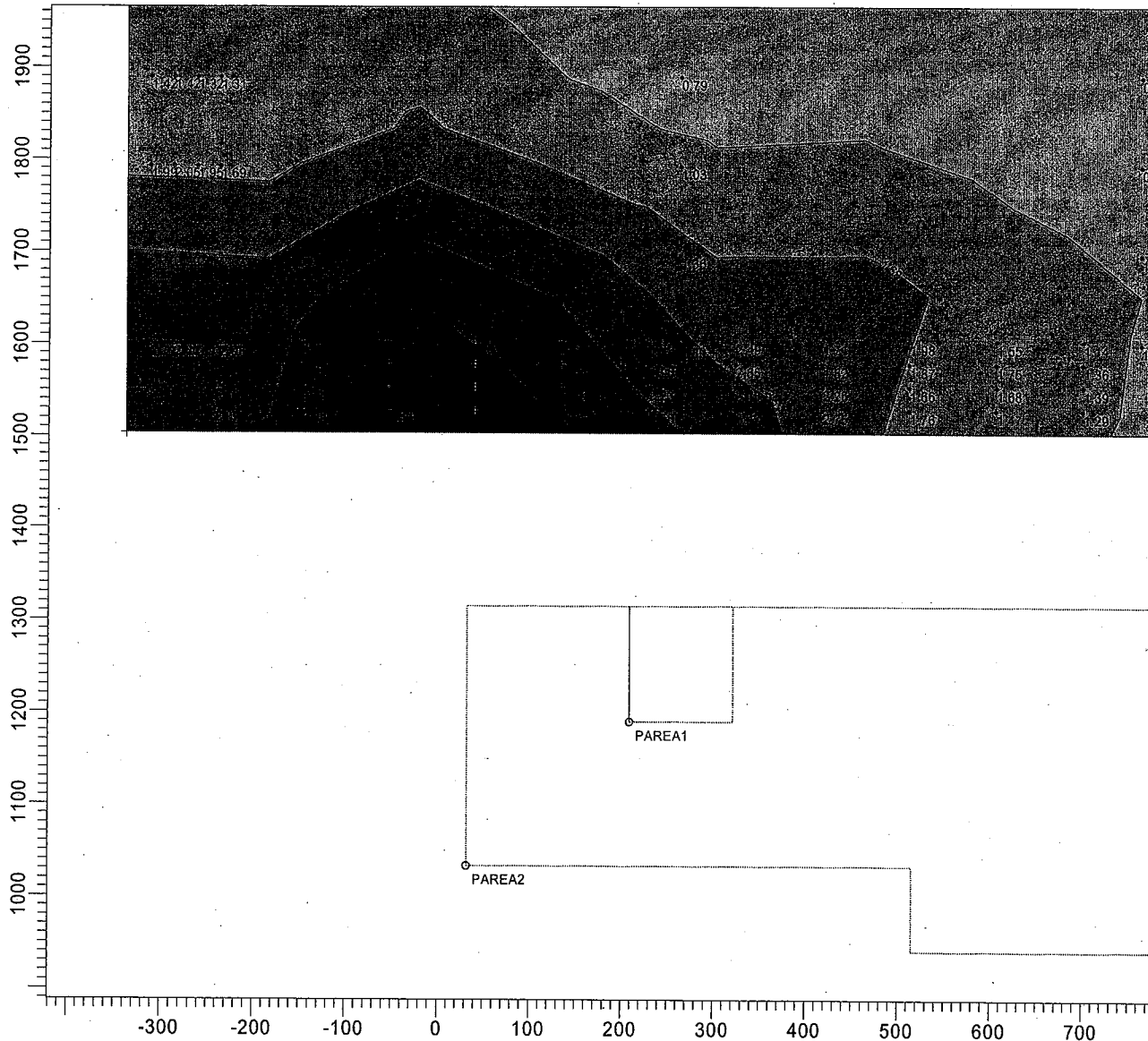
Chronic Score:

$$TS(t) = \{ ([EYR(t) / \text{Hours Of Operation}] / CREL(t)) * RP * SHA * 2.5 \}$$

PROJECT TITLE:

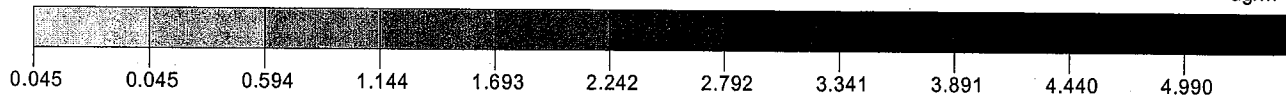
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Charles Van Der Kooi Dairy



PLOT FILE OF HIGH 1ST HIGH 24-HR VALUES FOR SOURCE GROUP: ALL

ug/m³



COMMENTS:

SOURCES:

2

COMPANY NAME:

Charles Van Der Kooi

RECEPTORS:

2001

MODELER:

Matthew Cegielski

OUTPUT TYPE:

CONC

SCALE:

1:7,341

0 0.2 km

MAX:

0.0353

DATE:

9/19/2006

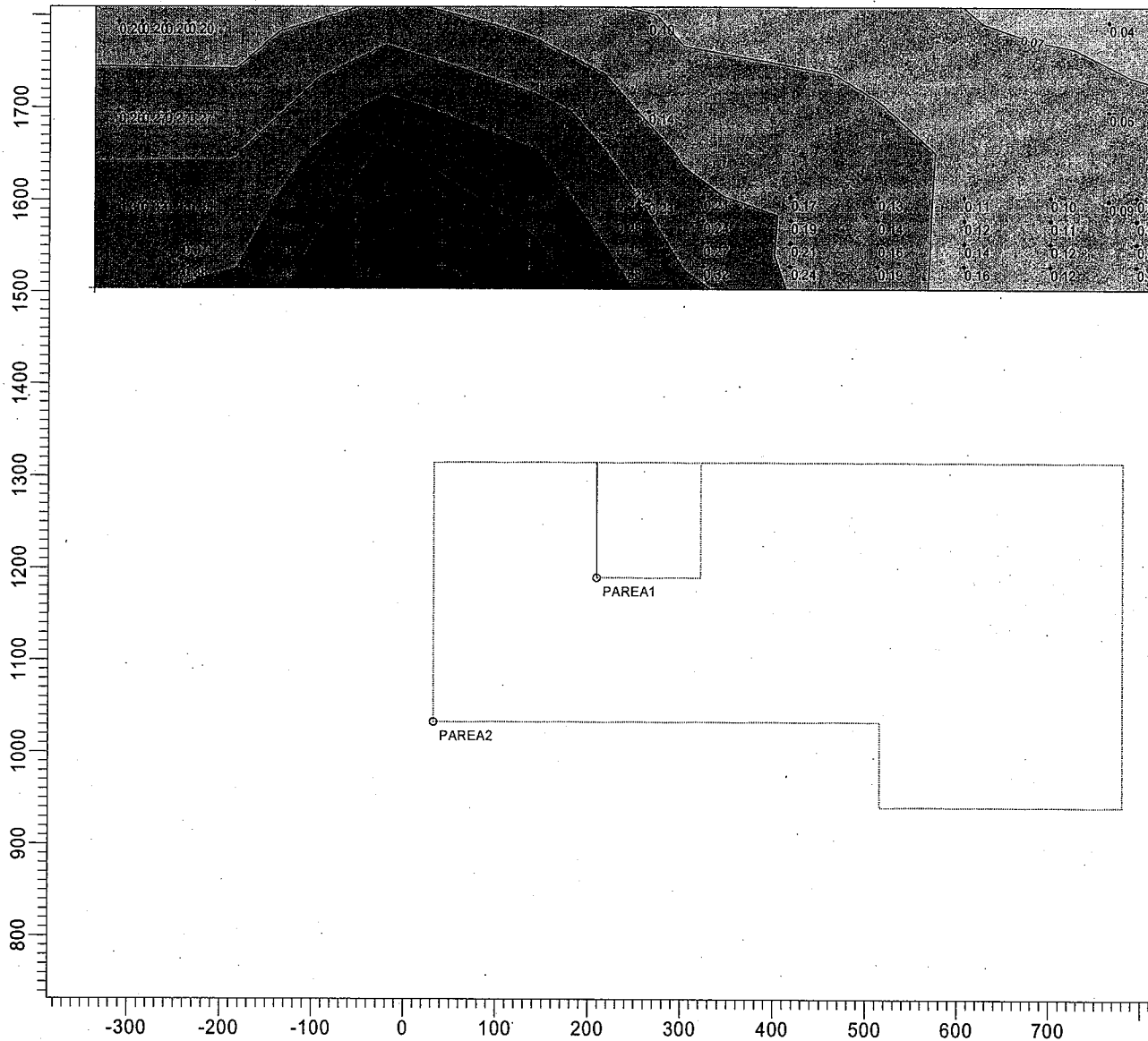
PROJECT NO.:

1053434

4.98955 ug/m³

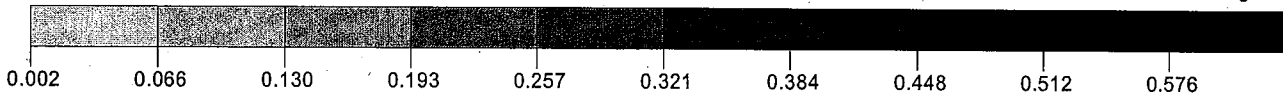
PROJECT TITLE:

C:\ISCView4\AAQA\IC-7013AP.isc
Charles Van Der Kooi Dairy



PLOT FILE OF PERIOD VALUES FOR SOURCE GROUP: ALL

ug/m³



COMMENTS:

SOURCES:

2

COMPANY NAME:

Charles Van Der Kooi

RECEPTORS:

2001

MODELER:

Matthew Cegielski

OUTPUT TYPE:

CONC

SCALE:

1:7,341

0 0.2 km

MAX:

0.57565 ug/m³

DATE:

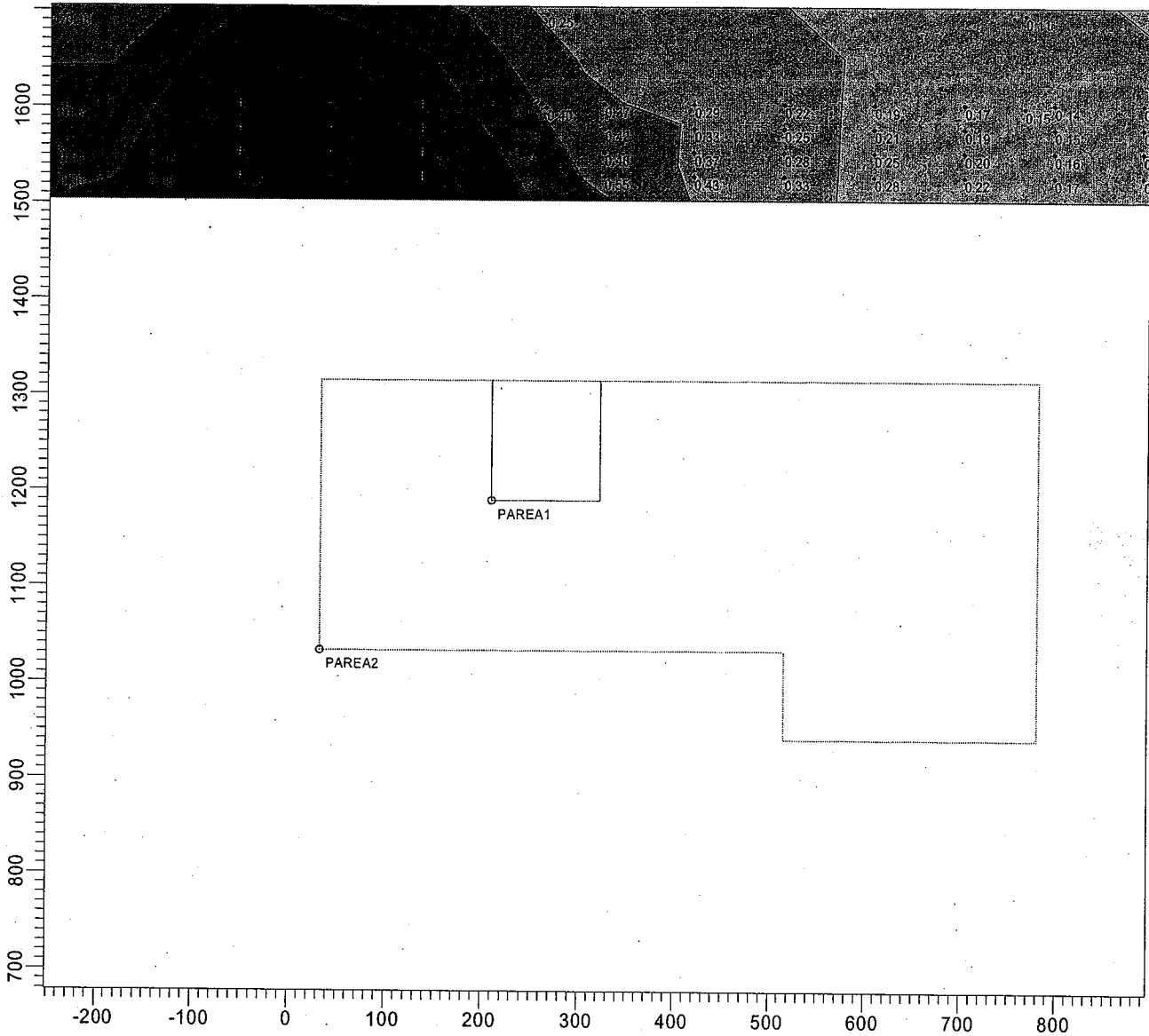
9/19/2006

PROJECT NO.:

1053434

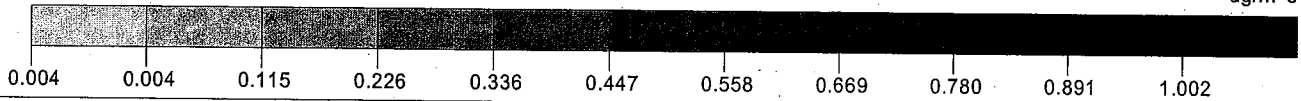
PROJECT TITLE:

C:\ISCView4\AAQA\IC-7013AO.isc
Charles Van Der Kooi Dairy



PLOT FILE OF PERIOD VALUES FOR SOURCE GROUP: ALL

ug/m³



COMMENTS:

SOURCES:

2

COMPANY NAME:

Charles Van Der Kooi

RECEPTORS:

2001

MODELER:

Matthew Cegielski

OUTPUT TYPE:

CONC

4,275 lb/yr

SCALE:

1:6,997

0

0.2 km

MAX:

0.0615g/sec

DATE:

9/18/2006

PROJECT NO.:

1053434

1.00161 ug/m³

Appendix L
Reconnaissance Level Biological Survey
for Van Der Kooi Dairy

RECONNAISSANCE LEVEL BIOLOGICAL SURVEY
for the Proposed Charles Van Der Kooi Dairy,
Fresno County, California



Prepared for:
The San Joaquin Air Pollution Control District
1990 East Gettysburg Ave.
Fresno, CA 93726

Prepared by:
QUAD KNOPF, Inc.
5110 West Cypress Ave.
Visalia, Ca. 93278
(559) 733-0440

6 March 2006

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SUMMARY OF FINDINGS AND CONCLUSIONS

The proposed project is the construction and operation of a 110 acre dairy on a 1,242 acre agricultural site located in southwestern Fresno County, California. The project site is currently planted in grain and is flood irrigated. A number of active and inactive/abandoned oil wells are present on the site. There are two stands of Eucalyptus trees on site and another stand that is adjacent to the northeast corner of the southern parcel. No native vegetation communities occur on the project site or on adjacent areas because they have been displaced by agricultural production. The oil well operation sites contain non-native grassland species and are relatively undisturbed. The remainder of the site is relatively weed-free, except along canal banks and dirt roadways. Three sensitive avian species were found on the site; Swainson's hawk, northern harriers, and loggerhead shrikes. Kangaroo rats, which could be the endangered Fresno kangaroo rat, were found on an oil well pad on the site. Construction and operation of the dairy and continued agricultural operations have the potential to significantly impact these and other sensitive species. Mitigation Measures to reduce levels of impact to less than significant include restricting construction and agricultural activities to daylight hours, using modified rodenticide bait stations, prohibiting expansion of agricultural activities into the oil well pads, and protecting the stands of trees.

INTRODUCTION

Project Description

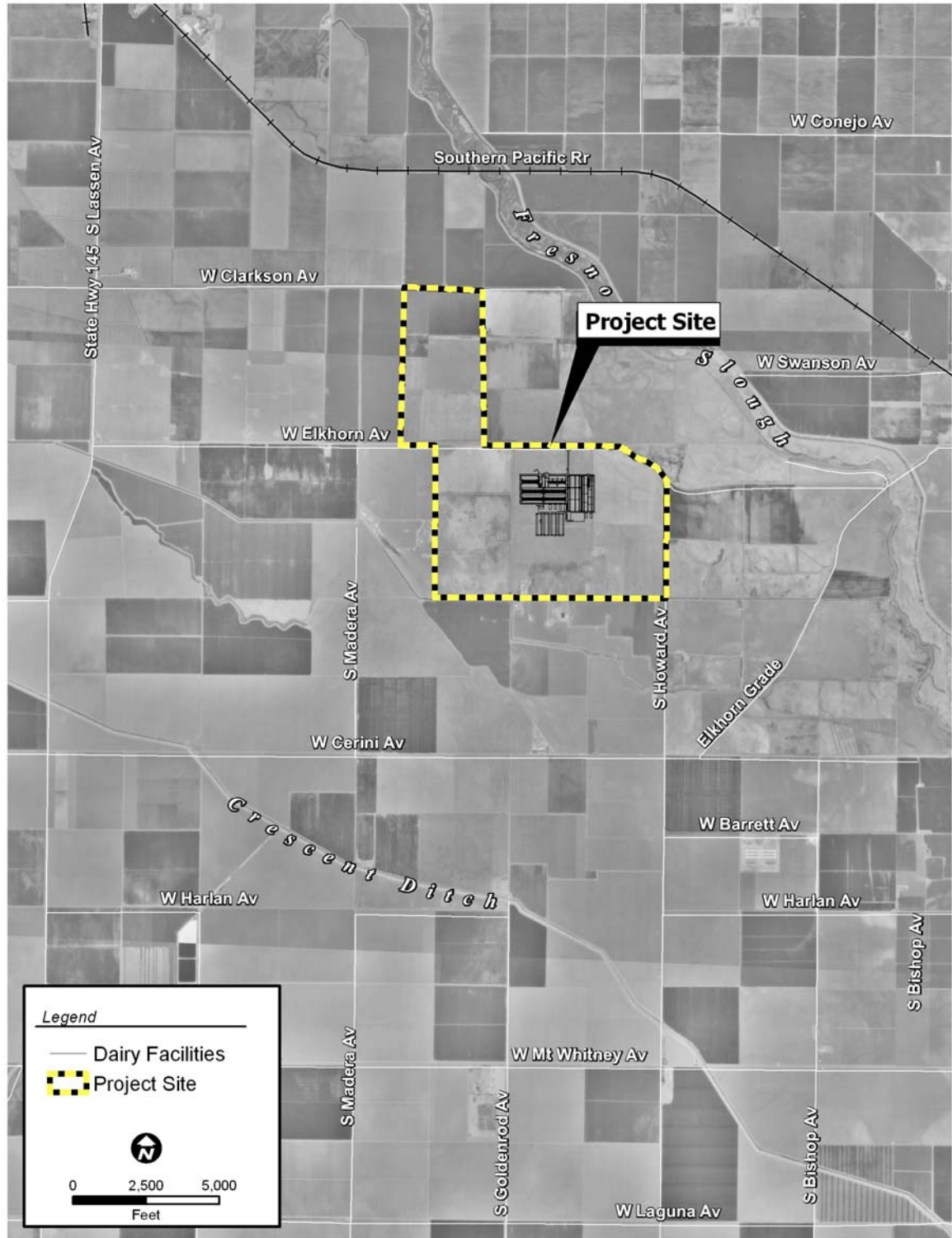
The project site is located in western Fresno County, California near the intersections of Elkhorn Avenue and Howard Avenue, approximately one mile southwest of the Fresno Slough (Figure 1). The site is approximately 25 miles southwest of the City of Fresno, and 20 miles northwest of the City of Lemoore.

The proposed project is the construction and operation of a 3,200 milk cow (Holstein) dairy on a 1,242 acre site that is currently in agricultural row crop production. The dairy will be constructed on 110 acres of land that will be graded for the dairy facilities site. The remainder of the site will remain in agricultural row crop production. The dairy will include a total of 6,646 animal units (Table 1).

Table 1. Proposed herd size of the Van Der Kooi dairy.

HERD SIZE			
	Animal Count	Factor	Animal Units*
Milk Cows	3,200	1.40	4,480
Dry Cows	480	1.12	538
Heifers 1-2 yr	960	1.02	979
Heifers 3mo-1yr	1,100	0.49	539
Calves	380	0.29	110
Total	6,120	--	6,646

*Animal units based on 1,000 pound cows, and support stock ratios approved by Central Valley Regional Water Quality Control Board.

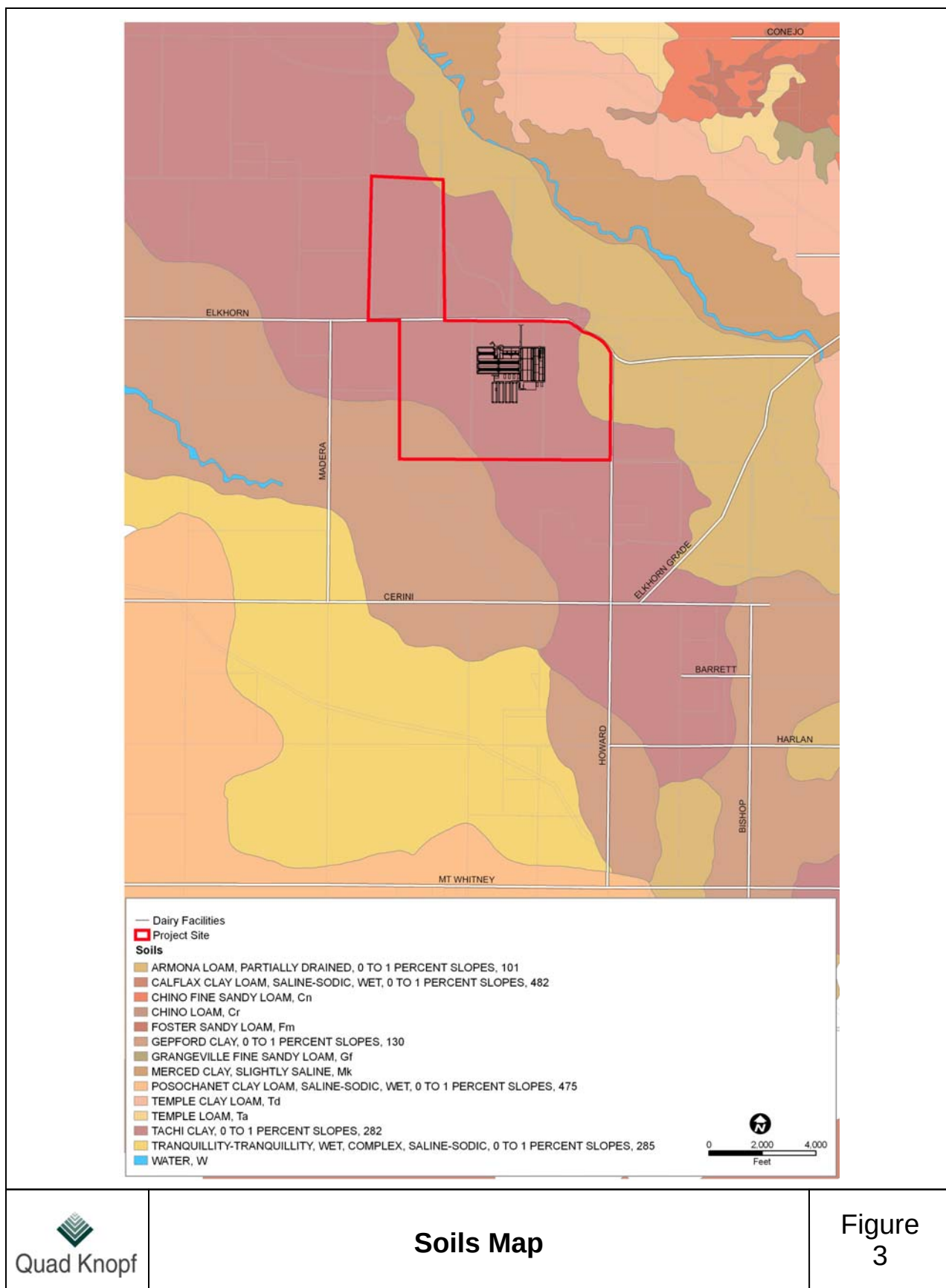


The proposed dairy facilities (Figure 2) are typical of those currently being constructed in the San Joaquin Valley, housing milk cows in freestall barns and support stock in corrals with flushed alleys. The Comprehensive Nutrient Management Plan which has been prepared for the project indicates that the agricultural row crops that will be raised on the site (totaling approximately 1,132 acres) will accommodate the liquid and solid manure produced by the dairy. The nitrogen and salt loading limitations will remain within the standards required by the Central Valley Regional Water Quality Control Board.

Environmental Setting

The project site is located in southwestern Fresno County in an area that is dominated by rural agriculture. The site is surrounded by agricultural crops (mostly alfalfa and barley), other dairies, and there is some oil field development on and near the site. Intensively managed, flood irrigated agricultural fields (currently planted in barley) is the primary land use of the site. There are irrigation canals and unpaved access roads separating the fields. Elkhorn Avenue divides the site into northern and southern parcels. The proposed dairy site has been graded, and some cement pads have been installed (see Photograph 6 in Appendix A). There are approximately 35 oil wells with associated pipelines and storage tanks on the southern parcel, but a large number of the wells appear to be inoperative and abandoned (see Figure 2). The well sites and access roads are not disturbed by agricultural operations, do not appear to be intensively disturbed by oilfield maintenance, and are primarily vegetated with non-native plants (see photographs 7 and 8 in Appendix A). The remains of a foundation of an old farmhouse are located on the site just southwest of the intersection of Elkhorn Avenue and Howard Avenue. That area contains a number of mature Eucalyptus trees. Directly across Elkhorn Avenue from this farmhouse (and located off of, but adjacent to the northeast corner of the southern parcel) are the remains of another farmhouse and outbuildings. At that location, there are numerous Eucalyptus trees, tamarisks, foundations and old farm outbuildings, and a number of seasonally wet areas. Vegetation is primarily ruderal, but the wet areas most likely contain native, emergent plants. Fresno Slough runs from the southeast to the northwest, approximately 1 mile to the northeast of the site (see Figure 1).

The climatic conditions of the project site are typical of the southern San Joaquin Valley. It is hot and dry in the summer and cold and moist in the winter. Winter rains are interspersed with spells of cloudy, foggy, or sunny weather. The average winter temperature is 47 degrees Fahrenheit and the average daily maximum temperature during the summer is 95 degrees Fahrenheit (USDA 1982). The primary soil type on the site is Tachi Clay (Figure 3), but there is a small area of Gepford Clay in the southwest corner. The northeast corner of the northernmost parcel and most of the eastern edge of the southern parcel contains Armona Loam.



Regulatory Setting

The natural vegetation communities of the southern San Joaquin Valley historically supported a diverse assemblage of plant and animal species. The conversion of native and naturalized plant communities by agricultural development, flood control, road construction, dam construction, and urbanization has significantly reduced available wildlife and plant habitat. As a result of this conversion, several species of both plants and animals have been extirpated from the region, and populations of other species have declined significantly. As a result, and as directed by the State and federal legislation, the California Department of Fish and Game (CDFG) and the United States Fish and Wildlife Service (USFWS) have listed many species as threatened, endangered, or as candidates for State or federal listing. Other species have been designated as “species of special concern by the CDFG. The California Native Plant Society (CNPS) has developed its own set of lists of native plants considered rare, threatened, or endangered. Collectively, these plants and animals are referred to as “special-status species”.

For this report, the terms “sensitive species”, “special status species” or “species of concern” refer to those species viewed with special concern by the USFWS; the CDFG Natural Diversity Data Base (CNDDDB) “Special Animals” (CDFG 2004a); and the CNDDDB “Special Vascular Plants, Bryophytes, and Lichens List (CDFG 2004b). This report identifies and addresses potential project related effects on special-status animal and plant species that could potentially be present on the project site. Special-status species included in the report may be listed under one or more of the following categories:

Federal Endangered - Listed as Endangered by the Federal Government.

Federal Threatened - Listed as Threatened by the Federal Government.

Federal Candidate - Candidate for federal listing (Taxa for which the U.S. Fish and Wildlife Service has sufficient biological information to support a proposal to list as Endangered or Threatened).

Federal Species of Concern - Federal Species of Concern (Taxa whose conservation status is of concern to the USFWS).

MBTA - Species protected under the auspices of the Migratory Bird Treaty Act.

State Endangered - Listed as Endangered by the State of California.

State Threatened - Listed as Threatened by the State of California.

State Rare - Plant species listed as Rare by the State of California and afforded protection under the Native Plant Protection Act.

State Species of Special Concern - California Department of Fish and Game Species of Special Concern.

The objectives of this reconnaissance level biological survey were to:

- Describe existing biotic conditions on the proposed project site;
- Determine the likelihood of occurrence of sensitive plant and animal species on the project site;
- Identify potential impacts on sensitive species that would result from implementation of the proposed project, and;
- Identify mitigation measures that would avoid impacts or reduce impacts to a level that would be less than significant.

METHODOLOGY

Quad Knopf, Inc. was retained by the San Joaquin Valley Air Pollution Control District to conduct a reconnaissance level biological survey of the proposed project site. Prior to conducting the field survey, a query of the CNDDDB (CDFG 2004a and b) was conducted for the Five Points, San Joaquin Helm, Burrel, Vanguard, Raisin, Westside, Harris Ranch, and Calfax USGS 7.5-Minute Quadrangles. A query of the California Native Plant Society's Electronic Inventory (CNPS 2005) was conducted for the same quadrangles to provide information on additional plant species of concern that may occur in the project area and surrounding vicinity. A species list was obtained from the U.S. Fish and Wildlife Service (USFWS) website for the Five Points USGS 7.5-minute quadrangle to provide information on additional special-status species that have the potential to occur in the vicinity of the proposed project. Only those species with the potential to occur on the project site were given consideration in this report. A query of the USFWS National Wetland Inventory (NWI) Map for the Five Points USGS 7.5-minute quadrangle was conducted for information regarding known wetlands in the project area.

On 17 February 2006, Quad Knopf, Inc. biologist Curtis Uptain conducted a reconnaissance-level biological survey to determine whether special-status plant and animal species or their habitats exist on the project site. The project site was surveyed by driving all access roads on the site. Areas that could potentially contain sensitive wildlife species were walked to locate species or sign of species. Roads in the vicinity of the site were driven. All plants, mammals, and birds were identified and tree locations were recorded using a geo-referenced aerial photo of the site.

RESULTS AND DISCUSSION

The majority of the project site consists of intensively managed, cultivated, and flood irrigated agricultural fields. The fields were recently planted in grain (which appears to be barley, *Hordium vulgare*) and contained relatively few other native or non-native plant species. A variety of weedy species dominate the canal banks and the edges of the agricultural access roads (Table 2). Some common plant species identified in these areas include black mustard (*Brassica nigra*), London rocket (*Sisymbrium irio*), Russian thistle (*Salsola tragus*), sunflower, (*helianthus annuus*), horseweed (*Canyza Canadensis*), prickly lettuce (*Lactuca serriola*), and oats (*Avena* sp.). Red-tailed hawks (*Buteo jamaicensis*) and northern harriers (*Circus cyaneus*) were observed foraging over the

fields. The grain fields may also provide seasonal foraging and nesting habitat for a variety of migratory birds. California ground squirrels (*Spermophilus beechyi*) were common along most of the canal banks and access roads. American kestrels (*Falco sparverius*), red-winged blackbirds (*Agelaius phoeniceus*), mourning doves (*Zenaidura macroura*), and other migratory birds were observed perched on power lines that occur along the perimeter and traverse the site.

Although the project site is primarily covered in grain, the dairy site has been graded and some cement pads have been installed (see photograph 6 in Appendix A). Because of the recent construction activities at the dairy site, it is almost completely devoid of vegetation and wildlife.

Approximately 35 oil wells are present on the project site, but many of those are abandoned or non-producing. About 10 of the wells are located on well pads of various sizes, some of which are accessible by dirt roads. The well pads and access roads are infrequently traveled, are not cultivated, and are vegetated with a variety of non-native weedy plant species (Table 2), many of which were not identifiable at the time of the survey. The well pads and access roads provide suitable (although degraded) habitat for a variety of wildlife species. Cottontails (*Sylvilagus audubonii*) and a variety of birds were common at these sites.

There are two stands of Eucalyptus trees on the project site, one at the northeastern corner of the southern parcel near the intersection of Elkhorn Avenue and Howard Avenue and another along the southern perimeter of the project site (Figure 4). There is also a stand of Eucalyptus and Tamarisk trees at the northwest corner of the intersection of Elkhorn Avenue and Howard Avenue. This stand of trees is off of, but adjacent to the project site. These stands of trees provide habitat for a variety of wildlife. Red-tailed hawks were observed perching in trees at all of these locations; a pair of Red-tailed hawks were engaged in nest building activities at the Elkhorn Avenue location that is off of the site. Cottontails were observed at all of these sites. Other birds and some species of bats are expected to roost in these stands of trees and a variety of small mammals also are expected to be common in the understory of these stands.

A query of the National Wetlands Inventory database indicated that there are no known wetlands on the project site (Figure 5). No wetlands or seasonally wet areas were observed on the project site during the biological survey. There are a number of agricultural irrigation canals and ditches that are present on the site, but these will not be impacted by the construction and operation of the dairy. The project site is located in a FEMA Flood Zone C (not subject to 100 year flood events). Although not included in the wetlands inventory (see Figure 5), the parcel of land north of the intersection of Elkhorn Avenue and Howard Avenue (that is adjacent to, but off of the project site) contains seasonally wet areas, trees, and other characteristics that appear to be extremely valuable to a variety of wildlife. This area could contain important biological resources, but it was not inventoried.

Sensitive habitats, sensitive plants, and sensitive wildlife

There are 2 sensitive natural communities, 7 sensitive plant species, and 13 sensitive wildlife species that are found in the vicinity of the project site (Table 3, Figure 6). The 2 sensitive plant communities, Valley Sacaton Grassland and Great Valley Valley Oak Riparian Forest, do not occur on or within the immediate vicinity of the project site. Of the 7 sensitive plants that are known from the vicinity, 3 are presumed to be absent from the project site and 4 are considered unlikely to occur (Table 3). These assessments were based upon the high level of disturbance on the site, the lack of suitable habitat conditions and appropriate soils, and the absence of co-dominant or indicator plant species.

Three sensitive wildlife species were observed on the project site (Table 3). One Swainson's hawk (*Buteo swainsoni*) was seen soaring over the northern portion of the south parcel on 12 February 2006. Suitable roosting sites exist (the 2 stands of Eucalyptus trees) and there is a potential nesting area adjacent to the site, north of the intersection of Elkhorn Avenue and Howard Avenue. Potential nesting sites also are likely to occur along the Fresno Slough, located approximately 1 mile northeast of the project site. Swainson's hawks are known to occur along the Fresno Slough (Figure 6). Two northern harriers were observed foraging on the site, one over the eastern portion of the northern parcel and one over the eastern portion of the southern parcel. The grain fields that cover the majority of the project site are prime foraging habitat for this species. Similarly, the alfalfa fields and fallowed grazing lands that surround the project site are prime foraging habitat. This species is expected to be relatively abundant and widespread in the project vicinity. Two loggerhead shrikes (*Lanius ludovicianus*) were seen on the site; they were perched together on a soil embankment near the proposed dairy facility. The grain fields and alfalfa fields on the site and in the vicinity of the site provide foraging habitat for this species. Roosting sites (e.g., transmission poles and lines, oil wells) are abundant. Loggerhead shrikes are expected to be relatively common and widespread in the area.

