LETTER 25 - Jan Knight, United States Department of the Interior

This comment letter was received after the close of the public review and comment period.

Response to Comment 25-1

The comment is appreciated and noted for the record. Responses to more detailed comments reflected in this comment are addressed in the following responses.

Response to Comment 25-2

The County agrees with the commentor's assessment of the responsibility under CEQA for the evaluation of potential impacts on water quality and public health related to implementation of the proposed Element. The comment does not identify specific impacts but supports full environmental review for the proposed Element.

Response to Comment 25-3

The comment generally identifies potential impacts related to manure and process water management. All potential impacts indicated by the comment were addressed in the PEIR with the exception of "endocrine disruption and animal deformities." More specific discussion of this impact is presented in Responses to Comments 25-12, 25-21, 25-22, and 25-23.

Response to Comment 25-4

The commentor's summary of the prohibitions under Section 9 of the Endangered Species Act related to any potential "take" of a federally listed "endangered species" is appreciated. The Draft PEIR (page 4.4-2) presented a similar discussion and the potential impacts related to endangered species are discussed in Impact 4.4-1.

Response to Comment 25-5

The comment is noted for the record.

Response to Comment 25-6

In response to this comment by USFWS, the responsible agency for implementation of the Endangered Species Act, the text of **Policy DE 3.3a** has been modified to require that dairy applicants obtain USFWS concurrence on compliance with the Act.

Response to Comment 25-7

The text of **Policy DE 1.2e** of the Element has been amended by to provide clarification on the types of wetlands and associated special-taxa species that could be affected by proposed dairy development.

Response to Comment 25-8

Under **Policy DE 3.3a** of the Element, all dairy development projects are required to conduct a biological resource survey to determine if habitat for sensitive species (including San Joaquin kit fox) would be significantly impacted by the proposed development. The surveys would determine if kit fox dens are present or if significant interruption of travel corridors would occur. It is important to note that the dairy facility (structures, lagoons, and corrals) comprises only a small percentage (about 10 percent) of dairy sites, which have been designed to accommodate agronomic application of manure and process water as required by **Policy DE 3.2b** of the Element. The remaining areas of dairy sites are agricultural land needed for the purpose of crop production (and manure reuse). These areas of dairy development sites will continue to provide foraging habitat and available corridors for migration. The commentor's reference to "intensified cultivation pattern" is not clear. **Policies DE 1.2g** through **1.2j** establish setback requirements (one-half mile) for dairy facilities, preserving potential corridors for kit fox and other animals.

Response to Comment 25-9

As indicated in the comment, the Food and Drug Administration (1993) reported that samples collected from "manure pits" by researchers at Michigan State University contained selenium at a concentration of 0.062 to 0.088 part per million (ppm) (wet basis). Recent evaluation of total selenium in cattle excreta indicates average total selenium levels in cattle supplemented with the allowable level of selenium supplements range from 0.010 to 0.179 ppm (wet basis). Comparatively, excreta from unsupplemented cattle contained, on average, 0.010 ppm.[35] The reported results reflect the total selenium in a mixture of solids and liquid. The amount of total selenium held in the solid particles and that contained in the liquid cannot be determined. The concentrations of soluble and insoluble selenium cannot be determined from the presented data. Only soluble selenium forms (species), such as selenium salts (e.g., sodium selenite and sodium selenate) would be expected in the liquid fraction; insoluble species, such as selenium oxides or selenides, could be present in the solid fraction. The comparison made by the commentor of the concentration of selenium in manure (combined solid and liquid phases) to water quality criterion for aquatic habitat or drinking water is not valid without an adequate determination of the expected amount of soluble selenium that would become available.

The concentration of selenium in the wastewater lagoons could be considerably lower than the concentration of selenium in manure pits (0.063 to 0.088 mg/L) cited by the commentor. Preliminary testing of selenium concentration in dairy wastewater lagoons conducted by

[35] Maas, J., 2001, Veterinarian, University of California Cooperative Extension, personal communication with Kevin O'Dea of BASELINE, 28 September.

the Central Valley Regional Water Quality Control Board (RWQCB)[36] suggests significantly lower selenium concentrations. Water samples were collected from 29 dairy wastewater lagoons located in the San Joaquin Valley in May and June 2001. The concentration of total selenium ranged from 0.00042 to 0.0125 mg/L. The mean concentration of total selenium was 0.003 mg/L, a level below the U.S. EPA water quality criterion for protection of freshwater aquatic life (0.005 mg/L).

