NUTRIENT MANAGEMENT PLAN

KF Dairy
1870 #B Jeffery Road
El Centro, California

Project No. 01-HCB-004

Prepared For:

California Regional Water Quality Control Board
Colorado River Basin Region
73-720 Fred Waring Drive, Suite 100
Palm Desert, CA 92260

Prepared By:

SGI Ag Services THE SOURCE GROUP, INC.

3213 Liberty Square Parkway
Turlock, CA 95382

September 30, 2008

NUTRIENT MANAGEMENT PLAN

KF DAIRY
1870 #B JEFFERY ROAD
EL CENTRO, CA 92243

SEPTEMBER 2008
REF. NO. 011-HCB-004

NUTRIENT MANAGEMENT PLAN
FOR
KF DAIRY

OWNER: **HEIDI KUHN**

OPERATOR: **TOM FERRIERA (Dairy)**
HEIDI KUHN (Farming)
1870 #B JEFFERY ROAD
EL CENTRO, CALIFORNIA 92243

COUNTY: IMPERIAL

ASSESSOR'S PARCEL #051-020-033
LEGAL DESCRIPTION: T 16S R 12E Sec 8
MERIDIAN: SAN BERNARDINO

CONTACT PERSON: TOM FERRIERA
PHONE: (760) 353-7699

DISCLAIMER

The Source Group (SGI) has developed this Nutrient Management Plan (NMP) based on information that was disclosed to the NMP Providers to the best of the owner and/or operator's knowledge pertaining to the livestock operation for each component of the NMP. The NMP Providers are not responsible for disclosed data/information that was knowingly denied or restricted, or that was otherwise incorrect, or for any resource problem(s) that was not disclosed. It is the owner and/or operator's responsibility to implement and manage the NMP. If they do not follow the implementation plans in the NMP, the NMP Providers are not responsible for any damages, losses, or liability.

The owner and/or operator understands that it is their responsibility to obtain any and all permits that may be required to implement the NMP and to keep all of the necessary records associated with the implementation of the NMP. They understand that the NMP was prepared in accordance with the requirements of General Waste Discharge Requirements and General National Pollution Discharge Elimination System (NPDES) Permit for Concentrated Animal Feeding Operations within the Colorado River Basin Region issued by the California Regional Water Quality Control Board – Colorado River Basin Region dated June 25, 2008 (Board Order NO. R7-2008-0800 and NPDES NO. CAG017001).

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1.0 INTRODUCTION

1.1 INTRODUCTION

This document presents a Nutrient Management Plan (NMP) prepared for KF Dairy (Dairy), located in Imperial County, California. The NMP includes information pertaining to the land application of manure and wastewater for the purpose of nutrient recycling to produce crops. The NMP considers site-specific conditions to identify areas for improvement.

This NMP was prepared in accordance with the requirements of the General Waste Discharge Requirements and General National Pollution Discharge Elimination System (NPDES) Permit for Concentrated Animal Feeding Operations within the Colorado River Basin Region issued by the California Regional Water Quality Control Board – Colorado River Basin Region dated June 25, 2008 (Board Order NO. R7-2008-0800 and NPDES NO. CAG017001).

1.2 FARM OVERVIEW

The dairy operation, located in Imperial County, California, consists of approximately 462 acres, which includes the dairy production area and 345 acres of surrounding cropland. The Dairy leases an additional 170 acres of cropland. The 515 acres of cropland is private land used to produce Bermuda grass hay, oat hay, Durum wheat, Sudan hay, and Klein grass hay. The Dairy production area consists of a milk barn, dry lot corrals equipped with shades, a maternity pen, feed and manure storage areas, a mechanical solid separator, wastewater storages (WWS), storm water basins and fresh water basins.

Approximately 3,620 mature Jersey dairy cows and 1,125 Jersey heifers are housed and fed at the Dairy. The Dairy produces approximately 67,273 tons of manure and 73,000,000 gallons of process wastewater annually. Herd inventory and manure production estimates can be found in Table 1. Figures 1 through 3 provide maps of the facility and surrounding cropland.

2.0 OVERALL NUTRIENT BALANCE

A whole farm nutrient balance was completed for the Dairy and can be found in Table 2. The balance is based on the current herd inventory, expected owned acreage and current crops. Leased acreage had not been included in the whole farm balance and will be viewed as contingency acreage. Using owned acreage, the balance indicates an excess of nutrients are generated at the Dairy. In order to balance based on the whole farm nutrient balance; the Dairy will need to export approximately 16,400 pounds of nitrogen in the form of wastewater or solid manure.

2.1 IMPLEMENTATION

Arrangements have been made to export manure from the mechanical solid separator and corrals. Sampling and analysis of manure and wastewater will be used to verify plant available nitrogen in manure and wastewater. Soil and plant tissue samples will be used to verify crop removal. Nutrient applications to crops and export of nutrients in the form of solid manure will be adjusted based on this information.

3.0 NUTRIENT BUDGET

3.1 CROP INFORMATION

There are a total of six fields used to produce Bermuda hay, Sudan hay, Durum wheat, oat hay and Klein grass hay for feed or cash crop. Fields planted to Bermuda grass and Klein grass will be harvested from early March through mid to late November. Bermuda grass will be irrigated approximately fourteen to sixteen times throughout the growing season. Bermuda grass will be harvested for hay approximately four times a year and for seed up to two times a year. Ryegrass may be seeded into Bermuda during winter months if additional nutrient removal is necessary. Klein grass will follow an irrigation schedule similar to Bermuda grass and be harvested approximately five times for a total yield of fourteen tons. Fields double cropped in Sudan hay and oat hay or Durum wheat will be planted to Sudan in March or April. Fields will require seven to nine irrigations to produce adequate forage for two cuttings. Sudan hay will be harvested twice from early July through late November for a total yield of approximately six tons. Wheat or oats will follow Sudan in the crop rotation and be planted during December or January for harvest sometime from mid-May to early July. Fields seeded to wheat or oats will be irrigated prior to seeding. Subsequent irrigations will be based on crop water use requirements and terminate at approximately soft dough to medium dough stage. Oat hay will be harvested at soft dough stage for an approximate yield of four tons. Wheat for Durum will be harvested at hard dough and will yield approximately three tons of grain and 1.25 tons of straw.

