United States Department of the Interior
FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, W-2605
Sacramento, California 95825

IN REPLY REFER TO:
1-1-00-TA-2158

September 14, 2001

Mr. Bill Zumwalt
Kings County Planning Department
Government Center Building #6
1400 W. Lacey Boulevard
Hanford, CA 93230

Subject: Comments on the Revised Program Environmental Impact Report for the Draft Dairy Element of the Kings County General Plan

Dear Mr. Zumwalt:

This letter responds to the *Revised Program Environmental Impact Report for the Draft Dairy Element of the Kings County General Plan SCH #2000111133* (PEIR), dated May 7, 2001, that was received by the U.S. Fish and Wildlife Service (Service) on May 10, 2001. The PEIR presents goals, objectives, and policies to guide development, expansion, and operation of milk cow dairies in the Kings County. Three hundred and ninety-four square miles have been designated as suitable for the development and expansion of bovine dairy facilities and 646 square miles have been designated as suitable for reuse of manure and process water generated at dairies as fertilizer and irrigation on cropland. Because the implementation of this project will likely impact federally-listed species, we are providing comments and recommendations pursuant to our responsibilities under the Endangered Species Act of 1973, as amended (Act). We previously provided comments to Kings County on this issue in a letter to the Kings County Planning Department dated February 15, 2001. 25-1

As a Responsible Agency under the California Environmental Quality Act, the County of Kings has a responsibility to ensure that potential project impacts are identified, alternatives are considered, and potential impacts are avoided and/or mitigated to below a level of significance. This responsibility includes ensuring that the impacts of the project, considered together with the past, present, and reasonably foreseeable impacts of other projects, will not result in cumulative impacts to the extent that such impacts significantly affect the quality of the environment. The concentration of proposed and current concentrated animal feeding operations (CAFOs) in this area could pose a number of risks to water quality and public health, mainly owing to the amount of animal manure and wastewater they generate. Manure and wastewater from large, CAFOs have the potential to contribute pollutants such as nutrients (e.g., nitrogen, phosphorus), organic matter, dust, carbon dioxide, methane, sediments, pathogens, heavy metals, hormones, antibiotics, and ammonia to the environment. These pollutants can cause several types of water quality, 25-2 25-3

public health, and other environmental impacts, including the contamination of drinking water supplies, soil contamination, air pollution, vegetation loss, algal blooms, fish kills, ground water depletion, endocrine disruption and animal deformities (e.g., amphibians and birds), and the creation of suitable conditions for vectors of diseases. 25-3 Cont.

Section 9 of the Act prohibits the "take" (e.g., hunt, harm, harass, pursue, injure, kill, trap, wound, collect) of federally listed wildlife species. "Harm" is further defined to include habitat modification or degradation that kills or injures wildlife by impairing essential behavioral patterns including breeding, feeding, or sheltering (50 CFR § 17.3). Congress established two provisions (sections 7 and 10) of the Act that allow for the "incidental take" of listed species by Federal agencies, private interests, and non-Federal government agencies. Incidental take is defined as take that is "...incidental to, and not the purpose of, the carrying out of an otherwise lawful activity." Take incidental to an otherwise lawful activity may be authorized by one of two procedures. If a Federal agency is involved with the permitting, funding, or carrying out of the project, then initiation of formal consultation between that agency and the Service pursuant to section 7 is required if it is determined that the proposed project may affect a federally listed species. Such consultation may result in a biological opinion that addresses the anticipated effects of the project to the listed species and may authorize a limited level of incidental take. If a proposed project does not involve a Federal agency, but is likely to result in the take of a listed animal species, then the landowner or project proponent should apply for an incidental take permit, pursuant to section 10. When an application is made for an incidental take permit, measures to avoid, minimize, or mitigate for effects to listed species and their habitat must be identified and incorporated into a habitat conservation plan. If the habitat conservation plan and the application for the permit meet the issuance criteria, a permit authorizing incidental take may be issued by the Service. 25-4

We appreciate the removal of the word "native" from policy 3.3a of the Dairy Element, as requested in our February 15, 2001, letter to your agency. However, we remain concerned about the following issues: 25-5

1. Wildlife Survey requirement for the Technical Report: The Technical Report is a report prepared by a qualified professional that is submitted with an application for a new dairy or expansion of an existing dairy. Before construction begins, the applicant should obtain concurrence from the Service that their proposed project is in compliance with the Act. We recommend that this be included as a required component of the Wildlife Habitat Survey for the Technical Report. 25-6