Five sensitive wildlife species that were not observed, but may sometimes occur on the site (Table 3, Figure 6) include tri-colored blackbirds (*Agelaius tricolor*), burrowing owls (*Athene cunicularia*), mountain plovers (*Charadrius montanus*), Fresno kangaroo rats (*Dipodomys nitratoides exilis*), and western mastiff bats (*Eumops perotis californicus*). The tri-colored blackbird could nest and forage on the project site during the nesting season (February 15 - September 15), when the cultivated grain is mature. Burrowing owls could inhabit California ground squirrel burrows that are common along the canals and roadways on the project site. Burrowing owls are both summer and winter residents of the central and southern San Joaquin Valley and foraging and nesting opportunities on the site are adequate to support this species. The mountain plover could occur on the site as an occasional winter migrant and forage in the agricultural fields soon after disking and cultivation. The western mastiff bat could roost in the Eucalyptus trees that are present on the site. Kangaroo rat sign (including burrows, tail drags and footprints, and scat) was found at an oil well pad in the extreme southern portion of the project site. The pad is approximately 2 acres in size, has a substrate of a fine textured sandy soil, contains relatively undisturbed (although non-native) habitat with open scalds, and contains a

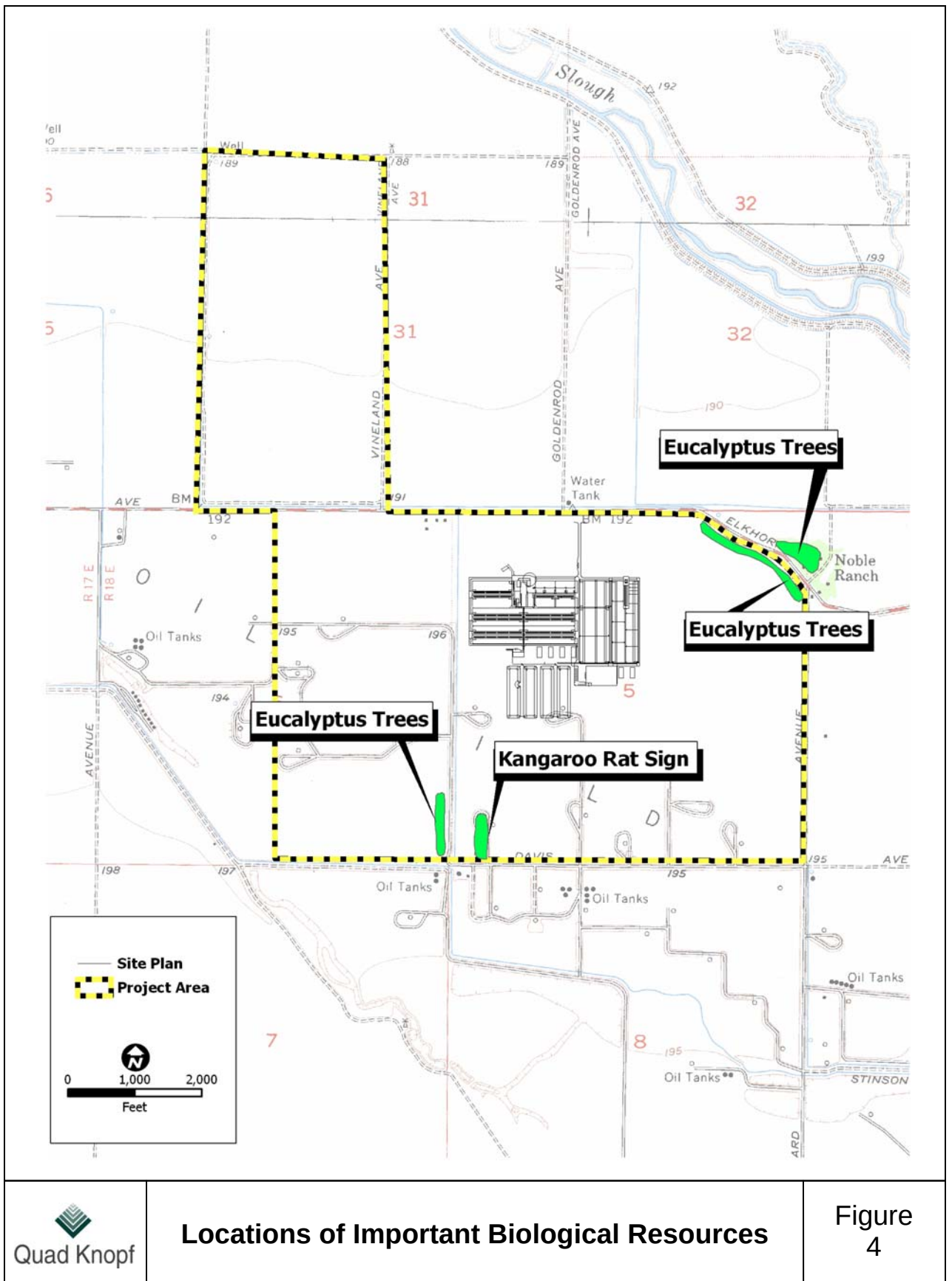
number of large storage tanks (see photographs 8, 9, and 10 in Appendix A). Trapping was not conducted to determine which species of kangaroo rat is present at this site, but they could either be Heermann's kangaroo rats (*Dipodomys herrmanni*) or Fresno kangaroo rats. Because of the limited distribution of this suitable soil type and because of the limited amount of available habitat, kangaroo rat distribution on the site is confined to this one area. However, kangaroo rats may be more prevalent directly south of the project site where there are considerable expanses of similar oil field pads and fallowed and grazed agricultural lands.

There are 2 sensitive wildlife species that are unlikely to occur on the project site, except perhaps as occasional visitors; the San Joaquin kit fox (*Vulpes macrotis mutica*) and the American badger (*Taxidea taxus*). No sign of these species were found during the site visit, but there are some areas on the site that provide adequate denning and foraging opportunities (particularly along the dirt roadways, canal embankments, and at the oil well pads). The project site is not within a recognized area of potential kit fox occurrence (Figure 6). However, the project site lies between 2 designated kit fox areas and it is reasonable to assume that the Fresno Slough and surrounding agricultural lands provide a suitable movement corridor between the 2 kit fox areas. The project site is located within this potential movement corridor.

The project site may provide some foraging opportunities for a number of additional sensitive species including various species of raptors and migratory birds that are protected by the Migratory Bird Treaty Act (Appendix B). Other species of bats, some of which are considered sensitive, could also forage and roost on the site.

Table 2.
Plant and Animal Species Observed
During the Field Survey of the Van Der Kooi Dairy Site, 17 February 2006.
O = observed, B = burrows, S = other sign.

SCIENTIFIC NAME	COMMON NAME	OBSERVATION NOTES
<u>Plants</u>		
<i>Brassica nigra</i>	Black mustard	O
<i>Bromus diandrus</i>	Ripgut brome	O
<i>Capsella bursa-pastoris</i>	Shepherd's purse	O
<i>Cirsium vulgare</i>	Bull thistle	O
<i>Conyza Canadensis</i>	Horseweed	O
<i>Erodium cicutarium</i>	Red-stem filaree	O
<i>Eucalyptus sp</i>	Eucalyptus	O
<i>Helianthus annuus</i>	sunflower	O
<i>Hordeum murinum</i> ssp. <i>gussoneanum</i>	Foxtail chess	O
<i>Lactuca serriola</i>	Prickly lettuce	O
<i>Lolium multiflorum</i>	Annual ryegrass	O
<i>Rumex crispus</i>	Sheep sorrel	O
<i>Salsola tragus</i>	Russian thistle	O
<i>Scirpus sp.</i>	Tule	O
<i>Senecio vulgaris</i>	Common groundsel	O
<i>Sisymbrium irio</i>	London rocket	O
<i>Sorghum halepense</i>	Johnson grass	O
<i>Tribulus terrestris</i>	Puncture vine	O
<i>Vicia sp.</i>	Vetch	O
<u>Birds</u>		
<i>Agelaius phoeniceus</i>	Red-winged blackbird	O
<i>Buteo jamaicensis</i>	Red-tailed hawk	O
<i>Carpodacus mexicanus</i>	House finch	O
<i>Charadrius vociferus</i>	Killdeer	O
<i>Circus cyaneus</i>	Northern harrier	O
<i>Corvus brachyrhynchos</i>	American crow	O
<i>Falco sparverius</i>	American kestrel	O
<i>Lanius ludovicianus</i>	Loggerhead shrike	O
<i>Melospiza melodia</i>	Song sparrow	O
<i>Passerculus sandwichensis</i>	Savannah sparrow	O
<i>Sturnella neglecta</i>	Western meadowlark	O
<i>Zenaida macroura</i>	Mourning dove	O
<i>Zonotrichia leucophrys</i>	White crowned sparrow	O
<u>Mammals</u>		
<i>Dipodomys sp.</i>	Kangaroo rat	B, S
<i>Spermophilus beecheyi</i>	California ground squirrel	O, B
<i>Sylvilagus auduboni</i>	Cottontail	O
<i>Thomomys bottae</i>	Botta's pocket gopher	B



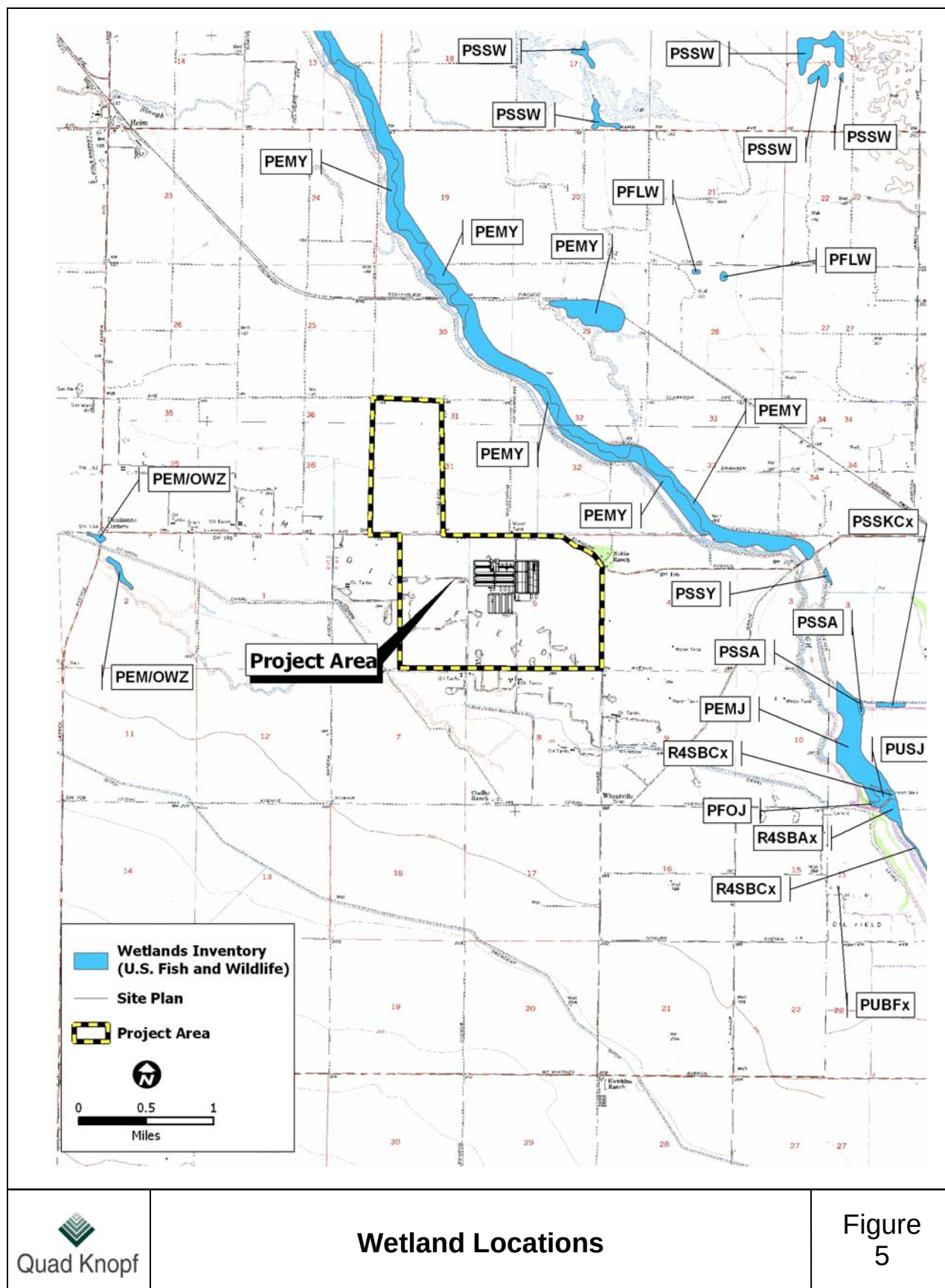


Table 3
Special-Status Species Reported on the California Natural Diversity Database
and Inventory of Rare and Endangered Plants of California.

Common Name	Scientific Name	Status	Habitat Requirements	Probability of Occurrence and Assessment of Impacts
lesser saltscale	<i>Atriplex minuscula</i>	1B	This annual plant occurs in Chenopod scrubland, grassland, and alkali sink habitats, but it also is known to occur in wet areas.	Unlikely. Marginally suitable habitat exists on some oil well pads and access roads. Additional surveys during the appropriate phenological season would need to be conducted to verify presence/absence of this species in those areas. There is no potential habitat at the proposed dairy site. The proposed dairy will not significantly impact this species. This plant does not occur in the agricultural areas of the project site and continued agricultural operations will not significantly impact this species.
subtle orache	<i>Atriplex subtilis</i>	1B	This annual plant occurs in Chenopod scrubland, grassland, and alkali sink habitats, but it also is known to occur in wet areas.	Unlikely. Marginally suitable habitat exists on some oil well pads and access roads. Additional surveys during the appropriate phenological season would need to be conducted to verify presence/absence of this species in those areas. There is no potential habitat at the proposed dairy site. The proposed dairy will not significantly impact this species. This plant does not occur in the agricultural areas of the project site and continued agricultural operations will not significantly impact this species.
recurved larkspur	<i>Delphinium recurvatum</i>	1B	This plant is found in Chenopod scrublands, grasslands, and foothill woodland.	Unlikely. Marginally suitable habitat exists on some oil well pads and access roads. Additional surveys during the appropriate phenological season would need to be conducted to verify presence/absence of this species in those areas. There is no potential habitat at the proposed dairy site. The proposed dairy will not significantly impact

Common Name	Scientific Name	Status	Habitat Requirements	Probability of Occurrence and Assessment of Impacts
				this species. This plant does not occur in the agricultural areas of the project site and continued agricultural operations will not significantly impact this species.
*Pinnacles buckwheat	<i>Eriogonum nortonii</i>	1B	Chaparral, valley and foothill grasslands, on sandy soils, often found after recent burns.	Absent. Soils in the project site are not suitable for this species. Even the sandier soils located at some of the oil well pads would likely be too alkaline to support this species. The proposed dairy will not significantly impact this species. This plant does not occur in the agricultural areas of the project site and continued agricultural operations will not significantly impact this species.
heartscale	<i>Atriplex cordulata</i>	1B	This annual plant occurs in Chenopod scrubland and grassland habitats, but it also is known to occur in wet areas. Most common on alkaline soils.	Unlikely. Soils in the project site are generally not suitable for this species. There is no potential habitat at the proposed dairy site. The proposed dairy will not significantly impact this species. This plant does not occur in the agricultural areas of the project site and continued agricultural operations will not significantly impact this species.
*Vernal barley	<i>Hordeum intercedens</i>	3	This annual grass typically occurs in saline flats and depressions in grasslands or with vernal pool basins.	Absent. Soils and habitat characteristics on the project site are not suitable for this species. Significant impacts to this species will not occur.
Munz's tidy tips	<i>Layia munzii</i>	1B	Munz's tidy-tips grows on alkaline clay in low-lying scrublands and on hillsides in grasslands.	Absent. Soils and habitat characteristics on the project site are not suitable for this species. Significant impacts to this species will not occur.
molestan blister beetle	<i>Lytta molesta</i>	FSC	This beetle is likely restricted to vernal pool vegetation.	Absent. Habitat characteristics on the project site are not suitable for this species. Significant impacts to this species will not occur.

Common Name	Scientific Name	Status	Habitat Requirements	Probability of Occurrence and Assessment of Impacts
western spadefoot	<i>Spea (=Scaphiopus) hammondi</i>	CSC	This species is uncommon, but widespread in grassland, scrub, and chaparral habitat. It occurs in seasonally moist areas, including puddles, vernal pools, and roadside ditches.	Absent. Habitat characteristics on the project site are not suitable for this species. Significant impacts to this species will not occur. There is suitable habitat for this species adjacent to the project site, north of the intersection of Elkhorn Avenue and Howard Avenue.
Giant garter snake	<i>Thamnophis gigas</i>	FT, ST	Occurs in dense emergent vegetation near pools of water (which persist throughout the seasonal cycle of activity). Requires open areas along the pool margins to allow for basking and upland habitat with suitable structures for hibernation and escape from flooding.	Absent. Habitat characteristics on the project site are not suitable for this species. Significant impacts to this species will not occur. There is marginally suitable habitat for this species adjacent to the project site, north of the intersection of Elkhorn Avenue and Howard Avenue.
tri-colored blackbird	<i>Agelaius tricolor</i>	CSC	Nests in colonies in marshes, upland habitat and grain fields. Forages over wetlands, marshes, and open country.	Possible. Although this species was not observed on the project site, the grain fields that are present may provide foraging and nesting opportunities during appropriate seasons. Construction of the dairy will reduce the amount of this habitat that is available and may have a significant impact on this species. Continued agricultural activities will provide habitat and would not significantly impact this species.
burrowing owl	<i>Athene cunicularia</i>	CSC	This owl is found in open, dry grasslands, agricultural and range lands, and desert habitats often associated with burrowing animals	Possible. Although no burrowing owls were seen on the site, there are areas that are potentially suitable for this species. They could occur along roadways, canal banks, well pads, and other areas that are infrequently disturbed and where California ground squirrels are common and provide suitable burrowing sites. Because the dairy is located in the cultivated agricultural field, significant impacts to this species will not occur from its construction. Continued agricultural practices will similarly not significantly impact this species.

Common Name	Scientific Name	Status	Habitat Requirements	Probability of Occurrence and Assessment of Impacts
Swainson's hawk	<i>Buteo swainsoni</i>	CT	This species nests in riparian forests and other forested areas. It will roost in a variety of trees and forage widely over forests, grasslands, and shrublands. This hawk forages over open plains for small mammals, lizards, frogs, and insects. It is easily disturbed by human activities.	Present. A Swainson's hawk was observed soaring over the project site on 2/12/06. The site contains suitable foraging and roosting habitat. Suitable nesting habitat occurs adjacent to the site, north of the intersection of Elkhorn Avenue and Howard Avenue. Suitable habitat also exists along the Fresno Slough, approximately 1 mile to the northeast of the project site. Because these raptors are extremely sensitive to disturbances, construction and operation of the dairy could reduce the potential for nesting and foraging on the site. Significant impacts to this species may occur.
mountain plover	<i>Charadrius montanus</i>	CSC	Inhabits plains and grassy or bare dirt fields. Winters in the Central Valley and coastal valleys where it forages for seed and grain.	Possible. Although this species was not observed during field surveys, it could forage in the grain fields during the winter as a migrant. Construction of the dairy site will remove some potential foraging habitat, but that loss is not considered to be significant. Continued agricultural operations will not significantly impact this species.
northern harrier	<i>Circus cyaneus</i>	CSC	Inhabits open plains and fields.	Present. This species was observed foraging over the agricultural areas on the project site. Significant impacts are not expected to occur from construction and operation of the dairy or from continued farming operations.
Loggerhead shrike	<i>Lanius ludovicianus</i>	CSC	Open woodlands, chaparral and grasslands.	Present. Two shrikes were observed perching on a raised embankment on the project site, near the proposed dairy site. Construction of the dairy will remove some foraging habitat, but construction and operation of the dairy and continued agricultural production is not expected to significantly impact this species.

Common Name	Scientific Name	Status	Habitat Requirements	Probability of Occurrence and Assessment of Impacts
Fresno kangaroo rat	<i>Dipodomys nitratoide exilis</i>	FE, SE	Upland, grassland, and alkali sink habitats. Flooding tends to eliminate this species.	Possible. Kangaroo rat sign was observed at a well pad site in the southern portion of the project site. Trapping would be needed to verify the species that is present. Construction and operation of the dairy is not likely to significantly impact this species. However, continued agricultural production on lands south of the dairy facility, which is included as a proposed operation, may significantly impact this species.
San Joaquin kit fox	<i>Vulpes macrotis mutica</i>	FE, FT	The San Joaquin kit fox occurs in open, dry grassland and shrub and open forest habitats on the floor of the San Joaquin Valley and surrounding foothills.	Unlikely. This species or its sign (burrows, tracks, scat) were not observed during field surveys. Marginal habitat exists in some limited areas (well pads and uncultivated areas), but the high degree of disturbance and lack of suitable habitat likely precludes its presence. It may occur from time to time as a transient. Construction and operation of the dairy and continued grain farming are not expected to significantly impact this species.
American badger	<i>Taxidea taxus</i>	CSC	This mammal is an uncommon, permanent resident found throughout most of California. It is most abundant in dry, open shrublands but also occurs in grasslands and other habitats.	Unlikely. This species or its sign (burrows, tracks, scat) were not observed during field surveys. Marginal habitat exists in some limited areas (well pads and uncultivated areas), but the high degree of disturbance and lack of suitable habitat likely precludes its presence. It may occur from time to time as a transient. Construction and operation of the dairy and continued grain farming are not expected to significantly impact this species.
western mastiff bat	<i>Eumops perotis californicus</i>	CSC	This bat is an uncommon resident in San Joaquin Valley and the Coastal Range. It occurs in many open, semi-arid to arid habitats, including conifer and deciduous woodlands, coastal scrub, annual and perennial grasslands, palm oases, chaparral, desert scrub, and urban areas. It roosts in crevices in cliff faces, high	Possible. A number of large trees on the site may provide suitable roosting sites. Construction and operation of the dairy and continued farming in the agricultural areas are not expected to significantly impact this species. Additional surveys would need to be conducted in order to determine presence on the project site.

Common Name	Scientific Name	Status	Habitat Requirements	Probability of Occurrence and Assessment of Impacts
			buildings, trees, and tunnels.	
Valley Sacaton Grassland	<i>Valley Sacaton Grassland</i>	SC		Absent.
Great Valley Valley Oak Riparian Forest	<i>Great Valley Valley Oak Riparian Forest</i>	SC		Absent.

Sources:

California Department of Fish and Game. 2005. California Natural Diversity Data Base, California Department of Fish and Game, Sacramento, CA.

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USGS 7.5 Minute Quadrangles:

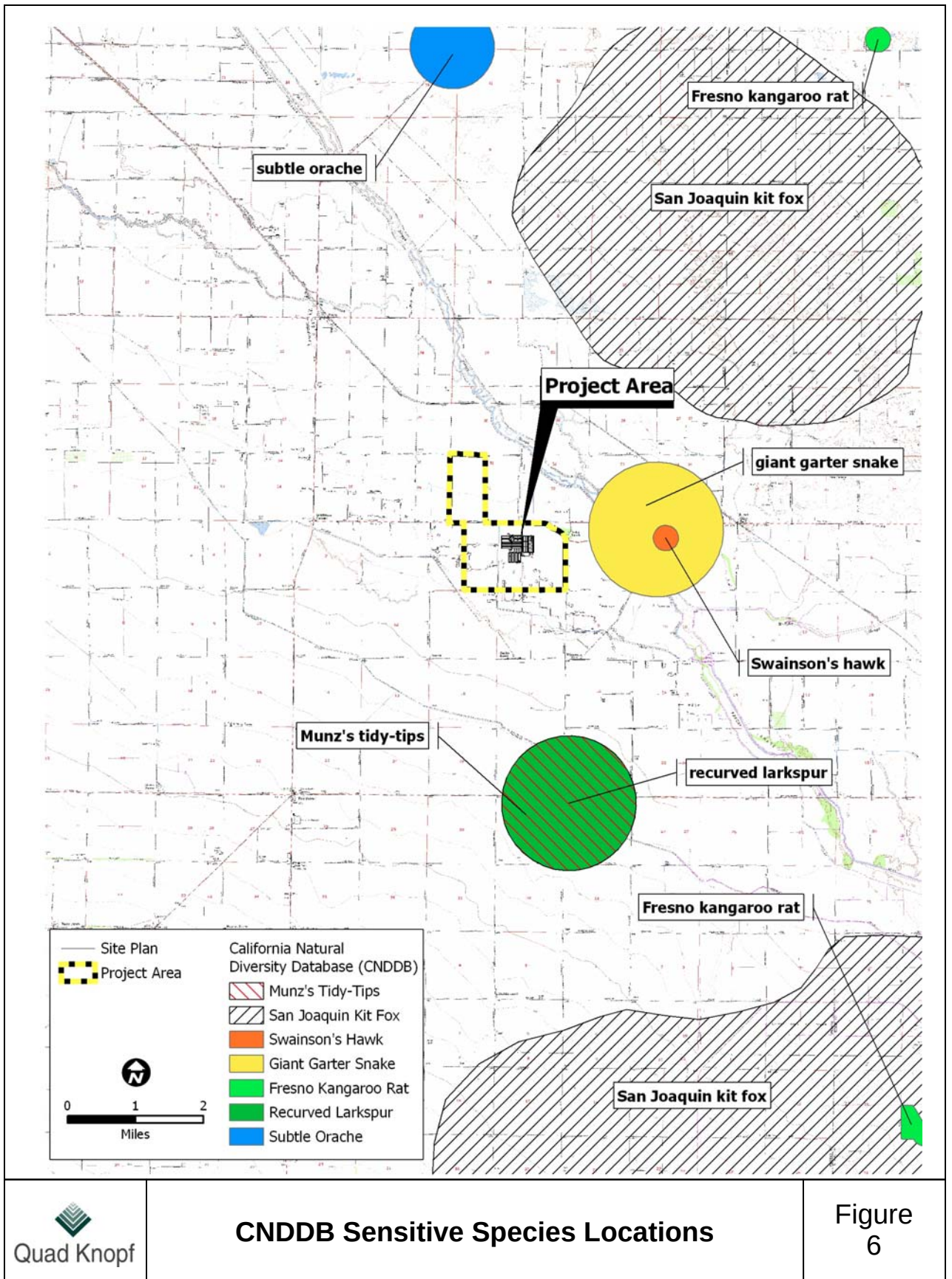
Five Points, San Joaquin, Helm, Burrell, Vanguard, Raisin, Westside, Harris Ranch, Calfax.

Abbreviations:

FE	Federal Endangered Species
FT	Federal Threatened Species
MBTA	Species Protected Under the Auspices of the Migratory Bird treaty Act
CE	California Endangered Species
CT	California Threatened Species
CR	California Rare Species Afforded Protection Under the Native Plant Protection Act
FSC	Federal Species of Special Concern.
CSC	California Department of Fish and Game Species of Special Concern
1B	California Native Plant Society List 1B Species-Plants Categorized as Rare, Threatened, or Endangered in California and Elsewhere.
SC	California Department of Fish and Game Sensitive Community

*Potential Occurrence Definitions:

Present:	Species or sign of their presence observed on site at time of the field survey.
Likely:	Species not observed on site, but may reasonably be expected to occur there on a regular basis. Or, species not observed on the site, exceptional habitat exists, and additional surveys needed to verify presence.
Possible:	Species not observed on site, but could occur there from time to time. Or, species not observed on the site, suitable habitat exists, and additional surveys needed to verify presence.
Unlikely:	Species not observed on site, and would not be expected to occur there except, perhaps, as a transient. Or, species not observed on the site, marginally suitable habitat exists, and additional surveys needed to verify presence.
Absent:	Species or sign of their presence not observed on site, and precluded from occurring there because habitat requirements are not met.



IMPACT EVALUATION AND RECOMMENDATIONS

Three sensitive species were observed on the site; the Swainson's hawk, the northern harrier, and the loggerhead shrike. There are 5 other sensitive wildlife species that are expected to occur on the site from time to time or may currently exist on the site (tri-colored blackbirds, burrowing owls, mountain plovers, Fresno kangaroo rats, and western mastiff bats). Two sensitive wildlife species could occur on the site as transients (San Joaquin kit fox and American badger). Four sensitive plant species (lesser saltscale, subtle orache, recurved larkspur, and heartscale) are unlikely to, but could, occur on the site. Construction and operation of the proposed dairy and continued farming operations on the site have the potential to impact these species. However, these species would not occur on the dairy construction site or agricultural areas, but only on the oil well pad sites. Construction and agricultural activities will be prohibited on the oil well pad sites, eliminating impacts to special status plant species.

The dairy will be built on land that has been previously cultivated in grain and has provided potential foraging and nesting habitat for a variety of sensitive and migratory bird species. Loss of that foraging and nesting habitat is considered to be less than significant because less than 10% of the site (110 acres of 1,242 acres) will be converted to the dairy operation. The remainder of the site will remain in agricultural production and will continue to provide foraging and nesting habitat. Throughout the Valley, the conversion of cultivated farmland to dairies and other developments are resulting in a cumulative and significant loss of foraging and nesting habitat for sensitive and migratory birds. Conversion of this site to a dairy will contribute to that cumulative loss.

Construction activities may disrupt foraging and nesting behaviors of a variety of species and could result in direct mortalities of kangaroo rats. Although the kangaroo rat population that exists on the site is approximately 0.25 miles south of the dairy facility, kangaroo rats are known to conduct nightly foraging excursions of that distance and they can disperse greater distances. Although the intervening habitat and soils are incompatible with permanent habitation, kangaroo rats could none-the-less travel along dirt roadways and canal banks between their population center and the construction area, putting them at risk from construction activities. Trapping was not conducted to determine whether these are the common Heermann's kangaroo rat or the federally and state endangered Fresno kangaroo rat. However, mitigation measures will be implemented that will eliminate take of kangaroo rats and reduce impacts to less than significant. Those mitigation measures include:

- Construction of a barrier fence along the southern and western edges of the construction site which would exclude kangaroo rats from entering the construction area. The fence would be constructed of 3 foot-high metal flashing supported by t-posts. The lower edge of the fencing would be buried approximately 6 inches below the ground surface. A qualified Biologist will inspect the integrity of the barrier fencing every 2 weeks during construction activities.
- Construction related traffic outside of the fenced area would be limited to daylight hours.

Continued agricultural operations would also have the potential to impact kangaroo rats and other sensitive species. Mitigation measures that will be implemented to avoid take of kangaroo rats and reduce impacts to sensitive species to less than significant include:

- Agricultural operations must not encroach into the existing oil well pad sites;
- Agricultural activities within 0.25 miles of the kangaroo rat occurrence (see Figure 6) shall not be conducted after sundown (kangaroo rats are active at night);
- Construction of irrigation facilities such as canals, ditches, and retention basins will not proceed until the specific construction sites are inspected by a biologist and determined to be free of kangaroo rats. The construction of barrier fencing at such construction sites may be required;
- The application of rodenticides within 0.25 miles of the site occupied by kangaroo rats will only be applied using raised “T”-type bait stations which are approved for use in areas occupied by endangered kangaroo rats (Appendix D); and,
- Retain all existing stands of trees, individual trees, and snags.

In an area where San Joaquin kit fox may occur on a proposed construction site, it is usually customary to recommend that a pre-construction survey be conducted for kit fox dens. This provides an opportunity for biologists to inspect and hand-excavate potential fox dens, thus ensuring avoidance of impacts to foxes. Because construction of this dairy has commenced, this recommendation is not warranted. However, other Standardized Recommendations for the protection of San Joaquin Kit fox (Appendix C) should be followed. These include:

1. Project-related vehicles should observe a 20-mph speed limit in all project areas, except on county roads and State and Federal highways; this is particularly important at night when kit foxes are most active. To the extent possible, nighttime construction should be avoided. Off-road traffic outside of designated project areas should be prohibited.
2. To prevent inadvertent entrapment of kit foxes or other animals during the construction phase of the project, all excavated, steep-walled holes or trenches more than 2 feet deep should be covered at the close of each working day by plywood or similar materials, or provided with one or more escape ramps constructed of earth fill or wooden planks. Before such holes or trenches are filled, they should be thoroughly inspected for trapped animals. If at any time a trapped or injured kit fox is discovered, the procedures under numbers 8 and 9 of this section must be followed.
3. Kit foxes are attracted to den-like structures such as pipes and may enter stored pipe, becoming trapped or injured. All construction pipes, culverts, or similar structures with a diameter of 4-inches or greater that are stored at a construction site for one or more overnight periods should be thoroughly inspected for kit foxes before the pipe is subsequently buried, capped, or otherwise used or moved in anyway. If a kit fox is discovered inside a pipe, that section of pipe should not be moved until the USFWS has been consulted. If necessary, and under the direct supervision of the biologist, the pipe may be moved once to remove it from the path of construction activity, until the fox has escaped.

4. All food-related trash items such as wrappers, cans, bottles, and food scraps should be disposed of in closed containers and removed at least once a week from a construction or project site.
5. No firearms shall be allowed on the project site.
6. To prevent harassment, mortality of kit foxes or destruction of dens by dogs or cats, no pets should be permitted on project sites.
7. A representative shall be appointed by the project proponent who will be the contact source for any employee or contractor who might inadvertently kill or injure a kit fox or who finds a dead, injured or entrapped individual. The representative's name and telephone number shall be provided to the USFWS.
8. In the case of trapped animals, escape ramps or structures should be installed immediately to allow the animal(s) to escape, or the USFWS should be contacted for advice.
9. Any contractor, employee(s), or military or agency personnel who inadvertently kills or injures a San Joaquin kit fox shall immediately report the incident to their representative. This representative shall contact the CDFG immediately in the case of a dead, injured or entrapped kit fox. The CDFG contact for immediate assistance is State Dispatch at (916) 445-0045. They will contact the local warden or biologist.
10. The Sacramento Fish and Wildlife Office and CDFG will be notified in writing within three working days of the accidental death or injury to a San Joaquin kit fox during project related activities. Notification must include the date, time, and location of the incident or of the finding of a dead or injured animal and any other pertinent information. The USFWS contact is the Chief of the Division of Endangered Species, 2800 Cottage Way, Suite W2605, Sacramento, CA 95825-1846, and (916) 414-6620. The CDFG contact is Mr. Ron Schlorff at 1416 9th Street, Sacramento, CA 95814, (916) 654-4262.

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<http://sacramento.fws.gov/es/spp-list.htm>
- United States Fish and Wildlife Service. 1999. Conservation Guidelines for the Valley Elderberry Longhorn Beetle. Sacramento, CA.

APPENDIX A

SITE PHOTOGRAPHS



Photograph 1 – Photo of the project site taken from Elkhorn and Howard Avenues facing southwest.



Photograph 2 – Photo of the project site taken from Howard Ave. facing west.



Photograph 3 – Photo of the project site taken from the south boundary facing north. Note the stand of Eucalyptus in the background



Photograph 4 – Photo of the project site taken from the south boundary facing northeast. Note the stand of Eucalyptus in the background.



Photograph 5 – Photo of the project site (north parcel) taken from the east boundary facing west.



Photograph 6 – Photo of the dairy site and dairy construction taken from west of the dairy facing east.



Photograph 7 – Photo of a well pad along the south site boundary.



Photograph 8 – Photo of a well pad along the south site boundary. This site contains kangaroo rat sign.



Photograph 9 – Photo of kangaroo rat burrows and tail drags at a well pad.



Photograph 10 – Photo of kangaroo rat burrows and tail drags at a well pad.



Photograph 11 – Photo of Eucalyptus stand to the north of Elkhorn and Howard Avenues, adjacent to the project site.



Photograph 12 – Photo of alfalfa field and dairy directly east of the project site.

APPENDIX B

MIGRATORY BIRD TREATY ACT

Migratory Bird Treaty Act of 1918

Migratory Bird Treaty Act of 1918 (16 U.S.C. 703-712; Ch. 128; July 13, 1918; 40 Stat. 755) as amended by: Chapter 634; June 20, 1936; 49 Stat. 1556; P.L. 86-732; September 8, 1960; 74 Stat. 866; P.L. 90-578; October 17, 1968; 82 Stat. 1118; P.L. 91-135; December 5, 1969; 83 Stat. 282; P.L. 93-300; June 1, 1974; 88 Stat. 190; P.L. 95-616; November 8, 1978; 92 Stat. 3111; P.L. 99-645; November 10, 1986; 100 Stat. 3590 and P.L. 105-312; October 30, 1998; 112 Stat. 2956

The original 1918 statute implemented the 1916 Convention between the U.S. and Great Britain (for Canada) for the protection of migratory birds. Later amendments implemented treaties between the U.S. and Mexico, the U.S. and Japan, and the U.S. and the Soviet Union (now Russia).