Yield goals for the crops produced at the Dairy are based on expected yields for the area as well as crop production records from fields currently farmed by the Dairy. Crop nutrient requirements for nitrogen, phosphorus and potassium are based on recommendations from Guidelines for Field Crops – Bulletin 104-F and default recommendations from Manure Management Planner Version 2008.02.28.

3.2 NUTRIENT APPLICATION

A field specific nutrient budget was developed for the Dairy and can be found in Appendix A. The budget includes the planned rates for wastewater and manure application based on crop nitrogen requirements.

Although, fields 192 and 193 are capable of receiving wastewater applications and all fields are capable of receiving solid manure, neither wastewater nor solid manure have been used as nutrient sources in recent years. The Dairy is in the process of installing

the infrastructure to deliver wastewater to Preece field and fields 190, 191 and 194. All fields will be flood irrigated with either a combination of wastewater and irrigation water or irrigation water only. Solid manure will only be applied when nutrient applications from wastewater are not adequate to meet crop nutrient requirements. Field specific information can be found in Table 3.

3.3 AVAILABLE NUTRIENTS

All sources of nutrients were considered, including: manure, wastewater, irrigation water, commercial fertilizers, soil, and previous legume crops in the determining application rates. Application rates for manure and wastewater are based on the nitrogen requirement of the crops. In the absence of site specific data, "book values" were used for manure and process wastewater nutrient content. Soil test data is not currently available.

3.4 NITROGEN

Total plant available nitrogen applications to the field prior to and during the crop growing season will be targeted to not exceed the total nitrogen removed from the field through harvest unless the following conditions are met:

- Plant tissue testing indicates additional nitrogen is required to obtain typical crop yield for the soils and local conditions;
- The amount of additional nitrogen applied is based on plant tissue testing and is consistent with University of California Cooperative Extension written guidelines or written recommendations from a professional agronomist;
- The form, timing and method of application make the nitrogen immediately available to the crop; and
- Records are maintained documenting the need for additional applications.

At no time will total plant available nitrogen application rates exceed 1.65 times the total nitrogen removed from the field through harvest and removal of the crop.

3.5 PHOSPHORUS

The California Phosphorus Index (P-Index) was completed for all fields which are or will be farmed by the Dairy. The P-index was based on expected practices and was devoid of phosphorus levels from soil tests. Based on available information, all fields are rated as low risk for phosphorus loss from erosion, runoff and leaching. A copy of

the P-Index can be found in Appendix B. The P-Index should be re-run once soil test results are available.

3.6 NUTRIENT APPLICATION TIMING AND METHODS

Under the current crop rotation, irrigation occurs year round. All fields are irrigated using flood irrigation. Future wastewater applications will be based on nutrient needs of the crop, the daily water use of the crop, the water holding capacity of the soil (1.80 in/ft), which is consistent across all fields, and the lower limit of soil moisture for each crop and soil. Irrigations will be planned to refill to root zone for the given crop. The amount of water required to refill the root zone is approximately 3.6 inches of Bermuda and Klein grass and 1.80 inches for winter forage. Table 4 provides irrigation water required to fill the root zone per field and an estimate of irrigation times based on average pump output.

Irrigation frequency will be planned using crop water use estimates. Need for irrigation will be verified by field evaluations using a soil moisture probe or by the USDA-NRCS technique "Estimating Soil Moisture by Feel and Appearance" which can be found in Appendix C.

The timing of nutrient application will correspond as closely as possible to plant nutrient uptake characteristics.

3.7 IMPLEMENTATION

Implementation of practices relating to timing and rate of nutrient application will begin with the 2009 crop. Timing and rate of nutrient application will be recorded each irrigation. Following each cropping season, practices will be evaluated and modified to reach nutrient management goals. All sampling and analysis of soil, manure, wastewater, and discharges will be done in accordance with Attachment E-Monitoring and Reporting Program, Board Order NO. R7-2008-0800 and NPDES NO. CAG017001, as summarized in Appendix D.

4.0 WASTEWATER MANAGEMENT ON LAND APPLICATION AREAS

Currently all fields can be irrigated with fresh water. Upon installation of wastewater transfer lines, all fields will be capable of receiving wastewater. Therefore, all fields will be equipped with tail water recovery systems to prevent runoff to surface water.

Irrigation flow direction is established for all fields. Tail water flow and recovery for each field has been proposed. Field 190 irrigates form north to south and tail water will flow west then north. Field 191 and the west side of Preece field irrigate east to west and tail water will flow south then east along the south side of each field. The east side of Preece field irrigates to the east and tail water will flow south then east along the south side of the field. Field 192 irrigates south to north and tail water will flow west then south along the west side of the field. Field 193 irrigates west to east and tail water will flow south then west along the east side of the field. Field 194 irrigates from north to south and tail water will flow east then north along the west side of the field. All tail water will be returned to each field's respective head ditch and reused for irrigation.

4.1 SETBACKS

All fields are adjacent to surface water (irrigation canals); however, the surface water is located upgradient from irrigation flow in all fields except field 193. Surface water will be protected from runoff by a tail water recovery system. There are no open tile line intake structures, sinkholes, agricultural well heads, or other conduits to surface waters; therefore, no setbacks are required to protect surface water or ground water.

4.2 FIELD RISK ASSESSMENT

Fields are managed in a manner to reduce movement of nitrogen and phosphorus from the land application areas to surface water or ground water. A field risk assessment was completed and can be found in Table 5.

5.0 RECORD KEEPING – LAND APPLICATION AREA

Records to be maintained by the Dairy include, at a minimum, the following:

- Crop and expected yields for each field;
- Application records for each manure or wastewater application event, including:
  - date,
  - nutrient form, manure or wastewater,
  - fields receiving nutrients with total acreage,
  - application method,
  - nutrient application per acre (weight or volume),
  - weather conditions at the time of manure or wastewater application and 24 hours pre and post application;
- Record of inspection of land application areas immediately prior to commencement of application of wastewater and daily when wastewater is being applied, including:
  - conditions of land application area berms including rodent holes, piping, and bank erosion,
  - the presence, or lack of, field saturation, ponding, erosion, runoff (including tailwater discharges from the end of fields, pipes, or other conveyances),
  - nuisance conditions,
  - the conditions of any vegetated buffers or alternative conservation practices,
  - Records documenting any corrective actions taken to correct deficiencies notes as a result of the inspections required. Deficiencies not corrected in 30 days must be accompanied by an explanation of the factors preventing immediate correction;
- Dates, locations, sampling and test methods for soil, manure, and wastewater sampling;
- Results from soil, manure, wastewater, discharge (including tail water), and storm water sampling;
- Explanation for the basis for determining manure or wastewater application rates;
- Calculations showing the total nitrogen and phosphorus to be applied to each field, including sources other than manure or wastewater;
- Total amount of nitrogen and phosphorus actually applied to each field, including documentation of calculations for the total amount applied;
- Dates of manure and/or wastewater application equipment inspections;
- Manure tracking manifests for each manure or wastewater export;