2. Potential effects of the proposed development expansion and/or operation on vernal pool species, including the federally-listed vernal pool tadpole shrimp (*Lepidurus packardi*) and the vernal pool fairy shrimp (*Branchinecta lynchi*): From maps in the PEIR, it appears that the implementation of this project may result in loss or degradation of vernal pools and other wetlands. Federally-listed vernal pool crustaceans, have been documented at several locations in Kings County. Although wetlands are discussed in the PEIR, vernal pools, and more specifically, vernal pool crustaceans, should be adequately addressed in the final environmental documents. 25-7

3. Effects of the proposed project on the San Joaquin kit fox (*Vulpes macrotis mutica*; "kit fox"): Kit foxes are known to forage in agricultural fields and use them as travel corridors. Although farmland is not used as intensely as natural lands by foraging or traveling kit foxes, it is becoming more important as foraging areas and travel corridors as natural lands are eliminated by land conversions. The proposed dairy facilities and intensified cultivation pattern will greatly reduce in value or permanently remove agricultural lands from possible use by the kit fox for foraging and other essential behaviors. Therefore, the development of dairy structures on former croplands could constitute harm to the kit fox because these areas can no longer be used for activities such as foraging, dispersal, and denning; all of which strongly influence the survival of kit foxes. Hence, we do not agree with the PEIR that the proposed project will not adversely impact the San Joaquin Kit Fox. 25-8

Additionally, we have the following comments and concerns regarding contaminants issues:

Specific Concerns Relevant to Dairies and the PEIR

The US Food and Drug Administration's (FDA) September, 1993, **Federal Register** announcement noted that selenium concentrations in a few sampled dairy cow manure pits had been documented at levels of 63-88 micrograms/liter (parts per billion). By comparison, the U.S. Environmental Protection Agency's (EPA) selenium water quality criterion for protection of aquatic life is 5 micrograms/liter, and EPA's human drinking water standard for selenium is 50 micrograms/liter. Thus, direct contamination of fish and wildlife habitats and human drinking water supplies is clearly a potential hazard that the PEIR should address. The FDA also noted that without more information on the exact chemical forms of selenium in dairy manure, potential for environmental impact cannot be evaluated adequately to support a Finding of No Significant Impact (FONSI) pursuant to the National Environmental Policy Act (NEPA). Of equal or greater concern, is the issue of selenium loading into the environment via land applications of dairy manure. As FDA stated (1993:47968), "Agricultural soils are highly manipulated oxidized systems that tend to favor formation of selenite and selenate and stimulate microbial activities." Much previous research has revealed that selenate selenium is highly mobile in the environment, easily transported to aquatic ecosystems, where it can rapidly become bioaccumulated to toxic levels (e.g., papers in Frankenberger and Engberg 1998). 25-9 25-10

The Council for Agricultural Science and Technology (CAST) recently (1994) published some vital statistics regarding selenium dynamics of lactating Holstein cows. For a herd receiving feed supplemented with 0.3 ppm selenium, it was found that on average each cow excreted 6.4 milligrams selenium (in urine and manure) per day (CAST 1994:13). That works out to the equivalent of 1.668 grams Selenium/yr/animal unit (AU), assuming that a lactating Holstein cow equals 1.4 AU (as assumed in the PEIR) and that there are 365 days in a year. Thus, if the entire remaining capacity of 586,207 AU recognized in the draft Dairy Element were fulfilled, it would result in about an additional 978,000 grams selenium being introduced into the Kings County environment each year. This roughly 1 million grams of additional environmental selenium is far from trivial. That is the equivalent of an annual addition of 1 trillion micrograms of selenium to the environment, and remember that as little of 6 micrograms in a liter of water would be considered an environmentally toxic amount by U.S. EPA. We recommend the final 25-11

environmental documents contain an adequate analysis of the projected environmental fate of those trillions and trillions of micrograms of selenium that will be introduced into the environment if the draft Dairy Element is fully implemented as proposed. The FDA has clearly warned the public that supplementing livestock feeds with 0.3 ppm selenium is a significant issue. 25-11 Cont.