The commentor's conclusion that "direct contamination of fish and wildlife habitat and human drinking water is clearly a potential hazard" is speculative. The State regulations prohibit the discharge of manure or process water to waters of the State; these materials are required to be collected and managed. Under the Element, the manure from proposed dairies is required to be treated by aerobic or controlled anaerobic treatment systems. The manure and process water would then be reused as fertilizer and irrigation for the production of agricultural crops. Nutrients, including selenium, would be available for uptake by agricultural crops. Agricultural crops from the western San Joaquin Valley exhibit a wide range in the concentration of total selenium but are within the range reported above for dairy cattle manure. For example, the average total concentration of selenium contained in broccoli leaves is 0.43 ppm while corn leaves contain an average of 0.047 ppm. The comparison of these selenium levels in plant tissue (including solids and liquids) to water quality standards would not be a valid evaluation of environmental risk posed by agricultural crops.

Response to Comment 25-10

The comment makes the point that the FDA has determined that, in 1993, existing scientific research was inadequate to determine whether allowable selenium supplementation to domestic animals as an essential nutrient presented a significant environmental impact. The FDA also determined that "using the current data base and making assumptions where data are missing leads to interpretations of potential environmental impacts across the entire spectrum from no impacts expected to significant impacts expected." Because of the uncertainties, the FDA concluded that preparation of an Environmental Impact Statement under the National Environmental Protection Act to evaluate environmental effects of selenium supplementation was not appropriate. A discussion of the FDA's 1993 ruling, subsequent actions taken by the Federal government, and past and current scientific research regarding selenium supplementation to livestock are presented in Response to Comment 16-1.

[36] Rodgers, Clay, 2001, Senior Engineering Geologist, Central Valley Regional Water Quality Control Board, personal communication with Kevin O'Dea of BASELINE, 9 October.

Response to Comment 25-11

As described in Response to Comment 25-10, an accurate assessment of the ultimate fate of selenium contained in manure and process water that is applied as fertilizer and irrigation to cropland cannot be made because of deficiencies in the data available on the biogeochemistry of selenium. The estimates of the amount of selenium introduced to the environment in Kings County presented by the commentor rely on assumptions that are similar to assumptions rejected by FDA in 1993 as inadequate to provide a meaningful analysis of the potential environmental impacts related to supplementation of livestock feed with selenium.

The commentor compares the estimated amount of total selenium in manure to a water quality objective implying that all selenium may eventually be released to receiving waters. There is no justification for this comparison considering that some of the selenium would be taken up by agricultural crops and that insoluble forms of selenium would not be expected to be readily mobilized into water resources. The commentor's request for an adequate analysis of the projected environmental fate of selenium in the PEIR is not possible.

The comment presents an interpretation of the FDA's finding that is not accurate. The FDA has not "clearly warned the public that supplementing livestock feeds with 0.3 ppm selenium is a significant issue." The FDA concluded that insufficient data and methodologies were available to accurately determine the significance of environmental impacts of selenium supplementation. It is important to note that, although more recent data are available, the FDA has not changed the allowable supplementation of selenium in animal diets.

Response to Comment 25-12

The estimate of potential selenium concentration applied to agricultural land presented in the comment is noted for the record. The preparers of the PEIR do not agree with the assumptions presented in the estimate. The Element conservatively estimates that manure and process water would be applied to 268,129 acres of available agricultural cropland, not the total 665,623 acres within the DDOZs and NSOZs as assumed in the comment.

The commentor is correct in pointing out that the FDA regulates only the amount of inorganic selenium that can be added to feed for cattle. It is possible for dairy cattle feed to be additionally supplemented with chicken manure, which contains selenium at varying concentrations. The dry matter feedstock for dairy cattle can also contain selenium. The amount of selenium in feed can vary widely depending on the specific feed plants and where the plants are grown. Because selenium concentrations in feed are variable, dairy

cattle nutritionists typically recommend the full allowable supplement to be added to the cattle diet.[37]

A statewide project monitoring trace element content in cattle is maintained by the University of California Cooperative Extension.[38] The results of limited testing in Kings County indicate that selenium levels within blood in cattle are marginally deficient relative to recommended selenium levels. Common practice in Kings County is to provide dairy cattle with the full allowable selenium supplement.[39] Full supplementation is generally rationalized by nutritionists because the allowable supplementation level is approximately sixteen times less than the lowest dietary level that has been related to chronic toxicity. Therefore, it is reasonable to assume that the diet includes selenium at concentrations in excess of the allowable supplement. However, it is likely that the diets of the cattle whose manure was tested in the past to determine selenium concentrations also contained selenium that was not ingested as the allowable supplement.