- Records of on-site monitoring activities shall include:
  - date that observations were recorded, measurements were made, or samples were collected;
  - name and signature of the individual(s) who made the observations, made and recorded the measurements, or conducted the sampling,
  - location of measurements or sample collection,
  - procedures used for measurements or sample collection,
  - unique identifying number assigned to each sample,
  - method of sample preservation utilized;
- Records of laboratory analyses shall include:
  - results for the analyses performed on the samples that were submitted,
  - chain-of-custody forms used for sample transport and submission,
  - form that records the date the samples were received by the laboratory and specifies the analytical tests results,
  - name, address, and phone number of the laboratory which performed the analysis,
  - analytical methods used,
  - date(s) analyses were performed,
  - name of individual (s) who performed the analyses or the lab manager,
  - results for the quality control/quality assurance (QA/QC) program for the analyses performed;
- A copy of the Dairy's site-specific Nutrient Management Plan
- Documentation of NMP implementation;
- All analyses of manure, wastewater, discharges (including tail water discharges), surface water, storm water and ground water.

Changes in ownership or management and modifications which would result in a change in the quantity or quality of manure or land will be reported prior to changes.

5.1 IMPLEMENTATION

Record keeping has begun and will continue at the level necessary to obtain the information required to complete the annual report due January 15 of each year. Records will be kept on file at the Dairy for at least 5 years.

6.0 NUTRIENT MANAGEMENT PLAN REVIEW

The NMP plan will be reviewed at a minimum once every five years. Annual reports will be used to notify the Regional Board of any proposed changes that would affect the NMP. The NMP will be review by a certified Nutrient Management Planner.

The NMP will be updated if any of the following occur:

- Discharges from the land application area exceed water quality objectives;
- A nutrient source has changed;
- Site specific information is available; and
- Nitrogen application rates exceed allowable rates.

The NMP will be updated prior to:

- Changes in crop rotation;
- Changes in availability of land application area; and
- Changes in the volume of wastewater generated.

7.0 CERTIFICATION OF NUTRIENT MANAGEMENT PLAN

"I certify under penalty of law that this document and all the 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 mange 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.

Heidi Kuhn

Heidi Kuhn

26 Sept 2008

Date

TABLES

TABLE 1

ANNUAL ANIMAL INVENTORY (PROPOSED AND PRESENT)
AND ESTIMATED OUTPUT (AS EXCRETED)
KF DAIRY
IMPERIAL COUNTY, CALIFORNIA

Livestock Type	*Proposed Numbers*	*Current Numbers*	*Average Weight (lb)*	*AU*	*Current Manure Quantity Estimate (1) Volume Per Type (lbs/day)*	*Current Manure Quantity Estimate (1) Volume Per Type (tons/year)*	*Nutrient Content (2) N (3) (lbs/yr)*	*Nutrient Content (2) P_2O_5 (lbs/yr)*	*Nutrient Content (2) K_2O (lbs/yr)*
Milk Cows	3,400	3,200	1,000	3,200	256,000	46,720	525,600	187,230	364,416
Dry Cows	537	480	1,050	504	41,328	7,542	66,226	21,063	50,773
Bred Heifers	575	500	990	495	42,075	7,679	56,009	16,550	52,034
Heifers (6 to 11 mo.)	675	625	550	344	29,219	5,332	38,895	11,493	36,135
Total				4,199	368,622	67,273	686,730	236,337	503,358

(1) Manure volume production calculated based on information from Table 4-5 Dairy Waste Characterization - as excreted, USDA NRCS Agricultural Waste Management Field Handbook Part 651. Pounds/day = 80# - Lactating Cow; 82# - Dry Cow; 85# - Heifers.

(2) Manure nitrogen, phosphorus, and potasium content calculated based on information from Table 4-5 Dairy Waste Characterization - as excreted, USDA NRCS Agricultural Waste Management Field Handbook Part 651. Nitrogen =0.45#N/1,000# Milk cow; 0.36#N/1,000# Dry cow; 0.31#N/1,000# Heifer. Phosphorus = 0.07#P/1,000# Milk cow; 0.05#P/1,000 Dry cow; 0.04#P/1,000# Heifer. Potasium = 0.26#K/1,000# Milk cow; 0.23#K/1,000# Dry cow; 0.24#K/1,000# Heifer

(3) No losses have been applied.

TABLE 2

OVERALL NUTRIENT BALANCE
KF DAIRY
IMPERIAL COUNTY, CALIFORNIA

Crop	*Yield (per acre)*	*Area (acre)*	*Nitrogen*		*$P_2 0_5$*		*$K_2 0$*	
			lb/unit	*Total Need (lbs)*	*lb/unit*	*Total Need (lbs)*	*lb/unit*	*Total Need (lbs)*
Klein grass hay, 90% DM (tons)	14.0	74.9	32.00	33,555.2	10.50	11,010.3	50.00	52,430.0
Sudan hay, 90% DM (tons)	4.0	120.1	32.00	15,372.8	10.00	4,804.0	40.00	19,216.0
Wheat, grain (tons)	4.3	120.1	58.00	29,952.9	25.00	12,910.8	60.00	30,985.8
Bermuda hay, 90% DM (tons)	12.0	150.0	35.00	63,000.0	10.50	18,900.0	50.00	90,000.0
Total Crop Need (lbs)[(1)]:				141,881		47,625		192,632
Manure Supplies (lbs)[(2)]:				158,206		143,231		288,617
Balance (lbs)[(3)]:				-16,325		-95,606		-95,986

(1) Nutrient Uptake Rates taken from Western Fertilizer Handbook

(2) Losses during storage taken from Table 11-5-Percent of Original Nutrient Content of Manure Retained by Various Management Systems, USDA-NRCS Agricultural Waste Management Field Handbook, Part 651. Nitrogen losses = 30%, Phosphorus and Potasium losses = 10%.
Average nutrient availability for first year taken from Table 11-9-General Mineralization Rates for Nitrogen, Phosphorus and Potassum, USDA-NRCS Agricultural Waste Management Field Handbook, Part 651. Nitrogen = 43%, Phosphorus = 85% and Potasium = 88%.