Specific provisions in the statute include:

- Establishment of a Federal prohibition, unless permitted by regulations, to "pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird, included in the terms of this Convention . . . for the protection of migratory birds . . . or any part, nest, or egg of any such bird." (16 U.S.C. 703)

This prohibition applies to birds included in the respective international conventions between the U.S. and Great Britain, the U.S. and Mexico, the U.S. and Japan, and the U.S. and the Russia.

- Authority for the Secretary of the Interior to determine, periodically, when, consistent with the Conventions, "hunting, taking, capture, killing, possession, sale, purchase, shipment, transportation, carriage, or export of any . . . bird, or any part, nest or egg" could be undertaken and to adopt regulations for this purpose. These determinations are to be made based on "due regard to the zones of temperature and to the distribution, abundance, economic value, breeding habits, and times of migratory flight." (16 U.S.C. 704)
- A decree that domestic interstate and international transportation of migratory birds which are taken in violation of this law is unlawful, as well as importation of any migratory birds which are taken in violation of Canadian laws. (16 U.S.C. 705)
- Authority for Interior officials to enforce the provisions of this law, including seizure of birds illegally taken which can be forfeited to the U.S. and disposed of as directed by the courts. (16 U.S.C. 706)

- Establishment of fines for violation of this law, including misdemeanor charges. (16 U.S.C. 707)
- Authority for States to enact and implement laws or regulations to allow for greater protection of migratory birds, provided that such laws are consistent with the respective Conventions and that open seasons do not extend beyond those established at the national level. (16 U.S.C. 708)
- A repeal of all laws inconsistent with the provisions of this Act. (16 U.S.C. 710)
- Authority for the continued breeding and sale of migratory game birds on farms and preserves for the purpose of increasing the food supply. (16 U.S.C. 711)

The 1936 statute implemented the Convention between the U.S. and Mexico for the Protection of Migratory Birds and Game Mammals. Migratory bird import and export restrictions between Mexico and the U.S. were also authorized, and in issuing any regulations to implement this section, the Secretary of Agriculture was required to consider U.S. laws forbidding importation of certain mammals injurious to agricultural and horticultural interests. Monies for the Secretary of Agriculture to implement these provisions were also authorized.

The 1960 statute (P.L. 86-732) amended the MBTA by altering earlier penalty provisions. The new provisions stipulated that violations of this Act would constitute a misdemeanor and conviction would result in a fine of not more than \$500 or imprisonment of not more than six months. Activities aimed at selling migratory birds in violation of this law would be subject to fine of not more than \$2000 and imprisonment could not exceed two years. Guilty offenses would constitute a felony. Equipment used for sale purchases was authorized to be seized and held, by the Secretary of the Interior, pending prosecution, and, upon conviction, be treated as a penalty.

Section 10 of the 1969 amendments to the Lacey Act (P.L. 91-135) repealed the provisions of the MBTA prohibiting the shipment of wild game mammals or parts to and from the U.S. or Mexico unless permitted by the Secretary of the Interior. The definition of "wildlife" under these amendments does not include migratory birds, however, which are protected under the MBTA.

The 1974 statute (P.L. 93-300) amended the MBTA to include the provisions of the 1972 Convention between the U.S. and Japan for the Protection of Migratory Birds and Birds in Danger of Extinction. This law also amended the title of the MBTA to read: "An Act to give effect to the conventions between the U.S. and other nations for the protection of migratory birds, birds in danger of extinction, game mammals, and their environment."

Section 3(h) of the Fish and Wildlife Improvement Act of 1978 (P.L. 95-616) amended the MBTA to authorize forfeiture to the U.S. of birds and their parts illegally taken, for disposal by the Secretary of the Interior as he deems appropriate. These amendments also authorized the Secretary to issue regulations to permit Alaskan natives to take migratory

birds for their subsistence needs during established seasons. The Secretary was required to consider the related migratory bird conventions with Great Britain, Mexico, Japan, and the Soviet Union in establishing these regulations and to establish seasons to provide for the preservation and maintenance of migratory bird stocks.

Public Law 95-616 also ratified a treaty with the Soviet Union specifying that both nations will take measures to protect identified ecosystems of special importance to migratory birds against pollution, detrimental alterations, and other environmental degradations. (See entry for the Convention Between the United States of America and the Union of Soviet Socialist Republics Concerning the Conservation of Migratory Birds and Their Environment; T.I.A.S. 9073; signed on November 19, 1976, and approved by the Senate on July 12, 1978; 92 Stat. 3110.)

Public Law 99-645, the 1986 Emergency Wetlands Resources Act, amended the Act to require that felony violations under the MBTA must be "knowingly" committed.

P.L. 105-312, Migratory Bird Treaty Reform Act of 1998, amended the law to make it unlawful to take migratory game birds by the aid of bait if the person knows or reasonably should know that the area is baited. This provision eliminates the "strict liability" standard that was used to enforce Federal baiting regulations and replaces it with a "know or should have known" standard. These amendments also make it unlawful to place or direct the placement of bait on or adjacent to an area for the purpose of taking or attempting to take migratory game birds, and makes these violations punishable under title 18 United States Code, (with fines up to \$100,000 for individuals and \$200,000 for organizations), imprisonment for not more than 1 year, or both. The new amendments require the Secretary of Interior to submit to the Senate Committee on Environment and Public Works and the House Committee on Resources a report analyzing the effect of these amendments and the practice of baiting on migratory bird conservation and law enforcement. The report to Congress is due no later than five years after enactment of the new law.

P.L. 105-312 also amends the law to allow the fine for misdemeanor convictions under the Migratory Bird Treaty Act to be up to \$15,000 rather than \$5000.

APPENDIX C

**STANDARDIZED RECOMMENDATIONS FOR THE PROTECTION
OF THE SAN JOAQUIN KIT FOX**

**U.S. FISH AND WILDLIFE SERVICE
STANDARDIZED RECOMMENDATIONS
FOR PROTECTION OF THE SAN JOAQUIN KIT FOX
PRIOR TO OR DURING GROUND DISTURBANCE**

Prepared by the Sacramento Fish and Wildlife Office
June 1999

INTRODUCTION

The following document includes many of the San Joaquin kit fox (*Vulpes macrotis mutica*) protection measures typically recommended by the U. S. Fish and Wildlife Service (Service), prior to and during ground disturbance activities. However, incorporating relevant sections of these guidelines into the proposed project is not the only action required under the Endangered Species Act of 1973, as amended (Act). Project applicants should contact the Service in Sacramento to determine the full range of requirements that apply to your project; the address and telephone number are given at the end of this document. Formal authorization for the project may be required under either section 7 or section 10 of the Act. Implementation of the measures presented in this document may be necessary to avoid violating the provisions of the Act, including the prohibition against "take" (defined as killing, harming, or harassing a listed species, including actions that damage or destroy its habitat). Such protection measures may also be required under the terms of a biological opinion pursuant to section 7 of the Act resulting in incidental take authorization (authorization), or an incidental take permit (permit) pursuant to section 10 of the Act. The specific measures implemented to protect kit fox for any given project shall be determined by the Service based upon the applicant's consultation with the Service.

The purpose of this document is to make information on kit fox protection strategies readily available and to help standardize the methods and definitions currently employed to achieve kit fox protection. The measures outlined in this document are subject to modification or revision at the discretion of the Service.

All surveys, den destructions, and monitoring described in this document must be conducted by a qualified biologist. A qualified biologist (biologist) means any person who has completed at least four years of university training in wildlife biology or a related science and/or has demonstrated field experience in the identification and life history of the San Joaquin kit fox. In addition, biologist(s) must be able to identify coyote, red fox, gray fox, and kit fox tracks, and to have seen a kit fox in the wild, at a zoo, or as a museum mount.

SMALL PROJECTS

Small projects are considered to be those projects with small foot prints such as an individual in-fill oil well, communication tower, or bridge repair. These projects must stand alone and not be part of, or in any way connected to larger projects (i.e., bridge repair or improvement to serve a

future urban development). The Service recommends that on these small projects, the biologist survey the proposed project boundary and a 200-foot area outside of the project footprint to identify habitat features, and make recommendations on situating the project to minimize or avoid impacts. If habitat features cannot be completely avoided, then preconstruction surveys should be conducted.

Preconstruction/preactivity surveys shall be conducted no less than 14 days and no more than 30 days prior to the beginning of ground disturbance and/or construction activities or any project activity likely to impact the San Joaquin kit fox. Surveys should identify kit fox habitat features on the project site and evaluate use by kit fox and, if possible, and assess the potential impacts to the kit fox by the proposed activity. The status of all dens should be determined and mapped (see Survey Protocol).

Written results of preconstruction/preactivity surveys must be received by the Service within five days after survey completion and prior to the start of ground disturbance and/or construction activities. If a natal/pupping den is discovered within the project area or within 200-feet of the project boundary, the Service shall be immediately notified. If the preconstruction/preactivity survey reveals an active natal pupping or new information, the project applicant should contact the Service immediately to obtain the necessary take authorization/permit.

If take authorization/permit has already been issued, then the biologist may proceed with den destruction within the project boundary, except natal/pupping dens (active or inactive). Protective exclusion zones can be placed around all known and potential dens which occur outside the project footprint (conversely, the project boundary can be demarcated, see den destruction section).

OTHER PROJECTS

It is likely that all other projects occurring within kit fox habitat will require a take authorization/permit from the Service. This determination would be made by the Service during the early evaluation process (see Survey Protocol). These other projects would include, but are not limited to: linear projects; projects with large footprints such as urban development; and projects which in themselves may be small but have far reaching impacts (i.e., water storage or conveyance facilities that promote urban growth or agriculture, etc.).

The take authorization/permit issued by the Service may incorporate some or all of the protection measures presented in this document. The take authorization/permit may include measures specific to the needs of the project, and those requirements supersede any requirements found in this document.

EXCLUSION ZONES

The configuration of exclusion zones around the kit fox dens should have a radius measured outward from the entrance or cluster of entrances. The following radii are minimums, and if they cannot be followed the Service must be contacted:

Potential den	50 feet
Known den	100 feet
Natal/pupping den (occupied <u>and</u> unoccupied)	Service must be contacted
Atypical den	50 feet

Known den: To ensure protection, the exclusion zone should be demarcated by fencing that encircles each den at the appropriate distance and does not prevent access to the den by kit foxes. Exclusion zone fencing should be maintained until all construction related or operational disturbances have been terminated. At that time, all fencing shall be removed to avoid attracting subsequent attention to the dens.

Potential and Atypical dens: Placement of 4-5 flagged stakes 50 feet from the den entrance(s) will suffice to identify the den location; fencing will not be required, but the exclusion zone must be observed.

Construction and other project activities should be prohibited or greatly restricted within these exclusion zones. Only essential vehicle operation on existing roads and foot traffic should be permitted. Otherwise, all construction, vehicle operation, material storage, or any other type of surface-disturbing activity should be prohibited within the exclusion zones.

DESTRUCTION OF DENS

Disturbance to all San Joaquin kit fox dens should be avoided to the maximum extent possible. Protection provided by kit fox dens for use as shelter, escape, cover, and reproduction is vital to the survival of the species. Limited destruction of kit fox dens may be allowed, if avoidance is not a reasonable alternative, provided the following procedures are observed. The value to kit foxes of potential, known, and natal/pupping dens differ and therefore, each den type needs a different level of protection. **Destruction of any known or natal/pupping kit fox den requires take authorization/permit from the Service.**

Natal/pupping dens: Natal or pupping dens which are occupied will not be destroyed until the pups and adults have vacated and then only after consultation with the Service. Therefore, project activities at some den sites may have to be postponed.

Known Dens: Known dens occurring within the footprint of the activity must be monitored for three days with tracking medium or an infra-red beam camera to determine the current use. If no kit fox activity is observed during this period, the den should be destroyed immediately to preclude subsequent use. If kit fox activity is observed at the den during this period, the den should be monitored for at least five consecutive days from the time of the observation to allow any resident animal to move to another den during its normal activity. Use of the den can be discouraged during this period by partially plugging its entrances(s) with soil in such a manner that any resident animal can escape easily. Only when the den is determined to be unoccupied may the den be excavated under the direction of the biologist. If the animal is still present after five or more consecutive days of plugging and monitoring, the den may have to be excavated when, in the judgment of a biologist, it is temporarily vacant, for example during the animal's normal foraging activities. The Service encourages hand excavation, but realizes that soil conditions may necessitate the use of excavating equipment. However, extreme caution must be exercised.

Destruction of the den should be accomplished by careful excavation until it is certain that no kit foxes are inside. The den should be fully excavated, filled with dirt and compacted to ensure that kit foxes cannot reenter or use the den during the construction period. If at any point during excavation a kit fox is discovered inside the den, the excavation activity shall cease immediately and monitoring of the den as described above should be resumed. Destruction of the den may be completed when in the judgement of the biologist, the animal has escaped from the partially destroyed den.

Potential Dens: If a take authorization/permit has been obtained from the Service, den destruction may proceed without monitoring, unless other restrictions were issued with the take authorization/permit. If no take authorization/permit has been issued, then potential dens should be monitored as if they were known dens. If any den was considered to be a potential den, but is later determined during monitoring or destruction to be currently, or previously used by kit fox (e.g., if kit fox sign is found inside), then destruction shall cease and the Service shall be notified immediately.

CONSTRUCTION AND OPERATIONAL REQUIREMENTS

Habitat subject to permanent and temporary construction disturbances and other types of project-related disturbance should be minimized. Project designs should limit or cluster permanent project features to the smallest area possible while still permitting project goals to be achieved. To minimize temporary disturbances, all project-related vehicle traffic should be restricted to established roads, construction areas, and other designated areas. These areas should also be

included in preconstruction surveys and, to the extent possible, should be established in locations disturbed by previous activities to prevent further impacts.

1. Project-related vehicles should observe a 20-mph speed limit in all project areas, except on county roads and State and Federal highways; this is particularly important at night when kit foxes are most active. To the extent possible, night-time construction should be minimized. Off-road traffic outside of designated project areas should be prohibited.
2. To prevent inadvertent entrapment of kit foxes or other animals during the construction phase of a project, all excavated, steep-walled holes or trenches more than 2 feet deep should be covered at the close of each working day by plywood or similar materials, or provided with one or more escape ramps constructed of earth fill or wooden planks. Before such holes or trenches are filled, they should be thoroughly inspected for trapped animals. If at any time a trapped or injured kit fox is discovered, the procedures under number 13 of this section must be followed.
3. Kit foxes are attracted to den-like structures such as pipes and may enter stored pipe becoming trapped or injured. All construction pipes, culverts, or similar structures with a diameter of 4-inches or greater that are stored at a construction site for one or more overnight periods should be thoroughly inspected for kit foxes before the pipe is subsequently buried, capped, or otherwise used or moved in any way. If a kit fox is discovered inside a pipe, that section of pipe should not be moved until the Service has been consulted. If necessary, and under the direct supervision of the biologist, the pipe may be moved once to remove it from the path of construction activity, until the fox has escaped.
4. All food-related trash items such as wrappers, cans, bottles, and food scraps should be disposed of in closed containers and removed at least once a week from a construction or project site.
5. No firearms shall be allowed on the project site.
6. To prevent harassment, mortality of kit foxes or destruction of dens by dogs or cats, no pets should be permitted on project sites.
7. Use of rodenticides and herbicides in project areas should be restricted. This is necessary to prevent primary or secondary poisoning of kit foxes and the depletion of prey populations on which they depend. All uses of such compounds should observe label and other restrictions mandated by the U.S. Environmental Protection Agency, California Department of Food and Agriculture, and other State and Federal legislation, as well as additional project-related restrictions deemed necessary by the Service. If rodent control

must be conducted, zinc phosphide should be used because of proven lower risk to kit fox.

8. A representative shall be appointed by the project proponent who will be the contact source for any employee or contractor who might inadvertently kill or injure a kit fox or who finds a dead, injured or entrapped individual. The representative will be identified during the employee education program. The representative's name and telephone number shall be provided to the Service.
9. An employee education program should be conducted for any project that has expected impacts to kit fox or other endangered species. The program should consist of a brief presentation by persons knowledgeable in kit fox biology and legislative protection to explain endangered species concerns to contractors, their employees, and military and agency personnel involved in the project. The program should include the following: a description of the San Joaquin kit fox and its habitat needs; a report of the occurrence of kit fox in the project area; an explanation of the status of the species and its protection under the Endangered Species Act; and a list of measures being taken to reduce impacts to the species during project construction and implementation. A fact sheet conveying this information should be prepared for distribution to the above-mentioned people and anyone else who may enter the project site.
10. Upon completion of the project, all areas subject to temporary ground disturbances, including storage and staging areas, temporary roads, pipeline corridors, etc. should be re-contoured if necessary, and revegetated to promote restoration of the area to pre-project conditions. An area subject to "temporary" disturbance means any area that is disturbed during the project, but that after project completion will not be subject to further disturbance and has the potential to be revegetated. Appropriate methods and plant species used to revegetate such areas should be determined on a site-specific basis in consultation with the Service, California Department of Fish and Game (CDFG), and revegetation experts.
11. In the case of trapped animals, escape ramps or structures should be installed immediately to allow the animal(s) to escape, or the Service should be contacted for advice.
12. Any contractor, employee, or military or agency personnel who inadvertently kills or injures a San Joaquin kit fox shall immediately report the incident to their representative. This representative shall contact the CDFG immediately in the case of a dead, injured or entrapped kit fox. The CDFG contact for immediate assistance is State Dispatch at (916) 445-0045. They will contact the local warden or biologist.
13. The Sacramento Fish and Wildlife Office and CDFG will be notified in writing within three working days of the accidental death or injury to a San Joaquin kit fox during

project related activities. Notification must include the date, time, and location of the incident or of the finding of a dead or injured animal and any other pertinent information. The Service contact is the Chief of the Division of Endangered Species, at the addresses and telephone numbers given below. The CDFG contact is Mr. Ron Schlorff at 1416 9th Street, Sacramento, California 95814, (916) 654-4262.

Any project-related information required by the Service or questions concerning the above conditions or their implementation may be directed in writing to the U.S. Fish and Wildlife Service at:

Endangered Species Division
2800 Cottage Way, Suite W2605
Sacramento, California 95825-1846
(916) 414-6620

"Take" - Section 9 of the Endangered Species Act of 1973, as amended (Act) prohibits the "take" of any federally listed endangered species by any person (an individual, corporation, partnership, trust, association, etc.) subject to the jurisdiction of the United States. As defined in the Act, take means " . . . to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct." Thus, not only is a listed animal protected from activities such as hunting, but also from actions that damage or destroy its habitat.

"Dens" - San Joaquin kit fox dens may be located in areas of low, moderate, or steep topography. Den characteristics are listed below, however, the specific characteristics of individual dens may vary and occupied dens may lack some or all of these features. Therefore, caution must be exercised in determining the status of any den. Typical dens may include the following: (1) one or more entrances that are approximately 5 to 8 inches in diameter; (2) dirt berms adjacent to the entrances; (3) kit fox tracks, scat, or prey remains in the vicinity of the den; (4) matted vegetation adjacent to the den entrances; and (5) manmade features such as culverts, pipes, and canal banks.

"Known den" - Any existing natural den or manmade structure that is used or has been used at any time in the past by a San Joaquin kit fox. Evidence of use may include historical records, past or current radiotelemetry or spotlighting data, kit fox sign such as tracks, scat, and/or prey remains, or other reasonable proof that a given den is being or has been used by a kit fox. The Service discourages use of the terms "active" and "inactive" when referring to any kit fox den because a great percentage of occupied dens show no evidence of use, and because kit foxes change dens often, with the result that the status of a given den may change frequently and abruptly.

"Potential Den" - Any subterranean hole within the species' range that has entrances of appropriate dimensions for which available evidence is insufficient to conclude that it is being used or has been used by a kit fox. Potential dens shall include the following: (1) any suitable subterranean hole; or (2) any den or burrow of another species (e.g., coyote, badger, red fox, or ground squirrel) that otherwise has appropriate characteristics for kit fox use.

"Natal or Pupping Den" - Any den used by kit foxes to whelp and/or rear their pups. Natal/pupping dens may be larger with more numerous entrances than dens occupied exclusively by adults. These dens typically have more kit fox tracks, scat, and prey remains in the vicinity of the den, and may have a broader apron of matted dirt and/or vegetation at one or more entrances. A natal den, defined as a den in which kit fox pups are actually whelped but not necessarily reared, is a more restrictive version of the pupping den. In practice, however, it is difficult to distinguish between the two, therefore, for purposes of this definition either term applies.

"Atypical Den" - Any manmade structure which has been or is being occupied by a San Joaquin kit fox. Atypical dens may include pipes, culverts, and diggings beneath concrete slabs and buildings.

APPENDIX D

**MODIFIED BAIT STATION FOR USE IN ENDANGERED
KANGAROO RAT HABITAT**

MODIFIED BAIT STATIONS FOR CONTROL OF THE CALIFORNIA GROUND SQUIRREL IN ENDANGERED KANGAROO RAT HABITAT

This study was undertaken in association with the California Department of Fish and Game and California Department of Food and Agriculture. Funding was provided by the Vertebrate Pest Control Research Advisory Committee (Bait surcharge funds).

Simple modifications to existing bait stations were found to exclude kangaroo rats while still allowing ground squirrels access to poison bait.

I. Inverted "T" design

45 degree elbows and additional pipe can be placed on each entrance of the traditional station such that the entrance to the station is 12 inches above ground level. Ground squirrels generally begin visiting these bait stations at the same time as they would visit the traditional station (between 1 and 6 days). In the event that ground squirrels do not visit the modified station, the extensions should be removed, and the station pre-baited with clean (i.e., no poison) grain. Once the squirrels begin feeding from the station, the extensions can be replaced, poison grain added and the squirrels will continue to visit the station.

Traditional and modified inverted "T" bait stations Specifications:

1. The entrances must be at least 12 inches above the ground.
2. Vegetation should be cleared from around the entrances. Kangaroo rats will be able to climb into the stations if dense vegetation is present or if the stations are placed against a 1/2 inch (or finer) wire mesh fence. Keep entrances away from fence posts and large rocks that might be used by kangaroo rats to gain access.
3. Rain or sprinkler irrigators will result in water collecting in the bait stations. In locations or at times when this is likely, it may be necessary to further modify the bait station (e.g., by adding an additional horizontal extension; drilling a hole in the bottom of the station to drain water, etc.). It is important to remember that ground squirrels will not take moldy bait.
4. In kit fox range, the entrance to the station should be no greater than 3-inches in diameter. This can be achieved by fitting a 4-inch to 3-inch reducer or 1/2 endcap.

II. Platform for other bait station types

Almost any type of bait box may be elevated on a 12-inch high platform. Any material may be used for building the platform but due to kangaroo rat behavior, it is important to adhere to the specifications.

Ground squirrels generally begin visiting these bait stations at the same time as they would visit the traditional station (between 1 and 6 days). In the event that ground squirrels do not visit the modified station, the station should be placed at ground level and pre-baited with clean (i.e., no poison) grain. Once the squirrels begin feeding from the station, it can be elevated, poison grain added and the squirrels will continue to visit the station.

Specifications:

1. The platform should be 12-inches high.
2. The platform must not have a solid base. Kangaroo rats are able to jump or climb to heights of up to 24 inches if they're presented with a solid base. Even a platform top with a 3-inch overhang over a solid base is easily negotiated by kangaroo rats.
3. The legs of the platform should be inset at least 2-inches to stop kangaroo rats from climbing into the station. Ramps or wire mesh should not be added to improve accessibility by ground squirrels as kangaroo rats will learn to use these to climb into the bait station.
4. Vegetation should be cleared from around the base of the platforms. Kangaroo rats will be able to climb into the stations if dense vegetation is present or if the stations are placed against a 1/2 inch (or finer) wire mesh fence. Keep entrances away from fence posts and large rocks that might be used by kangaroo rats to gain access.
5. It may be necessary to add a lip to the top of the platform to stop grain spillage. Any grain spilled from bait stations should be picked-up daily.
6. In rangeland areas, bait stations should be firmly secured to the ground to avoid them being tipped over by livestock.
7. In kit fox range, the entrance to the station should be no greater than 3-inches in diameter.

Modifying a “T” Bait Station for Ground Squirrel control in Kangaroo Rat habitat

Traditional bait Stations do not exclude kangaroo rats



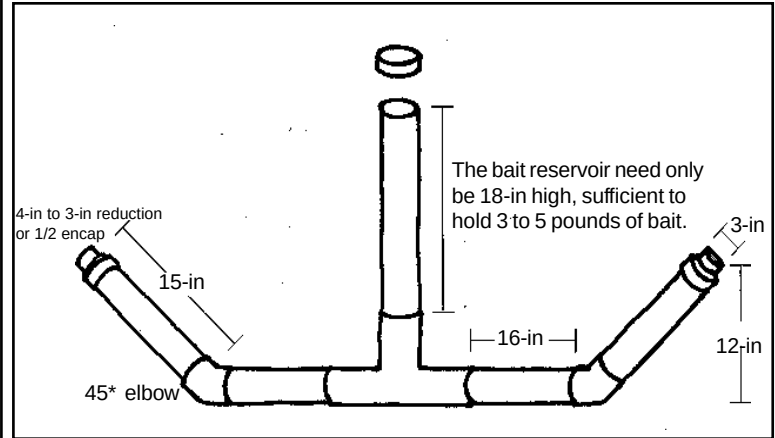
Modified bait stations exclude kangaroo rats while allowing access to squirrels



Inverted “T” design: 45 -degree PVC elbows and pipe can be placed on each entrance of the traditional station such that the entrance to the station is 12 inches above ground level (see above picture). Ground squirrels generally begin visiting these bait stations at the same time as they would visit the traditional station (1-6 days). In the event that ground squirrels do not visit the modified station, the extension should be removed, and the station pre-baited with clean (i.e., no poison) grain. Once the squirrels begin feeding from the station, the extensions can be replaced, poison grain added and the squirrels will continue to visit the station.

Photos: Desley Whisson/UCD Extension

Modified “T” Bait Station Design



Specifications

1. The entrances must be at least 12 inches above the ground.
2. Vegetation should be cleared from around the entrances. Kangaroo rats will be able to climb into the stations if dense vegetation is present or if the stations are placed against a 1/2 inch(or finer) wire mesh fence. Keep entrances away from fence posts and large rocks that might be used by Kangaroo rats to gain access.
3. Rain or sprinkler irrigators will result in water collecting in the bait stations. In locations or at times when this is likely, it may be necessary to further modify the bait station (e.g., by adding an additional horizontal extension; drilling a hole in the bottom of the station to drain water, etc.). It is important to remember that ground squirrels will not take moldy bait.
4. In San Joaquin Kit fox range, the entrance to the station should be no greater than 3-inches in diameter. This can be achieved by fitting a 4-inch to 3-inch PVC reduction or 1/2 and endcap.

For more information contact: Desley Whisson, UC Davis (916)754-8644



California Department of Pesticide Regulation
Endangered Species Project

WWW.cdpr.ca.gov

Appendix M
Cultural Resources Records Search



Center for Archaeological Research
California State University, Bakersfield
9001 Stockdale Highway
Bakersfield, California 93311-1099

(661) 654-3297
(661) 654-2143 Fax



February 15, 2006

Jackie Neuffer
Quad Knopf, Inc.
P.O. Box 3699
Visalia CA 93278

Re: Cultural Resources Records Search for the project titled "Van Der Kooi Dairy," for land located in Section 31 of T16S, R18E of the Five Points and Helm, CA 7.5' USGS Topographic Quadrangles and Sections 5 and 6, T17S, R18E of the Five Points, CA 7.5' USGS Topographic Quadrangle, on behalf of the County of Fresno.

Dear Ms. Neuffer:

Per your request, a cultural resources records search (RS No. 06-057; CAR Project No. 06-06) was conducted for the above-referenced project on February 13, at the Southern San Joaquin Valley Historical Resources Information Center at California State University, Bakersfield, by myself. The purpose of this records search is for the proposed Van Der Kooi Dairy project, a 110-acre dairy facility site within a 1.242-acre project area. The dairy will be located at the intersection of Elkhorn Avenue and Howard Avenue southwest of Fresno.

The results of the records search indicate that one cultural resource study has been conducted on the subject property, but was limited to a narrow strip of land identified as a potential location for a 500 KV transmission line. One study has been performed within about a half mile of the property, again related to the proposed electrical transmission lines and focused on are in and around nearby Fresno Slough. No cultural resources have been reported found on the subject property or within about a half-mile radius of the subject property during these minimal surveys. There are no known cultural resources within the subject property that are listed in the *National Register of Historic Places*, the *California Register of Historical Resources*, *California Points of Interest*, *California Inventory of Historic Resources*, or the *California State Historic Landmarks*.

As noted above, the cultural resource studies performed on and around the Project Area were limited to one survey along a proposed transmission line. Therefore, the possibility remains that resources do exist there, and as such, further investigation may be warranted.

The invoice for this records search is enclosed. If you have any further questions or concerns, please feel free to contact me at 661-654-6161 or by email at rorfila@csub.edu.

Sincerely,

Rebecca S. Orfila, M.A., RPA
Senior Staff Archaeologist



Appendix N
Geological – Hydrological Report

GEOLOGICAL-HYDROLOGICAL REPORT

FNS Investments Dairy
Elkhorn Avenue and Howard Avenue
Fresno County, California

Project No. 42-202-16
February 18, 2002

Prepared by:

ERWIN ENGINEERING

Geotechnical/Environmental Consultants
1625 Howard Road, Ste 301
Fresno, California 93637
(559) 673-0923

ERWIN ENGINEERING

Geotechnical/Environmental Consultants
1625 Howard Road, Ste 301, Fresno, Ca., 93637
(559) 673-0923 Fax 673-0923

February 18, 2002

FNS Investments Incorporated
P.O. Box 1267
Hollister, CA 95024-1267

Attention: Mr. Marc Frelier

RE: Geological-Hydrological Report
FNS Investments Dairy
Elkhorn Avenue and Howard Avenue
Fresno County, California

Pursuant to your request, Erwin Engineering has completed a Geological-Hydrological Report for the above-referenced subject property. The attached report summarizes the details of our findings.

Should you have any questions or if we may be of some additional service, please contact me at (559) 673-0923.

Respectfully submitted,

Erwin Engineering



Michael Erwin, PE
CE18625
GE297

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Appendix B	Well Water Test Results
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1.0 INTRODUCTION

This report presents the findings of Erwin Engineering's Geological-Hydrological Investigation of the property located near the intersection of Elkhorn Avenue and Howard Avenue in Fresno County, California (Figure 1). The subject site is located in the west half of section 31 of T16S, R18E, and sections 5 and the west half of sections 6 of T17S, R18E, MDB&M.

At the time of the investigation, the property was developed for agricultural production and encompasses approximately 1,242 acres. The Site Map (Figure 1) shows the approximate location of the subject site.

2.0 PURPOSE AND SCOPE OF SERVICES

The purpose of our Geological-Hydrological Investigation was to explore and evaluate the subsurface soil conditions, the current and historical groundwater conditions at the site.

This report includes the following items:

- Site plan and vicinity map showing the approximate location of the site with well locations (Fig 1) and test borings drilled for this study (Fig. 2);
- Logs of Test Borings;
- Geological conditions including USDA Soil Survey data, topography and proposed grading;
- Historical groundwater levels, highest anticipated groundwater, gradient and those items that may effect the future groundwater levels;
- Groundwater quality from current test samples and historical data;
- Available well logs;
- An evaluation of the need for groundwater monitoring wells;

3.0 FIELD EXPLORATION

Central Valley Testing completed the soil borings for the subject property. The field portion of the investigation included the drilling of seven exploratory borings. The exploratory soil boring locations are shown on the Dairy Site Plan which is included as Figure 2 of this report.

The field exploration was performed on February 8 and 14, 2002. The exploration consisted of drilling and sampling six test borings for soil classification to the maximum depth drilled of 35 feet below the existing grade. Soils were classified according to the Unified Soil Classification System.

4.0 SOIL PROFILE AND SUBSURFACE CONDITIONS

Based on the exploratory soil borings, soils beneath the site were predominantly a silty sand, sandy silt, and silty clay. Silty clay typically occupies the near surface soils to a depth of approximately 15 feet. Below this level and to the maximum depth drilled of 35 feet alternating strata of silty sands and sandy soils were encountered. A fine to medium sand was the predominant soil below the 15 foot level.

Detailed descriptions of the soils encountered in each boring are noted on the logs of borings, included in the Appendix of this report. All soils have been classified according to the Unified Soil Classification System.

The soils encountered during the soil drilling had a damp to moist moisture contentment. The depth to ground water's unconfined aquifer is approximately 150 feet as reported by the Department of Water resources. It is possible that groundwater conditions at the site could change due to variations in rainfall, groundwater withdrawal, irrigation, construction activities, or other factors not apparent at the time the borings were drilled.

Review of the Soil Conservation Service's Soil Survey for Fresno County reveals the near surface soil types in the vicinity of the proposed dairies' acreage varies from a Tachi and Gepford clay and Armona loam. These soils are described as irrigated cropland. The predominant soil type that occupies the near surface of the pond area and most of the proposed dairy site is the Tachi clay. The Soil Conservation Service describes these soils as poorly drained or slow permeability to a depth of 60 inches. The reported irrigated crops include alfalfa, pasture and other saline-sodic tolerant crops. The slope across the site varies from approximately 0 to 1 percent. The soil survey notes flooding is rare in years of abnormally high precipitation.

4.1 Soils Particle Size Analysis

During the drilling of the exploratory borings, soil samples were obtained at approximately the 10 and 20 foot intervals from borings 1, 2, 3 and 4 at the proposed pond locations. Samples were obtained at the 10 foot level from borings 5, 6 and 7. The samples were tested for their particle size in accordance with test method ASTM D422. The tests measures the percent by weight of the soils that are gravel, sand, silt, and clay. The specific information required by the CRWQCB and Fresno County includes the percent of clay content. The following table summarizes the clay content from the tests.

TABLE I			
Particle Size Test Results			
Sample No.	Sample Location	Depth (feet)	Clay (Percent)
1	B1	10	39
2	B1	20	15
3	B2	10	11
4	B2	20	9
5	B3	10	42
6	B3	20	13
7	B4	10	44
8	B4	20	12
9	B5	10	36
10	B6	10	29
11	B7	10	32

The complete results of the tests are included in Central Valley Testing's test report. A copy is included in the appendix of this report.

The results of the soil exploratory borings to a depth of 35 feet with the results of the soil gradation tests (hydrometer tests) indicate that the site soils provide materials with at approximately 10 percent clay in the vicinity of the proposed northerly pond. The preliminary test results of drilling samples from the southerly pond revealed results less than 10 percent.

5.0 PHYSICAL SETTING

A summary of the generalized physiological, geological, and hydrogeological settings based on review of the readily available published information is provided in the following sections.

5.1 Physiography

Information obtained by Erwin Engineering, from the review of the USGS maps indicates the following:

- Topographic quadrangle: USGS Topographic Map Five Points Quadrangle, Fresno County, California.
- Location: The west half of section 31 of T16S, R18E, and section 5 and the west half of section 6 of T17S, R18E, Mount Diablo Base & Meridian.
- Elevation: The approximate mid site elevation is 194 feet above sea level.
- Nearest surface water is the Fresno Slough. It is approximately two miles west of the subject site.

5.2 Topography

The subject sites natural grade varies from approximately 0 to 1 percent to the south west. The proposed grade of the site is approximately 1 to 2 percent. The proposed grading will control the on site drainage and divert it in to the proposed waste water ponds. The proposed grading will maintain the storm water on site.

5.3 Geology

The subject property is located within the San Joaquin Valley, a topographic and structural basin bounded on the east by the Sierra Nevada and to the west by the Coast Ranges. The Sierra Nevada, a fault block dipping gently southwestward, is composed of igneous and metamorphic rocks of pre-Tertiary age which comprise the basement complex beneath the valley. The Coast Ranges contain folded and faulted sedimentary rocks of Mesozoic and Cenozoic age, which are similar to those rocks that underlie the Valley at depth, and non-conformably overlie the basement complex. Gently dipping to nearly horizontal, sedimentary rocks of Tertiary and Quaternary age overlie the older rocks. The younger rocks are mostly of continental origin were derived from the Sierra Nevada mountains. The subject area is situated within the central portion of the Great Valley, and its large alluvial basin is comprised of predominantly fine grained sediments.