The "FDA model" described in the comment, which attempted to evaluate the effect of the application of selenium in chicken manure, was not cited and could not be verified by the PEIR preparers. However, it is important to realize that the metabolisms of chickens and other fowl are significantly different from those of ruminant animals such as dairy cattle. Very little is known about the forms of selenium in chicken manure or manure generated by dairy cattle. The comment does not describe the assumptions made for the model regarding the topography, climate, soil conditions, or the vegetation in the area where the chicken manure was theoretically applied. The comment does not indicate if the model was verified or calibrated. Therefore, it is not possible to evaluate whether the calculated concentrations of selenium in runoff generated by the model reported by the comment have any relevance to the proposed project.

Response to Comment 25-13

The comment is noted for the record. It is noted that discharge of manure or process water to water bodies is prohibited under the Element and State regulation. Please refer to Response to Comment 16-2.

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[37] Robinson, P.H., 2001, Extension Veterinarian, University of California Cooperative Extension, personal communication with Kevin O'Dea of BASELINE, 27 September.

[38] The results of the UC Cooperative Extension Trace Mineral Program are available on the internet at http://animalscience.ucdavis.edu/extension/mineralproject.

[39] Aseltine, Mark, 2001, Professional Nutritionist, personal communication with Kevin O'Dea of BASELINE, 26 September.

Response to Comment 25-14

The information presented in the comment regarding selenium content in earthworms is noted for the record. However, preparers of the PEIR point out that the commentor's implied conclusion concerning the accumulation of selenium released to the environment is difficult to support. Firstly, the conclusion relies on an annual estimate of bioavailable selenium, which cannot be substantiated at this time. (Please refer to Responses to Comments 25-9 and 25-11.) But, even if the selenium loading rate was 5.5 grams per hectare (as estimated in Comment 25-12), the loading rate would be approximately 22 times less than the rate of application described in this comment. Secondly, the conclusion implies that individual earthworms would bioaccumulate selenium over a 20 to 25 year period. The average life span of common earthworms is three to six years. The estimate of the bioaccumulation rate in earthworms related to an annual loading rate of 5.5 grams of selenium per year, which ignores the life span of potential receptors and the potential uptake of selenium during the production of valuable agricultural crops, is neither reasonable nor responsible.

Response to Comment 25-15

The development of the maximum theoretical dairy herd presented in the Element assumed the maximum application rate of 1,000 pounds (45,326 g) of salt per acre of single-cropped agricultural field (recommended rate by RWQCB guidelines). The applied salts would include selenium salts (predominantly selenate and selenite). If all selenium contained in manure and urine were conservatively assumed to be in the form of soluble salts, the commentor's estimated application of 5.5 grams of selenium per hectare (2.2 grams per acre) represents 0.005 percent of the total salt application. As discussed above, some, currently unquantifiable, amount of the selenium would be expected to be taken up in agricultural crops. Most of these crops would be fed back to dairy cattle. The selenium in harvested crops would provide a portion of dietary selenium required for cattle nutrition. Therefore, most of the selenium could be recycled for a beneficial use. The non-bioavailable forms of selenium, such as elemental selenium and selenide, have low solubility and would be relatively stable in the environment. Some unknown amount of selenium would be volatilized as organic, methylated compounds through respiration by cattle and during plant metabolization.

Response to Comment 25-16

The commentor's opinion expressed in the comment regarding previous analysis and conclusions presented by the commentor regarding potential selenium impacts ("analyses such as those presented above") is acknowledged and appreciated. The view of the commentor "that educated predictions about reality [regarding estimation of impacts related to selenium] are virtually impossible (as opposed to specific hypothetical scenarios that are precise, but of unknown realism)" is shared by the preparers of the PEIR, as

expressed in Responses to Comments 16-1, 16-2, 16-3, 25-9, 25-10, 25-11, 25-12, 25-13, 25-16, and 25-15. Insufficient data are available to support the identification of selenium loading associated with management of dairy cattle excreta containing selenium as a significant or insignificant environmental impact.

In response to the commentor's suggestion that selenium monitoring should be required, **Policy DE 6.1h.B** (now **6.2f.B**) identifies the minimum constituents to be analyzed as part of required groundwater quality monitoring. The policy provides that the list of constituents to be monitored may be modified by the Regional Water Quality Control Board (RWQCB). The RWQCB does not generally require selenium monitoring at dairy facilities.[40] However, if recommended by the RWQCB, the list of constituents can be modified to include selenium.