(3) Negative number indicates excess.

TABLE 3

SUMMARY OF FIELD INFORMATION
KF DAIRY
IMPERIAL COUNTY, CALIFORNIA

Field No.	*Total Acreage*	*Crops Grown*	*Ownership* [1]
Preece	150.0	Bermuda	Kuhn Farms
191	74.9	Klein grass	Kuhn Farms
194	120.1	Sudan hay/Durum wheat	Kuhn Farms
190	65.3	Sudan hay/Oat hay	Lerno
192	38.1	Klein grass	Lerno
193	66.3	Klein grass	Lerno

(1) Kuhn Farms is in the process of purchasing the Preece field.

TABLE 4

IRRIGATION QUANTITY DETERMINATION
KF DAIRY
IMPERIAL COUNTY, CALIFORNIA

		Bermuda/Klein grass[1]				Winter Forage[4]			
Field No.	*Total Acreage*	Rate[2] *in/acre*	*Irrigation Total in*	*Hours*[3] *to irrigate*	*Days to irrigate*	Rate[5] *in/acre*	*Irrigation Total in*	*Hours*[3] *to irrigate*	*Days to irrigate*
			in				in		
Preece	150	3.60	540.0	60.3	2.5	1.80	270.0	18.1	0.8
191	74.9	3.60	269.6	30.1	1.3	1.80	134.8	9.0	0.4
194	120.1	3.60	432.4	48.3	2.0	1.80	216.2	14.5	0.6
190	65.3	3.60	235.1	26.2	1.1	1.80	117.5	7.9	0.3
192	38.1	3.60	137.2	15.3	0.6	1.80	68.6	4.6	0.2
193	66.3	3.60	238.7	26.6	1.1	1.80	119.3	8.0	0.3

(1) Assumptions: 1.80 in/ft available water; 3.0 foot root zone; 50% depletion; 75% irrigation efficiency; Wastewater pump flow = 700 gpm; Irrigation flow = 5400 gpm.

(2) 1.8 in/ft X 3 ft = 5.4 in X 50% depletion = 2.7 in / 75% efficiency = 3.6 in to refill root zone

(3) Hours = $\frac{\text{SMD X Acres x 452.2}}{\text{Pump Flow X IrrEff}}$

SMD = Soil moisture depletion in inches
Acres = Acres of field
452.2 = Constant
Pump Flow = pump flow rate in gallons per minute
IrrEff = irrigation efficiency as a decimal

(4) Assumptions for winter forage: 1.80 in/ft available water; 1.5 foot root zone; 50% depletion; 75% irrigation efficiency, Wastewater pump flow = 700 gpm; Irrigation flow = 5400 gpm.

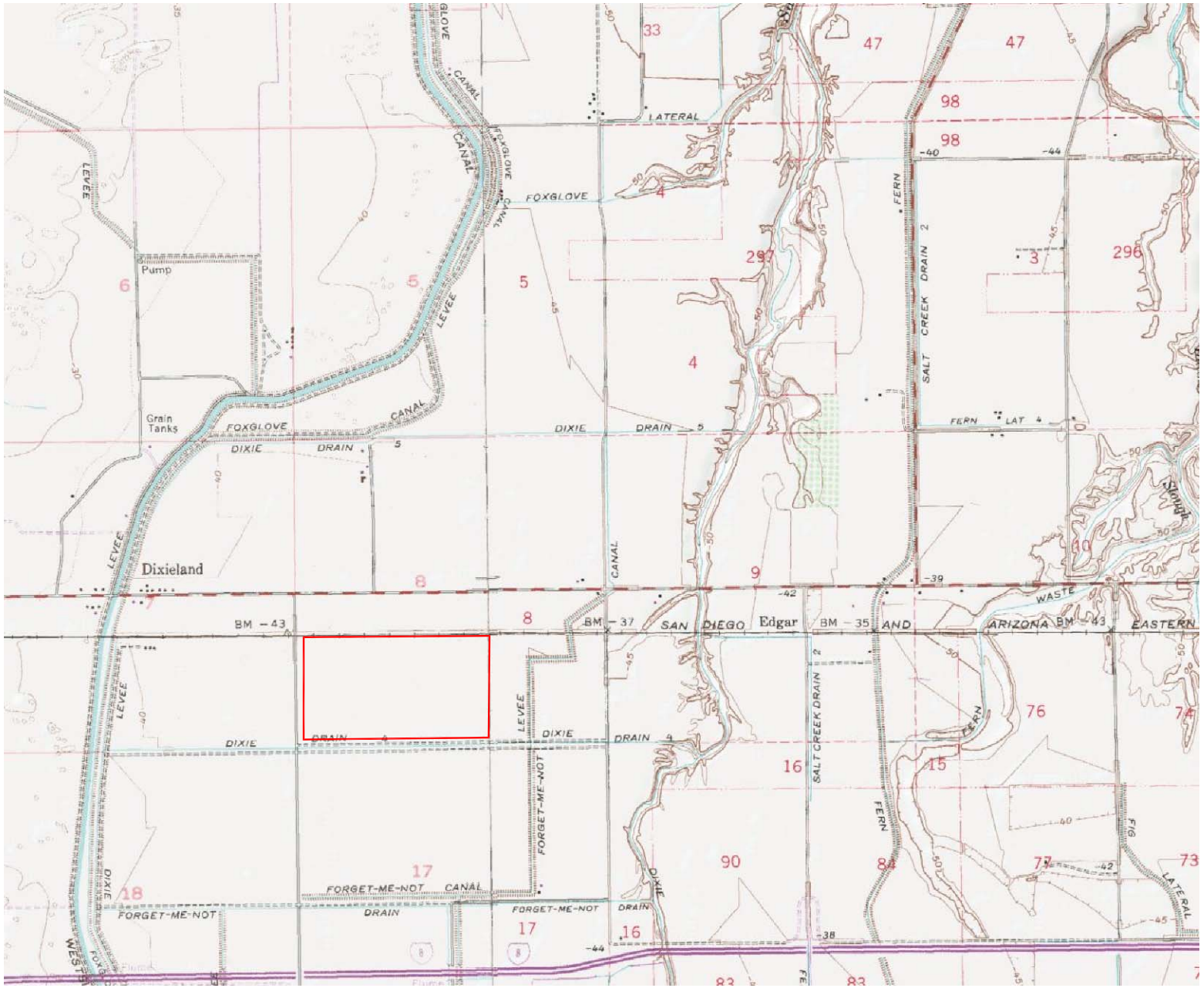
(5) 1.80 in/ft X 1.5 ft = 2.7 in X 50% depletion = 1.37 in / 75% efficiency = 1.80 in to refill root zone