Alluvial fans, historically formed by the Fresno Slough is the largest geomorphic features in the area of the subject site. The alluvial fan in the younger alluvium of Sierra Nevada and Coast Ranges origin, generally considered as alluvial fan and floodplain deposits. The formation of the fans have resulted in a rather flat regional topography with a southwesterly gradient of less than 5 feet per mile in the vicinity of the site. The nearly level alluvial fan deposits are dissected by shallow, meandering creeks and sloughs.

5.4 Geological Map

The geological mapping of the subject site revealed no bedrock, faults, jointing systems, seeps or springs. The site is occupied by soil alluvium to a depth of several hundred feet. The soil profile is described as noted in the "Soil Profile and Subsurface Conditions" section of this report. Figure 3 shows the near surface soil types of the site as summarized by the Soil Conservation Service.

5.5 Regional Hydrogeology

The principal hydrogeological units beneath the floor of the western portion of the San Joaquin Valley are alluvial fan deposits from the Temblor Range and Kettleman Hills. The San Joaquin Valley has two types of aquifers, including 1) an upper, unconfined to semi-confined aquifer and 2) a lower, confined aquifer. Water quality in the San Joaquin Valley is generally better than that in the Kettleman Plain and Kettleman Hills areas, because these waters have an opportunity to co-mingle with waters from the Sierra Nevada Mountains. TDS concentrations range from 125 to 3300 ppm in the unconfined aquifer, and approximately 500 to 4000 ppm in the confined zones beneath the Corcoran Clay.

5.6 Site Hydrogeology

Erwin Engineering used the State of California, Department of Water Resources' computer retrieval system entitled "Groundwater Level Retrieval Map Interface" to obtain historical hydrologic information for the subject site. In addition, elevation plots and depth to groundwater as reported by the Department of Water Resources were summarized.

Information reviewed regarding hydrologic and hydrogeologic conditions at the subject site and vicinity is indicated by the following:

- On site water wells: Four observed (Fig. 1), three of the wells are older (40 yrs +/-) and well logs were not available, the fourth well was recently constructed to a depth of 590 feet (fig. 5);
- Adjacent site water wells: Four wells were observed near the boundaries of the subject site, two north of Elkhorn Ave. and two near the southeast corner of the subject site, wells number 1 and 35;
- Groundwater gradient: Southwest (Department of Water Resources)
- Depth to ground water: approx 150 feet (Spring 2000) below ground surface (Department of Water Resources) from wells near the subject property.

The following tables are summaries of the depth to ground water below the surface as reported by the Department of Water Resources. These summaries were taken from the following plots of groundwater depth;

- Lines of Equal Elevation of Water in Wells, Unconfined Aquifer;
- Lines of Equal Depth to Water in Wells, Unconfined Aquifer.

TABLE I Lines of Equal Elevation of Water in Wells Unconfined Aquifer		
Date	Calculated Water Surface Depth (Site Elev. 194 ft.)	Water Surface Elevation (feet)
Fall 1987	124	70
Spring 1988	134	60
Spring 1996	144	50
Spring 1998	144	50
Spring 1999	139	55
Spring 2000	154	40

TABLE II Lines of Equal Depth to Water in Wells Unconfined Aquifer	
Date	Water Surface Depth (feet)
Spring 1981	150
Spring 1988	150
Spring 1995	160
Spring 2000	150

These two tabular summaries of elevation and depth of groundwater shows the depth has varied between 124 to 154 feet below the surface since 1987.

ERWIN ENGINEERING

Based on the historical groundwater levels summarized in tables II and III, the highest anticipated groundwater is approximately 150 feet below the surface. Based on the proposed project there is no anticipated items that may effect the future groundwater levels or the current southwest groundwater gradient.

The California Department of Water Resources maintains a computerized data base retrieval system entitled "Groundwater Level Retrieval Map Interface" of groundwater levels from wells for most of California. The data base was accessed through the internet at www.well.water.ca.gov. Figures 4A and 4B in the appendix of this report shows the results of this data base search. They are identified by the State Department of Water Resources' Well Numbers 16S18E31M and 17S18E09C. The identification locates these wells near the southwest corner of section 31, of T.16S., R.18E., and near the northwest corner section 9, T.17 S. R.18 E., M.D.B. & M..

Table IV summarizes shallowest and deepest elevation for state well numbers 16S18E31M and 17S18E09C.

TABLE III				
Summary of State Well Data Base				
Water Surface	State Well No. & (elev.)	Date	W.S. Depth (ft.)	W.S. Elevation (ft.)
Shallowest W.S.	16S18E31M (190.0) **	01-31-86	140.0	50.0
Deepest W.S.	16S18E31M (190.0) **	12-04-92	189.1	0.9
Shallowest W.S.	17S18E09C (194.0) ***	10-20-98	132.0	62.0
Deepest W.S.	17S18E09C (194.0) ***	02-96-00	158.0	36.0

*** Well number 16S18E31M is located near the southeast corner of section 31

*** Well number 17S18E09C is located near the northwest corner of section 9

6.0 WATER QUALITY

Two existing wells, numbered 1 and 35 located near the southeast corner of the subject site, as located on the site map (fig. 1) were sampled and tested. These two currently producing agricultural wells were sampled on 04-24-2001. A copy of the test results are in the appendix of this report and are summarized in table IV. Copies of well logs for these two wells were not available at the time of preparing this report. We are not certain of the depth of pumping of the wells sampled.

The quality of the near surface groundwater (unconfined aquifer) is unknown for the subject area. The scope of this report, as outlined by the California Regional Water Quality Control Board (CRWQCB), is to sample and test for water quality of the uppermost aquifer beneath the site. With out well logs for each well sampled, it is not known from what depth water is being pumped. The samples were tested in accordance with the Fresno Counties requirements.

We are not aware of any historical groundwater quality monitoring records for the subject area. The Department of Water Resources has no historical water quality records for the subject area.

The following table summarizes the well water test results.

TABLE IV
Groundwater Wells
Results of Laboratory Analysis (mg/L)
August 2001

Constituent	Well #1 (meq/l)	Well #35 (meq/l)
Sulfate	34.	nd
Calcium	9.7	13.
Magnesium	0.12	3.5
Sodium	190.	240.
Carbonate	nd	nd
Bicarbonate	330.	350.
Chloride	62.	140.
Potassium	nd	3.0
pH	7.8	7.9
Nitrate (ppm)	nd	nd
E.C. (mmhos/cm)	--	--
Total Suspended Solids (ppm)	--	--
T.D.S.	530.	640.

7.0 MONITORING WELL RECOMMENDATIONS AND CONCLUSIONS

The following is a summary of the information developed during the preparation of this report that should be considered during the determination of whether monitoring wells should be recommended.

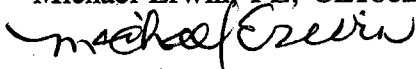
- Based on the historical groundwater levels summarized in tables I, II and III, the highest anticipated groundwater is approximately 150 feet below the surface.
- Historical well drillers logs for the area of the subject site shows the soil types to typically be alternating strata of clay and sandy soils.
- The results of the soil exploratory borings to a depth of 35 feet, test results and the near surface soil types as provided by the Soil Conservation Service indicate that the site soils provide materials with approximately 10 percent clay in the vicinity of the proposed ponds.
- The log of borings and the results the gradation test results show that the soils have at least 10 percent clay content. At a depth of approximately 15 feet the soils become relatively sandy and with a clay size content of approximately 10 percent.
- In accordance with the CRWQCB's Geological-Hydrological Report guide lines recommendations, follow up soil sampling shall be taken after the lagoons and ponds construction is complete. This sampling and test results are to demonstrate the lagoons and ponds underlying soils contain a minimum of 10 percent clay and no more than 10 percent gravel. It is the intent as part of this project to sample soils underlying the proposed lagoons and ponds once the project is constructed.

It is Erwin Engineering's opinion that due to the existence of the alternating strata of clayey and sandy soils to the unconfined aquifer at approximately 150 feet, it may not be advisable for the expenditure of constructing groundwater monitoring wells at the subject site.

Should you have any questions or if we may be of some additional service, please contact me at (559) 673-0923.

Respectfully submitted,

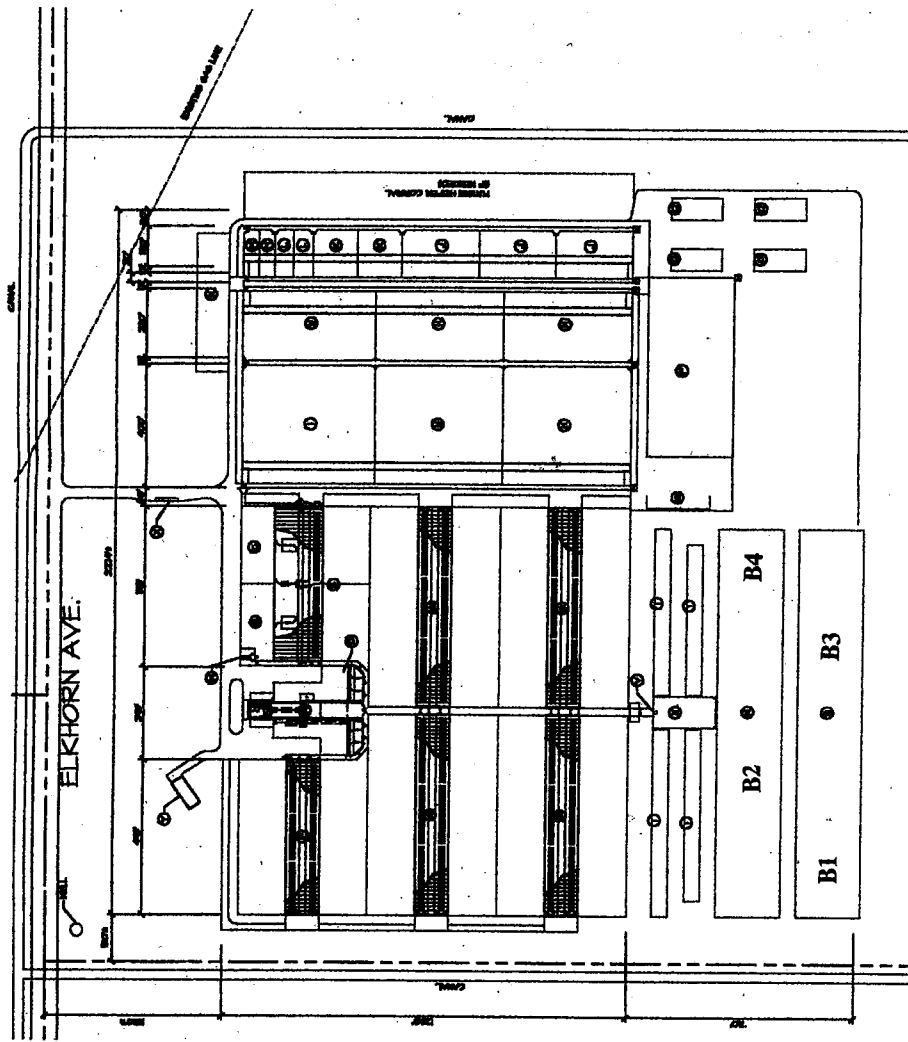
Erwin Engineering
Michael Erwin, PE, CE18625, GE297



ERWIN ENGINEERING

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- Department of Water Resources, Historical Groundwater Records for Lines of Equal Depth to
..... Water in Wells



B1 Boring Number and Location

FHS INVESTMENTS DAIRY LAYOUT
SCALE 1"=20'

CANAL





APPENDIX A

LOG OF BORING

Client: FNS Investments Dairy
 Job No.: 042-202-16
 BORING No. B-1
 Date drilled: February 8, 2002
 Elevation:

R	USC	Depth	Description
	CL	0	Silty Clay, medium dense, gray/brown, damp
	CL	5	Silty Clay, medium dense, gray/brown, damp
	CL SM	10	Silty Clay, medium dense, gray/brown, damp @ 13 ft., Silty Sand, tan, damp
	SM	15	Silty Sand, medium dense, tan, damp
	SC	20	Sandy, Silt, medium dense, tan, damp
	SM	25	Silty, Sandy, medium dense, tan, damp
	SW	30	Fine to Medium Sand, medium dense, tan, damp
		35	Bottom of Boring @ 35.0 feet

Legend:

M/D Moisture/Density
 R Sampling Resistance
 USC Uniform Soil Classification

LOG OF BORING

Client: FNS Investments Dairy
 Job No.: 042-202-16
 BORING No. B-2
 Date drilled: February 8, 2002
 Elevation:

R	USC	Depth	Description
	CL	0	Silty Clay, medium dense, gray/brown, damp
	CL	5	Silty Clay, medium dense, gray/brown, damp
	CL	10	Silty Clay, medium dense, gray/brown, damp
	SM	@ 14 ft.,	Silty Sand, tan, damp
	SM	15	Silty, Sand, medium dense, tan, damp
	SC	20	Sandy, Silt, medium dense, tan, damp
	SW	25	Fine to Medium, Sand, medium dense, tan, damp
	SW	30	Fine to Medium Sand, medium dense, tan, damp
		35	Bottom of Boring @ 35.0 feet

Legend:

M/D Moisture/Density
 R Sampling Resistance
 USC Uniform Soil Classification

LOG OF BORING

Client: FNS Investments Dairy

Job No.: 042-202-16

BORING No. B-3

Date drilled: February 8, 2002

Elevation:

R	USC	Depth	Description
	CL	0	Silty Clay, medium dense, gray/brown, damp
	CL	5	Silty Clay, medium dense, gray/brown, damp
	CL	10	Silty Clay, medium dense, gray/brown, damp
	SM	15	Silty Sand, medium dense, tan, damp
	SM	20	Silty Sand, medium dense, tan, damp
	SM	25	Silty Sand, medium dense, tan, damp
	SW	30	Fine to Medium Sand, medium dense, tan, damp
		35	Bottom of Boring @ 35.0 feet

Legend:

M/D Moisture/Density
R Sampling Resistance
USC Uniform Soil Classification

LOG OF BORING

Client: FNS Investments Dairy

Job No.: 042-202-16

BORING No. B-4

Date drilled: February 8, 2002

Elevation:

R	USC	Depth	Description
	CL	0	Silty Clay, medium dense, gray/brown, damp
	CL	5	Silty Clay, medium dense, gray/brown, damp
	CL	10	Silty Clay, medium dense, gray/brown, damp
	SM	@ 14 ft.,	Silty Sand, tan, damp
	SM	15	Silty, Sand, medium dense, tan, damp
	SW	20	Fine to Medium, Sand, medium dense, tan, damp
	SW	25	Fine to Medium, Sand, medium dense, tan, damp
	SW	30	Fine to Medium Sand, medium dense, tan, damp
		35	Bottom of Boring @ 35.0 feet

Legend:

M/D Moisture/Density
R Sampling Resistance
USC Uniform Soil Classification

LOG OF BORING

Client: FNS Investments Dairy

Job No.: 042-202-16

BORING No. B-5

Date drilled: February 8, 2002

Elevation:

R	USC	Depth	Description
	CL	0	Silty Clay, medium dense, gray/brown, damp
	CL	5	Silty Clay, medium dense, gray/brown, damp
	CL	10	Silty Clay, medium dense, gray/brown, damp
	CL	15	Silty Clay, medium dense, tan, damp
	SM	20	@ 19 ft., Silty Sand, medium dense, tan, damp
	SW	25	Fine to Medium Sand, medium dense, tan, damp
	SW	30	Fine to Medium Sand, medium dense, tan, damp
		35	Bottom of Boring @ 35.0 feet

Legend:

M/D Moisture/Density
R Sampling Resistance
USC Uniform Soil Classification

LOG OF BORING

Client: FNS Investments Dairy
 Job No.: 042-202-16
 BORING No. B-6
 Date drilled: February 8, 2002
 Elevation:

R	USC	Depth	Description
	CL	0	Silty Clay, medium dense, gray/brown, damp
	CL	5	Silty Clay, medium dense, gray/brown, damp
	CL	10	Silty Clay, medium dense, gray/brown, damp
	CL	15	Silty Clay, medium dense, brown, damp
	SW	20	Fine to Medium Sand, medium dense, tan, damp
	CL	25	Silty, Clay, medium dense, gray/brown, damp
	CL	30	Silty Clay, medium dense, brown, wet
	SW	35	@ 32 ft. Fine to Medium Sand, tan, damp Bottom of Boring @ 35.0 feet

Legend:

M/D Moisture/Density
 R Sampling Resistance
 USC Uniform Soil Classification

LOG OF BORING

Client: FNS Investments Dairy
 Job No.: 042-202-16
 BORING No. B-7
 Date drilled: February 14, 2002
 Elevation:

R	USC	Depth	Description
	CL	0	Silty Clay, medium dense, gray/brown, damp
	CL	5	Silty Clay, medium dense, gray/brown, damp
	SC		@ 7 ft., Sandy Silt, medium dense, tan, damp
	SM	10	@ 13 ft., Silty Sand, medium dense, tan, damp
	SW	15	Fine to Medium Sand, medium dense, tan, damp
	SM		@ 18 ft., Fine to Medium Sand, medium dense, tan, damp
	SW	20	
	SM		@ 23 ft., Silty Sand, medium dense, tan Damp
	SW	25	Fine to Medium, Sand, medium dense, tan, damp
	SW	30	Fine to Medium Sand, medium dense, tan, damp
		35	Bottom of Boring @ 35.0 feet

Legend:

M/D Moisture/Density
 R Sampling Resistance
 USC Uniform Soil Classification

LOG OF BORING

Client: Van Der Kooi Dairy
 Job No.: 056-505-01
 BORING No. B-8
 Date drilled: August 25, 2005
 Elevation:

R	USC	Depth	Description
	CL	0	Silty Clay, stiff, low plasticity, gray/brown, damp
	CL	5	Silty Clay, stiff, low plasticity, gray/brown, damp
	ML		@ 8 ft., Sandy Silt, medium dense, tan, damp
	SM	10	Silty Sand, medium dense, tan, damp
	SM	15	Silty Sand, medium dense, tan, damp
	SM	20	Silty Sand, medium dense, tan Damp
	SM	25	Silty Sand, medium dense, tan, damp
	SM	30	Silty Sand, medium dense, tan, damp
	SM	35	Silty Sand, medium dense, tan, damp
	SM	40	Silty Sand, medium dense, tan, damp

LOG OF BORING

Client: Van Der Kooi Dairy
 Job No.: 056-505-01
 BORING No. B-8
 Date drilled: August 25, 2005
 Elevation:

R	USC	Depth	Description
	SM	45	Silty Sand, medium dense, tan, damp
	SM	50	Silty Sand, medium dense, tan, damp
	SM	55	Sandy Silt, medium dense, gray/brn, damp
	CL	60	Clayey Silt, stiff ,low plasticity, gray/brn, damp
	ML	65	Sandy Silt, medium dense, gray/brn, damp
	SM	70	Sandy Silt, medium dense, brn, damp
			Bottom of Boring @ 70.0 feet No Groundwater Found

Legend:

M/D Moisture/Density
 R Sampling Resistance
 USC Uniform Soil Classification



Michael Erwin

Erwin Engineering

APPENDIX B

**CENTRAL VALLEY TESTING, Inc.**

materials testing and inspection services
soils and environmental investigations

February 13, 2002

Report No. 02-0377-A

Mr. Mike Erwin
Erwin Engineering
1625 Howard Road
Madera, California

Project: Dairy Site (F-N-S)
Elkhorn Avenue
One-mile West of Madera Avenue
Fresno County, California

Re: Particle Size Analysis of soils

Dear Mr. Erwin,

At your request we have completed laboratory tests for particle size analysis of soils sampled at the above referenced project. The test methods and results are as follows.

ASTM D 422				
PARTICLE SIZE ANALYSIS OF SOILS				
SAMPLE NO.	SAMPLE LOCATION	% SAND	% SILT	% CLAY
1	B-7 @ 10 FT.	21	47	32

If you have any questions please do not hesitate to phone our office at (559) 264-2224.

Central Valley Testing, Inc

Dennis R. Myers
Director of Operations



CENTRAL VALLEY TESTING, Inc.

materials testing and inspection services
soils and environmental investigations

February 13, 2002

Report No. 02-0377

Mr. Mike Erwin
Erwin Engineering
1625 Howard Road
Madera, California

Project: Dairy Site
Elkhorn Avenue
One-mile West of Madera Avenue
Fresno County, California

Re: Particle Size Analysis of soils

Dear Mr. Erwin,

At your request we have completed laboratory tests for particle size analysis of soils sampled at the above referenced project. The test methods and results are as follows.

ASTM D 422				
PARTICLE SIZE ANALYSIS OF SOILS				
SAMPLE NO.	SAMPLE LOCATION	% SAND	% SILT	% CLAY
1	B-1 @ 10 FT.	15	46	39
2	B-1 @ 20 FT.	23	62	15
3	B-2 @ 10 FT.	53	36	11
4	B-2 @ 20 FT.	61	30	9
5	B-3 @ 10 FT.	11	47	42
6	B-3 @ 20 FT.	29	58	13
7	B-4 @ 10 FT.	12	44	44
8	B-4 @ 20 FT.	42	46	12
9	B-5 @ 10 FT.	27	37	36
10	B-6 @ 10 FT.	25	46	29

If you have any questions please do not hesitate to phone our office at (559) 264-2224.

Central Valley Testing, Inc

Dennis R. Myers
Director of Operations

BSK ANALYTICAL LABORATORIES

Certificate of Analysis

ELAP Certificate #1180

Report Issue Date: 05/14/2001

BSK Submission #: 2001041062

BSK Sample ID #: 105972

Project ID:

Project Desc:

Submission Comments:

Sample Type: Liquid

Sample Description: Freitas #1

Sample Comments:

Date Sampled: 04/24/2001

Time Sampled: 1300

Date Received: 04/24/2001

Inorganics

Analyte	Method	Result	Units	PQL	Dilution	DLR	Prep Date	Analysis Date
Alkalinity (as CaCO ₃)	SM 2320 B	330	mg/L	1	1	1	04/25/2001	04/25/2001
Aluminum (Al)	EPA 200.7	ND	mg/L	0.05	1	0.05	04/25/2001	05/07/2001
Antimony (Sb)	EPA 200.8	ND	µg/L	2	1	2	04/25/2001	05/02/2001
Arsenic (As)	EPA 200.8	12	µg/L	2	1	2	04/25/2001	05/02/2001
Barium (Ba)	EPA 200.7	ND	mg/L	0.05	1	0.05	04/25/2001	05/07/2001
Beryllium (Be)	EPA 200.8	ND	µg/L	1	1	1	04/25/2001	05/02/2001
Bicarbonate (as CaCO ₃)	SM 2320 B	330	mg/L	1	1	1	04/25/2001	04/25/2001
Cadmium (Cd)	EPA 200.8	ND	µg/L	1	1	1	04/25/2001	05/02/2001
Calcium (Ca)	EPA 200.7	9.7	mg/L	0.1	1	0.1	04/25/2001	05/07/2001
Carbonate (as CaCO ₃)	SM 2320 B	ND	mg/L	1	1	1	04/25/2001	04/25/2001
Chloride (Cl)	EPA 300.0	62	mg/L	1	10	10	04/26/2001	04/26/2001
Chromium - Total (Cr)	EPA 200.8	10	µg/L	1	1	1	04/25/2001	05/02/2001
Conductivity - Specific (EC)	SM 2510 B	820	µmho/cm	1	1	1	04/25/2001	04/25/2001
Copper (Cu)	EPA 200.7	ND	mg/L	0.05	1	0.05	04/25/2001	05/07/2001
Cyanide (CN)	SM 4500-CN-F	ND	µg/L	20	1	20	05/08/2001	05/11/2001
Fluoride	EPA 300.0	ND	mg/L	0.1	10	1.0	04/26/2001	04/26/2001
Hardness (as CaCO ₃)		31	mg/L	1.0	1	1.0	05/09/2001	05/09/2001
Hydroxide (as CaCO ₃)	SM 2320 B	ND	mg/L	1	1	1	04/25/2001	04/25/2001
Iron (Fe)	EPA 200.7	ND	mg/L	0.05	1	0.05	04/25/2001	05/07/2001
Langelier Index (Saturation Index)		-0.094	-	-	1	N/A	05/09/2001	05/09/2001
Lead (Pb)	EPA 200.8	ND	µg/L	5	1	5	04/25/2001	05/02/2001
Magnesium (Mg)	EPA 200.7	1.7	mg/L	0.1	1	0.1	04/25/2001	05/07/2001
Manganese (Mn)	EPA 200.7	0.12	mg/L	0.01	1	0.01	04/25/2001	05/07/2001
Mercury (Hg)	EPA 200.8	ND	µg/L	0.4	1	0.4	04/25/2001	05/02/2001
Nickel (Ni)	EPA 200.8	ND	µg/L	10	1	10	04/25/2001	05/02/2001
Nitrate (NO ₃)	EPA 300.0	ND	mg/L	1	10	10	04/26/2001	04/26/2001
Nitrite (NO ₂ -N)	EPA 300.0	ND	mg/L	0.05	10	0.50	04/26/2001	04/26/2001
pH	EPA 9040	7.8	STD	-	1	N/A	04/25/2001	04/25/2001
Potassium (K)	EPA 200.7	ND	mg/L	2	1	2	04/25/2001	05/07/2001
Selenium (Se) - Total	EPA 200.8	ND	µg/L	2	1	2	04/25/2001	05/02/2001
Silver (Ag)	EPA 200.7	ND	mg/L	0.01	1	0.01	04/25/2001	05/07/2001

mg/L: Milligrams/Liter (ppm)

mg/Kg: Milligrams/Kilogram (ppm)

µg/L: Micrograms/Liter (ppb)

µg/Kg: Micrograms/Kilogram (ppb)

PQL: Practical Quantitation Limit

DLR: Detection Limit for Reporting

: PQL x Dilution

ND: None Detected at DLR

H: Analyzed outside of hold time

P: Preliminary result

S: Suspect result. See Cover Letter for comments.

E: Analysis performed by External laboratory.

See External Laboratory Report attachments.

ND: None Detected (surrogates)

Report Authentication Code:

BSK ANALYTICAL LABORATORIES

Certificate of Analysis

ELAP Certificate #1180

Report Issue Date: 05/14/2001

BSK Submission #: 2001041062

BSK Sample ID #: 105972

Project ID:

Project Desc:

Submission Comments:

Sample Type: Liquid

Sample Description: Freitas #1

Sample Comments:

Date Sampled: 04/24/2001

Time Sampled: 1300

Date Received: 04/24/2001

Inorganics

Analyte	Method	Result	Units	PQL	Dilution	DLR	Prep Date	Analysis Date
Sodium (Na)	EPA 200.7	190	mg/L	1	1	1	04/25/2001	05/07/2001
Sulfate (SO ₄)	EPA 300.0	34	mg/L	2	10	20	04/26/2001	04/26/2001
Thallium (Tl)	EPA 200.8	ND	µg/L	1	1	1	04/25/2001	05/02/2001
Total Dissolved Solids (TDS)	SM 2540-C	530	mg/L	5	1	5	05/01/2001	05/03/2001
Zinc (Zn)	EPA 200.7	ND	mg/L	0.05	1	0.05	04/25/2001	05/07/2001

mg/L: Milligrams/Liter (ppm)

mg/Kg: Milligrams/Kilogram (ppm)

µg/L: Micrograms/Liter (ppb)

µg/Kg: Micrograms/Kilogram (ppb)

%Rec: Percent Recovered (surrogates)

PQL: Practical Quantitation Limit

DLR: Detection Limit for Reporting

: PQL x Dilution

ND: None Detected at DLR

H: Analyzed outside of hold time

P: Preliminary result

S: Suspect result. See Cover Letter for comments.

E: Analysis performed by External laboratory.

See External Laboratory Report attachments.

Report Authentication Code:

1414 Standard G.

BSK ANALYTICAL LABORATORIES

Certificate of Analysis

ELAP Certificate #1180

Report Issue Date: 05/14/2001

BSK Submission #: 2001041062

BSK Sample ID #: 105973

Project ID:

Project Desc:

Submission Comments:

Sample Type: Liquid

Sample Description: Freitas #35

Sample Comments:

Date Sampled: 04/24/2001

Time Sampled: 1330

Date Received: 04/24/2001

Inorganics

Analyte	Method	Result	Units	PQL	Dilution	DLR	Prep Date	Analysis Date
Alkalinity (as CaCO ₃)	SM 2320 B	350	mg/L	1	1	1	04/25/2001	04/25/2001
Aluminum (Al)	EPA 200.7	8.4	mg/L	0.05	1	0.05	04/25/2001	05/04/2001
Antimony (Sb)	EPA 200.8	ND	µg/L	2	1	2	04/25/2001	05/07/2001
Arsenic (As)	EPA 200.8	18	µg/L	2	1	2	04/25/2001	05/07/2001
Barium (Ba)	EPA 200.7	0.090	mg/L	0.05	1	0.05	04/25/2001	05/04/2001
Beryllium (Be)	EPA 200.8	ND	µg/L	1	1	1	04/25/2001	05/07/2001
Bicarbonate (as CaCO ₃)	SM 2320 B	350	mg/L	1	1	1	04/25/2001	04/25/2001
Cadmium (Cd)	EPA 200.8	ND	µg/L	1	1	1	04/25/2001	05/07/2001
Calcium (Ca)	EPA 200.7	13	mg/L	0.1	1	0.1	04/25/2001	05/04/2001
Carbonate (as CaCO ₃)	SM 2320 B	ND	mg/L	1	1	1	04/25/2001	04/25/2001
Chloride (Cl)	EPA 300.0	140	mg/L	1	15	15	04/26/2001	04/26/2001
Chromium - Total (Cr)	EPA 200.8	12	µg/L	1	1	1	04/25/2001	05/07/2001
Conductivity - Specific (EC)	SM 2510 B	1000	µmho/cm	1	1	1	04/25/2001	04/25/2001
Copper (Cu)	EPA 200.7	ND	mg/L	0.05	1	0.05	04/25/2001	05/04/2001
Cyanide (CN)	SM 4500-CN-P	ND	µg/L	20	1	20	05/08/2001	05/11/2001
Fluoride	EPA 300.0	ND	mg/L	0.1	15	1.5	04/26/2001	04/26/2001
Hardness (as CaCO ₃)		47	mg/L	1.0	1	1.0	05/08/2001	05/08/2001
Hydroxide (as CaCO ₃)	SM 2320 B	ND	mg/L	1	1	1	04/25/2001	04/25/2001
Iron (Fe)	EPA 200.7	9.2	mg/L	0.05	1	0.05	04/25/2001	05/04/2001
Langelier Index (Saturation Index)		0.20	-	-	1	N/A	05/08/2001	05/08/2001
Lead (Pb)	EPA 200.8	5.0	µg/L	5	1	5	04/25/2001	05/07/2001
Magnesium (Mg)	EPA 200.7	3.5	mg/L	0.1	1	0.1	04/25/2001	05/04/2001
Manganese (Mn)	EPA 200.7	0.22	mg/L	0.01	1	0.01	04/25/2001	05/04/2001
Mercury (Hg)	EPA 200.8	ND	µg/L	0.4	1	0.4	04/25/2001	05/07/2001
Nickel (Ni)	EPA 200.8	10	µg/L	10	1	10	04/25/2001	05/07/2001
Nitrate (NO ₃)	EPA 300.0	ND	mg/L	1	15	15	04/26/2001	04/26/2001
Nitrite (NO ₂ -N)	EPA 300.0	ND	mg/L	0.05	15	0.75	04/26/2001	04/26/2001
pH	EPA 9040	7.9	STD	-	1	N/A	04/25/2001	04/25/2001
Potassium (K)	EPA 200.7	3.0	mg/L	2	1	2	04/25/2001	05/04/2001
Selenium (Se) - Total	EPA 200.8	ND	µg/L	2	1	2	04/25/2001	05/07/2001
Silver (Ag)	EPA 200.7	ND	mg/L	0.01	1	0.01	04/25/2001	05/04/2001

mg/L: Milligrams/Liter (ppm)

mg/Kg: Milligrams/Kilogram (ppm)

µg/L: Micrograms/Liter (ppb)

µg/Kg: Micrograms/Kilogram (ppb)

%Rec: Percent Recovered (surrogates)

PQL: Practical Quantitation Limit

DLR: Detection Limit for Reporting

: PQL x Dilution

ND: None Detected at DLR

H: Analyzed outside of hold time

P: Preliminary result

S: Suspect result. See Cover Letter for comments

E: Analysis performed by External laboratory.

See External Laboratory Report attachments.

Dated 11/14/2001



BSK ANALYTICAL LABORATORIES

Certificate of Analysis

ELAP Certificate #1180

Report Issue Date: 05/14/2001

BSK Submission #: 2001041062

BSK Sample ID #: 105973

Project ID:

Project Desc:

Submission Comments:

Sample Type: Liquid

Sample Description: Freitas #35

Sample Comments:

Date Sampled: 04/24/2001

Time Sampled: 1330

Date Received: 04/24/2001

Inorganics

Analyte	Method	Result	Units	PQL	Dilution	DLR	Prep Date	Analysis Date
Sodium (Na)	EPA 200.7	240	mg/L	1	1	1	04/25/2001	05/04/2001
Sulfate (SO4)	EPA 300.0	ND	mg/L	2	15	30	04/26/2001	04/26/2001
Thallium (Tl)	EPA 200.8	ND	µg/L	1	1	1	04/25/2001	05/07/2001
Total Dissolved Solids (TDS)	SM 2540-C	640	mg/L	5	1	5	05/01/2001	05/03/2001
Zinc (Zn)	EPA 200.7	ND	mg/L	0.05	1	0.05	04/25/2001	05/04/2001

mg/L: Milligrams/Liter (ppm)

mg/Kg: Milligrams/Kilogram (ppm)

µg/L: Micrograms/Liter (ppb)

µg/Kg: Micrograms/Kilogram (ppb)

%Rec: Percent Recovered (surrogates)

PQL: Practical Quantitation Limit

DLR: Detection Limit for Reporting

: PQL x Dilution

ND: None Detected at DLR

H: Analyzed outside of hold time

P: Preliminary result

S: Suspect result. See Cover Letter for comments.

E: Analysis performed by External laboratory.

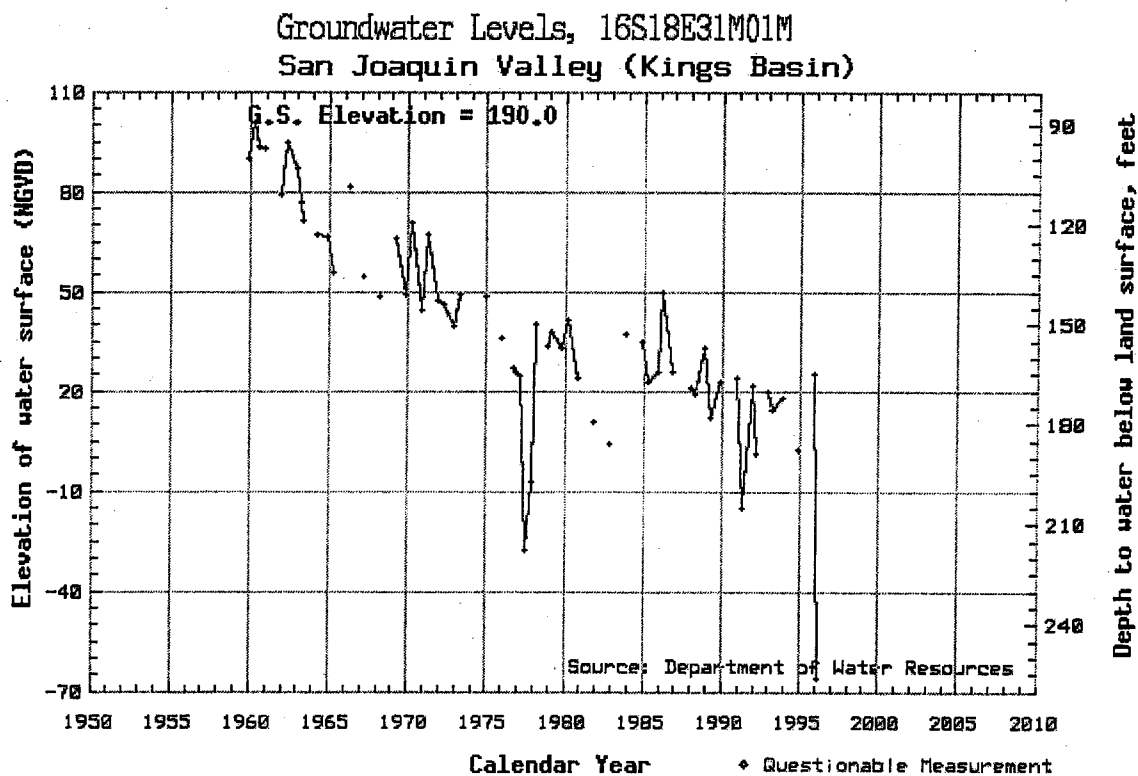
See External Laboratory Report attachments

APPENDIX C

California Department of Water Resources
Division of Planning and Local Assistance

Groundwater Level Query Results for '16S18E31M01M'

The query for the well you selected returned 80 records. The data are listed in the table below. The table headings and records contain several codes and abbreviations.