Response to Comment 25-17

The commentor is referred to Responses to Comments 22-61 and 24-88 for discussion of potential impacts related to the use of medicines at dairy facilities. Please refer to Responses to Comments 25-9 through 25-16 and 25-18 for discussion of other common micronutrient supplements.

Response to Comment 25-18

Copper and zinc, like selenium, are essential micronutrients required for healthy cattle. Copper deficiency is the second most common cattle mineral deficiency worldwide. The most common condition indicating a dietary deficiency for copper is lack of color ("bleached out") in the hair of affected cattle. Other symptoms of low dietary copper can include bone fractures and/or weak bones and delayed shedding of winter hair coat. Deficiency of dietary zinc can result in reduced weight gains, slower wound healing, impaired reproductive function, and listlessness. Recommended dietary requirement for copper in the diet of Holstein milk cows is approximately 16 milligrams per kilogram of dry matter intake (mg/kg); the requirement for zinc is 65 mg/kg.[41] If insufficient amounts of zinc and/or copper are contained in feedstuff, dietary supplementation of these minerals may be required.

Normal blood serum levels (i.e., not indicating a deficiency) for copper in cattle range from 0.8 to 1.5 parts per million (ppm). Copper levels in cattle liver tissue of 100 ppm or greater indicate that dietary supplementation is not required. Blood serum levels of zinc were

[40] Rodgers, Clay, 2001, Senior Engineering Geologist, Central Valley Regional Water Quality Control Board, personal communication with Kevin O'Dea of BASELINE, 9 October.

[41] National Research Council, 2001, Nutrient Requirements of Dairy Cattle, Seventh Revised Edition, 2001, prepared by the Subcommittee on Dairy Cattle Nutrition.

within the range 0.8 to 1.4 ppm. Monitoring of cattle in Kings County by the University of California Cooperative Extension indicate that copper levels are adequate, but that some cattle are likely deficient in zinc.

The average daily production of copper and zinc in manure generated by dairy cattle is 0.45 and 1.8 grams, respectively, per animal unit.[42] The copper and zinc contained in the manure would be transferred into manure treatment systems. If these metals go into solution, there is a potential for them to migrate into the subsurface with infiltrating water from storage lagoons. The concentration of copper and zinc in dairy lagoons in California has not been studied.

Metals would be conserved in treated manure and process water and would ultimately be applied to irrigated crop land. Runoff from irrigated fields could contain trace amounts of copper and/or zinc. Studies[43] of copper and zinc concentrations in soils in areas amended with poultry manure indicate that the concentration of copper and zinc were higher than in areas that were not amended. However, the concentrations decreased significantly with depth, indicating limited mobility in the subsurface. Both metals were found at higher concentrations in the organic fraction of the soil than the mineral fraction, exhibiting an affinity for binding with organic material. The mobility of these metals may be enhanced by subsurface transport of colloids (e.g., fine clay particles) to which the metals are adsorbed. Similar studies have not been conducted in California for areas amended with dairy cow manure. Although the southern San Joaquin Valley supports a large dairy industry, surface waters in the area have not been identified by the Regional Water Quality Control Board as impaired by elevated levels of copper or zinc.

The Element presents numerous performance standards, which have been developed to minimize the potential for water quality degradation. **Policy DE 4.1a.B.2** of the Element presents mitigation, which minimizes the infiltration of process water from lagoons, manure separation pits, and corrals. **Policy DE 3.2d** prohibits the discharge of dairy process water to surface water bodies, minimizing the potential for runoff containing trace metals to enter surface water. The policy is supported by **Policy DE 4.1c**, which requires land management practices that minimize the movement of soil, organic material, and nutrients from lands where manure is applied into surface water or groundwater. In addition, **Policy DE 4.1b.C** requires that a dairy development project develop and implement an Irrigation Management Program, which ensures that irrigation water and runoff is prevented from migrating into surface water.

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[42] American Society of Agricultural Engineers, 1999, Manure Production and Characteristics, ASAE Publication D384.1.

[43] Han, F.X., Kingery, W.L., and Selim, H.M., 2001, Accumulation, Redistribution, Transport, and Bioavailabilty of Heavy Metals in Waste-Amended Soils, in Trace Elements in Soil, eds. I.K. Iskandar and M.B. Kirkham, Lewis Publishers, pp. 145-169.