TABLE 5

CROPLAND RISK ASSESSMENT
KF DAIRY
IMPERIAL COUNTY, CALIFORNIA

Field No.	*Predominant Soil Type*	*Runoff Class*	*Tile Drainage*	*Historical depth to groundwater < 5'?*	*Irrigation Tailwater drains off site?*	*Runoff of Manure with Rainfall likely?*	*High Risk Area in Field?*	
							Highly permeable soils?	*Downgradient Surface Water?*
Preece	Imperial, silty clay	C	N	N	N	N	N	Y
190	Imperial-Glenbar, silty clay loam	C	N	N	N	N	N	Y
191	Imperial, silty clay	C	N	N	N	N	N	Y
192	Imperial, silty clay	C	N	N	N	N	N	Y
193	Imperial-Glenbar, silty clay loam	C	N	N	N	N	N	Y
194	Holtville, silty clay	B	N	N	N	N	N	Y

FIGURES



LEGEND

Facility Boundary

SGI environmental THE SOURCE GROUP, INC.
3451-C VINCENT ROAD
PLEASANT HILL, CA 94523

SCALE:

0 4,000 8,000

APPROXIMATE SCALE IN FEET

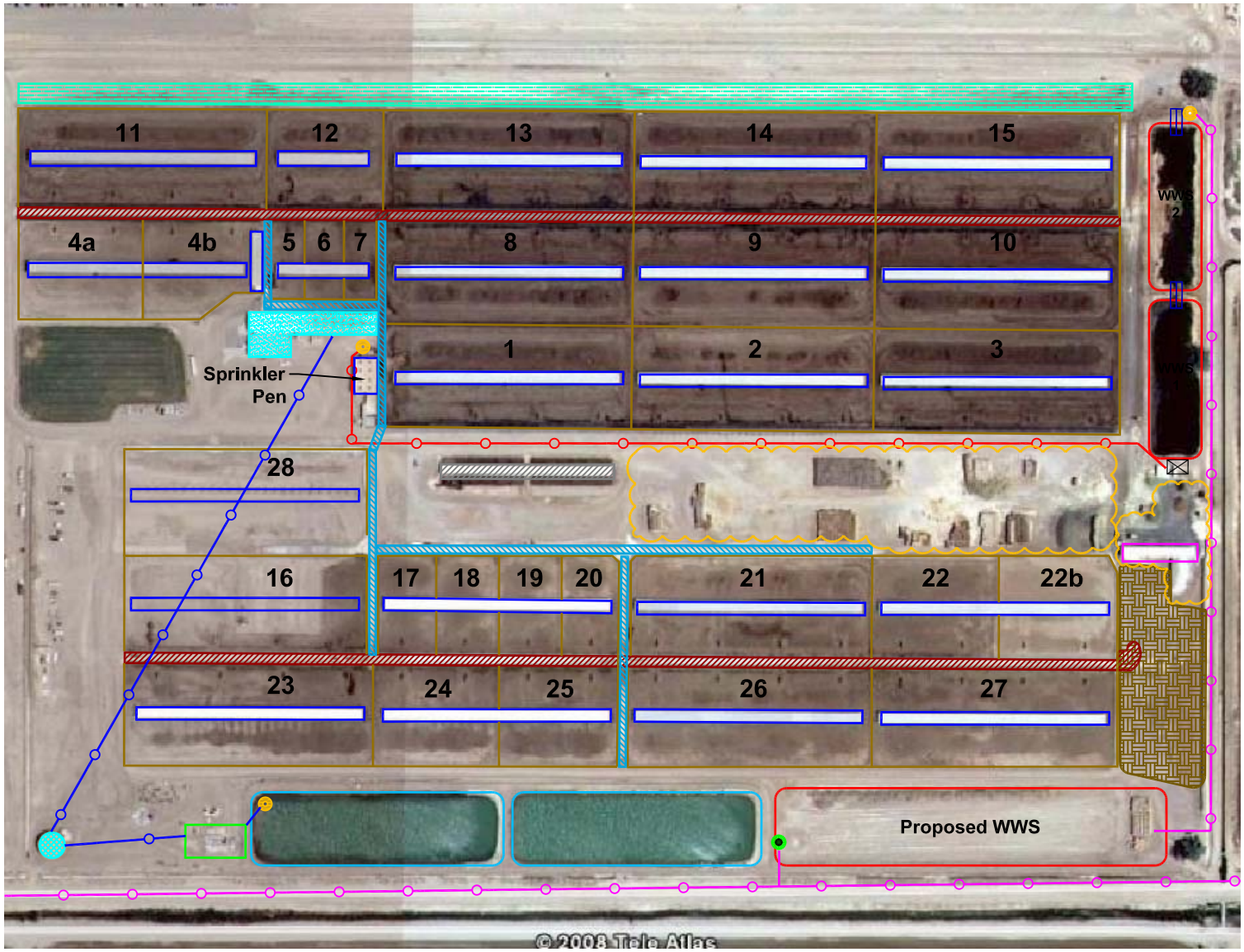
KF DAIRY
EL CENTRO, CA

FIGURE 1
TOPOGRAPHIC MAP

PROJECT NO.	DATE:	DRAWN BY:	APP. BY:
01-HCB-004	9/29/08	SB	TP

LEGEND

- Milk Barn
- Waste Water Storage
- Animal Housing/Shade
- Commodity Barn
- Corral
- Mechanical Solid Separator
- Feed Lane
- Soild Manure Stacking
- Storage Tank
- Storm Water Basin
- Fresh Water Reservoir
- Water Treatment Facility
- Structure/Feature no longer present
- Feed Storage
- Transfer Lane
- Weir Box
- Pump
- Proposed Pump
- Freshwater Pipeline
- Existing Wastewater Pipeline
- Proposed Wastewater Pipeline