Graphics created using fly.

Meas. Date	R.P.Elev	G.S.Elev	RPWS	WSE	GSWS	QMC	NMC
10/08/1959	191.0	190.0	101.1	89.9	100.1		
02/23/1960	191.0	190.0	90.6	100.4	89.6		
05/12/1960	191.0	190.0	97.4	93.6	96.4		
10/20/1960	191.0	190.0	98.0	93.0	97.0		
10/16/1961	191.0	190.0	111.9	79.1	110.9		
03/06/1962	191.0	190.0	96.4	94.6	95.4		
10/17/1962	191.0	190.0	104.1	86.9	103.1		
02/18/1963	191.0	190.0	114.0	77.0	113.0		
02/27/1963	191.0	190.0	119.9	71.1	118.9		
02/12/1964	191.0	190.0	123.9	67.1	122.9		
09/24/1964	191.0	190.0	124.4	66.6	123.4		
02/02/1965	191.0	190.0	135.2	55.8	134.2		
02/03/1966	191.0	190.0	109.7	81.3	108.7		

ERWIN ENGINEERING - FIGURE 4A

02/07/1967	191.0	190.0	136.2	54.8	135.2	
02/05/1968	191.0	190.0	142.6	48.4	141.6	
02/05/1969	191.0	190.0	125.0	66.0	124.0	
10/01/1969	191.0	190.0	141.7	49.3	140.7	
02/02/1970	191.0	190.0	120.1	70.9	119.1	
09/29/1970	191.0	190.0	146.8	44.2	145.8	
02/03/1971	191.0	190.0	124.1	66.9	123.1	
10/04/1971	191.0	190.0	143.9	47.1	142.9	
02/04/1972	191.0	190.0	145.0	46.0	144.0	
10/04/1972	191.0	190.0	151.6	39.4	150.6	
03/02/1973	191.0	190.0	141.8	49.2	140.8	
10/10/1973	191.0	190.0	0.0	0.0	0.0	5
02/04/1974	191.0	190.0	0.0	0.0	0.0	1
10/16/1974	191.0	190.0	142.7	48.3	141.7	
01/17/1975	191.0	190.0	0.0	0.0	0.0	1
10/17/1975	191.0	190.0	155.0	36.0	154.0	
01/20/1976	191.0	190.0	0.0	0.0	0.0	1
07/23/1976	191.0	190.0	164.2	26.8	163.2	
10/14/1976	191.0	190.0	165.2	25.8	164.2	
01/12/1977	191.0	190.0	166.5	24.5	165.5	
06/09/1977	191.0	190.0	218.5	-27.5	217.5	
10/06/1977	191.0	190.0	198.5	-7.5	197.5	
01/31/1978	191.0	190.0	151.0	40.0	150.0	
10/05/1978	191.0	190.0	157.5	33.5	156.5	
01/31/1979	191.0	190.0	153.0	38.0	152.0	
09/26/1979	191.0	190.0	157.8	33.2	156.8	
01/28/1980	191.0	190.0	149.9	41.1	148.9	
10/04/1980	191.0	190.0	167.3	23.7	166.3	
02/06/1981	191.0	190.0	0.0	0.0	0.0	1
09/09/1981	191.0	190.0	180.3	10.7	179.3	
01/30/1982	191.0	190.0	0.0	0.0	0.0	1
10/08/1982	191.0	190.0	187.0	4.0	186.0	
02/11/1983	191.0	190.0	0.0	0.0	0.0	9
09/26/1983	191.0	190.0	153.6	37.4	152.6	
01/31/1984	191.0	190.0	0.0	0.0	0.0	1
10/09/1984	191.0	190.0	156.2	34.8	155.2	
02/21/1985	191.0	190.0	168.0	23.0	167.0	
10/18/1985	191.0	190.0	165.0	26.0	164.0	
01/31/1986	191.0	190.0	141.0	50.0	140.0	
10/03/1986	191.0	190.0	165.0	26.0	164.0	
02/05/1987	191.0	190.0	0.0	0.0	0.0	9
10/27/1987	191.0	190.0	170.0	21.0	169.0	
01/26/1988	191.0	190.0	172.0	19.0	171.0	
10/19/1988	191.0	190.0	157.9	33.1	156.9	
01/25/1989	191.0	190.0	178.8	12.2	177.8	
10/10/1989	191.0	190.0	168.2	22.8	167.2	
01/31/1990	191.0	190.0	0.0	0.0	0.0	9
10/04/1990	191.0	190.0	166.8	24.2	165.8	
02/13/1991	191.0	190.0	206.1	-15.1	205.1	
10/07/1991	191.0	190.0	169.2	21.8	168.2	
02/04/1992	191.0	190.0	190.1	0.9	189.1	
10/07/1992	191.0	190.0	171.5	19.5	170.5	
01/27/1993	191.0	190.0	176.8	14.2	175.8	
10/06/1993	191.0	190.0	172.9	18.1	171.9	
01/27/1994	191.0	190.0	0.0	0.0	0.0	9
10/11/1994	191.0	190.0	188.9	2.1	187.9	
01/27/1995	191.0	190.0	0.0	0.0	0.0	9
10/05/1995	191.0	190.0	166.1	24.9	165.1	
01/23/1996	191.0	190.0	257.2	-66.2	256.2	
10/11/1996	191.0	190.0	0.0	0.0	0.0	3

03/10/1997	191.0	190.0	0.0	0.0	0.0	9
10/27/1997	191.0	190.0	0.0	0.0	0.0	9
03/11/1998	191.0	190.0	0.0	0.0	0.0	9
10/14/1998	191.0	190.0	0.0	0.0	0.0	9
02/01/1999	191.0	190.0	0.0	0.0	0.0	9
11/17/1999	191.0	190.0	0.0	0.0	0.0	9
03/07/2000	191.0	190.0	0.0	0.0	0.0	9

[\[Return to Well Location Map\]](#)

[\[Groundwater Home | Division of Planning and Local Assistance Home | Department of Water Resources Home \]](#)

For more information, please contact our office:

*Department of Water Resources, San Joaquin District
Water Management Section
3374 East Shields Avenue
Fresno, CA 93726*

Phone: 559-230-3326

Fax: 559-230-3301

Please send any comments to [Eric Senter](#)

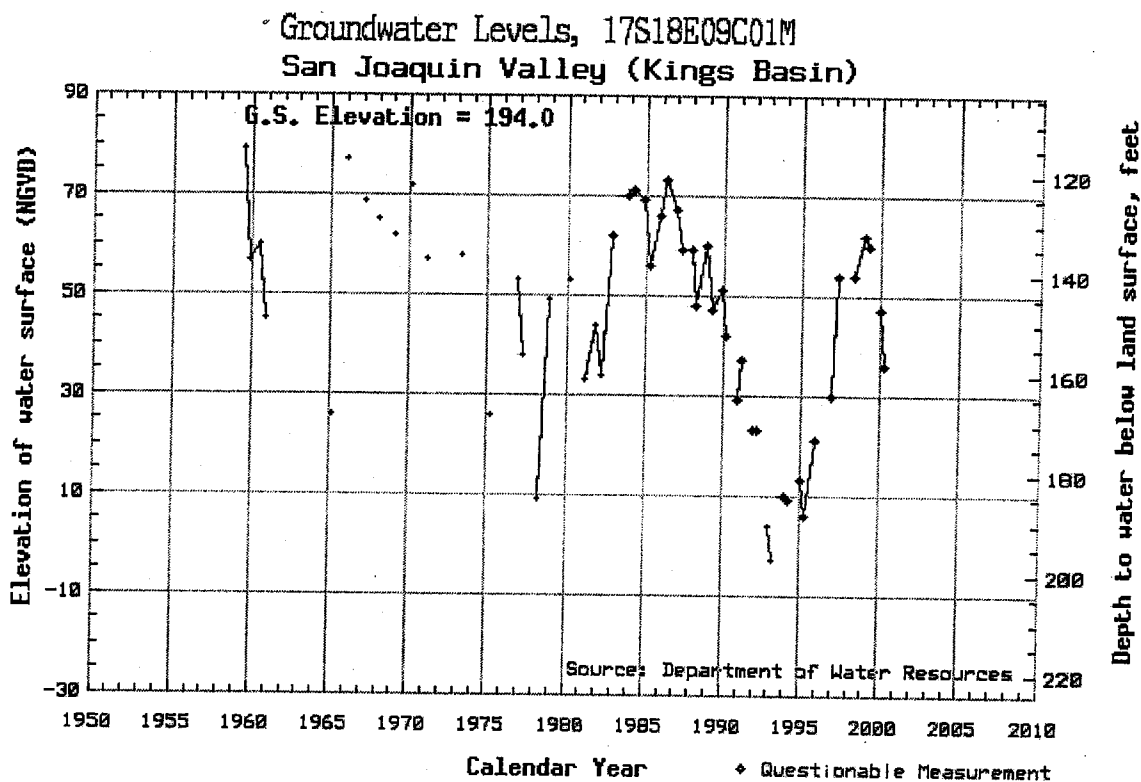
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Revised: March 3, 2000

California Department of Water Resources
Division of Planning and Local Assistance

Groundwater Level Query Results for '17S18E09C01M'

The query for the well you selected returned 61 records. The data are listed in the table below. The table headings and records contain several codes and abbreviations.



Graphics created using fly.

Meas. Date	R.P.Elev	G.S.Elev	RPWS	WSE	GSWS	QMC	NMC
10/30/1958	194.0	194.0	0.0	0.0	0.0		3
05/06/1959	194.0	194.0	115.0	79.0	115.0		
10/16/1959	194.0	194.0	137.3	56.7	137.3		
05/18/1960	194.0	194.0	134.2	59.8	134.2		
10/14/1960	194.0	194.0	148.8	45.2	148.8		
12/21/1964	194.0	194.0	168.0	26.0	168.0		
12/13/1965	194.0	194.0	117.0	77.0	117.0		
12/29/1966	194.0	194.0	125.5	68.5	125.5		
12/18/1967	194.0	194.0	129.0	65.0	129.0		
12/27/1968	194.0	194.0	132.0	62.0	132.0		
12/15/1969	194.0	194.0	122.0	72.0	122.0		
01/04/1971	194.0	194.0	137.0	57.0	137.0		
02/16/1972	194.0	194.0	0.0	0.0	0.0		1

ERWINENGINEERING - FIGURE 4B

03/14/1973	194.0	194.0	136.0	58.0	136.0		
03/15/1974	194.0	194.0	0.0	0.0	0.0		1
02/20/1975	194.0	194.0	168.0	26.0	168.0		
10/20/1976	194.0	194.0	141.0	53.0	141.0		
02/03/1977	194.0	194.0	156.0	38.0	156.0		
10/12/1977	194.0	194.0	0.0	0.0	0.0		1
02/03/1978	194.0	194.0	185.0	9.0	185.0		
10/12/1978	194.0	194.0	145.0	49.0	145.0		
10/03/1979	194.0	194.0	0.0	0.0	0.0		1
02/06/1980	194.0	194.0	141.0	53.0	141.0		
10/03/1980	194.0	194.0	0.0	0.0	0.0		1
02/18/1981	194.0	194.0	161.0	33.0	161.0		
09/29/1981	194.0	194.0	150.0	44.0	150.0		
02/02/1982	194.0	194.0	160.0	34.0	160.0		
10/08/1982	194.0	194.0	132.0	62.0	132.0	9	
03/28/1983	194.0	194.0	0.0	0.0	0.0		9
10/12/1983	194.0	194.0	124.0	70.0	124.0	9	
02/15/1984	194.0	194.0	123.0	71.0	123.0	9	
10/25/1984	194.0	194.0	125.0	69.0	125.0	9	
02/21/1985	194.0	194.0	138.0	56.0	138.0	9	
10/30/1985	194.0	194.0	128.0	66.0	128.0	9	
02/24/1986	194.0	194.0	121.0	73.0	121.0	9	
10/08/1986	194.0	194.0	127.0	67.0	127.0	9	
02/25/1987	194.0	194.0	135.0	59.0	135.0	9	
10/19/1987	194.0	194.0	135.0	59.0	135.0	9	
02/18/1988	194.0	194.0	146.0	48.0	146.0	9	
10/13/1988	194.0	194.0	134.0	60.0	134.0	9	
02/17/1989	194.0	194.0	147.0	47.0	147.0	9	
10/10/1989	194.0	194.0	143.0	51.0	143.0	9	
01/30/1990	194.0	194.0	152.0	42.0	152.0	9	
10/10/1990	194.0	194.0	165.0	29.0	165.0	9	
01/11/1991	194.0	194.0	157.0	37.0	157.0	9	
10/22/1991	194.0	194.0	171.0	23.0	171.0	9	
01/17/1992	194.0	194.0	171.0	23.0	171.0	9	
10/26/1992	194.0	194.0	190.0	4.0	190.0		
02/16/1993	194.0	194.0	197.0	-3.0	197.0		
10/22/1993	194.0	194.0	184.0	10.0	184.0	9	
02/16/1994	194.0	194.0	185.0	9.0	185.0	9	
11/16/1994	194.0	194.0	181.0	13.0	181.0	3	
02/23/1995	194.0	194.0	188.0	6.0	188.0	3	
10/18/1995	194.0	194.0	173.0	21.0	173.0	9	
10/22/1996	194.0	194.0	164.0	30.0	164.0	9	
02/19/1997	194.0	194.0	140.0	54.0	140.0	9	
03/26/1998	194.0	194.0	140.0	54.0	140.0	9	
10/20/1998	194.0	194.0	132.0	62.0	132.0	9	
02/04/1999	194.0	194.0	134.0	60.0	134.0	9	
10/19/1999	194.0	194.0	147.0	47.0	147.0	9	
02/09/2000	194.0	194.0	158.0	36.0	158.0	9	

[\[Return to Well Location Map\]](#)

[\[Groundwater Home | Division of Planning and Local Assistance Home | Department of Water Resources Home \]](#)

For more information, please contact our office:
Department of Water Resources, San Joaquin District
Water Management Section
3374 East Shields Avenue

WELL COMPLETION REPORT

Refer to Instruction Pamphlet

No. **814938**

DWR USE ONLY - DO NOT FILL IN

STATE WELL NO./STATION NO.

LATITUDE LONGITUDE

APN/ITS/OTHER

Page 1 of 1
Owner's Well No.

Date Work Began **1-7-2000** Ended **1-14-2000**

Local Permit Agency **Fresno County**

Permit No. **19731** Permit Date **1-3-00**

GEOLOGIC LOG

WELL OWNER

ORIENTATION ()			VERTICAL	HORIZONTAL	ANGLE	(SPECIFY)
DEPTH FROM SURFACE			DRILLING METHOD	FLUID		
			DESCRIPTION			
			Describe material, grain size, color, etc.			
0	25		Brown clay			
25	80		Sand			
80	130		Clay			
130	170		Sand			
170	200		Clay			
200	220		Sand & Gravel & Clay			
220	250		Clay			
250	260		Sand & Clay			
260	310		Clay			
310	337		Sand			
337	339		Clay			
339	349		Sand			
349	353		Clay			
353	365		Sand			
365	370		Clay			
370	376		Sand			
376	385		Clay			
385	392		Sand			
392	408		Clay			
408	418		Sand			
418	424		Clay			
424	450		Sand			
450	467		Clay			
467	506		Sand			
506	523		Clay			
523	554		Sand			
554	590		Clay - Sand			
TOTAL DEPTH OF BORING			590	(Feet)		
TOTAL DEPTH OF COMPLETED WELL			570	(Feet)		

Name **F. N. S. Inc. Marc Freller**
Mailing Address **P.O. Box 1267**
City **Hollister, CA 95024-1267**

WELL LOCATION
Address **1/2 Mile South of Elkhorn, 50' East of Howard**
City
County **Fresno**
APN Book **050** Page **160** Parcel **16**
Township **17 S** Range **18 E** Section **5-6**
Latitude DEG MIN SEC NORTH Longitude DEG MIN SEC WEST

LOCATION SKETCH

Elkhorn

1/2 Mile South

50'

Howard

WEST EAST

Mt. Whitney

SOUTH

Illustrate or Describe Distance of Well from Roads, Buildings, Fences, Rivers, etc. and attach a map. Use additional paper if necessary. PLEASE BE ACCURATE & COMPLETE.

ACTIVITY ()

☒ NEW WELL

MODIFICATION/REPAIR

Deepen

Other (Specify)

DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG")

PLANNED USES ()

WATER SUPPLY

Domestic Public

Irrigation Industrial

MONITORING

TEST WELL

CATHODIC PROTECTION

HEAT EXCHANGE

DIRECT PUSH

INJECTION

VAPOR EXTRACTION

SPARGING

REMEDIATION

OTHER (SPECIFY)

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER (Ft.) BELOW SURFACE

DEPTH OF STATIC WATER LEVEL (Ft.) & DATE MEASURED

ESTIMATED YIELD (GPM) & TEST TYPE

TEST LENGTH (Hrs.) TOTAL DRAWDOWN (Ft.)

* May not be representative of a well's long-term yield.

DEPTH FROM SURFACE			BORE-HOLE DIA. (Inches)	CASING (S)					DEPTH FROM SURFACE			ANNULAR MATERIAL			
FL	to	FL		TYPE ()	MATERIAL GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)	FL	to	FL	CE-MENT ()	BEN-TONITE ()	FILL ()	FILTER PACK (TYPE/SIZE)
0	50		44"	X	Steel	30"	5/16		0	50		XX			5/16 X 2
0	280		28"	X	Steel	16"OD	.312		0	590				XX	5/16 X 2
280	560		28"	X	Steel	16"OD	.312	.060							
560	570		28"	X	Steel	16"OD	.312								

ATTACHMENTS ()

- Geologic Log
- ☒ Well Construction Diagram
- Geophysical Log(s)
- Soil/Water Chemical Analyses
- Other

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

NAME **Myers Bros. Well Drilling, Inc.** BY **6**
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)
8650 E. Lacey Blvd. Hanford, CA 93230-4844
ADDRESS CITY STATE ZIP
Signed **[Signature]** 1-29-00 548214
WELL DRILLER/AUTHORIZED REPRESENTATIVE DATE SIGNED C-57 LICENSE NUMBER

101--Armona loam, partially drained, 0 to 1 percent slopes. This very deep, poorly drained soil is on floodplains. It formed in alluvium derived dominantly from granitic rock. Elevation is 175 to 215 feet. The mean annual precipitation is 7 to 8 inches, the mean annual temperature is 62 to 64 degrees F, and the frost-free period is 250 to 275 days.

Typically, the surface layer is grayish brown loam about 14 inches thick. The subsoil to a depth of 60 inches or more is stratified light brownish gray and gray loam and clay loam. It is saline-sodic or sodic in some part. It is calcareous throughout. Redoximorphic features occur below a depth of 14 inches.

Included in this unit are 5 percent small areas of Tachi clay, 2 percent small areas of Gepford clay, 2 percent small areas of Elnido sandy loam, and 1 percent small areas of Bisgani sandy loam. Also included are 3 percent small areas which flood on rare occasions, located primarily near the Fresno Slough and the Kings County line and near the San Joaquin River and the Merced County line. Included areas make up about 15 percent of the total acreage.

Permeability of this Armona soil is moderately slow. Available water capacity is moderate or high due to varying levels of salinity. Effective rooting depth of the crops commonly grown in the area is limited by a high water table that is at a depth of 60 to 72 inches. Runoff is negligible, and the hazard of water erosion is slight.

Most areas of this unit are used for irrigated crops, mainly cotton and alfalfa. Some areas are used for home site development.

If this unit is used for irrigated crops, the limitations are the saline-sodic or sodic condition of the soil, moderately slow permeability, and a seasonal high water table.

If this unit is used for irrigated crops, salinity and the high water table influences the choice of crops. Intensive management is required to reduce the salinity and maintain soil productivity. Content of toxic salts can be reduced by applying proper amounts of soil amendments, leaching, and returning crop residue to the soil. Gypsum, sulfur and sulfuric acid are among the soil amendments that can be used to reclaim this soil. If sulfur or sulfuric acid is used, lime should be present in the surface layer. If the saline-sodic condition is significantly reduced by reclamation, the permeability and available water capacity increase.

Furrow, border and sprinkler irrigation systems are suited to this unit. Because of the moderately slow permeability of this soil, the length of runs should be adjusted to permit adequate infiltration of water. The application of water should be regulated so that water does not stand on the surface and damage the crops. Subsoiling increases the infiltration of water and the permeability of this soil.

Drainage can be provided by using tile systems to intercept water from higher lying areas. Tile or open drains can be used to remove excess water and salts from the soil, if a suitable outlet is available.

A cropping system that includes crop rotation and return of crop residue to the soil or regular addition of other organic matter improves fertility, reduces crusting and increases the water intake rate.

If this unit is used for home site development, the main limitations are the saline-sodic or sodic condition of the soil, moderately slow permeability, and a seasonal high water table. The saline-sodic condition causes high corrosivity to steel and concrete. Treated steel pipe and sulfate-resistant concrete should be used. Selection of salt and sodium tolerant plants is important for the establishment of lawns, shrubs, trees and vegetable gardens. The moderately slow permeability and the seasonal high water table increase the possibility of failure of septic tank absorption fields. Use of long absorption lines and sandy backfill for the trench helps to compensate for this. Onsite investigation is needed to determine whether the area considered for a septic tank absorption field is underlain by a high water table. If a high water table is present, other specially designed sewage disposal systems may be required.

This map unit is in capability unit IIIw-6, irrigated, and capability subclass V IIw, nonirrigated. The MLRA is 17.

130--Gepford clay, 0 to 1 percent slopes. This very deep, poorly drained, saline-sodic soil is on flood plains. It formed in alluvium derived from igneous and sedimentary rock. Elevation is 175 to 212 feet. The mean annual precipitation is 7 to 8 inches, the mean annual air temperature is 62 to 63 degrees F, and the frost-free period is 250 to 260 days.

Typically, the upper 16 inches of the surface layer is gray and olive gray clay. The upper 17 inches of the underlying material is gray, light olive gray and pale olive silty clay loam. The lower part to a depth of 65 inches is light yellowish brown and light greenish gray silt loam. Gleyed colors with mottles occur below a depth of 16 inches. The profile is calcareous throughout, and it is saline-sodic in some part. Gypsum crystals occur below a depth of 58 inches. In some areas the surface layer is clay loam.

Included in this unit are small areas of Tachi and Lillis clays, Armona loam and Lethent clay loam. Also included are small areas of soil which is not saline-sodic, does not have a high perched water table or does not flood. Included areas make up about 10 percent of the total acreage.

Permeability of this Gepford soil is very slow. Available water capacity is moderate to high because of varying levels of salinity. Effective rooting depth of the crops commonly grown in the area is limited by an apparent water table that occurs from 30 to 48 inches from the soil surface. This unit is considered to be partially drained because of the presence of dams and reservoirs in the Sierra Nevada, pumping from the water table, use of tile and interceptor drains and the filling and leveling of the sloughs in the vicinity. Runoff is ponded, and the hazard of water erosion is slight. This soil is subject to very long periods of flooding in January through March in years of above normal precipitation.

This unit is used mainly for irrigated crops. It is also used for pasture and home site development.

This unit is best suited to irrigated, saline-sodic tolerant crops. It is limited mainly by the saline-sodic condition of the soil, a high perched water table, very slow permeability and very long periods of flooding in years of above normal precipitation.

If this unit is irrigated, salinity influences the choice of crops. Intensive management is required to reduce the salinity and maintain soil productivity. Content of toxic salts can be reduced by applying proper amounts of soil amendments, leaching and returning crop residue to the soil. Gypsum, sulfur and sulfuric acid are among the soil amendments that can be used to reclaim this soil. If sulfur or sulfuric acid is used, lime should be present in the surface layer. Tile drainage can be used to lower the water table if a suitable outlet is available.

Furrow, border and sprinkler irrigation systems are suited to this unit. Because of the very slow permeability of this soil, the application of water should be regulated so that water does not stand on the surface and damage the crops. The risk of flooding can be reduced by the use of levees, canals and diversions.

A cropping system that includes crop rotation and return of crop residue to the soil or regular addition of other organic matter improves fertility, reduces crusting and increases water intake rate.

If this unit is used for hay and pasture, the main limitations are the saline-sodic conditions of the soil, a high perched water table and very long periods of flooding in years of above normal precipitation. The concentration of salts and sodium in the surface layer limits the production of plants suitable for hay and pasture. Leaching the salts from the surface layer is limited by the high water table. Drainage and irrigation water management reduce the concentration of salts. Salt-tolerant species are most suitable for planting. Gypsum, sulfur and sulfuric acid are among the soil amendments that can be used to reclaim this soil. If sulfur or sulfuric acid is used, lime should be present in the surface layer. The risk of flooding can be reduced by the use of levees, canals and diversions.

Irrigation water can be applied by the sprinkler and border methods. Leveling helps to insure the uniform application of water. Proper stocking rates, pasture rotation and restricted grazing during wet periods help to keep the pasture in good condition and to protect the soil from erosion. Use of nitrogen and phosphorus fertilizer promotes good growth of forage plants.

Population growth has resulted in increased construction of homes on this soil. If this unit is used for home site development, the main limitations are a high perched water table, the saline-sodic condition of the soil, very slow permeability, high potential of shrinking and swelling, and very long periods of flooding in years of above normal precipitation.

Deep drainage reduces wetness. Tile drainage can be used to lower the water table if a suitable outlet is available. Plants that tolerate a seasonal high water table and droughtiness should be selected unless drainage and irrigation are provided. The saline-sodic condition causes high corrosivity to steel and concrete. Treated steel pipe and sulfate-

resistant concrete should be used. Content of toxic salts can be reduced by applying proper amounts of soil amendments, leaching and returning crop residue to the soil. Selection of adapted vegetation is critical for the establishment of lawns, shrubs, trees and vegetable gardens.

Very slow permeability and the high water table increase the possibility of failure of septic tank absorption fields. Absorption lines should be placed below the very slow permeable layer. Increasing the size of the absorption area helps to compensate for the levees, canals and diversions permeability. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has low shrink-swell potential. The risk of flooding can be reduced by the use of levees, canals and diversions.

This map unit is in capability unit IIIW-6, irrigated, and capability subclass VIw, nonirrigated. The MLRA is 17

282--Tachi clay, 0 to 1 percent slopes. This very deep, very poorly drained, saline-sodic soil is on flood plains and in basins. It formed in alluvium derived dominantly from igneous and sedimentary rock. Elevation is 125 to 205 feet. The mean annual precipitation is about 7 to 8 inches, the mean annual air temperature is 62 to 64 degrees F, and the frost-free period is 245 days to 255 days.

Typically, the surface layer is very dark gray, dark gray, and olive gray clay about 14 inches thick. The underlying material to a depth of 60 inches is dark gray, olive gray, light olive gray, light gray and gray clay. Redoximorphic features are present in all layers below a depth of 14 inches. Tachi soils are calcareous throughout and are saline-sodic in some parts of the soil profile.

Small areas of Lillis soil are included along the western edge of this unit. Also included, near Fresno Slough, are small areas of coarser textured, stratified soil. In the N 1/2 of the NE 1/4 of sec. 8, T.14 S., R.15 E., there are small areas of Tachi soil with a 3 to 10-inch overwash of silt loam or silty clay loam texture. Included areas make up about 7 percent of the total acreage.

Permeability of this Tachi soil is very slow. The water infiltration rate is high when the soil is dry and the cracks are open. As the soil becomes wet and the cracks close, the infiltration rate greatly decreases. The available water capacity is moderate or high. Effective rooting depth of the crops commonly grown in the area is limited by saline-sodic conditions and an apparent water table at a depth of 4 to 6 feet. Runoff is ponded and the hazard of water erosion is slight. These soils are purposefully flooded in the Mendota Wildlife Management Area from October through April for recreational and wildlife habitat purposes.

This unit is used mainly for wildlife habitat and recreation. It is also used for irrigated crops.

This unit is suited to irrigated, saline-sodic tolerant crops. It is limited mainly by saline-sodic conditions, an apparent water table, and very slow permeability. Intensive management is required to reduce the salinity and maintain soil productivity. Reduction of high salinity may be achieved by applying specific soil amendments and returning crop residue to the soil. Gypsum, sulfur and sulfuric acid are among the soil amendments that can be used to reclaim this soil. If sulfur or sulfuric acid is used, lime should be present in the surface layer.

A cropping system that includes crop rotation and the return of crop residue to the soil or the regular addition of other organic matter improves fertility, reduces crusting and increases the water intake rate. Furrow, border and sprinkler irrigation systems are suited to this unit. Because of the very slow permeability of this soil, the application of water should be regulated so that water does not stand on the surface and damage the crops. Subterranean Tile drainage may be used to lower the water table if a suitable outlet is available.

This map is in capability unit IIIw-6, irrigated, and capability subclass VIIw, nonirrigated. The MLRA is 17.

Appendix O
Comprehensive Nutrient Management Plan

Nutrient Management Plan

FNS Investments Dairy

Elkhorn Avenue and Howard Avenue
Fresno County

Revised

April 13, 2006

Prepared by:

Livingston Dairy Consulting, Inc.

99 North Tower Square

Tulare, CA 93274

(559) 687-1440

Nutrient Management Plan (revised)

FNS Investments Dairy

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Sheet A	Herd Size and Manure Produced
Sheet E	Irrigation Schedule - Acre Feet Per Month

Nutrient Management Plan (revised)

FNS Investments Dairy

1.0 Introduction

FNS Investments Dairy is located 3 miles west of the community of Burrel near the intersection of Elkhorn Avenue and Howard Avenue, Fresno County. Farmland available for distribution of dairy nutrients is located in the west ½ of Section 31, Township 16 South, Range 18 East, the east ½ of Section 6, and all of Section 5, Township 17 South, Range 18 East MDB & M.

Total acreage 1,242 consists of a dairy (approximately 110 acres) and approximately 1,132 net farmable acres.

2.0 Scope of Service

Revise the provided Nutrient Management Plan (reference 1) using "Committee of Experts on Manure Management, June 2005" and ASAE Standards 384.2, March 2005.

3.0 Proposed Dairy

The quantity of manure diverted to the liquid retention system varies depending on animal housing and the number within age and production groups. The herd is comprised of and housed according to the following numbers as proposed.

<u>Herd size/makeup</u> -	3,200 milk cows	Freestalls
	480 dry cows	flushed, open corrals with shade
	960 heifers 12 to 24 months	flushed, open corrals with shade
	1,100 heifers 3 to 12 months	flushed, open corrals with shade
	380 Calves	Off-site

The drainage area of the dairy is approximately 110 acres, leaving an estimated 1,132 net farmable acres for nutrient distribution. For planning purposes, 566 acres of alfalfa, and 566 acres of wheat double cropped to corn was used.

<u>Total acreage available</u> -	<u>APN</u>	<u>Acres</u>
	41-100-045	316
	50-016-013	320
	50-016-016	606
	Total	1,242 acres

Nutrient Management Plan (revised)

FNS Investments Dairy

The quantity and makeup of manure generated by a dairy depends on the breed, total number of animals, the distribution of animal numbers within age groups, and housing facilities. Animal unit factors are from Table 1, Fact Sheet for Dairies No. 4 which is produced by the California Regional Water Quality Control Board, Central Valley Region.

Breed: Holstein	Head	Animal Unit Factor	Animal Units
Age Group			
Milk Cows	3,200	1.4	4,480
Dry Cows	480	1.12	538
Heifers 1 to 2 years	960	1.02	979
Heifers 3 months to 1 year	1,100	0.49	539
Calves	380	0.29	110
TOTAL	6,120		6,646

The following table demonstrates the herd makeup in animal units and the respective volumes of manure in its wet or dry category where the milking and dry cows are housed in freestalls, and all support stock are kept in open lot corrals with shades and flushed feed lanes.

Age Group	Animal Units	% Collected In Flush	Animal Units Wet Manure	Animal Units Dry Manure
Milk Cows	4,480	80.00	3,584	896
Dry Cows	538	60.00	323	215
Heifers 1 to 2 years	979	60.00	587	392
Heifers 3 months to 1 year	539	60.00	323	216
Calves	110	0	0	110
TOTAL	6,646		4,817	1,829

Process water generated will consist of barn wash water and water used to cool barn equipment. This water will be collected by the drainage collection system and transported to the solid separation system. Solids are separated from the flush stream by multiple settling basins.

Nutrient Management Plan (revised)

FNS Investments Dairy

The solids collected are dried and stored for use as freestall bedding, fertilizer/soil amendment. Rain runoff is conveyed to the storage pond to be blended with dairy process water for application to crops. Dry manure is scraped into piles in the corrals where it is stored prior to removal for application to fields for use as fertilizer or soil amendment.

3.1 Dairy Liquid Manure

Required liquid retention capacity includes factors for manure displacement, dairy process water, and rainwater runoff. Manure displacement was decreased by 40% to reflect the effectiveness of the manure separation system. Dairy Process water is based on 50 gallons per milk cow per day (reference 2).

Adequacy of retention capacity has been established in the original Nutrient Management Plan and will not be further addressed here (reference 1) .

3.2 Dairy Dry Manure

The separated solids are dried, with seepage returning to the retention system, before use as bedding in the freestalls. Excess dried solids and dried manure in the corrals are stored before removal for use as fertilizer/soil amendment.

4.0 Nutrient Management

Water in the retention pond system is laden with manure nutrients which will be used as fertilizer for the proposed crops grown on the dairy's acreage. Pond water is blended with fresh irrigation water during irrigation applications to the subject acreage. As previously stated, for planning purposes, 566 acres of alfalfa and 566 acres of wheat double cropped to corn was used.

4.1 Irrigation Requirements

Total irrigation requirements for the proposed crop rotation is approximately 3,962 acre feet per year (reference 1). Calculated contribution of dairy process water, average rainfall runoff, and the runoff from a 25 year - 24 hour storm event is 243 acre feet per year (reference 1). "Sheet E" shows the estimated time and amount of irrigation by crop, the total irrigation needs by month, and the approximate contribution and timing of dairy process water and rainwater runoff. (reference 3)

Nutrient Management Plan (revised)

FNS Investments Dairy

4.2 Nutrient Uptake by Crops

The planned crop rotation of alfalfa and wheat/corn silage will use an estimated 650,900 pounds of nitrogen annually as calculated in reference 1.

“Salt” uptake is not well understood generally due to the fact that many elements and compounds which are chemically classified as “salts” are beneficial if not required crop nutrients. Total “salts” produced (3,077,475 pounds per year) averages 2,718.6 pounds per acre. This is below the CRWQCB allowable 3,000 pounds of “salts” per acre for double cropped farmland.

5.0 Nutrient Generation and Distribution

For years, the California Regional Water Quality Control Board has provided animal unit per age breakdown and excretion values for both Nitrogen and “Salt” in a publication called Fact Sheet 4 for Dairies.

A recent publication titled “Managing Dairy Manure in the Central Valley of California” (*University of California Division of Agriculture and Natural Resources Committee of Experts on Dairy Manure Management*, 6/05) which refers to *ASAE Standards D384.2 Mar2005, Manure Characteristics and Production* is the basis for RWQCB staff requesting that Nutrient Management Plans be prepared using revised excretion values. The excretion values determined from these reports are based on 1,400 pound animal units. For purposes of this report, the excretion values have been adjusted to 1,000 pound animal units to make possible direct comparison of results.

5.1 CRWQCB Fact Sheet 4 for Dairies

The Regional Board requires that there be sufficient net farmable acreage upon which manure nutrients *in the liquid* may be applied at agronomically appropriate times and rates.