Selenium in Perspective

The overall implications of adding 586,207 AU to the existing dairy herds (283,974 AU) in Kings County and spreading manure from all 870,181 AU's over the 665,623 acres (269,483 hectares) of the dairy development and nutrient spreading zones is equivalent to an expectation of adding 5.5 grams of selenium per hectare per year to the manured lands (if selenium supplementation of feed is ubiquitous and if manure wastes are spread absolutely evenly across the available 269,483 hectares). This estimate could be low, if the cows are being fed poultry litter. FDA does not regulate total selenium content of livestock feeds, but only the supplemental addition of inorganic selenium salts. In poultry production areas, such as Kings County, it is not uncommon to use poultry litter (wastes) as a feed for cows. Such litter has been documented to contain an average of about 1 ppm selenium, which would be in addition to the selenium fortification of more traditional sources of feed. Thus, the estimate of 5.5 grams of selenium per hectare per year from cow manure could be low. FDA constructed a model to evaluate the addition of 3.94 grams of selenium per hectare via application of chicken manure and calculated that such a scenario would lead to surface runoff from the amended fields that contained 7.8 micrograms/liter of selenium. or 1.56 times U.S. EPA's aquatic life criterion. FDA's model did not consider the cumulative effects of repeated annual additions of selenium to the environment, but only looked at the scenario of a one-time land application of manure. If the FDA modeling even remotely applies to Kings County conditions, the environmental consequences of increasing Kings County dairy herds (including support stock) by 586,207 AU would be potentially significant for any surface water feature downslope of manured lands and all listed species of animals strongly linked to aquatic ecosystems. 25-12

Additional perspective, or context, can be gained from a study of Stewart Lake, Utah (Stephens et al. 1992), where it was found that annual loading of only 252 grams of selenium (to the 250 surface-acre lake) was sufficient to cause selenium bioaccumulation in waterfowl eggs of over 20 parts per million (an unequivocally toxic dose that caused embryo deformities). Thus, with an addition of only 2.5 grams of selenium per surface hectare of the lake, severe selenium poisoning of wildlife occurred. 25-13

A study by Gissel-Nielsen (1973) monitored the environmental effects of a 120 gram per hectare selenium amendment. It was found that the selenium content of earthworms increased from 2.2 parts per million to 7.5 parts per million. Generally, about 5 parts per million Se (or more) in earthworms would present a toxic hazard to vertebrate animals (such as robins) that eat earthworms. Under the full herd development scenario for the Kings County draft Dairy Element, a cumulative application of 120 grams of selenium would be reached in about 20-25 years. 25-14

In conclusion, it seems quite plausible that 5.5 grams of selenium applied per hectare per year is more than the environment of Kings County could safely withstand. This suggests that addition 25-15

of nitrogen and/or salts may not be the limiting constraint on herd size that was assumed by the Kings County Planning Agency and therefore that the calculations of allowable total herd sizes for Kings County should be reexamined in the final environmental documents. 25-15 Cont.

Uncertainties and Monitoring

There are numerous, and important uncertainties associated with analyses such as those presented above (as elaborately presented in FDA's September, 1993, **Federal Register** announcement) such that educated predictions about reality are virtually impossible (as opposed to specific hypothetical scenarios, that are very precise, but of unknown realism). The known potentials for grave risk, however, are well documented; yet the PEIR does not prescribe any selenium monitoring. Adding selenium to the minimum monitoring requirements is mandatory for risk management given the well known scientific uncertainties. The PEIR also did not prescribe monitoring of any kind for lands receiving applications of dairy manure, nor any monitoring of downslope surface aquatic features. 25-16

Other Unaddressed Contaminant Issues

In addition to selenium supplementation of livestock feeds, supplementation with antibiotics, growth promoters, and other nontraditional contaminants is also common practice. The PEIR needs to address the issue of potential environmental release of such constituents and needs to evaluate the potential for hazard. The final environmental documents should address the expected loading to the environment of such constituents be and how sensitive to such loadings will be to the environment. If the project is approved as proposed, massive tonnages of medicated and otherwise chemically manipulated feed will be converted to massive tonnages of liquid and solid dairy waste (manure) that will be released to the environment on a grand spatial scale (665,623 acres). The environmental consequences at the landscape level is unaddressed in the PEIR for most of the known contaminants in livestock feed/manure. Therefore, we recommend the County of Kings adequately address these issues. 25-17

The copper and zinc content of dairy manure are not adequately addressed in the PEIR. Other manures, such as poultry and swine manure contain concentrations of copper and zinc that quickly present a cumulative hazard if the manure is repeatedly applied to the same piece of land. Many livestock feeds are fortified with copper and zinc, two metals that tend to cumulatively accumulate in soils subject to repeated manure applications. Phytotoxicity from land applications of copper and zinc rich manures, and permanent chemical sterilization of agricultural lands are issues of serious concern (e.g., Warrick and Stith 1995). The final environmental documents should compare metals composition of dairy manure to regulatory lifetime loading limits for such metals as stipulated for land application of sewage sludges. For sewage sludges, once the lifetime loading limit is exceeded for any one metal, further land application of sludge is permanently forbidden. There is no adequate discussion of such concepts and environmental safeguards with respect to the massive land applications of dairy manure that will be a necessary part of the draft Dairy Element. 25-18