SGI environmental THE SOURCE GROUP, INC.
3451-C VINCENT ROAD
PLEASANT HILL, CA 94523

SCALE:
0 500 1000
HORIZONTAL SCALE IN FEET

KF DAIRY
EL CENTRO, CA

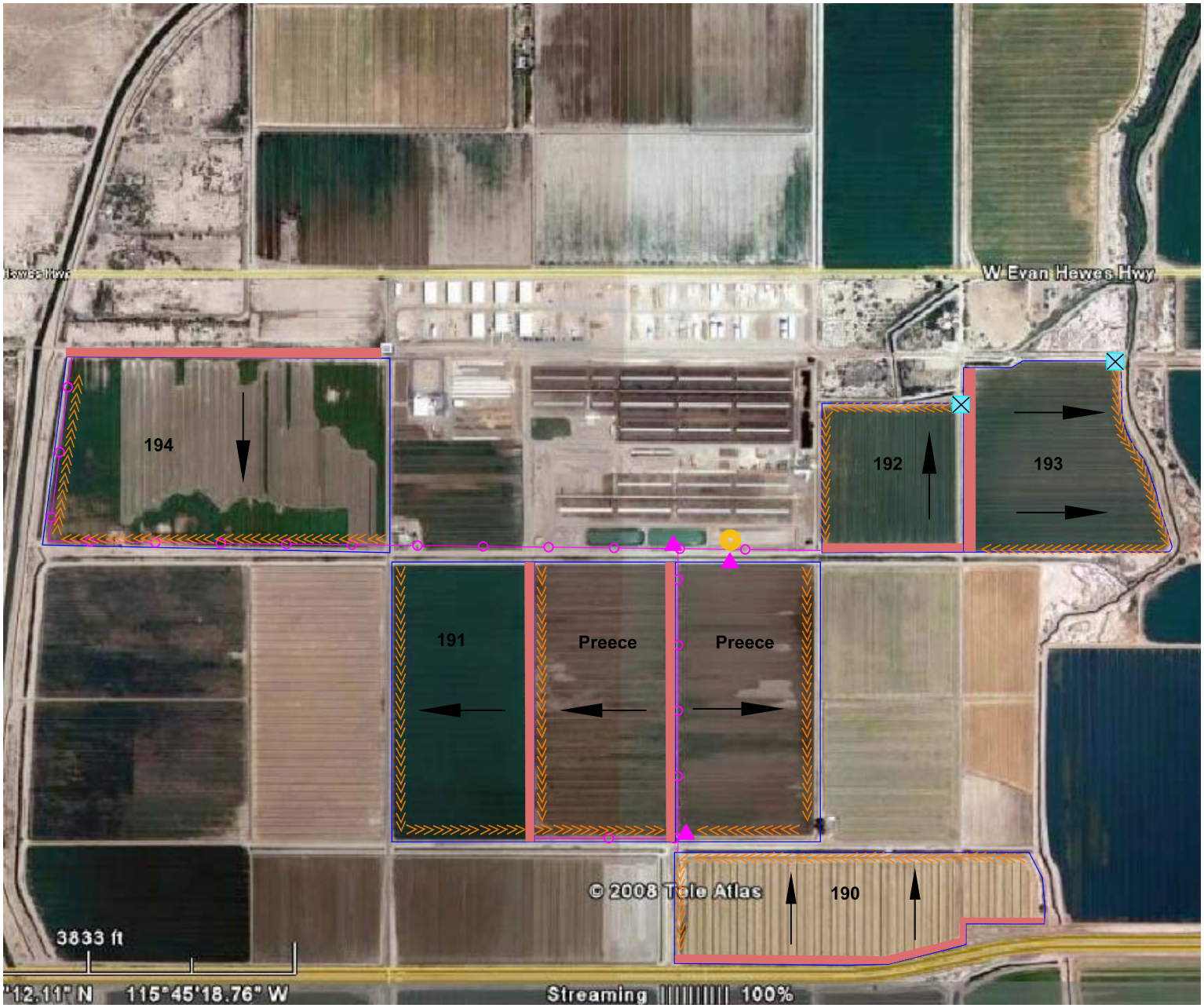
FIGURE 2
DAIRY FACILITY

PROJECT NO.	DATE:	DRAWN BY:	APP. BY:
01-HCB-004	10/16/08	SB	TP

KF Dairy

LEGEND

- Fields
- Irrigation Ditch
- Pump
- Valve
- Current Field Drain
- Proposed Wastewater Pipeline
- Proposed Tailwater Flow Direction
- Irrigation Flow



SGI environmental THE SOURCE GROUP, INC. 3451-C VINCENT ROAD PLEASANT HILL, CA 94523	SCALE: 0 1400 2800 HORIZONTAL SCALE IN FEET	KF DAIRY EL CENTRO, CA	**FIGURE 3** DAIRY FIELDS	
	PROJECT NO. 01-HCB-004	DATE: 10/16/08	DRAWN BY: SB	APP. BY: TP

KF Dairy

APPENDIX A

NUTRIENT BUDGET

Nutrient Application Planner
KF Dairy
Imperial County, California

			Target	Nutrient Requirements[1]			Lab results	Soil Test Nitrogen	Commercial Fertilizer	Nutrient Requirements
			Yield	Nitrogen	P_2O_5	K_20	N	(STN)	(CF)	Net N
Field	Acres	Crop	ton/ac	lb/ac	lb/ac	lb/ac	mg/Kg or ppm	lb/ac		lb/ac
Preece	150	Bermuda grass	12	588	126	600		0	0	588.0
191	74.9	Klein grass	14	627	147	700		0	0	627.0
192	38.1	Klein grass	14	627	147	700		0	0	627.0
193	66.3	Klein grass	14	627	147	700		0	0	627.0
190	65.3	Sudan hay	6	269	60	240		0	0	269.0
190	65.3	Wheat, grain	4.25	349	108	258		0	0	349.0
194	120.2	Sudan hay	6	269	60	240		0	0	269.0
194	120.2	Oat hay	4	224	60	160		0	0	224.0

(1) Taken from Manure Management Planner, Version 2008.02.28 and Guidelines for Field Crops, UCCE Bulletin 104-F