Animal units are based on 1,000 pounds. Excretion of Nitrogen is .56 pounds per day for milk cows and .45 pounds per day for support stock (dry cows and heifers). “Salt” excretion is estimated to be 1.29 pounds per 1,000 pound animal unit per day.

Nutrients collected in the retention system are determined by the type of housing (freestall 80%, flushed open corrals 60%, or scraped open corrals 10%) and manure handling system. Section 3.0, above, illustrates conversion of the proposed 6,120 head to animal units and separation into wet and dry streams of manure.

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FNS Investments Dairy

5.2 Committee of Experts and ASAE

For the 1,000 pound animal unit, daily excretion of nitrogen is estimated to be 0.707 pounds for milk cows and 0.190 pounds for support stock. Discussion of “salt” excretion is mixed but suggests that at best is poorly understood and probably inaccurate. However, it is assumed that the RWQCB will not change (lower) “salt” excretion estimates. For this report, “Salt” excretion is estimated to be 1.29 pounds per 1,000 pound animal unit per day.

The Committee of Experts report emphasizes that nitrogen is volatilized at a significantly lower rate (40% instead of 75%) than previously thought. Also, the report suggested that appropriate application of nutrients may, due to a variety of factors (the most important of which is soil composition) need to be up to 165% of crop needs.

Nitrogen, using these excretion values, generated in the liquid is estimated to be 606,247 pounds annually (Sheet A). This represents 93% of crop requirements. However, assuming a 130% application is needed to supply crop needs (650,900 pounds X 1.30 = 846,170 pounds), the nutrient content in the liquid is estimated to be 72% of the nitrogen needed to supply the proposed crop rotation.

Based on these calculations, the 1,132 farmable acres is more than adequate for appropriate distribution of both nitrogen and “salts” in the liquid generated by dairy operations.

6.0 Summary

This facility, as proposed, can meet nutrient distribution at agronomic times and rates under the criteria discussed without exporting any manure products. There is room for some variation in manure management practices.

It is highly recommended that nutrient distribution practices be documented through activity logs, nutrient analysis, and crop production history. Annual summaries will allow effective review of these practices and provide a basis for adjustment, if needed.

Nutrient Management Plan (revised)

FNS Investments Dairy

7.0 Conclusion

This report has been prepared for Erwin Engineering to supplement a previously submitted Nutrient Management Plan in a Report of Waste Discharge. It is expressly prohibited for others to rely on this report unless given written consent by Livingston Dairy Consulting, Inc.

Estimates in this report were based on information (Nutrient Management Plan, FNS Investments Dairy, 4/02) provided by Erwin Engineering. Basis for calculations are listed in the attached reference page.

This report has been prepared in accordance with generally accepted methodologies and standards of practice in the area and is limited to the scope of work described herein. No other warranty, either expressed or implied, is made as to the findings or conclusions included in this report. The findings and conclusions presented are based on field review and observations, and the data obtained from the sources listed in the report, and are valid as of the date of the report. The passage of time, natural processes or human intervention on the Site or adjacent properties and changes in the regulations can cause changed conditions which can invalidate the findings and conclusions presented in this report.

Nutrient Management Plan (revised)

FNS Investments Dairy

References

Nutrient Management Plan, FNS Investments Dairy, Erwin Engineering, 4/12/02

Regional Water Quality Control Board, accepted practice for sizing retention ponds, dairy process water equals 50 gallons per milk cow per day.

Western Regional Climate Center, 25 year- 24 hour Precipitation Frequency

United States Department of Agriculture, Natural Resource Conservation Service, Engineering Field Manual, Chapter 2, 10/89

University of California Cooperative Extension, Water Budget Method of Irrigation Scheduling of Field Crops, 2/91.

University of California Cooperative Extension, Dairy Manure Management Series, Series #6, 10/97.

University of California Cooperative Extension, Dairy Manure Management Series, Series #2, 10/97.

University of California Division of Agriculture and Natural Resources, Committee of Experts on Dairy Manure Management, 6/05

American Society of Agricultural Engineers, Standards D384.2 Mar2005, Manure Production and Characteristics

HERD SIZE AND MANURE PRODUCED

FNS Investments Dairy

	Head	Factor	AU	% Flush	AU Flushed	% Collected	Total Wet manure	Total Dry manure
Milk Cows	3,200	1.4	4,480	100.00%	4,480	80.00%	3,584	896
Dry Cows	480	1.12	538	100.00%	538	60.00%	323	215
Heifers 1-2 years	960	1.02	979	100.00%	979	60.00%	588	392
Heifers 3 mo to 1 year	1,100	0.49	539	100.00%	539	60.00%	323	216
Calves	380	0.29	110	0.00%	0	0.00%	0	110
Total	6,120		6,646				4,817	1,829

NITROGEN - WET MANURE

Source	AU	N excretion value/day	TOTAL N Produced	40% Denitrification an aerobic pond	minus	Denitrification solid separator	N produced
Milk Cows	3,584	0.707	924,869	369,948		0	554,921
Dry Cows & Heifers	1,233	0.190	85,542	34,217		0	51,325
Total	4,817				minus		606,247

lbs.

"SALTs" - WET MANURE

Total AU	"Salts" Production Rate/day	TOTAL "Salts" Produced	minus	Separator Removed "Salts"	"Salts" Production
4,817	1.29	2,268,310		0	2,268,310

lbs.

NITROGEN - DRY MANURE

Source	AU	N excretion value/day	TOTAL N Produced	plus	N from Solids Separator	minus	40.00% Denitrification	N Produced
Milk Cows	896	0.707	231,217		0		92,487	138,730
Dry Cows & Heifers	933	0.19	64,670		0		25,868	38,802
Total	1,829							177,533

lbs.

"SALTs" - DRY MANURE

Total AU	"Salts" Production Rate/day	TOTAL "Salts" Produced	plus	Separator Removed "Salts"	NET "Salts" Production
1,829	1.29	860,959		0	860,959

lbs.

Notes:

- Excretion values used by Regional Water Quality Control Board for a high producing herd.
- Denitrification values accepted by Regional Water Quality Control Board.

FNS Investments Dairy

IRRIGATION SCHEDULE - ACRE FEET PER MONTH

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
ALFALFA	0	0.2	0.3	0.3	0.4	0.5	0.6	0.5	0.3	0.2	0.2	0	3.5
WHEAT	0	0.3	0.3	0.3	0	0	0	0	0	0.2	0.2	0.2	1.5
CORN	0	0	0	0	0.3	0.3	0.5	0.5	0.4	0	0	0	2
	0	0	0	0	0	0	0	0	0	0	0	0	0
Total/mo	0	0.5	0.6	0.6	0.7	0.8	1.1	1	0.7	0.4	0.4	0.2	7

1,132 Acres farmed

IRRIGATION WATER

Required	0	283	340	340	396	453	623	566	396	226	226	113	3,962

LAGOON WATER 176,500 gallons per day

ACRE FEET PER MONTH

Generated	18	18	18	18	18	18	18	18	18	18	18	18	212
Rainwater	8	8									8	8	32
Total/mo	26	26	18	18	18	18	18	18	18	18	26	26	243

Percent total water use

5.35%

0.80%

6.14%

Appendix P
Lagoon/Pond Design Guidelines

651.1080 Appendix 10D- Geotechnical, Design, and Construction Guidelines

Introduction

The protection of surface and ground water and the proper utilization of wastes are the primary goals of waste storage ponds and treatment lagoons. Seepage from these structures creates potential risks of pollution of surface water and underground aquifers. The permeability of the soil in the boundaries of a constructed waste treatment lagoon or waste storage pond directly influences the potential for downward or lateral seepage of the stored wastes.

Many natural soils on the boundaries of waste treatment lagoons and waste storage ponds at least partly seal as a result of introduction of manure solids into the reservoir. Physical, chemical, and biological processes occur that reduce the permeability of the soil-liquid interface. Suspended solids settle out and physically clog the pores of the soil mass. Anaerobic bacteria produce by-products that accumulate at the soil-liquid interface and reinforce the seal. The soil structure can also be altered in the process of metabolizing organic material. Chemicals in waste, such as salts, can disperse soil, which may be beneficial in reducing seepage. Researchers have reported that, under the right conditions, the permeability of the soil can be decreased by up to several orders of magnitude in a few weeks following contact with waste in a waste storage pond or treatment lagoon. These guidelines have been developed under the premise that the permeability decrease induced by the manure should not be counted on as the sole means of ground water protection. However, the guidelines do propose recognition of sealing to the extent of one order of magnitude for soils with a clay content exceeding 5 percent for ruminant manures and 15 percent for monogastric animal manures.

General design considerations

The following guidelines¹ address the design and construction techniques needed to overcome certain soil limitations. These guidelines should be considered in the planning, design, construction, and operation of agricultural waste management components including waste treatment lagoons and waste storage ponds.

Soil and foundation characteristics are critical to design, installation, and safe operation of successful waste treatment lagoons or waste storage ponds. Waste impoundments must be located in soils with acceptable permeabilities or be lined.

¹ These guidelines are an update and augmentation of material previously published in SNTC Technical Note 716, "Design and Construction Guidelines for Considering Seepage from Agricultural Waste Storage Ponds and Treatment Lagoons." SNTC Technical Note 716 has been canceled.

Soil properties

NRCS soil mechanics laboratories have a data base of permeability tests performed on over 1,100 compacted soil samples. Experienced NRCS engineers have analyzed these data and correlated permeability rates with soil index properties and degree of compaction of the samples. Tables 10D- 1 to 10D- 3 are based on this analysis and provide general guidance on the probable permeability of the described soil groups. The grouping of soils in table 10D- 1 is based on the percent fines and Atterberg limits of the soils. Fines are those particles finer than the No. 200 sieve. Table 10D- 2 provides assistance in converting from the Unified Soil Classification to one of the four permeability groups.

Table 10D- 1 Grouping of soils according to their estimated permeability

Group	Description
I	Soils that have less than 20% passing a No. 200 sieve and have a Plasticity Index (PI) less than 5.
II	Soils that have 20% or more passing a No. 200 sieve and have PI less than or equal to 15. Also included in this group are soils with less than 20 percent passing the No. 200 sieve with fines having a PI of 5 or greater.
III	Soils that have 20% or more passing a No. 200 sieve and have a PI of 16 to 30.
IV	Soils that have 20% or more passing a No. 200 sieve and have a PI of more than 30.

Table 10D- 2 Unified classification versus soil permeability groups ^{1/}

Unified classification	-----Permeability group ^{2/} -----			
	I	II	III	IV
CH	N	N	S	U
MH	N	S	U	S
CL	N	S	U	S
ML	N	U	S	N
CL-ML	N	A	N	N
GC	N	S	U	S
GM	S	U	S	S
GW	A	N	N	N
SM	S	U	S	S
SC	N	S	U	S
SW	A	N	N	N
SP	A	N	N	N
GP	A	N	N	N

- 1/ ASTM Method D-2488 has criteria for use of index test data to classify soils by the Unified Soil Classification System.
- 2/ A = Always in this permeability group.
 N = Never in this permeability group.
 S = Sometimes in this permeability group (less than 10 percent of samples fall in this group).
 U = Usually in this permeability group (more than 90 percent of samples fall in this group).

Permeability of soils

Table 10D- 3 shows the percentage of each group for which a permeability test measured a k value of 0.0028 feet per day (1×10^{-6} cm/s) or less. The table also shows the median k value for the group in feet per day. A value of the coefficient of permeability of 0.0028 feet per day (1×10^{-6} cm/s) was selected for the median value studied. For typical NRCS designed structures, this value results in an acceptable seepage loss. As discussed later in this section, sealing by manure solids and biological action will most likely produce an additional order of magnitude reduction in permeability in the soils at grade.

Table 10D- 3 summarizes a total of 1,161 tests. Where tests are shown at 85 to 90 percent of maximum density, over 75 percent of the tests were at 90 percent of maximum dry density. Where 95 percent degree of compaction is shown, data include both 95 and 100 percent degree of compaction tests. Over 80 percent of this group of tests was performed at 95 percent of maximum density. Based on these data, the following general statements can be made for the four soil groups:

Group I- These soils have the highest permeability and could allow unacceptably high seepage losses. Because the soils have a low clay content, permeability values may not be substantially reduced by manure sealing, and will probably exceed 10^{-6} centimeters per second.

Group II- These soils generally are less permeable than the Group I soils, but lack sufficient clay to be included in Group III.

Group III- These soils generally have a very low permeability, good structural features, and only low to moderate shrink-swell behavior.

Caution: Some soil in Group III is more permeable than indicated by the percent fines and PI value because they contain a high amount of calcium. The presence of a high amount of calcium results in a flocculated or aggregated structure in the soils. These soils often result from the weathering of high calcium parent rock, such as limestone. Soil scientists and published soil surveys are helpful in identifying these soil types. Dispersants, such as tetrasodium polyphosphate, can alter the flocculated structure of these soils by replacement of the calcium with sodium on the clay particles (See the section, *Design and construction of clay lines treated with soil dispersants*). Because manure contains salts, it can be helpful in dispersing the structure of these soils, but design should probably not rely solely on manure as the additive for these soil types.

Group IV- Normally, these soils have a very low permeability. However, because of their sometimes blocky structure, they can experience high seepage losses through cracks that can develop when the soil is allowed to dry. They possess good attenuation properties if the seepage does not move through cracks in the soil mass.

Table 10D- 3 Summary of soil mechanics laboratories permeability test data

Soil group	Percent of ASTM D698 dry density	Number of observations	Median K	Median K	Percent of tests where $k < 0.0028$ (ft/d)
			(cm/s)	(ft/d)	
I	85-90	27	7.2×10^{-4}	2.0	0
I	95	16	3.5×10^{-4}	1.0	0
II	85-90	376	4.8×10^{-6}	0.014	30
II	95	244	1.5×10^{-6}	0.004	45
III	85-90	226	8.8×10^{-7}	0.0025	59
III	95	177	2.1×10^{-7}	0.0006	75
IV	85-90	41	4.9×10^{-7}	0.0014	72
IV	95	54	3.5×10^{-8}	0.0001	69

In situ soils with acceptable permeability

Natural soils that are classified in permeability Groups III or IV generally have permeability characteristics that result in acceptable seepage losses. NRCS permeability data bases show these soils usually have coefficients of permeability of 1×10^{-6} centimeters per second (0.0028 ft/d) or less if the soils are at dry densities equivalent to at least 90 percent of their Standard Proctor (ASTM D698) maximum dry densities. Based on the literature reviewed, introduction of manure provides a further decrease in the permeability rate of at least 1 order of magnitude. Such sealing is thought to be a result of physical, chemical, and biological processes. Suspended solids settle or filter out of solution and physically clog the pores of the soil mass. Anaerobic bacteria produce by-products that accumulate at the soil-water interface and reinforce the seal, and in the process of metabolizing organic material can alter the soil structure. Chemicals in animal waste, such as salts, can disperse soil, which may be beneficial in reducing seepage. Special design measures generally are not necessary where agricultural waste storage ponds or treatment lagoons are constructed in these soils, provided that the satisfactory soil type is at least 2 feet thick below the deepest excavation limits and sound construction procedures are used. This also assumes that no highly unfavorable geologic conditions, such as limestone formations with extensive caves or solution channels, occur at the site.

Soils in Groups III and IV that have a blocky structure or desiccation cracks should be disked, watered, and recompacted to destroy the structure in the soils and provide an acceptable permeability. The depth of the treatment required should be based on design guidance given in the section, *Construction considerations for compacted clay liners*. High calcium clays should be modified with soil dispersants to achieve the target permeability goals based on the guidance given in the section, *Design and construction of clay liners treated with soil dispersants*.

Definition of pond liner

Liners are relatively impervious barriers used to reduce seepage losses to an acceptable level. A liner for a waste impoundment can be constructed in several ways. When soil is used as a liner, it is often called a clay blanket or impervious blanket. A simple method of providing a liner for a waste storage structure is to improve the soils at the excavated grade by disking, watering, and compacting them to a thickness indicated by guidelines in following sections. Soils with suitable properties can make excellent liners, but the liners must be designed and installed correctly. Soil has an added benefit in that it provides an attenuation medium for many types of pollutants.

The three options when the soil at the excavated grade is unsuitable to serve as a liner for a waste impoundment are:

- Treat the soil at grade with bentonite or a soil dispersant.
- Construct the soil liner by compacting imported clay from a nearby borrow source onto the bottom and sides of the waste impoundment.
- Use concrete or synthetic materials, such as geosynthetic clay liners (GCL's) and geomembranes.

Treat the soil at grade with bentonite or a soil dispersant. Problem soils in Group III may be treated with dispersants to attain a satisfactory soil liner. (See the section, *Design and construction of clay liners treated with soil dispersants*.) Soils in Groups I and II that are unsuitable in their natural state for use as liners can often be treated with bentonite to produce a satisfactory soil liner. Bentonite or soil dispersants should be added and mixed well into a soil prior to compaction. Brown (1991) describes techniques for constructing bentonite treated liners.

High quality sodium bentonite with good swell properties should be used for construction of clay liners using Group I and II soils. The highest quality bentonite is mined in Wyoming and Montana. NRCS soil mechanics laboratories have found it important to use the same type and quality of bentonite that will be used for construction in the laboratory permeability tests used to design the soil-bentonite mixture. Both

the quality of the bentonite and how finely ground the product is before mixing with the soil affect the final permeability rate of the mixture. It is important to work closely with both the bentonite supplier and the soil testing facility when designing treated soil liners.

Construct the soil liner by compacting imported clay from a nearby borrow source onto the bottom and sides of the waste impoundment- Compaction is often the most economical method for constructing liners if suitable soils are available nearby.

Use concrete or synthetic materials, such as geosynthetic clay liners (GCL's) and geomembranes- Concrete has advantages and disadvantages for use as a liner. It will not flex to conform to settlement or shifting of the earth. In addition, some concrete aggregates may be susceptible to attack by continued exposure to chemicals contained in or generated by the waste. Concrete serves as an excellent floor from which to scrape solids. It also provides a solid support for equipment, such as tractors or loaders. Some bedrock may contain large openings caused by solutioning and dissolving of the bedrock by ground water. Common types of solutionized bedrock are limestone and gypsum. When existence of sinks or openings is known or identified during the site investigation, these areas should be avoided and proposed facility located elsewhere. However, when these conditions are discovered during construction or alternate sites are not available, concrete liners may be required to bridge the openings, but only after the openings have been properly treated and backfilled.

Geomembranes and GCL's are the most impervious types of liners if designed and installed correctly. Care must be exercised both during construction and operation of the waste impoundment to prevent punctures and tears. Forming seams in the field for geomembranes can require special expertise. GCL's have the advantage of not requiring field seaming, but the overlap required to provide a seal at seams is an extra expense. Geomembranes and GCL's must contain ultraviolet inhibitors if they will be exposed. Designs should include provision for their protection from damage during cleaning operations.

Four conditions where a liner should be considered

Four conditions for which a designer should consider seepage reduction beyond that provided by the natural soil at the excavation boundary are listed below.

Proposed site is located where any underlying aquifer is at a shallow depth and not confined and/or the underlying aquifer is a domestic or ecologically vital water supply. State or local regulations may prevent locating a waste storage structure within a given distance from such features.

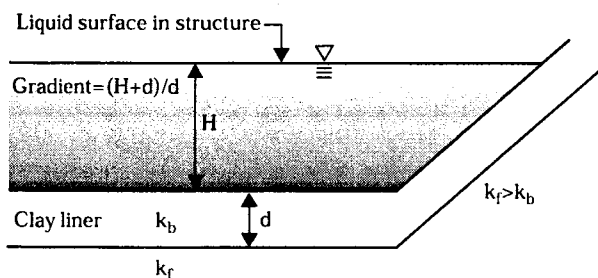
Excavation boundary of a site is underlain by less than 2 feet of soil over bedrock. Bedrock that is near the soil surface is often fractured or jointed because of weathering and stress relief. Many rural domestic and stock water wells are developed in fractured rock at a depth of less than 300 feet. Some rock types, such as limestone and gypsum, may have wide, open solution channels caused by chemical action of the ground water. Soil liners may not be adequate to protect against excessive leakage in these bedrock types. Concrete or geomembrane liners may be appropriate for these sites. However, even hairline openings in rock can provide avenues for seepage to move downward and contaminate subsurface water supplies. Thus, a site that is shallow to bedrock can pose a potential problem and merits the consideration of a liner. Bedrock at a shallow depth may not pose a hazard if it has a very low permeability and has no unfavorable structural features. An example is massive siltstone.

Excavation boundary of a site is underlain by soils in Group I- Coarse grained soils with less than 20 percent low plasticity fines generally have higher permeability and have the potential to allow rapid movement of polluted water. The soils are also deficient in adsorptive properties because of their lack of clay. Relying solely on the sealing resulting from manure solids when Group I soils are encountered is not advisable. While the reduction in permeability from manure sealing may be 1 to 3 orders of magnitude, the final resultant seepage losses are still likely to be excessive, and a liner should be used.

Excavation boundary of a site is underlain by some soils in Group II or problem soils in Group III (flocculated clays) and Group IV (highly plastic clays that have a blocky structure)- Soils in Group II may or may not require a liner. Documentation through laboratory or field permeability testing or by other acceptable alternatives is advised. An acceptable alternative would be correlation to similar soils in the same geologic or physiographic areas for which test data are available. Higher than normal permeability for flocculated clays and clays that have a blocky structure has been discussed. These are special cases, and most soils in Groups III and IV will not need a liner. Note that a liner may be constructed by treating a determined required thickness of unfavorable soils occurring at grade.

The above conditions do not always dictate a need for a liner. Specific site conditions can reduce the potential risks otherwise indicated by the presence of one of these conditions. For example, a thin layer of soil over high quality rock, such as an intact shale, is less risky than if the thin layer is over fractured or fissured rock.

Figure 10D- 1 Definition of terms for clay liner and seepage calculations



where:

- H = Head of waste liquid in waste impoundment
- k_f = Permeability of foundation
- d = Thickness of liner
- k_b = Permeability of liner

Specific discharge

(a) Introduction

No soil or artificial liner, even concrete or a geomembrane liner, can be considered impermeable. To limit seepage to an acceptable level, regulatory agencies may specify a maximum allowable permeability value in liners. A criterion often used for clay liners is that the soils at grade in the structure, or the clay liner if one is used, must have a permeability of 1×10^{-7} centimeters per second or less. However, using only permeability as a criterion ignores other factors defining the seepage from an impoundment. Seepage is calculated from Darcy's Law (covered in the following section), and seepage calculations consider the permeability of the soil and the hydraulic gradient for a liner at a site.

(b) Definition of specific discharge

The term *specific discharge*, or unit seepage, is the seepage rate for a unit cross-sectional area of a pond. It is defined as follows from Darcy's Law. The hydraulic gradient for a clay liner is defined in figure 10D- 1.

Given:

$$Q = k \left(\frac{(H + d)}{d} \right) A \quad (\text{Darcy's Law})$$

Where:

- Q = Total seepage through area A (L³/T)
- k = Coefficient of permeability (hydraulic conductivity) (L³/L²/T)

$$\frac{(H + d)}{d} = \text{Hydraulic gradient} \quad (L/L)$$

- H = Vertical distance measured between the top of the liner and required volume of the waste impoundment (figs. 10D- 1, 10D- 14, 10D- 15, and 10D- 21) (L)

- d = Thickness of the soil liner (fig. 10D- 1) (L)

- A = Cross-sectional area of flow (L²)

- L = Length

- T = Time

Rearrange terms:

$$\frac{Q}{A} = \frac{k(H+d)}{d} \quad (L/T)$$

By definition, unit seepage or specific discharge, v , is Q/A :

$$v = \frac{k(H+d)}{d} \quad (L^3/L^2/T)$$

The units for specific discharge are $L^3/L^2/T$. However, these units are commonly reduced to L/T .

If a coefficient of permeability of 1×10^{-7} centimeters per second is regarded as acceptable, then an allowable specific discharge value can be calculated. Typical NRCS waste impoundments have a depth of waste liquid of about 9 feet and a liner thickness of 1 foot. Then, a typical hydraulic gradient of $(9+1)/1 = 10$ is a reasonable assumption. To solve for an allowable specific discharge, using previous assumptions that an acceptable permeability value is 1×10^{-7} centimeters per second, and a hydraulic gradient of 10, substituting in the equation for v :

$$\begin{aligned} v_{\text{allowable}} &= k \frac{(H+d)}{d} \\ &= 1 \times 10^{-7} \text{ cm / s} \times 10 \\ &= 1 \times 10^{-6} \text{ cm / s} \\ &= 0.0028 \text{ ft / d} \end{aligned}$$

However, if one assumes at least one order of magnitude of reduction in permeability will occur, the initial permeability can be 10 times greater (1×10^{-6} centimeters per second) and the final value for permeability will approach 1×10^{-7} centimeters per second after sealing. Then, an allowable initial specific discharge of will be:

$$\begin{aligned} v_{\text{initial allowable}} &= k \frac{(H+d)}{d} \\ &= 1 \times 10^{-6} \text{ cm / s} \times 10 \\ &= 1 \times 10^{-5} \text{ cm / s} \\ &= 0.028 \text{ ft / d} \end{aligned}$$

As noted previously, allowable specific discharge actually has units of cubic feet per square foot per day, but for convenience the units are often stated as foot per day. Note that some State or local regulations may not permit taking credit for an order of magnitude reduction in permeability resulting from manure sealing. The State or local regulations should be used in design for a specific site.

Specific discharge or unit seepage is the quantity of water that flows through a unit cross-sectional area composed of pores and solids per unit of time. It has units of $L^3/L^2/T$ and is often simplified to L/T . Because specific discharge expressed as L/T has the same units as velocity, specific discharge is often misunderstood as representing the average rate or velocity of water moving through a soil body rather than a quantity rate flowing through the soil. Because the water flows only through the soil pores, the cross sectional area of flow is computed by multiplying the soil cross section (A) by the porosity (n). The seepage velocity is then equal to the unit seepage or specific discharge, v , divided by the porosity of the soil, n . Seepage velocity = (v / n) . In compacted liners, the porosity usually ranges from 0.3 to 0.5. The result is that the average linear velocity of the seepage flow is two to three times the specific discharge value. The units of seepage velocity are L/T .

(c) Design of compacted clay liners

To determine the required thickness of clay liner, rearrange the above equation for specific discharge using test values for permeability and the depth of waste liquid in the waste impoundment. Alternatively, a given value for the thickness of liner to be constructed may be assumed, and the minimum permeability required to meet a target specific discharge for the depth of waste liquid in the facility can be determined. Detailed design examples and equation derivations are shown later in this section.

Detailed design steps for clay liners

The suggested steps for design of a compacted soil liner are:

Step 1- Size the structure to achieve the desired storage requirements within the available construction limits and determine this depth or the height, H, of storage needed.

Step 2- Either estimate the permeability from the previous information showing estimated permeability values for Groups III and IV, or use the value attained in laboratory permeability tests. Field tests on compacted liners could also supply permeability design information. Use a value for allowable discharge of $v = 1 \times 10^{-5}$ centimeters per second (0.028 ft/d) if manure sealing can be credited, or 1×10^{-6} centimeters per second (0.0028 ft/d) if it is not credited. Calculate a preliminary liner thickness (d) to meet the allowable specific discharge criterion using the following equation. Derivation of the equation is shown later in this section. Terms are defined in figure 10D-1.

$$d = \frac{k \times H}{v - k}$$

Step 3- If the k value used for the liner is equal to or greater than the assumed allowable specific discharge, meaningless results are attained for d, the calculated thickness of the liner in the equation above. The allowable specific discharge goal cannot be met if the liner soils have k values equal to or larger than the assumed allowable specific discharge.

Step 4- The calculated thickness of liner required is very sensitive to the value of permeability used and the assumed allowable specific discharge value. Often, the required liner thickness can be reduced most economically by decreasing the soil permeability. Small changes in the soil liner specifications, including degree of compaction, rate of bentonite addition, and water content at compaction, can drastically affect the permeability of the clay liner soil.

Step 5- An alternative design approach is to use a predetermined desirable thickness for the liner; for example, 1 foot, and then calculate what permeability

is required to meet the specific discharge target. The equation used is derived later in this section, and is as follows:

$$k = \frac{v \times d}{H + d}$$

This design approach requires that measures, such as special compaction or addition of bentonite or other soil additives, be then taken to ensure the calculated allowable permeability or a lesser value is attained.

Step 6- Cautions

The liner soil must be filter-compatible with the natural foundation upon which it is compacted. Filter compatibility is determined by criteria in NEH Part 633 (chapter 26). As long as the liner soil will not pipe into the foundation, no limit need be placed on the hydraulic gradient across the liner. Filter compatibility is most likely to be a significant problem when very coarse soil, such as poorly graded gravels and sands, occurs at a site and a liner is being placed directly on this soil.

The minimum recommended thickness of a compacted natural clay liner is 1 foot. Clay liners constructed by mixing soil dispersants or bentonite with the natural soils at a site are recommended to have a minimum thickness of 6 inches. These minimum thicknesses are based on construction considerations rather than calculated values for liner thickness requirement from the specific discharge equations. In other words, if the specific discharge equations indicate only a 7-inch thickness of compacted natural clay is needed to meet suggested seepage criteria, a 1-foot-thick blanket would still be recommended because constructing a 7-inch natural clay blanket with integrity would be difficult.

Natural and constructed liners must be protected. Natural and constructed liners must be protected against damage by mechanical agitators or other equipment used for cleaning accumulated solids from the bottoms of the structures. Liners should also be protected from the erosive forces of waste liquid flowing from pipes during filling operations.

Soil liners may not provide adequate confidence against ground water contamination if foundation bedrock relatively near the pond waste impoundment bottom contains large, connected openings, where collapse of overlying soils into the openings could occur. These bedrock conditions were discussed in detail previously. Structural liners of reinforced concrete or geomembranes should be considered because the potential hazard of direct contamination of ground water is significant.

Liners should be protected against puncture from animal traffic and roots from trees and large shrubs. The subgrade must be cleared of stumps and large angular rocks before construction of the liner.

If a clay liner is allowed to dry, it may develop drying cracks or a blocky structure and will then have a much higher permeability. Desiccation can occur during the initial filling of the waste impoundment and later when the impoundment is emptied for cleaning or routine pumping. Disking, adding water, and compaction are required to destroy this structure. A protective insulating blanket of less plastic soil may be effective in protecting underlying more plastic soil from desiccation during these exposure periods.

State and Federal regulations may be more stringent than the design guidelines given, and they must be considered in the design. Examples later in this section address consideration of alternative guidelines.

Construction considerations for compacted clay liners

(a) Thickness of loose lifts

The permissible loose lift thickness of clay liners depends on the type of compaction roller used. If a tamping or sheepfoot roller is used, the roller teeth should fully penetrate through the lift being compacted into the previously compacted lift to achieve bonding of the lifts. A loose lift thickness of 9 inches is commonly used by NRCS specifications. If the feet on rollers cannot penetrate the entire lift during compaction, longer feet or a thinner lift should be specified. A loose layer thickness of 6 inches may be needed for some tamping rollers that have larger pad type feet that do not penetrate as well. Thinner lifts could significantly affect construction costs.

(b) Method of construction

(1) Bathtub

This method of construction consists of a continuous thickness of soil compacted up and down or across the slopes (fig. 10D- 2). This construction is clearly preferable to the stair step method because inter-lift seepage flow through the sides of the excavation is less. This method also lends itself well to the thinner lifts used by NRCS. Side slopes should be 3H:1V or flatter to use this method. Shearing of the soil by the equipment on steeper slopes is a problem. To prevent shearing of the compacted soil, the slope used must be 3H:1V or flatter so that equipment will exert more normal pressure on the slope than downslope pressure.

(2) Stair step

This method of construction is illustrated in figure 10D- 2. It would probably be needed for side slopes steeper than about 3H:1V. A much thicker blanket, measured normal to the slope, will result compared to the bathtub method of construction. This is a positive factor in seepage reduction, but it will probably be more expensive because of the larger volume of soil required. Another advantage of this method is that the thicker blanket reduces the impact of shrinkage

cracks, erosive forces, and potential mechanical damage to the liner. If the main concern is leakage through the bottom of the lagoon rather than the sides, the method has fewer advantages over the bathtub method. Another disadvantage of this method is that a larger volume of excavation is required to accommodate the thicker blanket.

(c) Soil type

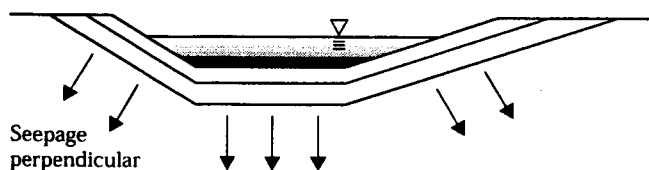
(1) Classification

Group IV soil has a plasticity index (PI) greater than 30 and is usually considered desirable. However, soil that has a PI value greater than 40 is not desirable for several reasons. Although more highly plastic clays may have very low laboratory test permeability values, these clays can develop severe shrinkage cracks. Preferential flow through the desiccated soil often results in a higher than expected permeability. Figure 10D-3 illustrates the structure that can occur with plastic clays where clods are present.

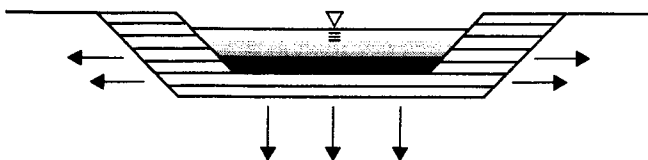
Highly plastic clays are also difficult to compact properly. Special effort should be directed to processing the fill and degrading any clods in high plasticity clays to prevent the problems illustrated with figure 10D-3.

Figure 10D-2 Methods of liner construction (After Boutwell, 1990)

Bathtub construction



Stairstep construction



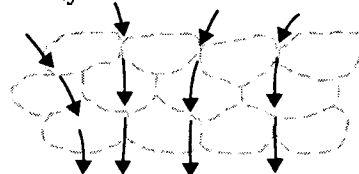
High plasticity clays may be covered with a blanket of insulating soil, such as an SM soil, to protect the liner from desiccation while the waste impoundment is being filled, particularly if filling will occur during hot, dry months.

(2) Size of clods

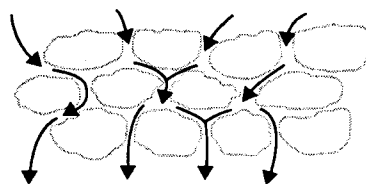
The size and dry strength of clay clods in soil prior to compaction have a significant effect on the final quality of a clay liner. Large, dry clods of plastic clays are extremely difficult to degrade and moisten thoroughly. High speed rotary pulverizers are sometimes needed if conditions are especially unfavorable. Adding water to the soil is difficult because water penetrates the clods slowly.

Figure 10D-3 Macrostructure in highly plastic clays with poor construction techniques (from Hermann 1987)

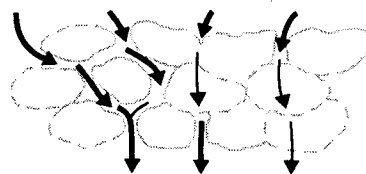
Micropermeability



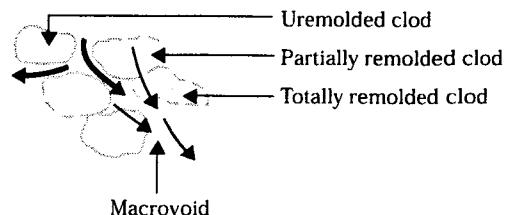
Macropermeability



Intermediate situation



Key



(d) Natural water content of borrow**(1) Dry conditions in the borrow**

Dry, highly plastic clays are most likely extremely cloddy. Time must be allowed for added water to penetrate larger clods before processing. Prewetting the borrow area may reduce the severity of this problem. Because water slowly penetrates any clods, adding significant amounts of water to a plastic clay is difficult if this addition is delayed until processing on the compacted fill.

(2) Wet conditions in the borrow

If the natural water content of the borrow soil is significantly higher than optimum water content, achieving the required degree of compaction may be difficult. A good rule-of-thumb is that a soil will be difficult to compact if its natural water content exceeds about 90 percent of the theoretical saturated water content at the dry density to be attained. The following procedure can help to determine if a wet condition may be present.

Step 1- Measure the natural water content of the soil to be used as a borrow source for the clay liner being compacted.

Step 2- Measure the maximum dry density and optimum water content of the soil by the appropriate Proctor test (generally ASTM D 698, method A).