Response to Comment 25-19

The Element does not rely on regional mapping of groundwater levels, such as that referenced in the comment, to determine if proposed individual dairy development projects would be located in areas of high groundwater levels. The groundwater levels in Kings County are not considered static in the Element or the PEIR, as suggested by the commentor. The Element contains policies that require investigation and reporting of groundwater conditions prior to dairy development and throughout the operational period. **Policy DE 1.2d** of the Element does not allow the development of dairy operations in areas of high groundwater conditions unless the applicant can demonstrate that the minimum vertical distance between the proposed lagoon bottoms and corral surfaces and the highest groundwater levels is at least five feet. This determination is required to be made by a qualified professional engineer or geologist. **Policy DE 3.2a** requires that all dairies submit, as part of the Technical Report, a groundwater evaluation conducted by a qualified engineer or geologist. The evaluation is required to identify the highest anticipated groundwater level at the proposed dairy site. In addition, all dairies are required by **Policy DE 6.1h** (now **6.2f**) to implement a groundwater quality monitoring program. This policy requires that groundwater levels and water quality be monitored. These precautions are not acknowledged by the commentor

The preparers of the PEIR consider the site-specific investigation of groundwater conditions to be the most appropriate way to ensure that dairy development not be allowed in areas of high groundwater. If a dairy development project is not able to meet the requirements of the Element, the project would be required to obtain a Conditional Use Permit, which would result in further site-specific environmental review under CEQA.

Response to Comment 25-20

The commentor is referred to Response to Comment 20-19. It is possible that areas of the DDOZs established by the Element include areas in which groundwater is less than five feet below the ground surface. However, each proposed dairy development is required to ensure, on the basis of site-specific data, that the groundwater levels at the site are not less than five feet below the corrals and process water lagoons. If areas of high groundwater are determined by the site-specific evaluations, dairy development in those areas would not be permitted under the Site Plan Review process. It is important to realize that the designation of the DDOZs and the estimation of the maximum theoretical County dairy herd were made as general planning tools. Dairy development throughout the DDOZs and buildout of the maximum herd are not assured. The County recognizes that site-specific conditions may preclude dairy development under the SPR process.

The Element (**Policy DE 4.1a**) requires that all reuse of dairy manure and process water within both the DDOZs and NSOZs be conducted under a Manure Nutrient Management Plan (MNMP) and that nutrients are applied at agronomic rates whether the nutrients are

used at the dairy facility or transported away from the facility. Limiting the application of nutrients in this manner minimizes the potential impacts of the reuse of manure and process water as a valuable fertilizer.

Response to Comment 25-21

The comment reiterates points made in Responses to Comments 25-9 through 25-16. The commentor indicates that failing to mitigate potential selenium issues could be a violation of NEPA. The proposed Element is not a project under the jurisdiction of NEPA and, therefore, cannot violate that Federal Act. The Element is a project under CEQA and for that reason this PEIR has been prepared. It is the opinion of the PEIR preparers that the uncertainties related to available scientific research on the fate of selenium in cattle excreta make determination of the significance of this impact impossible at this time. As allowed for under Section 15145 of the CEQA Guidelines, this particular impact is too speculative for evaluation. Mitigation is not required in this circumstance.

The commentor's view that mitigation should require "extensive environmental monitoring for selenium" and "should probably include the funding of substantive primary scientific research" is noted for the record. Kings County is not responsible for the control of dietary supplements allowed by Federal law and is not responsible for funding research required for the development of Federal regulations. The Food and Drug Administration is responsible for setting allowable selenium supplements in livestock feed. Land grant colleges and universities, including the University of California, are conducting ongoing research on selenium and its use as an essential nutrient.

Response to Comment 25-22

The commentor is referred to Response to Comment 25-18.

Response to Comment 25-23

The commentor's opinion that dairy development under the Element could result in the take of federally listed species is noted for the record. However, the Element presents safeguards that prevent a taking of federally listed species by a dairy approved under the SPR process. **Policy DE 3.3a** requires that all dairy applications present a biological survey conducted in compliance with U.S. Fish and Wildlife Service (USFWS) guidelines. If the survey indicates that consultation with USFWS is required, the application would not be approved until consultation is performed and documented as complete. The policy has been amended to clarify that, if the required surveys indicate impacts on wildlife or wetlands, the application would be reviewed under the Conditional Use Permit process. The Conditional Use Permit process would require further site-specific environmental review and potential permitting by USFWS.