Nutrient Application Planner
KF Dairy
Imperial County, California

	Nutrient	Nutrient Inputs			Nutrient	Total		Target		TOTAL	
	Requirement	Irrigation water	Wastewater[1]		Availability[2]	Available		Manure Application		Manure Application	
	N	N	NH4-N	TKN	N	N		N		N	
Field	lb/ac	mg/L[2]	mg/L[2]	mg/L	%	lb/1,000 gal	#/ac-in	1,000 gal/ac	ac-in	gallons	ac-in
Preece	588.00	0	137	212	45	1.43	38.7	412.4	15.2	61,861,635	2280.6
191	627.00	0	137	212	45	1.43	38.7	439.8	16.2	32,938,375	1214.3
192	627.00	0	137	212	45	1.43	38.7	439.8	16.2	16,755,035	617.7
193	627.00	0	137	212	45	1.43	38.7	439.8	16.2	29,156,399	1074.9
190	269.00	0	137	212	45	1.43	38.7	188.7	7.0	12,320,215	454.2
190	349.00	0	137	212	45	1.43	38.7	244.8	9.0	15,984,219	589.3
194	269.00	0	137	212	45	1.43	38.7	188.7	7.0	22,678,251	836.0
194	224.00	0	137	212	45	1.43	38.7	157.1	5.8	18,884,492	696.2

(1) Nutrient content of wastewater based on 50% of values reported in Lagoon Water Composition, Sampling and Field Analysis, M. Campbell Mathews, et al., UCCE

(2) Nutrient availability taken from USDA-NRCS Agricultural Waste Management Field Handbook, Part 651, Table 11-9-General Mineralization Rates for Nitrogen - Year 1

Nutrient Application Planner
KF Dairy
Imperial County, California

	Nutrient	Nutrient Inputs		Nutrient	Total	Target	TOTAL
	Requirement	Irrigation water	Solid manure[1]	Availability[2]	Available	Manure Application	Manure Application
	N	N	N	N	N	N	N
Field	lb/ac	mg/L[2]	%	%	lb/ton	tons/ac	tons
Preece	588.00	0	2.3	40	18.08	32.5	4,878
191	627.00	0	2.3	40	18.08	34.7	2,597
192	627.00	0	2.3	40	18.08	34.7	1,321
193	627.00	0	2.3	40	18.08	34.7	2,299
190	269.00	0	2.3	40	18.08	14.9	972
190	349.00	0	2.3	40	18.08	19.3	1,260
194	269.00	0	2.3	40	18.08	14.9	1,788
194	224.00	0	2.3	40	18.08	12.4	1,489

(1) Based on solid manure samples taken from KF Dairy in 2006.
(2) Nutrient availability taken from USDA-NRCS Agricultural Waste Management Field Handbook, Part 651, Table 11-9-General Mineralization Rates for Nitrogen - Year 1

APPENDIX B

PHOSPHORUS INDEX

California Phosphorus Index

Transport Factors

Producer: KF DAIRY

Field (s): Preece, 190,191,192,193,194

Date: September 30, 2008

	None	Low	Medium	High	Very High	Current	Planned
Soil Erosion – tons/ac/yr (RUSLE)	< 1 (0)	1 – 3 (1)	4 – 6 (2)	7 – 15 (4)	> 15 (8)		
Sediment from Irrigation induced erosion	No irrigation or negligible sediment loss off site. (0)	Sediment reduction from conservation practices at least 90% (1)	Sediment reduction from conservation practices at least 80% (2)	Sediment reduction from conservation practices at least 40% (4)	Sediment reduction from conservation practices < 40% (8)	1.0	1.0
Ephemeral gully erosion, including furrowed fields	Negligible (0)	Occurs 1 in 4 years (1)	Occurs twice in 4 years (2)	Occurs in 3 of 4 years (4)	Occurs annually (8)	2.0	1.0
Irrigation Tailwater	No irrigation or all tailwater is captured. (0)	Occasional discharge of tailwater off farm (4)		Frequent discharge of tailwater off farm (8)		4.0	0.0
Runoff Class	Runoff from rainfall is insignificant, or Negligible runoff class (0)	Very low or low (1)	Medium (2)	High (4)	Very High (8)	2.0	2.0
Subsurface Drainage	No tile drains, no groundwater pumping from <50' depth, and no seepage to surface water occurs within 500' of the field. (0)			Irrigation occurs. Tile drains, seepage, or pumping from <50' occurs within 500' of the field. (8)		8.0	8.0
Use of drainage system discharging to impacted surface water	If water containing particulate, dissolved, or suspended phosphorus discharges from tile line, direct seepage, shallow groundwater extraction, tailwater ditch, field drain ditch, etc., into a drainage system that provides no substantial filtering and drains without significant impediment into the impacted water body or it's tributary use a Discharge Rating of **1.5.** Such conveyances may be a pipeline, free flowing ditch, or direct sheet flow into the water body or it's tributary. For other situations use a Discharge Rating of **1.0**.					1.0	1.0

California Phosphorus Index

Source Factors

Producer: KF Dairy

Fields:Preece,190,191,192,193,194

Date: September 30,2008

	None	Low	Medium	High	Very High	Current	Planned
Soil Test P 0-12", ppm	**(Soil Test P – Threshold) / 10 = Point Value** (_____ - ( )) / 10 = _____ Threshold = 20 for Olsen, 40 for Bray (Minimum Point Value = 0)					0.0	0.0
Commercial P Fertilizer Application Rate	**Annual P_2O_5 applied:** P_2O_5 lbs/ac/50 ___100_____ /50 = __2_____					2.0	1.0
Commercial P Fertilizer Application Method	None applied, or phosphorus fertilizer is injected, banded, or incorporated to greater than 2" prior to the rainy season (0)		Surface applied fertilizer is incorporated less than 2" prior to the rainy season (2)		Surface applied – not incorporated prior to irrigation or winter rain (8)	2.0	0.0
Organic P Source Application Rate	None Applied (0)	Application rate based on lab analysis of all sources of manure, consideration of all nutrient sources, soil or tissue tests, record keeping, and historic yields. (1)	Application rate based on UC accepted manure nutrient level estimates and crop needs, and record keeping. (2)	Application rate based on UC accepted manure nutrient level estimates and crop needs. (4)	Manure application rate decisions are not constrained by estimated crop needs or manure nutrient levels. (8)	0.0	1.0
Organic P Source Application Method for solids	None Applied, or all solids are incorporated > 3" prior to runoff and application system is calibrated. (0)	Solids from corrals, stalls, lanes, settling basins, separators, or ponds incorporated >3" before typical onset of the rainy season or irrigation. (1)		Solids from corrals, stalls, lanes, settling basins, separators, or ponds not incorporated before typical onset of rainy season or irrigation. (4)		0.0	0.0
Organic P Source Application Method for liquids	None Applied (0)	Low organic solids load with wastewater application. Very effective settling and separation system in place. (.5)	Moderate organic solids load with wastewater application. Agitation on a consistent basis during irrigation. (1)	High organic solids load applied with irrigation water during irrigation. Poor separation system in place. (2)	Very high organic solids load applied with irrigation when accumulated solids are being cleaned from pond, annually or less often. (4)	0.0	0.5