Groundwater Protection

A principal component of the groundwater protection strategy in the PEIR is the prohibition of dairy development where shallow groundwater is within 5 feet of the surface. However, shallow groundwater levels across much of Kings County are not static. For example, the California Department of Water Resources (DWR) reported that within the "Tulare Sub-Basin" (almost exclusively Kings County) the amount of land with shallow groundwater within 5 feet of the surface had increased from 119,000 acres in 1991 to 301,000 acres in 1997 (DWR 1997). The rapidly changing status of groundwater levels in Kings County must be taken into consideration. To treat groundwater levels as static, will likely result in many dairies being sited over shallow groundwater despite the prohibition of that in the PEIR. The final environmental documents should adequately discuss what will be done if groundwater rises to within 5 feet of the surface after a dairy has been approved and developed. The final environmental documents also should adequately address monitoring the dynamics of shallow groundwater after a dairy has been approved and developed. 25-19

Comparison of the 1997 DWR groundwater maps with the PEIR maps for proposed Dairy Development Overlay Zones (DDOZ) and Nutrient Spreading Overlay Zones (NSOZ) reveals very substantial overlap. The final environmental documents should discuss why dairy development is being proposed for substantial areas of land that already have shallow ground water within 5 feet of the surface. An even larger proportion of the proposed NSOZ area already has shallow groundwater within 5 feet of the surface. The final environmental documents should adequately discuss the proposal to use large areas of land with shallow groundwater for manure applications. Based on the DWR (1997) groundwater maps, it certainly appears as though the amount of land deemed suitable for the DDOZ is substantially overestimated due to conflict with the draft Dairy Element prohibition against dairy development over shallow. 25-20

Summary

It is imperative that the environmental fate of approximately 1 trillion micrograms of selenium that could be added to the Kings County environment on an annual basis as a result of this project be addressed by the County of Kings in the final environmental documents. At present the topic is not addressed at all. After more than 5 years of study, the FDA concluded in 1993 that a finding of no significant impact for such additions of selenium to the environment was not scientifically defensible. Consequently failing to mitigate for this issue could be in violation of the NEPA. Presumably this would apply also to the California Environmental Quality Act (CEQA). Due to the critical scientific uncertainties that led to FDA's conclusion, risk management would require fairly extensive environmental monitoring of selenium at dairy development sites, manure application sites, and at all downstream surface water features. Mitigation should probably include the funding of substantive primary scientific research aimed at resolving the main uncertainties regarding the exact chemical form, the reactivity, and the environmental mobility of selenium in dairy cow liquid and solid manure. 25-21

The issue of lifetime load limits for other potentially toxic inorganic chemical constituents of dairy cow manure, such as copper and zinc, have not been adequately addressed in the PEIR. The 25-22

cumulative effects of repeated land applications of animal manure are known to present definite hazards with regard to accumulation of copper and zinc. The potential for environmental release of selenium or medical supplements commonly added to livestock feed, via land applications of manure, such as growth promoters and antibiotics, also has not been adequately addressed in the PEIR. The examination of groundwater issues should be re-evaluated keeping in mind that groundwater levels are very dynamic across much of Kings County. The extent of Kings County that is deemed suitable for dairy development appears to need re-examination in light of DWR (1997) groundwater maps. Upon consideration of the above issues, it is likely that the total size of dairy herds that can be supported in Kings County without significant adverse selenium impacts on the environment will be significantly lower than the estimates currently reported in the PEIR. The Service is also concerned that the proposed development, expansion, and/or operation of milk cow dairies, as proposed in the PEIR likely will result in take of the df the endangered San Joaquin kit fox and other federally listed species. These species likely would be affected through direct, indirect, cumulative, and interrelated/interdependent effects. Therefore, we recommend that the County of Kings require parties applying for permission for the development, expansion, and/or operation of milk cow dairies obtain the concurrence of the Service that adverse selenium effects to listed species will be avoided, or incidental take authorization pursuant to sections 7 or 10(a)(1)(B) of the Act has been obtained prior to issuance of any permits by your agency.

25-22 Cont.

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Thank you for your interest in conserving threatened and endangered species. Please contact Brian Peterson or Peter Cross at (916) 414-6655 if you have any questions about this letter.

Sincerely,

Jan C. Knight
Chief, Endangered Species Division

cc: California Department of Fish and Game, Fresno, California (Attn: Donna Daniels)

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