Step 3- Determine from suggestions in this guidance document, or from laboratory permeability tests, to what degree of compaction are the clay soils to be compacted (generally 90, 95, or 100 percent of maximum dry density).

Step 4- Calculate the theoretical saturated water content at the design dry density of the liner:

$$w_{\text{sat}} (\%) = \left(\frac{\gamma_{\text{water}}}{\gamma_d} - \frac{1}{G_s} \right) \times 100$$

Step 5- Calculate 90 percent of the theoretical saturated water content.

Step 6- If the natural water content of the soil is more than 1 or 2 percent wet of this calculated upper feasible water content, the clays will be difficult to compact to the design density without drying. In most cases drying clay soils simply by disking is somewhat ineffective. It would be more practical to delay construction to a drier part of the year when the borrow source is at a lower water content. In some cases the borrow area can be drained several months before construction. This would allow gravity drainage to decrease the water content to an acceptable level.

(e) Method of excavation and methods of processing**(1) Clods in borrow soil**

If borrow soil is plastic clays at a low water content, it will probably have large, durable clods. Disking may be effective for some soils at the proper water content, but pulverizer machines may be required. To attain the highest quality liner, the transported fill should be processed with either a disk or a pulverizer before using a tamping roller. Equipment requirements depend on the severity of the clodiness and the water content of the soil.

(2) Placement of lifts

Preferential flow paths can be created if lifts of the clay liner are not staggered or placed in alternating directions. Continuous processing in one direction without adequate disking and bonding can also result in flow paths between lifts. Careful planning of the liner construction will avoid these problems.

(f) Macro-structure in plastic clay soils

Clods can create a macro-structure in a soil that results in higher than expected permeability because of preferential flow along the interfaces between clods. Figure 10D-3 illustrates a structure that can result from inadequate wetting and processing of plastic clay. The permeability of intact clay particles may be quite low, but the overall permeability of the mass is high because of flow between the intact particles.

(g) Dry density and optimum water content

(1) Introduction

Compaction specifications normally require a minimum dry density (usually referenced to a specified compaction test procedure) and an accompanying range of acceptable water contents (referenced to the same compaction test procedure). This method of fill specification may not be as applicable to design of clay liners. A given permeability value can be attained for many combinations of compacted density and water contents (Daniels 1990). Dry density/water combinations that result in compaction at a relatively high degree of saturation are most effective in minimizing permeability for a given soil.

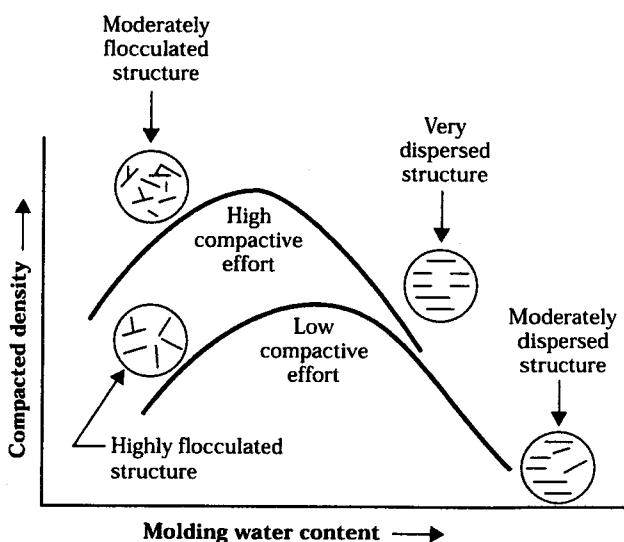
(2) Percent saturation criteria

A given value of permeability may be attained at any number of combinations of dry density and molding water content. Generally, for any given value of dry density, a lower permeability is attained if soils are compacted wet of optimum. However, many combinations of dry density and molding water content result in acceptably low permeability if the degree of saturation is high enough and a certain lower bound dry density value is met. For instance, a soil compacted at 90 percent of maximum Standard Proctor dry density at a water content 2 percent wet of optimum may have about the same permeability as a soil compacted to 95 percent of maximum Standard Proctor dry density at a water content equal to optimum water content.

Daniels (1990) describes a method of specifying combinations of dry density and water content to meet a certain permeability goal. Extensive testing may be required to establish the range of acceptable dry density and molding water content for a particular sample or site using this method. To limit soil mechanics testing complexity, generally no more than three combinations of dry density and placement water content are investigated to arrive at a design recommendation. More detailed analyses are usually reserved for large sanitary landfills or hazardous waste sites.

Figure 10D- 4 shows how a different structure results between soils compacted wet of optimum and those compacted dry of optimum water content. It also illustrates that soils compacted with a higher compactive effort or energy have a different structure than those compacted with low energy.

Figure 10D- 4 Effect of water content and compactive effort on remolding of soil structure in clays (from Lambe 1958)



(h) Energy level of compaction

The relationship of maximum dry density and optimum water content varies with the compactive energy used to compact a soil. Higher compactive energy results in higher values of maximum dry unit weight and lower values of optimum water content. Lower compactive energy results in lower values of maximum dry unit weight and higher values of optimum water content. Because optimum water content varies with the energy used in compaction, its nomenclature can be misleading. The optimum water content of a soil is actually for the particular energy used in the test to measure it.

Compactive energy is a function of the weight of the roller used, the thickness of the lift, and the number of passes of the roller over each lift. Rollers must be heavy enough to cause the teeth on the roller to penetrate or almost penetrate the compacted lift. Enough passes must be used to attain coverage and break up any clods. As such, additional passes cannot be used to compensate for rollers that are too light for the job.

Roller size is often specified in terms of contact pressure exerted by the feet on tamping rollers. Light rollers have contact pressures less than 200 pounds per square inch, while heavy rollers have contact pressures greater than 400 pounds per square inch.

Limited data are available for various sizes of equipment to correlate the number of passes required to attain different degrees of compaction. Typically, from 4 to 8 passes of a tamping roller with feet contact pressures of 200 to 400 pounds per square inch are required to attain degrees of compaction of from 90 to 100 percent of maximum Standard Proctor dry density. However, this may vary widely with the soil type and weight of roller used. Specific site testing should be used when possible.

(i) Equipment considerations

(1) Size and shape of teeth on roller

Tamping rollers should have teeth that protrude an appreciable distance from the drum surface, as the older style sheepsfoot rollers do. The newer types of tamping rollers have square pads that do not protrude far from the drum surface. They appear less desirable than the older style rollers because less bonding and destruction of clay clods probably result.

(2) Total weight of roller

To attain penetration of the specified loose lift, the roller weight must be appropriate to the specified thickness and the shape of the roller teeth. Many modern rollers have contact pressures that are too great to compact soils appreciably wet of optimum water content. When the specified compaction water content is approaching 90 percent theoretical saturation at the specified dry density, lighter rollers are essential. Permeability of clays is minimized by compaction at water contents wet of optimum.

(3) Speed of operation

Heavy rollers operated at excessive speed can shear the soil lifts being compacted. This can result in higher permeability. Close inspection of construction operations should indicate when this problem occurs, and adjustments to equipment or the mode of operation should then be made.

(4) Vibratory versus nonvibratory

Vibratory type tamping rollers appear to have few advantages in constructing clay liners. These rollers may be counterproductive when the base soil is saturated and lower in plasticity because the vibration can induce pore pressures in the underlying base soil and create free water. Smooth-wheeled vibratory rollers should never be used in compacting clay liners. They are suitable only for relatively clean, coarse-grained soil.

Appendix Q
CPA Economic Feasibility Analysis

September 18, 2006

Charles Vander Kooi
Vander Kooi Dairy
8315 Merrill Ave.
Chino, CA 91710



Re: Evaluation of alternatives for Vander Kooi Dairy

Dear Charles

We prepared the cash flow projections for the proposed dairy with 3,916 Animals for Phase II of the dairy. Phase II will be constructed for 2,100 milking cows. The projected cost of construction is \$10,000,000. You will obtain a loan for 100% of the costs using your equity in the existing real estate. The projection includes the maximum amount that can be borrowed on the cows and heifers. Since the dairy industry is subject to fluctuation milk prices, the projections include the results of various milk prices.

We prepared cash flow projections for reduced herd sizes:

	Animal Units	Milking Cows
Proposed dairy	3,916	2,050
40% Reduction	2,392	1,250
60% Reduction	1,566	815

The problem is that many of the costs of construction of the dairy facility are not reduced along with the reduced number of animals.

1. Regardless of the size of the dairy facility, it requires about the same space for the milking barn, corrals, feed storage, mixing area and room to operate the business. Reducing the number of animals will slightly reduce the area of land leveling.
2. The dairy operation requires certain structures including a dairy barn, corrals, freestall barns, commodity barn, feed storage area and a residence. The reduction of animals does not eliminate the need or the cost of these structures.

(909) 613 1717
Fax (909) 613 1724
11800 Central Avenue
Suite 225
Chino, CA 91710

MAILING ADDRESS
P O Box 697
Chino, CA 91708-0697

(559) 685 1700
Fax (559) 688 3740
120 North "L" Street
Tulare, CA 93274

Charles Vander Kooi
Vander Kooi Dairy
September 18, 2006
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The same problem exists with attempting to reduce the cost of operating a dairy business by reducing the number of animals.

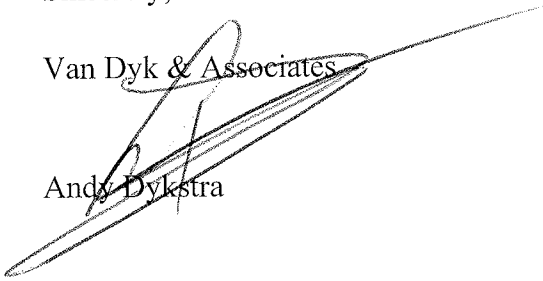
1. A certain number of employees are needed for the various aspects of the operation. The larger the size of operation usually makes each employee more efficient.
2. Many of the expenses will not be reduced with the reduced size, such as:
 - a. The electricity needed for all milking equipment and lighting will be required regardless of the number of cows.
 - b. The number of employees, tractors, loader and feed trucks will not change or be reduced by the number of cows and heifers that are fed.
 - c. Most dairy supplies, such as chlorine to clean the milk pipelines and equipment, will not be reduced because of certain activities that are required regardless of or the number of cows.
 - d. The repairs and maintenance of the equipment and facility will not decrease with the reduced cow numbers because the same facilities and equipment are required for the dairy operations regardless of the size.

If you have any questions of the foregoing, do not hesitate to contact me.

Sincerely,

Van Dyk & Associates

Andy Dykstra



Van Der Kooi Dairy - 3,916 Animals**Monthly Cash Flow Projection**

Projected Blend Milk Price	\$ 11.00	\$ 12.00	\$ 13.00
Total Cows	3,916	3,916	3,916
Milking Cows	2,050	2,050	2,050
Dry Cows/Springers	310	310	310
Growing Heifers	1,556	1,556	1,556
Average Daily Production	70	70	70
Milk Price	\$ 11.00	\$ 12.00	\$ 13.00

Income

Milk	\$ 473,550	\$ 516,600	\$ 559,650
Calves	3,186	3,186	3,186
Sale of Cull Cows	21,240	21,240	21,240
Total Income	\$ 497,976	\$ 541,026	\$ 584,076

Expenses**Feed**

Hay	157,133	157,133	157,133
Grain	77,490	77,490	77,490
Heifer Raising and Other Feed	55,965	55,965	55,965
Total Feed	\$ 290,588	\$ 290,588	\$ 290,588

Other Expenses

Labor	1.30	55,965	55,965	55,965
Milk Hauling	0.40	17,220	17,220	17,220
Association Charges	0.19	8,180	8,180	8,180
Supplies	0.30	12,915	12,915	12,915
Repairs and Maintenance	0.30	12,915	12,915	12,915
Utilities	0.24	10,332	10,332	10,332
Taxes and Licenses	0.35	15,068	15,068	15,068
Insurance	0.12	5,166	5,166	5,166
Fuel and Oil	0.15	6,458	6,458	6,458
Legal and Accounting	0.03	1,292	1,292	1,292
Employee Benefits	0.02	861	861	861
Vet and Medicine	0.05	2,153	2,153	2,153
Breeding	0.11	4,736	4,736	4,736
Hauling Livestock	0.04	1,722	1,722	1,722
Milk Testing	0.04	1,722	1,722	1,722
Clipping and Trimming	0.06	2,583	2,583	2,583
Miscellaneous	0.04	1,722	1,722	1,722
Total Other Expenses		\$ 161,007	\$ 161,007	\$ 161,007
Living Expenses		\$ 6,000	\$ 6,000	\$ 6,000
Principal		53,333	53,333	53,333
Interest		48,583	48,583	48,583
Total expenses, draw & debt service		\$ 559,511	\$ 559,511	\$ 559,511
Net Monthly Cash Flow		\$ (61,535)	\$ (18,485)	\$ 24,565

Van Der Kooi Dairy - 3,916 Animals**Debt Service:****Bank - Feed Loan**

Principal Balance	500,000	500,000	500,000
Interest Rate	5.00%	5.00%	5.00%
Principal Payment	0	0	0
Interest Payment	2,083	2,083	2,083

Bank - Cow Loan

Principal Balance	1,500,000	1,500,000	1,500,000
Interest Rate	5.00%	5.00%	5.00%
Principal Payment	10,000	10,000	10,000
Interest Payment	6,250	6,250	6,250

Bank - Equipment Loan

Principal Balance	60,000	60,000	60,000
Interest Rate	5.00%	5.00%	5.00%
Principal Payment	1,667	1,667	1,667
Interest Payment	250	250	250

Bank - Real Estate Loan

Principal Balance	10,000,000	10,000,000	10,000,000
Interest Rate	6.00%	6.00%	6.00%
Principal Payment	41,667	41,667	41,667
Interest Payment	40,000	40,000	40,000

Total Principal and Interest	<u>\$ 101,917</u>	<u>\$ 101,917</u>	<u>\$ 101,917</u>

Van Der Kooi Dairy - 2,392 Animals**Monthly Cash Flow Projection**

Projected Blend Milk Price	\$ 11.00	\$ 12.00	\$ 13.00
Total Cows	2,392	2,392	2,392
Milking Cows	1,250	1,250	1,250
Dry Cows/Springers	190	190	190
Growing Heifers	952	952	952
Average Daily Production	70	70	70
Milk Price	\$ 11.00	\$ 12.00	\$ 13.00

Income

Milk	\$ 288,750	\$ 315,000	\$ 341,250
Calves	1,944	1,944	1,944
Sale of Cull Cows	12,960	12,960	12,960
Total Income	<u>\$ 303,654</u>	<u>\$ 329,904</u>	<u>\$ 356,154</u>

Expenses**Feed**

Hay	95,813	95,813	95,813
Grain	47,250	47,250	47,250
Heifer Raising and Other Feed	34,125	34,125	34,125
Total Feed	<u>\$ 177,188</u>	<u>\$ 177,188</u>	<u>\$ 177,188</u>

Other Expenses

Labor	1.40	36,750	36,750	36,750
Milk Hauling	0.40	10,500	10,500	10,500
Association Charges	0.19	4,988	4,988	4,988
Supplies	0.40	10,500	10,500	10,500
Repairs and Maintenance	0.35	9,188	9,188	9,188
Utilities	0.30	7,875	7,875	7,875
Taxes and Licenses	0.35	9,188	9,188	9,188
Insurance	0.15	3,938	3,938	3,938
Fuel and Oil	0.15	3,938	3,938	3,938
Legal and Accounting	0.03	788	788	788
Employee Benefits	0.02	525	525	525
Vet and Medicine	0.05	1,313	1,313	1,313
Breeding	0.11	2,888	2,888	2,888
Hauling Livestock	0.04	1,050	1,050	1,050
Milk Testing	0.04	1,050	1,050	1,050
Clipping and Trimming	0.06	1,575	1,575	1,575
Miscellaneous	0.04	1,050	1,050	1,050
Total Other Expenses		<u>\$ 107,100</u>	<u>\$ 107,100</u>	<u>\$ 107,100</u>
Living Expenses		<u>\$ 6,000</u>	<u>\$ 6,000</u>	<u>\$ 6,000</u>
Principal		49,333	49,333	49,333
Interest		45,250	45,250	45,250
Total expenses, draw & debt service		<u>\$ 384,871</u>	<u>\$ 384,871</u>	<u>\$ 384,871</u>
Net Monthly Cash Flow		<u><u>\$ (81,217)</u></u>	<u><u>\$ (54,967)</u></u>	<u><u>\$ (28,717)</u></u>

Van Der Kooi Dairy - 2,392 Animals

Debt Service:

Bank - Feed Loan

Principal Balance	300,000	300,000	300,000
Interest Rate	5.00%	5.00%	5.00%
Principal Payment	0	0	0
Interest Payment	1,250	1,250	1,250

Bank - Cow Loan

Principal Balance	900,000	900,000	900,000
Interest Rate	5.00%	5.00%	5.00%
Principal Payment	6,000	6,000	6,000
Interest Payment	3,750	3,750	3,750

Bank - Equipment Loan

Principal Balance	60,000	60,000	60,000
Interest Rate	5.00%	5.00%	5.00%
Principal Payment	1,667	1,667	1,667
Interest Payment	250	250	250

Bank - Real Estate Loan

Principal Balance	10,000,000	10,000,000	10,000,000
Interest Rate	6.00%	6.00%	6.00%
Principal Payment	41,667	41,667	41,667
Interest Payment	40,000	40,000	40,000

Total Principal and Interest	<u>\$ 94,583</u>	<u>\$ 94,583</u>	<u>\$ 94,583</u>

Van Der Kooi Dairy - 1,566 Animals**Monthly Cash Flow Projection**

Projected Blend Milk Price	\$ 11.00	\$ 12.00	\$ 13.00
Total Cows	1,566	1,566	1,566
Milking Cows	815	815	815
Dry Cows/Springers	125	125	125
Growing Heifers	626	626	626
Average Daily Production	70	70	70
Milk Price	\$ 11.00	\$ 12.00	\$ 13.00

Income

Milk	\$ 188,265	\$ 205,380	\$ 222,495
Calves	1,269	1,269	1,269
Sale of Cull Cows	8,460	8,460	8,460
Total Income	<u>\$ 197,994</u>	<u>\$ 215,109</u>	<u>\$ 232,224</u>

Expenses**Feed**

Hay	62,470	62,470	62,470
Grain	30,807	30,807	30,807
Heifer Raising and Other Feed	22,250	22,250	22,250
Total Feed	<u>\$ 115,526</u>	<u>\$ 115,526</u>	<u>\$ 115,526</u>

Other Expenses

Labor	1.50	25,673	25,673	25,673
Milk Hauling	0.40	6,846	6,846	6,846
Association Charges	0.19	3,252	3,252	3,252
Supplies	0.50	8,558	8,558	8,558
Repairs and Maintenance	0.40	6,846	6,846	6,846
Utilities	0.35	5,990	5,990	5,990
Taxes and Licenses	0.35	5,990	5,990	5,990
Insurance	0.18	3,081	3,081	3,081
Fuel and Oil	0.15	2,567	2,567	2,567
Legal and Accounting	0.03	513	513	513
Employee Benefits	0.02	342	342	342
Vet and Medicine	0.05	856	856	856
Breeding	0.11	1,883	1,883	1,883
Hauling Livestock	0.04	685	685	685
Milk Testing	0.04	685	685	685
Clipping and Trimming	0.06	1,027	1,027	1,027
Miscellaneous	0.04	685	685	685
Total Other Expenses		<u>\$ 75,477</u>	<u>\$ 75,477</u>	<u>\$ 75,477</u>
Living Expenses		<u>\$ 6,000</u>	<u>\$ 6,000</u>	<u>\$ 6,000</u>
Principal		47,333	47,333	47,333
Interest		43,583	43,583	43,583
Total expenses, draw & debt service		<u>\$ 287,920</u>	<u>\$ 287,920</u>	<u>\$ 287,920</u>
Net Monthly Cash Flow		<u><u>\$ (89,926)</u></u>	<u><u>\$ (72,811)</u></u>	<u><u>\$ (55,696)</u></u>

Van Der Kooi Dairy - 1,566 Animals**Debt Service:****Bank - Feed Loan**

Principal Balance	200,000	200,000	200,000
Interest Rate	5.00%	5.00%	5.00%
Principal Payment	0	0	0
Interest Payment	833	833	833

Bank - Cow Loan

Principal Balance	600,000	600,000	600,000
Interest Rate	5.00%	5.00%	5.00%
Principal Payment	4,000	4,000	4,000
Interest Payment	2,500	2,500	2,500

Bank - Equipment Loan

Principal Balance	60,000	60,000	60,000
Interest Rate	5.00%	5.00%	5.00%
Principal Payment	1,667	1,667	1,667
Interest Payment	250	250	250

Bank - Real Estate Loan

Principal Balance	10,000,000	10,000,000	10,000,000
Interest Rate	6.00%	6.00%	6.00%
Principal Payment	41,667	41,667	41,667
Interest Payment	40,000	40,000	40,000

Total Principal and Interest	<u>\$ 90,917</u>	<u>\$ 90,917</u>	<u>\$ 90,917</u>

Appendix R
List of Dairies Currently Permitted in
the San Joaquin Valley Air Basin

LIST OF DAIRIES IN KERN, TULARE, KINGS, FRESNO MADERA, MERCED SAN JOAQUIN, AND STANISLUAS COUNTIES

This list of dairies within the eight counties was prepared by Quad Knopf. The information was obtained from the following sources:

- California Regional Water Quality Control Board Fresno: On April 12, 2002, Clay Rodgers with RWQCB acknowledged that the Fresno office had information on dairies in Madera, Fresno, Kings, Tulare and Kern County; however, only sixteen percent of these dairies were compiled into a list. To get the names of the remaining dairies would require going through the files in the Fresno office. Mr. Rodgers agreed that this information should be available from each County.
- Kern County Planning Department: A list of existing and proposed dairies in Kern County was provided by this agency.
- Tulare County Resource Management Agency: Roberto Brady provided a list of existing and proposed dairies in Tulare County (January 2005).
- Kings County Planning Department: This agency did not have a list of existing dairies in Kings County, but the information was available from the Tulare County Environmental Health Department's Dairy Inspector office, which is under contract with Kings County.
- Fresno County Environmental Health: This agency maintains information on existing dairies within the County and provided the list.
- Madera County Planning Department: A list of existing dairies in Madera County was provided from this agency.
- Merced County Environmental Health Department: This agency provided the names of dairies located in Merced County.
- San Joaquin County Environmental Health Department: A list of existing San Joaquin County dairies was available from this agency.
- California Regional Water Quality Control Board, Sacramento: This agency provided the existing dairy information from Stanislaus County.

Tulare County Existing Dairies

Dairy Name	City	Zip
A&L Dairy	Tulare	93274
Airosa Dairy	Tulare	93274
Angiola Dairy	Corcoran	93212
Ankeridge Dairy	Visalia	93292
Artesia Dairy Farm	Corcoran	93212
Atsma Dairy	Tipton	93272
Atsma Dairy #3	Pixley	93256
Aukeman Farms	Tulare	93274
Avila Dairy	Visalia	93291
B&D Dairy	Visalia	93291
B&G Dairy	Visalia	93277
Bakker Bros. Dairy	Visalia	93291
Bakker Dairy	Visalia	93291
Barcellos Dairy	Tipton	93272
Bardsley Dairy	Tulare	93274
Barthelemy Dairy	Tulare	93274
Bar-VP Dairy	Pixley	93256
Bayou Vista Dairy #1	Tipton	93272
Bertorelli Bros. Dairy	Strathmore	93267
Bixler Farms Inc.	Tulare	93274
Boertje Dairy	Visalia	93292
Borba Dairy #1	Porterville	93257
Borges & Silva Dairy	Tipton	93272
Borges Dairy	Tipton	93272
Bos Farms !11	Tulare	93274
Bosma Dairy	Tipton-	93272
Bosman Dairy	Visalia	93291
Branco Dairy	Visalia	93291
Brasil & Sons Dairy	Tipton	93272
Brasil's Udder Dairy	Tulare	93274
Bravo Farms	Visalia	93292
Brouwer Dairy	Visalia	93277
Brower Dairy #1	Exeter	93221
Brower Dairy #2	Lindsay	93247
Buena Vista Dairy	Tulare	93274
Buttercup Dairy	Tulare	93274
Cardoza Dairy (Joe V.)	Tulare	93274
Cardoza Dairy (John & Sh	Tipton	93272
Cardoza Dairy (Tony P)	Visalia	93277
Cascade Dairy	Tulare	93274
Cattail] Dairy	Tulare	93274
Clear Lake Farms	Tulare	93274
Coderniz & Gomes Dairy	Tulare	93274
Codomiz Dairy	Tulare	93274
Coito & Sons Dairy	Tulare	93274
Copenhagen Dairy	Visalia	93291
Cornerstone Dairy	Tipton	93272
Costa Dairy	Visalia	93277
Countryside Dairy	Tulare	93274
Creek Side Dairy	Tulare	93274

Curti Dairy #2	Tulare	93274
Curti Dairy #1	Tulare	93274
Curti Farm's Jerseys #3	Tulare	93274
D L & A Dairy #2	Tulare	93274
D&V Dairy	Tipton	93272
Dairyland Farms	Pixley	93256
Day & Night Dairy	Tulare	93274
De Jong Dairy (Chris)	Porterville	93257
DeBoer Dairy	Tulare	93274
Deercreek Dairy	Pixley	93256
DeGroot Dairy #1	Visalia	93291
DeGroot Dairy #2	Visalia	93291
DeGroot Dairy #3	Pixley	93256
DeGroot Dairy #4	Pixley	93256
DeGroot Dairy #5	Pixley	93256
DeJong Dairy	Porterville	93257
DeJong Dairy (Cornelis)	Visalia	93292
DeJong Dairy Farm	Visalia	93292
Del Oasis Farms	Visalia	93291
Della & Sons Dairy	Porterville	93257
Delta View Farms	Visalia	93291
DL&A Dairy	Tulare	93274
Double J Cattle	Tipton	93272
Double J Dairy	Visalia	93291
Dragt Dairy (Harold)	Visalia	93291
Dragt Dairy (J&T)	Visalia	93291
Dystra Dairy	Tulare	93274
E&J Brothers Dairy	Tulare	93274
El Monte Dairy	Tipton	93272
Endeavor Gold Dairy	Tulare	93274
Esteves Dairy #2	Visalia	93277
F&F Dairy	Tulare	93274
F&J Dairy	Delano	93215
Faria Dairy (M. P. & Sons) Eddie & Clearance Faria	Visalia	93277
Faria Farms Inc_	Tipton	93272
Femandes Dairy (Joey)	Tulare	93274
Fernandes Dairy (Joe)	Tulare	93274
Five Star Dairy #1	Tipton	93272
Five Star Dairy #2	Tipton	93272
Fletcher Dairy	Tulare	93274
FM Ranch #1	Tulare	93274
FM Ranch #2	Tipton	93272
Four 3 Dairy Frank Junio	Pixley	93256
Franco & Sons Dairy	Tulare	93274
Frank Pires III Dairy Frank Fires 111	Tulare	93274
Friesian Dairy #2	Tulare	93274
G&P Dairy	Visalia	93291
Galhano Dairy	Visalia	93277
Garcia Bros. Dairy	Tulare	93274
Garcia Dairy (Frank)	Tulare	93274
Garcia Dairy (Henry)	Tulare	93274

GH&G Zyling Dairy	Dinuba	93618
Glover Bros. Dairy	Strathmore	93267
GMC Dairy #1 George & Marilyn Lanting	Corcoran	93212
Golden West Dairy	Visalia	93291
Gomes Dairy	Tulare	93274
Gonsalves Dairy	Tulare	93274
Griffoen Dairy	Dinuba	93618
GTA Dairy	Tulare	93274
H&I Dairy	Tipton	93272
H&T Dairy	Tipton	93272
Hamstra Dairy	Tulare	93274
Harmony Farms	Strathmore	93267
Heijdam Dairy	Tulare	93274
Heritage Dairy	Tulare	93274
Hettinga Dairy (Warren)	Tipton	93272
Hettinga Dairy (Wilbur)	Pixley	93256
Highstreet Dairy	Tulare	93274
Hilarides Dairy West	Lindsay	93247
Hoffman Farms 12	Tulare	93274
Holstein Farms	Tulare	93274
Horizon Jersey Dairy	Tipton	93272
Irigaray Dairy	Tulare	93274
J&A Dairy	Tulare	93274
J&L Dairy (Menezes)	Tulare	93275
J&L Dairy (Pacheco)	Kingsburg	93631
Jacobi Dairy	Dinuba	93618
Jaques Dairy Jeffrey & Marlene Poston	Tulare	93274
JEM Farms	Tipton	93272
Jensen Cattle Company	Kingsburg	93631
Jer-Z-Boyz Ranch	Pixley	93256
Joey Fernandes Dairy #2	Tulare	93274
Jongsma Dairy (Chris)	Tipton	93272
Jongsma Dairy (James & J	Pixley	93256
Jongsma Dairy (William & John & Bill	Pixley	93256
Jongsma		
Jorge (Manuel) & Son Dai	Corcoran	93212
JR Dairy	Tipton	93272
Junction Farms	Tulare	93274
Kampen (Fred) & Sons Da	Visalia	93291
Kampen (Henry) & Sons	Visalia	93291
Kesting Dairy	Dinuba	93618
Koetsier Dairy (Henry & S Ron Sr, Ron Jr & Henry Koetsi 6901 Avenue 280	Visalia	93277
Koetsier Dairy (Jake)	Tulare	93274
Koetsier Dairy (Tom & So	Pixley	93256
Kroes Dairy	Tipton	93272
L&F Dairy #1	Tulare	93274
Lawrence Dairy (Frank C.) Frank C Lawrence	Visalia	93277
Lawrence Dairy (Manual	Hanford	93230
Leal Dairy	Tulare	93274

Lerda Farms	Tulare	93274
Leyendekker Dairy #1 (Ge	Visalia	93291
Leyendekker Dairy #3 (Art Arthur	Visalia	93291
Leyendekker		
LK Ranches	Visalia	93277
Lopes Dairy	Dinuba	93618
Lorenzo Dairy	Tulare	93274
Lou Mar Dairy	Tipton	93272
Lourenco Dairy	Tulare	93274
Lourenco Family Dairy	Visalia	93292
Lu-Al Dairy	Tulare	93274
M&S Dairy (Souza)	Tipton	93272
Macedo & Sons Dairy	Tipton	93272
Macedo Brothers Dairy	Tipton	93272
Machado Bros. Dairy	Tulare	93274
Machado Dairy	Tulare	93274
Mancebo Bros Dairy	Tulare	93274
Mancebo Dairy	Tulare	93274
Martin Bros. Dairy	Tulare	93274
Martin Dairy (Bel R. & So	Tulare	93274
Martin Dairy (Manuel)	Tipton	93272
Mattos Dairy (Joaquim)	Tulare	93274
Meadow Lake West Dairy	Tipton	93272
Mejia Dairy	Tulare	93274
Mellema Dairy	Visalia	93291
Mendonca Dairy	Tulare	93274
Mendonca Dairy #1 (Tony	Tulare	93274
Mendonca Dairy (Ben)	Tulare	93274
Mendonca Dairy 1#2 (Tony	Tulare	93274
Mendonca Dairy Farms	Tulare	93274
Mendonsa Farms (John)	Tipton	93272
Milky Way Dairy (South)	Visalia	93291
MJB Dairy (Borges)	Tulare	93274
Monteiro Dairy	Tulare	93274
Moonlight Dairy	Visalia.	93271
Morass Dairy	Tulare	93274
Mountain View Dairy	Visalia	93292
Nace Dairy	Tipton	93272
Northstar Dairy	Tipton	93272
Nunes & Sons Dairy Gerald & Eugene	Tulare	93274
Nunes		
Nunes Bros. Dairy Tony L & Patrick Nunes	Tulare	93274
Nunes Dairy (Adriano) Adriano Nunes	Tulare	93274
Nunes Dairy (Tony A.) . Tony A & Mary A	Visalia	93291
Nunes		
O&L Dairy	Visalia	93277
Oakview Dairy	Tulare	93274
Pacheco & Associates•Dair Benjamin	Tulare	93274
Pacheco		
Pacheco & Fagtm das Dairy R. Pacheco & M. Fagundes	Lindsay	93247

Palm Dairy	Tulare	93274
Parreira & Pinheiro & Son Randy & Clarence Parreira	Tipton	93272
Parreira & Pinheiro Dairy	Tipton	93272
Parreira & RHH Farms	Pixley	93256
Parreira Dairy (John L.) John Parreira	Tulare	93274
Pedro Dairy Joe & Virginia Pedro	Visalia	93277
Pereira Dairy (John V.) John V. & Maria Pereira	Tulare	93274
Pereira Dairy Steve & Sheri Pereira	Visalia	93291
Pete Vander Poet Dairy	Tulare	93274
Pinheiro Dairy Steve Milanesio	Strathmore	93267
Pires Dairy	Tipton	93272
Pires Dairy (Joe Jr.) Joe Jr & Marrgaret Fires	Tipton	93272
Ponderosa Dairy	Tipton	93272
R & S Dairy	Tulare	93274
R&V Dairy	Strathmore	93267
Rancho Nuevo Dairy	Tulare	93274
Rancho Teresita	Tulare	93274
Red Rose Dairy	Visalia	93291
Rib Arrow Dairy Dave & Joe Ribeiro	Tulare	93274
Ribeiro Dairy (Felipe & So Philip D & Philip A Ribeiro	Tulare	93274
Ribeiro Dairy Farm	Tulare	93274
Rio Blanco Dairy	Tulare	93274
Riverbend Dairy (North)	Tulare	93274
Riverview Dairy	Pixley	93256
Rocha Dairy	Porterville	93257
Rocky Road Dairy #1	Dinuba	93618
Rodrigues Dairy	Tulare	93274
Rynsburger Dairy	Strathmore	93267
S&S Dairy	Visalia	93277
Sanchez Dairy	Tulare	93274
Santos Dairy (Antonio)	Visalia	93277
Santos Dairy (John L. & S	Tulare	93274
S-Bar-F Dairy	Tulare	93274
Scheenstra Dairy	Tipton	93272
Schott Dairy	Tipton	93272
Sepeda Bros. Dairy	Tulare	93274
Shady Acres Dairy	Visalia	93291
Shirk Dairy	Visalia	93277
Sierra Valley Dairy	Pixley	93256
Sierra View Dairy	Tulare	93274
Sierra Vista Dairy	Tulare	93274
Silver Oak Dairy	Tipton	93272
Simoess & Ribeiro Dairy	Tulare	93274
Simoess Bros Dairy	Visalia	93277
Simoess Dairy #2 (Melvin)	Tulare	93274
Simoess Dairy (John)	Tulare	93274
Simoess Dairy (Mario & So Mario & Mark Simoess	Tipton	93272

Simoese Dairy (Mario)	Tulare	93274
Simoese Family Dairy	Tipton	93272
Souea & Souea Dairy	Tipton	93272
Souea Dairy (Alvin)	Tulare	93274
Souea Dairy (Tony)	Dinuba	93618
Souea Farm Dairy	Pixley	93256
Souza Dairy (Ed & Randy)	Tulare	93274
Souza Dairy (Paul & Co.)	Tulare	93274
Sun Valley Dairy	Delano	93213
Sunnyside Dairy	Dinuba	93618
Sunrise Dairy	Dinuba	93618
Sunset Dairy	Visalia	93291
Sweeney Dairy	Visalia	93292
T -Bar Dairy	Porterville	93257
T Bar Dairy #2	Porterville	93257
Terra Linda Dairy #2	Tulare	93274
Terra Linda Dairy 01	Tulare	93274
TeVelde Dairy #1 (G. T.)	Tipton	93272
TeVelde Dairy #2	Tipton	93272
Three Star Dairy	Tulare	93274
Tiemersma Dairy	Visalia	93291
Tiersma Dairy	Visalia	93291
Toledo Dairy (Joaquin Jr.)	Corcoran	93212
Toledo Dairy (Jose)	Porterville	93257
Triple H Dairy	Tulare	93274
Triple H Dairy 02 Larry & Cindy Hilarides	Tulare	93274
Triple M Dairy	Tulare	93274
Tulare High School Farm	Tulare	93274
Tule River Dairy	Tipton	93272
Two Star Dairy	Visalia	93292
Valley View Dairy (East)	Visalia	93277
Valov (John)	Tulare	93274
Van Beek Bros. Dairy	Tipton	93272
Van Groningen Dairy	Visalia	93291
Van Grouw Dairy	Visalia	93291
Vanden Brink Dairy (Stanl	Tipton	93272
Vander Eyk Dairy #1 (Cas	Pixley	93256
Vander Eyk Dairy #4 (Dav	Pixley	93256
Vander Hoek Dairy (Pier)	Visalia	93291
Vander Kooi Dairy (Pete)	Visalia	93277
Vander Wall Dairy	Tulare	93274
Vanderham Dairy	Visalia	93291
Vanderham Dairy (Dick &	Tipton	93272
Vanderham West Dairy	Tipton	93272
Vida Boa Dairy	Tulare	93274
Vieira Dairy	Tipton	93272
Vieira Dairy (R&A)	Tipton	93272
Vintage Dairy	Corcoran	
Visser Dairy	Pixley	93256
Wane Brothers Dairy	Tulare	93274
WateJersey Dairy	Visalia	93277