California Phosphorus Index
Field Risk Ratings

Producer: KF Dairy

Fields: Preece, 190,191,192,193,194

Date: September 30, 2008

Risk Rating for erosion P loss:

Score		Risk Rating	
Current	Planned	Current	Planned
12	5	Low	Low

Risk Rating for runoff P loss:

Score		Risk Rating	
Current	Planned	Current	Planned
24	5	Low	Low

Risk Rating for leachable P Loss:

Score		Risk Rating	
Current	Planned	Current	Planned
16	16	Low	Low

Risk Rating category chart

	Erosion	Runoff	Leachable
Low	< 20	< 30	< 40
Medium	20 - 60	30 - 100	40 - 80
High	60 - 300	100 - 300	80 -120
Very High	>300	>300	>120

Interpretation of Risk Ratings:

Low - Apply manure at a rate to match N requirements of the crops. Commercial P fertilizer should be applied based on soil or tissue sampling as recommended by UC guidelines.

Medium - Apply manure at a rate to match N requirements of the crops. Commercial P fertilizer should be applied based on soil or tissue sampling as recommended by UC guidelines.
Fields in this category should be monitored to assure risk of P loss does not increase. Appropriate practices should be considered to limit risk.

High - Apply manure at a rate to match P requirements of the crops.
A conservation plan must be in place to lower the Risk Rating to "Medium".
Commercial P fertilizers should be applied based on soil or tissue sampling as recommended by UC guidelines.
If a refined manure derived form of P is used to substitiute for the use of commercial P fertilizer, apply using UC guidelines based on soil and tissue sampling.

Very High - Apply no manure. A conservation plan is being enacted to lower the Risk Rating to "High" or lower. Commercial P fertilizer should be applied based on soil or tissue sampling as recommended by UC guidelines. Apply no P from any source if Soil Test P level exceeds 80 PPM (Olsen) or 120 PPM (Bray). A starter of up to 30 lbs P_2O_5/ac may be injected into soils below 55 degress fahrenheit when seeding winter vegetables.

APPENDIX C

ESTIMATING AVAILABLE MOISTURE BY FEEL

ESTIMATING AVAILABLE MOISTURE BY FEEL

Percent of readily avail. moisture remaining	**Sands** 0.50 - 1.0 inches of avail. water per foot of soil	**Sandy Loam to Fine Sandy Loam** 1.25 - 1.75 inches of avail. water per foot of soil	**Loam to Clay Loam** 1.50 - 2.25 inches of avail. water per foot of soil	**Clay** 2.00 - 2.50 inches of avail. water per foot of soil
		FEEL OR APPEARANCE		
0	Dry, loose, single-grained, flows through fingers.	Dry, loose, single-grained, flows through fingers, or may form soft clods.	Powdery dry, may form firm clods, which can be broken to fine granules by hand.	Hard, baked, cracked, sometimes has loose crumbs on surface.
50 or less	Still appears to be dry; will not form a ball with pressure.*	Still appears to be dry; will not form a ball with pressure.*	Somewhat crumbly, but will not hold together with pressure.	Somewhat pliable, will ball under pressure.
50 - 75	Same as sand under 50 or less.	Tends to ball under pressure, but seldom holds together.	Forms a ball, somewhat plastic; will sometimes slick slightly with pressure.	Forms a ball: will ribbon out between thumb & forefinger.
75 - Field	Tends to stick together slightly, sometimes forms a very weak ball under pressure.	Forms weak ball, breaks easily, will not slick.	Forms a ball and is very pliable; slicks readily.	Easily ribbons out between fingers; has a slick feeling.
	Upon squeezing, no free water appears on soil, but wet outline of ball is left on hand.	Same as sand.	Same as sand.	Same as sand.

* Ball is formed by squeezing a handfull of soil very firmly.

APPENDIX D

SAMPLING AND ANALYSIS PLAN

Sampling Analysis Plan
KF Dairy
Imperial County, California

Sample Type	Sample Collection Location	Collection Method	Analyses	Number of Samples
Irrigation Canal	Prior to irrigation mixing point	Collect during actual irrigation event.	Total Nitrogen	1 per irrigation season
Solid Manure	Manure stacking/storage area before export or land application	A minimum of 3 samples taken from points around the manure pile, from depth of 1 ft. After mixing, collect one composite sample for lab analysis.	Ammonia-Nitrogen, Total Kjeldahl Nitrogen, Total Phosphorus, Potassium, pH.	Minimum of 1 per year
Wastewater	Prior to irrigation mixing point	Collect a representative grab sample prior to any dilution.	Ammonia-Nitrogen, Total Kjeldahl Nitrogen, Total Phosphorus, Potassium, pH.	Minimum of 1 per year
Soil	1 composite per 80 acres of LAA	Place equal volumes of soil from each 10-acre sample site for each land application area and sample depth (0-12”), in a clean bucket. Thoroughly mix the sample and place at least one pint of composite sample in a clean plastic container.	Soluble phosphorus, Nitrate-Nitrogen, pH.	1 x per 5 years
Harvested Crops	Storage area	Collect sample within one week of harvest from a minimum of 5 locations in the storage area.	Total nitrogen, phosphorus, potassium, wet weight or density	1 composite sample per field
Effluent	Discharge from production area or land application area	Collect a representative composite sample of wastewater from a three time-sample series representing the beginning, middle and end of the wastewater discharge.	Nitrate-Nitrogen, Total Kjeldahl Nitrogen, Total Phosphorus, Total Dissolved Solids, BOD, Total Suspended Solids, Total and Fecal Coliform.	1 per unauthorized discharge event