APPENDIX C

Groundwater Quality

The groundwater basin in the Kern County portion of the San Joaquin Valley is a basin of interior drainage. It has no appreciable surface or subsurface outflow, except in extremely wet years (Kern County Water Agency, 1998). Salts (generally measured as total dissolved solids [TDS]) are introduced into the basin with imported water supplies. Although the water may leave the basin by evaporation or evapotranspiration, the majority of the salts stay behind, potentially leading to a build-up of salt in the soil and groundwater. Excessive salt loading can result in a degraded water supply, particularly if concentrations exceed the Secondary Drinking Water standard of 500 mg/L. Salt loading of managed groundwater basins is an important issue throughout the central San Joaquin Valley.

Manufactured fertilizers and manure generated by livestock contain salts and nitrogen (nitrogen is essential for plant growth). Salts leaching from manufactured fertilizers and manures contribute to the potential salt loading problem in the groundwater basin. Dairy manure tends to contain more salts than manufactured fertilizers (Table 4.3-1 shows examples of salt contents in fertilizers) and, therefore, groundwater underlying agricultural fields fertilized with manure may be more susceptible to salt loading increases.

TABLE 4.3-1. **Comparison of Salt Compositions in Fertilizers**

Ion	Regional Mix[1]	15:15:15 Blend[2]	Dairy Manure
	(pounds of salts per 100 pounds of nitrogen)		
Calcium (Ca)	126	0	147
Magnesium (Mg)	4	0	67
Sodium (Na)	5	0	292
Potassium (K)	23	80	28
Chloride (Cl)	8	73	82
Sulfate (SO_4)	45	173	123
Phosphate (HPO_4)	14	143	188
Nitrate (NO_3)	359	443	443
Total salts	584	912	1,370
Non-nitrogen salts	225	469	927
Non-nitrogen/total salts ratio	39%	52%	68%

Source: RWQCB, Santa Ana Region, 1990, page III-21.

[1] For the purpose of developing a salt loading unit factor for agricultural uses other than dairies, a regional fertilizer mix was formulated on a weighted basis using fertilizers commonly used within the region.

[2] Blend consisting of 40% ammonia sulfate, 33% diammonium phosphate, 25% muriate of potash, and 2.5% urea.

Excess nitrogen (in its nitrate form) in groundwater is a significant problem in some agricultural areas. Nitrates have been associated with several environmental problems in surface water, including eutrophication and altering the productivity of natural ecosystems. The effect of nitrates on human health is also a concern. High concentrations of nitrates

(PSP), adopted by Kern County in 1994 to allow development of a "new town" in that portion of the project site. The additional 434 acres in the northwestern portion of the project site was not included within the PSP area. Adoption of the PSP provided the opportunity to develop a wide range of urban uses within the PSP area, including residential, commercial, industrial, and public facility uses. Although the zoning change to modify zoning from "Exclusive Agriculture" to "Specific Planning District" to implement the Specific Plan was referred back to the Kern County Planning Department for consideration, it was not implemented. Therefore, the area of the proposed project remains zoned as "Exclusive Agriculture." Although dairies, such as proposed by the project, are a permissible use within "Exclusive Agriculture" zones, the Kern County Zoning Ordinance requires minimum buffers for dairies from specific uses, such as communities and special uses, to minimize the potential for land use conflicts. The location of Dairy 2 of the proposed project does not meet the minimum buffer requirements from the community of Old River or from Lakeside Union School and, therefore, is subject to a requirement for a Conditional Use Permit (CUP).

The location of Dairy 1 meets the minimum buffer requirements upon approval of the project. Following review of grading plans and approval of the project design by the Kern County Mosquito Abatement District, a grading authorization was issued in November 1998 for construction of Dairy 1. Grading of that site was begun in January 1999 but is not yet complete and has been suspended pending completion of the environmental review and approval process. The County has required preparation of either a development agreement or a CUP to ensure that any mitigation measures required for the project would be applied to both proposed dairies.

3.2.1 Proposed Facilities

The proposed project is a development of a new dairy operation in west-central Kern County (Figure 3-1). The project would consist of two dairies (Dairy 1 and Dairy 2) constructed on the project site, which encompasses 4,677 acres (Figure 3-2). Dairy 1 would be developed in the northern half of Section 10; Dairy 2 (George Borba) would be constructed in the southern half of Section 2 and northern portion of Section 11. Each dairy operation would cover approximately 341 acres; the remainder of the site would be devoted to agricultural crop production. The dairies would each support approximately 7,200 dairy cows and related stock; the related stock includes 3,264 dry cows and bred heifers, 1,092 heifers, and 2,730 calves. Each dairy would, therefore, support approximately 14,286 cattle for a total of 28,572 cattle at the project site. The applicants have proposed two dairies, operated by two separate entities, that would share common access to improve the operating efficiency of each dairy facility and to "streamline" the permitting and environmental review process.

The proposed dairy herds were developed on the basis of estimated animal waste generation and the amount of land on the project site that is available for waste application. Allowable waste loading rates are calculated on the basis of "animal units," a normalizing factor that accounts for animal size and waste production (see Appendix C). A 1,000-pound mature milking cow is the standard unit (1.0 animal unit); smaller, non-lactating