West Bardsley Dairy	Hanford	93230
West Bardsley Dairy (Bor	Visalia	93292
Westhill Dairy	Tulare	93274
Westra Dairy	Tulare	93274
Westview Dairy	Tulare	93274
White River Dairy	Ducor	93218
Windmill Dairy	Tulare	93274
Yettem Dairy	Visalia	93291
Zwaagstra Dairy	Visalia	93291
Zwart Dairy	Kingsburg	93631

Tulare County Proposed Dairies

Dairy Name	Note
Aguiar	Expansion
Atsma	Expansion
Astma	Expansion
Bar VP	New
Barcellos	New
Boertjie	Expansion
Borba	New
Bosman	New
Bosman	Expansion
Cardoza	Expansion
Chroman	New
Coito	Expansion
Curti	Expansion
DeBoer	Expansion
De Jong	Expansion
De Jong	Expansion
De Jong, G.	Expansion
Dias	Expansion
Dragt	Expansion
Dykstra	Expansion
El Monte	Expansion
Etchigaray	New
Faria	Expansion
Fernandes	Expansion
Fernandes	Expansion
Fernandes	Expansion
Fernandes, T.	New
Four J Farms	New
Gomes	Expansion
Gorzeman	Expansion
Hamstra	add wasteater land
Hillman	New
Hoffman	amendment
Jongsma, C	Expansion
Jongsma, James	Expansion
Kampen	Expansion
Koetsier	Expansion
Koetsier, G	Expansion
Koetsier, T.	Expansion
Lemon	Expansion
Lemstra	Expansion
Loftis	New
Mancebo	Expansion
Mellema	Expansion
Mello	New
Mendes	Expansion
Merritt Farms	New
Monteiro	New
Nace	Expansion
Nunes	New
Nunes	Expansion
Nunes, T.	Expansion

Pacheco	Expansion
Parreira	New
RCK Prop	New
Ribeiro	Expansion
Ribeiro	Expansion
Rijaarsdam	New
Ritchie	New
Rynsburger	Expansion
Te Velde, Jay	New
Tiersma	Expansion
Vander Poel, Pete	Expansion
White River	New

Kern County Existing Dairies

Dairy Name	City	Zip
Affentranger & Sons	Bakersfield	93312
AJB Ranch	Bakersfield	93311
Albert Goynetche Dairy	Bakersfield	
Ansonia Dairy	Arvin	
Bear Mountain Dairy		
Candido Costa Inland Empire Calf Company		
Cardoza Dairy	McFarland	
Den Dulk Dairy	McFarland	
Goyenatche Dairy		
H & P Dairy		
J & B Dairy Inc.	Bakersfield	93307
J & R Dairy	Bakersfield	93313
John Westheim Dairy		
Kootstra Dairy	Bakersfield	93307
Larsens Dairy		
Lewis Aukeman		
Manuel G. Rosa Dairy	McFarland	93250
Maple Farms Dairy		
McFarland Dairy	McFarland	93250
Mendoza Dairy		
Miersma Dairy		
Oasis Holsteins	Shafter	93263
Palla Rosa Dairy #1	Bakersfield	93313
Palla Rosa Dairy #2		
Palla Rosa Dairy #3		
Petrissans Dairy		
Progressive Dairies Inc.		
Ralph Te Velde Dairy	Bakersfield	93309
Reyneveld Dairy	Arvin	93203
Richard Atsma Dairy Farm	McFarland	93250
Richmar Farms (New)		
Richmar Farms Dairy		

Rodney Palla Farms		
T & W Dairy	Bakersfield	93313
Tjaarda Dairy		
VB Dairy	McFarland	
Whiteside Dairy	Bakersfield	93313
Whiteside Dairy (New)		
Wilgenburg Dairy	Bakersfield	93311

Kern County Proposed Dairies

Owner Name	Permit Issued
Boschma Dairy	N/A
Boston Ranch Co.	10/4/2000
George Borba	Grad. 12/8/00
George Plantenga	Grad. Issued
J.G. Boswell	5/18/2000
James Borba	12/10/2001
Pete Vanderham Dairy	9/26/2000
Poso Ranch Dairy	11/9/2000
Rodney Palla Farms Dairy #2	Grad. Issued
Rodney Palla Farms Dairy #3	N/A
Rodney Palla Farms Dairy #4	N/A
Samarin Dairy #1	N/A
Samarin Dairy #2	N/A
Tracy Ranch Dairy	2/2/2001
Vermeer & Goedhart	Grad. 11/2/00
Wegis & Young	12/10/1999
Wegis & Young	12/10/1999

San Joaquin County Existing Dairies

DAIRY	City	Zip
4-M Dairy	Manteca	95337
Amaral, Faustino & Joe	Farmington	95230
Angelo, Luis	Lodi	95242
Bacchette & Silva Dairy	Tracy	95304
Bader Dairy	Escalon	95320
Bartelink, Johan	Escalon	95320
Betschart & Sons Inc.	Manteca	95337
Bettencourt & Borges Dairy Inc.	Manteca	95336
Bettencourt, Antonio (Goat Dairy)	Manteca	95336
Borba Dairy Inc., tony	Escalon	95320
Borba, Frank D. & Carol Dairy	Escalon	95320
Borba, Frank V. & Sons 39-347	Escalon	95320
Borges, Frank J	Manteca	95337
Borges, John & Teresa	Tracy	95304
Borges, Manuel & Jeannette Dairy Inc.	Stockton	95215
Botelho, John & Lisa	Manteca	95336
Brasil & Sons Dairy Inc #1	Escalon	95320
Brasil & Sons Dairy Inc #2	Escalon	95320
Brazil Dairy, Anthony B	Escalon	95320
Brooks & Erman Ranch	Galt	95632
Bylsma, James Dairy	Escalon	95320
Castelanelli Bros 39-352	Lodi	95242
Caton, Darryl J	Escalon	95320
Chaves, Frank	Lodi	95240
Chaves, Frankie F. & Sons	Lodi	95240
Circle JM Dairy LP	Manteca	95337
Correia Trust, Jose & Alexan	Escalon	95320
Cotta & Ferreira Dairy	Stockton	95212
Creekside Dairy 39-355	Escalon	95320
Da Silva Joe 39-336	Escalon	95320
Da Silva, Joe	Escalon	95320
Da Silva, Manuel 39-362	Escalon	95320
Da Silva, Paul	Escalon	95320
Da Silva, Rick Dairy	Escalon	95320
De Ruyter Dairy	Manteca	95337
De Snayer Dairy	Lodi	95242
De Visser, Peter J	Escalon	95320
De Wit Dairy	Acampo	95220
Doorenbal Dairy #1	Escalon	95320
Doorenbal Dairy #2	Escalon	95320
Doorenbal Dairy #3	Escalon	95320
Duoma Dairy, Fred A	Tracy	95304
Dusi, Mario	Escalon	95320
Dutra Farms Inc.	Manteca	95337
Dutra, Shirley Dairy	Manteca	95337
Faria Dairy Inc. #1	Escalon	95320
Faria Dairy Inc. #2	Escalon	95320
Faria Dairy Inc. #3	Escalon	95320
Faria, John M	Acampo	95220
Ferreira & Silva Dairy	Tracy	95304
G & H Dairy	Escalon	95320
Hofman, Dirk (River Junction)	Manteca	95337

Hofman, Gerrit 39-342	Manteca	95337
Holmstead Dairy Inc.	Escalon	95320
J M Dairy	Ripon	95366
Kaehler Dairy	Lodi	95242
Kisst Dairy	Tracy	95376
Kooyman & Son Dairy	Acampo	95220
Lima Ranch 39-344	Lodi	95242
Linhares Bros	Stockton	95215
Lodi Home Dairy	Lodi	95242
Lucky J Dairy 39-331	Tracy	95304
Luis Dairy	Escalon	95320
Luis , Joe	Stockton	95205
Luiz, Everett & Sons Dairy	Lodi	95240
Luiz, Melvin D. Jr.	Manteca	95337
M & B Dairy	Escalon	95320
M & M Dairy	Lodi	95240
M S Farms	Acampo	95220
Machado & Machado Dairy 39-354	Manteca	95337
Machado Bros Dairy 39-338	Manteca	95336
Machado Dairy Farms #1 39-340	Manteca	95337
Machado Dairy Farms #2 39-351	Stockton	95205
Machado Dairy Farms #2 39-352	Stockton	95215
Machado, Joe J & Sons 39-330	Manteca	95337
Machado, Joe W.	Farmington	95230
Martin Dairy 39-333	Lodi	95242
Matos Bros Dairy	Acampo	95220
Meneses, J & Sons	Manteca	95336
Milky Way Dairy	Escalon	95320
Moreira, Daniel Francisco	Escalon	95320
Morris Dairy 39-323	Stockton	95205
Nascimento & Sons Dairy	Lodi	95240
Nissen Dairy Inc.	Escalon	95320
Nunes Dairy, Edward	Escalon	95320
Nunes, L Manuel Jr.	Farmington	95230
Ornellas Dairy	Tracy	95304
Ornellas Dairy #2	Tracy	95304
Pavao & Vieira Dairy	Tracy	95304
Pereira, Joe & Alice	Escalon	95320
Pimentel & Son Dairy	Tracy	95304
Pimentel , Joe L Dairy 39-346	Tracy	95304
Pires, T F & Son Dairy	Galt	95632
Prins Dairy, E & R	Stockton	95205
Quaresma, Raymod M 39-353	Manteca	95337
Reis, Tiberio	Stockton	95215
Robert L Moniz Dairy	Tracy	95337
Rocha, Danny 39-341	Tracy	95304
Rocha, Frank N Dairy #1 39-345	Escalon	95320
Rocha, Frank N Dairy #2	Escalon	95320
Rocha, Frank N Dairy #3	Escalon	95320
Rocha, John Jr	Escalon	95320
Rock Creek Dairy 39-349	Farmington	95230
Rothlin Dairy, Arnold	Manteca	95337
S & S Stuyt Dairy	Escalon	95320
Salvador, John V	Tracy	95304
Seifert Dairy Farm	Acampo	95220

Silva & Sons Inc., Tony	Acampo	95220
Silva Bros Dairy #1	Acampo	95220
Silva Bros Farms - Tracy 39-337	Tracy	95304
Silveira, Manuel A & Sons	Manteca	95337
Silveira, Maria	Escalon	95320
Simoes Dairy #1	Lodi	95242
Sunrise Dairy	Lodi	95240
Teicheira Dairy	Manteca	95337
Teicheira, Frank & Son	Manteca	95337
Teixeira Dairy, Isidoro 39-335	Tracy	95304
Temple Creek Dairy	Escalon	95320
Tevelde, George Dairy	Escalon	95320
Toledo Dairy #1	Galt	95632
Toledo Dairy #2	Galt	95632
Tosta #1 Henry	Tracy	95304
Toste Dairy, Orlando	Acampo	95220
Ullrich, Kevin (U Bar)	Galt	95632
Van De Pol Dairy	Escalon	95320
Van Egmond, Cornelius	Galt	95632
Van Egmond, G C (Greendale)	Galt	95632
Van Exel Dairy #1	Lodi	95242
Van Exel Dairy #2	Lodi	95242
Van Rys Dairy	Manteca	95336
Van Vliet, C G	Escalon	95320
Van Vliet, Connie	Escalon	95320
Van Vuren Dairy	Stockton	95215
Vander Meulen, William	Escalon	95320
Vander Schaaf Dairy #2	Escalon	95320
Vander Schaaf Dairy 39-328	Escalon	95320
Vander Werff, Pete 39-361	Escalon	95320
Vieira, John M	Escalon	95320
Virtue Dairy, S L	Galt	95632
Vitoria Bros Dairy	Lodi	95242
Vliet View Dairy 39-322	Stockton	95215
Wagner Dairy	Escalon	95320
Warmerdam Dairy, Jan	Lodi	95240
Weeda Dairy Partnership	Escalon	95320
Weststeyn Dairy #2	Linden	95236
Woods, Erwin F	Lodi	95242
Andre, Manuel D Dairy	Oakdale	95361
Castro, Frank & Darlene	Escalon	95320
Faria, Joe H & Son Dairy	Escalon	95320
Ormonde Dairy, Frank	Galt	95632
Rocha, Jason Dairy	Lodi	95240

Merced County Existing Dairies

DAIRY	City	Zip
2-Far Dairy		
2-Vel Dairy		
3 D Dairy		
6D/Dores Dairy		
A & F Dairy		
A & M Agueda		
A & M Azevedo Dairy		
A & S Dairy		
A Estevam Dairy		
AAA Dairy		
ABS Dairy (M Bruno)		
Aguiar & Faria & Sons		
Aguiar Dairy		
Ahlem West Dairy		
Alan Hath		
Albert Barcelos Jr		
Alvarino Alves		
Alves Bros Dairy		
Amaral & Amaral		
Amos Rocha		
Anchor J		
Andy Bertuccio & Sons		
Angelo Rocha		
Anselmo Sousa Dairy		
Antero Borges		
Anthony L Lopes Jr Dairy		
Anthony Vierra #1		
Antonio Azevedo		
Antonio Brasil Dairy		
Antonio G Branco		
Antonio Silveira		
Antonio Silveira		
Arie Roest		
Arnold Flores Dairy		
Arthur Oliveira		
Artur Sousa		
Askew William		
Augusto Lima		
Azevedo & Silva Dairy		
Azevedo Dairy		
Azevedo Dairy		
B & D Dairy		
Bano Royal Farms		
Belo Dairy		
Ben Souza		
Berkeley Farms Land Co		
Bernardo Dairy		
Bettencourt & Marson		
Bill Ahlem Dairy		
Bill Gomes		
Bill Mesman		
Bill Sousa		

Blue Sky Dairy
Bob Borba Livestock
Borba Brother Dairy
Borba Dairy Farms
Branco Dairy
Brasil Red Holsteins
C & J Dairy
Caetano Dairy
Carlo Machado
Carlos C Lourenco Dairy
Carlos Lopes
Carrancho-Brano Dairy
Charles Ahlem
Clarence A Borba
Claus Dairy #1
Clemente Sousa Dairy
Clover Prairie Farms
Correia Family
Costa Dairy
Costa Family Dairy
Cressey Holsteins
D & E Jersey
De Jager Dairy #1 North
De Jager Dairy #2 North
De Jager Dairy So.
De Jong Bros Dairy
Den-K Holsteins Areias
Dennis Nunes Dairy
Dias Family Dairy
Diniz Dairy
Dirkse Dairy
Dores Dairy
Double Creek Ranch
Double Diamond Dairy
Duarte Fernandes
E & M Silva Dairy
Ed Gomes Dairy
Edminister
Edward Oppendyk
Egidio Almeida
Eldred C Pires
Elias Sousa & Son Dairy
Emanuel Belo
Emanuel Belo #2
Everett Vaz Dairy
F & A Lemos #2
Fanelli Dairy
Faustino Dairy
Fawcett Farms, Inc
Felisberto Machado
Felix Proletti
Fernando Oliveira
Fernando Sequiera
Ferreira Dairy
Fialho & Sons

Fiorini Dairy
Five H Farms
Floriano Dairy
Frank Azevedo 2
Frank Coelho
Frank Coelho & Sons
Frank Gomes
Frank J Silva
Frank Lopes Dairy
Frank Mello
Frank Silveira
Frank Sozinho
Freitas Bros
Full Circle Dairy
Gabriel Machado Dairy
Gallo Bamboo
Gallo Bear Creek Dairy
Gallo Columbard Dairy
Gallo Cottonwood Dairy
Gallo Willow Dairy
Garcia Registered Jersey's
Heduno Silveira
Hillcrest Dairy (proposed)
Hilmar Hosteins, Inc
Home & Sons
Hoogendam
Hultgren Dairy
J & M Bettencourt & Sons
J & M Nascimento
J & T Dairy
J & T Dairy - West
J L Oliveira
James Ahlem
Joe & Dominic Barroso
Joe A Machado
Joe A Silva
Joe and Lucy Brasil
Joe Bettencourt
Joe Brazil
Joe C Lourenco Dairy
Joe Gomes Dairy
Joe Gomes Dairy #1
Joe Homen Dairy
Joe L Coelho Dairy
Joe Lopes & Sons
Joe Medonca
Joe Nunes Dairy
Joe O Rocha #1 Dairy
Joe Oliveira
Joe or Phillip Lima
Joe Pierce
Joe Pimentel Dairy
Joe R Borba & Sons
Joe Silva Dairy
Joe Simoes

Joe Soares #2
Joe Vargas
John B Pires
John Kesting Jr
John Leonardo
John N Lourenco
John Oliveira
John S Machado
John Silveira
John Vitorino Dairy
Jones Farm
Jorge Dairy
Jose A Nunes
Jose C Periera Dairy
Jose Diaz Dairy
Jose M Jorge
Jose Silveira
Joseph Duarte Jr
Joseph Egli
JVJ Meadow Dairy
JVJ Parkview Dairy
Ken Van Foeken Dairy
L & B Dairy
L & L Holsteins
Larry Migliazzo
Larry Peterson
Laura Rebelo & Co
Lazy A Holsteins
Lemos Dairy
Leonard Pareira
LeRoy Vierra
Lima Family Dairy
Linnel Fontes Dairy
Linora Dairy
Lone R Ranch
Lonely Ranch Dairy
Louie S Luis
Louis J Silva Dairy
Louis T Sousa Dairy
Luis Agueda
Luis Azevedo
Luis Nunes
Luis Oliveira
M & A Dairy
M & M Cardoso & Sons
M Couto
M-5 Dairy
Macedo Dairy
Macedo Dairy
Machado Dairy
Madsen & Moss Dairy
Magneson Dairy
Manuel A Bettencourt
Manuel A Lopes Dairy
Manuel Azevedo

Manuel Bettencourt
Manuel Bettencourt
Manuel Cipriano & Son
Manuel D Silveira Jr
Manuel E Vieira Jr
Manuel Goncalves
Manuel Lima Dairy
Manuel Luis
Manuel Mendes
Manuel P Silva
Manuel R Godinho
Manuel T Borba
Marcelino Amaral #2
Marcelino Dairy
MARCREST
Maria C Silveira
Martin Bros
Martins & Sons Dairy
Mater Dei Dairy
Matos Dairy
Maximinio Silveira Dairy
Mayo Bros
Melo & Sons Dairy
Melo Dairy
Michael Azevedo Dairy
Michael Wybenga
Mike Coehlo
Mike, Mark Vieira
Mile Made Dairy
MKM Dairy
N & C Silveira Dairy
Nelson Dairy
Norbert Mendonca
Nova - Schick Dairy
Nunes & Bettencourt
Nunes Bros Inc
Nyman Bros
O/L Dairy
O'Banion Ranches
P & D Dairy
P & L Souza
P H Ranch
Pavao & Sons
Pedretti Ranches Inc
R & V Dairy
R V Dairy
Rafael Pacheco
Raulino Manuel
Rego Dairy
Riopel Jersey Dairy
RMRC
Robert L Silva Dairy
Rodney Nylund #1
Rodney Nylund #2
Rodoni Dairy Farms

Rodrigues & Da Silva
Rogers Dairy
Rui Brasil
S & S Dairy
SAS Dairy #2
Segveira Dairy
Serpa & Pais Dairy
Seward Dairy
Shepard Dairy Farms
Sherman Dairy
Sidney Hibma
Silva Dairy Farms #1
Silva Dairy Farms #2
Silveira Bros #2
Silveira Bros Dairy #1
Soares Dairy Farms Inc
Soares Dairy Farms Inc
Soares Dairy Farms Inc
Souza Bros
Sunset West
Sunwest Jerseys
T & M Borba Dairy
T & M Dairy
Tavares Family Trust
Tell Farms Inc
Terra Dairy
Tiberio Azevedo
TJF Silva Dairy
Tony Azevedo Dairy
Tony de Oliveira Jr
Tony J Machado Dairy
Tony Lopes Dairy
Tony Pimentel
Triple A Dairy
V & R Dairy
V V Vieira Dairy
Vacant
Vacant
Vacant
Vacant
Vacant
Valley Holsteins
Vander Woude
Veldhuis Dairy
Veldhuis North
Viomar Dairy
Virgil Kronberg
Vista Livestock CO
Vista Verde Dairy
Westside Holsteins
Westside Holsteins
Wickstrom #1
Wickstrom Bros Dairy
Wickstrom Dairy #2
Wickstrom Jersey Dairy

Willie Bylsma #2
Xavier Cattle Holsteins
Yosemite Jersey Dairy

Fresno County Dairies

Dairy Name	Census
A J Slenders Dairy	740000
A & TO Dairy	770000
Adams Dairy	730000
American Dairy	760000
Areias & Meneses Dairy	80000
Areias Brothers Dairy Inc.	740000
Astiasuain Dairy	630000
Ayala Dairy	770000
Bar 20 #1/Producers Dairy	190000
Bar 20 #2/Producers Dairy	390000
Big D Dairy	760000
BOS Dairy	390000
Brady Goat Dairy	740000
Chaney Dairy	820000
CJV Dairy	740000
Coderniz Dairy	840200
Coelho Dairy (Joe D)	180000
Coelho Dairy Farms	770000
Couto Dairy	770000
CSUF Farm Market and Dairy	540800
Da Fonte Dairy	760000
De Groot & Visser Dairy	740000
Double A Dairy	740000
Dykstra Family Dairy	760000
Dykstra Family Dairy #2	760000
F S Brown Company Dairy	770000
F & F Goat Dairy	840200
F&M Aguiar Dairy	840200
Falcao Dairy	820000
Fontes Dairy	770000
Fontes II	750000
Frank Mendes Dairy	740000
Frea-Mattos Dairy	760000
Fred Rau Dairy	760000
Fred Rau Dairy	760000
Fred Thommen Dairy	840200
Freitas View Dairy	730000
Garcia Dairy	740000
Georgenson Dairy	750000
Godinho Dairy	770000
Gonsalves Dairy	740000
Gonsalves Dairy	740000
Goulart Dairy	390000
Goulart Dairy	740000
Green Valley Dairy LLC	390000
Gropetti & Sons Dairy	820000
Helco Farms	190000
Hillview Dairy Farm	390000
Hunger Dairy	840200
Inacio Dairy	840200
Iraizoz Dairy	630000
J & F Martins Dairy	750000
Joe & Fatima Coelho Dairy	760000

Johann Dairy	390000
John De Groot & Son Dairy	760000
John Verwey Dairy	390000
Jose De Melo Dairy	840200
Koller Dairy	190000
LaSalle Dairy	750000
Leonardo Brothers Dairy	730000
Living Waters	730000
Luis Dairy	740000
Luis M. Santos Dairy	730000
M 2 Dairy	770000
Machado Farms & Dairy	760000
Machado Farms & Dairy	760000
Maddox Dairy	760000
Martin Dairy	760000
Medeiros Dairy	740000
Mendes & Sons Dairy (Ernest F.)	770000
Mendes & Sons Dairy #1	770000
Mendes & Sons Dairy #2	770000
Mendonca Dairy (Antero)	770000
Milky Way Dairy	390000
Monteiro Brothers Dairy #1	770000
Monteiro Brothers Dairy #2	770000
Morning Star Dairy	760000
Mt. Whitney Dairy	770000
Nash Farms Inc.	730000
Oak Grove Dairy	740000
Organic Pastures Dairy	760000
Othart Dairy	760000
Ourique Dairy	740000
Pacheco Dairy	390000
Palm Dairy	390000
Parreira Dairy	180000
<i>Proposed Dairy</i>	<i>740000</i>
Quist Dairy #1	190000
Rodriguez Dairy	770000
Rollin Valley Farms	760000
Ruann Dairy #1	770000
Ruann Dairy #2	770000
Santos Dairy	770000
Sean Hodges Dairy	190000
Sheldon Dairy	740000
Silva Dairy	740000
Souza Dairy	760000
Tavares Dairy	180000
TNT Dairy	770000
Tony Cunha Jr. Dairy	740000
Tony Souza Dairy	740000
Van Rutten Family Trust	630000
Verburg Dairy	190000
Verwey Dairy	760000
Visser & Sons Dairy	770000
Westside Dairy	750000
Whitney Oaks Dairy	770000
Zonneveld Dairy	740000

Zonneveld Dairy

740000

Madera County Dairies

Dairy Name

A & T DAIRY
A.O. SOARES DAIRY
ANDRADE DAIRY
ANTONIO & LACALETE REIS
BORGES DAIRY
COELHO FARMS , L.P.
COSTA VIEW FARMS
DANIELI BROTHERS DAIRY
DAVE SEQUEIRA JR. DAIRY
DIAMOND H DAIRY
DIEPERSLOOT RANCH
DOMINGOS RIBIERO DAIRY
DOUBLE DJ FARMS DAIRY
ESPINOLA DAIRY
FABLAND FARMS I
FABLAND FARMS II
FAGUNDES DAIRY
FRANK FREITAS & SONS
FRANK PARRIERRA DAIRY
GROENEWEG DAIRY
HANSEN & SONS, INC.
IEST DAIRY
J & J DAIRY
JEAN L TRISTANT
JOHN SOUSA DAIRY
M & B DAIRY
M & B FEEDLOT
MADERA CALF RANCH
MANUEL MACHADO DAIRY
MASSARO DAIRY
MENESES DAIRY
MOO VIEW JERSEYS
NEVA GAYLE FARMS DAIRY
NEW VIEW DAIRY
P & F AVILA DAIRY
PAUL JANZEN DAIRY
PHILIP VERWEY FARMS
PIMENTEL DAIRY
REZENDES BROS DAIRY
ROBERT LASALLE DAIRY
RONNIE RAY DAIRY
SERPA PAIS DAIRY
SINKS BROS. DAIRY
SLENDERS DAIRY
TA-RO-LEE HOLSTEINS
TONY FAGUNDES DAIRY
TRIANGLE M DAIRY
TRI-EST DAIRY
TROOST DAIRY
VITORIA TRUST DAIRY
VLOT HEIFFER RANCH

Kings County Dairies

Dairy Name	City	Zip
Andre, Tony P Dairy	Hanford	93230
Atsma-Cameron Dairy	Hanford	93230
Augusto, Raymond Dairy	Lemoore	93245
Avila, John M & Sons Dairy	Hanford	93230
Avila, Xavier Dairy	Hanford	93230
Avila, Arnaldo Dairy	Lemoore	93245
Barcellos, Frank P	Hanford	93230
Barcellos, Maria Goat Dairy	Lemoore	93245
Barreto & Silveira Dairy	Hanford	92330
Bella Rosa Dairy	Hanford	92330
Benifica Dairy	Lemoore	93245
Bettencourt, Joe Dairy	Hanford	93230
Brasil, Angelo & Mary	Lemoore	93245
Brazil, Tony & Sons	Hanford	93230
Brown Dairy	Hanford	93230
C & C Holsteins	Hanford	93230
C & G Dairy	Hanford	93230
Cadillac Ranch	Hanford	93230
Caetano Dairy	Hanford	93230
Camara Dairy	Lemoore	93245
Camara, John T Dairy #2	Stratford	93266
Cardoso Dairy	Hanford	93230
Cloverdale Dairy LLC	Hanford	93230
Contente & Co Dairy	Hanford	93230
Correia, Jose Dairy	Hanford	93230
Couto Dairy	Lemoore	93245
Cunha Dairy	Hanford	93230
Cunha Dairy #2	Lemoore	93245
Cunha Dairy	Hanford	93230
D & E Dairy	Hanford	93230
D & M Dairy	Hanford	93230
D & T Dairy	Hanford	93230
De Faria Dairy	Lemoore	93245
De Groot, Tony #2	Hanford	93230
De Groot, Tony #1	Hanford	93231
De Jong, John Dairy	Hanford	93230
Di-Man G Dairy	Hanford	93230
Diamond D Dairy	Hanford	93230
Dias Dairy	Kingsburg	93631
Dias, Joe L. Dairy & Son	Hanford	93230
Dover Dairy	Hanford	93230
Dover Dairy #2	Hanford	93230
Dragt, Harold Dairy #2	Hanford	93230
Droogh Dairy	Lemoore	93245
Duarte, John F & Son Dairy	Hanford	93230
Dutra & Dutra Dairy	Hanford	93230
Dutra Dairy	Hanford	93230
Eden Vale Dairy	Lemoore	93245
F & J Dairy	Hanford	93230
F S M Dairy	Kingsburg	93631
Fagundes Agribusiness	Hanford	93230
Fagundes, F & S Dairy	Hanford	93230
Feaver, Roger Dairy	Hanford	93230

Felicita Dairy	Corcoran	93212
Fernandes Dairy	Hanford	93230
Ferreira Dairy	Hanford	93230
Flint Dairy	Hanford	93230
Fragoso & Sons Dairy	Hanford	93230
Freitas, Leonardo Dairy	Hanford	93230
Furtado Dairy	Lemoore	93245
Galhandro, Manuel Dairy	Lemoore	93245
Garcia & Sons Dairy	Lemoore	93245
Garcia Antonio Dairy	Hanford	93230
Garcia0Grangeville Dairy	Hanford	93230
Gaspar Dairy	Hanford	93230
Giacomazzi, Fred & Don Farms	Hanford	93230
Green Acres Goat Dairy	Lemoore	93245
Hakker, Simon Dairy	Hanford	93230
Hoggard Dairy	Hanford	93230
Holland's Dairy	Hanford	93230
Hollandia Farms North	Hanford	93230
J & B Goat Dairy	Lemoore	93245
J & F Dairy	Lemoore	93245
J & L Dairy #2	Kingsburg	93631
JCJ Dairy, Inc.	Hanford	93230
Jensen Dairy	Hanford	93230
JMC's Dairy	Hanford	93230
JVD Dairy	Hanford	93230
Kansas Holstein Dairy	Hanford	93230
Knevelbaard Farms	Hanford	93230
Lake Tree Dairy	Hanford	93230
Leal, D C & Sons Dairy	Lemoore	93245
Lima, Bernard Dairy	Hanford	93230
Log Haven Dairy	Hanford	93230
Lone Oak Farms	Hanford	93230
Lone Star Dairy	Hanford	93230
Longfellow Farming	Hanford	93230
Lu-Ar Dairy	Hanford	93230
M & E Dairy	Lemoore	93245
Machado, Alvaro Dairy	Hanford	93230
Machado, Joe Dairy	Hanford	93230
Maciel & Sons Dairy	Hanford	93230
Macy-L Holsteins Dairy	Hanford	93230
Martella, Art Dairy	Hanford	93230
Martin's Dairy	Hanford	93230
Martin's Dairy*	Hanford	93230
Martins, Joe Dairy	Hanford	93230
Martins, Robert Dairy #4	Hanford	93230
Mattos Bros Dairy	Hanford	93230
Mattos, A P & Sons	Lemoore	93245
Mattos, A P & Sons Dairy #2	Lemoore	93245
Mattos, Anthony & Sons Dairy	Hanford	93230
Medeiros Dairy	Hanford	93230
Mello, J D Dairy	Hanford	93230
Memorare Dairy	Stratford	93266
Monteiro, John R Dairy	Hanford	93230
Murphy Dairy	Lemoore	93245
N & N Dairy	Hanford	93230

New Pennies Dairy	Kingsburg	93631
Oliveira & Santos Goat Dairy	Hanford	93230
Oliveira Dairy	Lemoore	93245
Pacheco, Joe B Dairy #2	Hanford	93230
Parreira, Joe Dairy	Stratford	93245
Paulo & Son Dairy	Hanford	93230
Paulo Brothers Dairy	Hanford	93230
Paulo Holsteins Dairy	Hanford	93230
Pedreiro Goat Dairy	Lemoore	93245
Pedro Dairy	Stratford	93266
Phoenix Dairy	Hanford	93230
Pimentel, Joe V & Esther J	Hanford	93230
Pires, Valdemar Dairy	Hanford	93230
Raven's Goat Dairy	Hanford	93230
Ribeiro, Antonio Dairy	Hanford	93230
Ribeiro, Francisco G Dairy	Hanford	93230
Ribeiro, Max Dairy	Hanford	93230
River Ranch Dairy	Hanford	93230
Rodriguez, A A & Son Dairy	Lemoore	93245
Rosa Dairy	Hanford	93230
Santos, Hamilton	Hanford	93230
Santos, Jorge & Mary Lou Dairy	Laton	93242
Santos, Manuel Dairy	Hanford	93230
Silveira Dairy	Hanford	93230
Silveira, Antonio G. Dairy	Hanford	93230
Simas, Richard Dairy	Lemoore	93245
Sozinho Dairy	Hanford	93230
Sozinho Dairy #2	Hanford	93230
T & T Dairy	Kingsburg	93631
Te Velde, Bernard Dairy #1	Hanford	93230
Te Velde, David Dairy	Hanford	93230
Thomas Dairy	Riverdale	93656
Toste Dairy	Lemoore	93245
Upton Goat Dairy	Hanford	93230
V & F Dairy	Lemoore	93245
Valadio Dairy	Hanford	93230
Valley View Dairy	Hanford	93230
Van Dyk & Sons Dairy	Hanford	93230
Veenendaal Dairy Farms	Hanford	93230
Veenendaal, Henry D. Dairy	Hanford	93230
Ver Hoeven Dairy	Hanford	93230
Vintage Dairy	Corcoran	93212
Visser, John Dairy	Hanford	93230
Warmerdam Dairy	Hanford	93230
White River West Dairy	Stratford	93266
Willow Grove Farms	Hanford	93230

Stanislaus Dairies

Dairy Name

City

Zip

306 dairies in Stanislaus County during fiscal year 2000/2001.
1,476 total

Appendix S
SJVAPCD Criteria Pollutants Forecast,
Emissions by Category

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Almanac Emission Projection Data (published in 2006)

2005 Estimated Annual Average Emissions

SAN JOAQUIN VALLEY AIR BASIN

All emissions are represented in Tons per Day and reflect the most current data provided to ARB.

 [See detailed information.](#)

[Start a new query.](#)

STATIONARY SOURCES	TOG	ROG	CO	NOX	SOX	PM	PM10	PM2.5
FUEL COMBUSTION	37.7	15.5	49.5	105.7	12.9	6.9	6.5	6.4
WASTE DISPOSAL	242.2	2.2	0.1	0.0	0.0	0.1	0.1	0.0
CLEANING AND SURFACE COATINGS	23.0	19.1	-	0.0	-	0.1	0.1	0.1
PETROLEUM PRODUCTION AND MARKETING	68.3	39.4	0.4	0.6	0.4	0.0	0.0	0.0
INDUSTRIAL PROCESSES	18.8	15.2	4.1	21.7	7.2	26.7	16.4	9.6
* TOTAL STATIONARY SOURCES	390.0	91.4	54.0	128.0	20.4	33.8	23.0	16.2
AREA-WIDE SOURCES	TOG	ROG	CO	NOX	SOX	PM	PM10	PM2.5
SOLVENT EVAPORATION	66.2	61.4	-	-	-	-	-	-
MISCELLANEOUS PROCESSES	927.2	128.7	826.9	24.0	4.3	571.5	323.0	138.0
* TOTAL AREA-WIDE SOURCES	993.4	190.1	826.9	24.0	4.3	571.5	323.0	138.0
MOBILE SOURCES	TOG	ROG	CO	NOX	SOX	PM	PM10	PM2.5
ON-ROAD MOTOR VEHICLES	91.8	83.9	874.4	195.7	1.7	6.3	6.2	4.5
OTHER MOBILE SOURCES	52.9	47.4	349.2	133.7	3.9	9.1	8.9	8.0
* TOTAL MOBILE SOURCES	144.7	131.4	1223.6	329.4	5.6	15.4	15.2	12.5
GRAND TOTAL FOR SAN JOAQUIN VALLEY	1528.1	412.9	2104.6	481.4	30.3	620.8	361.1	166.7

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