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Via Certified Mail, Return Receipt Requested:

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**RE: FRIENDS OF MAHA'ULEPU'S COMMENTS ON HAWAI'I DAIRY
FARM'S ENVIRONMENTAL IMPACT STATEMENT PREPARATION
NOTICE, DATED JANUARY, 2015.**

Dear Ms. McIntyre,

This firm represents the Friends of Māhā'ulepu (hereinafter abbreviated as "FOM"). FOM is a grassroots, not-for-profit corporation dedicated to protecting and preserving the Māhā'ulepu Valley and Kaua'i. In furtherance of its mission, FOM hereby submits its scoping comments concerning Hawai'i Dairy Farm's ("HDF") January, 2015 "Environmental Impact Statement Preparation Notice" or "EISPN." After reviewing and responding to these comments, FOM believes that the State, the Department of Health, and HDF will recognize that the construction and operation of a 2,000-head dairy farm on Kaua'i's south shore will cause irreparable environmental, economic, and social harm. These harms far outweigh any of the alleged benefits of a dairy of this size being operated within the State of Hawai'i – especially considering that HDF will need to ship all of the milk produced by its herd off the island of Kaua'i for processing and bottling.

As an initial matter, FOM is very concerned that HDF is using the HEPA process merely to justify its already decided position that it *will* build a dairy at this location. The EIS process, of course, is designed to determine *whether* an action should occur given the environmental, social, economic, and cultural impacts. HDF has put the cart before the horse, assuming that approval for an already decided project will occur. The EIS process is not intended to be used as a justification for a decision already made. This is not the way HEPA works, and FOM anticipates that HDF will reconsider its position once the full gamut of negative consequences of a large dairy being placed in the Māhā'ulepu Valley come to light.

In addition to a proper HEPA process, HDF must research the various local, state, and federal ordinances, statutes, and regulations that may impose additional requirements on its proposed dairy operations. HDF identified some of these in its EISPN, including the Hawai'i Constitution, Clean Air Act, and Clean Water Act. EISPN at 5-1. The EISPN did not list the Endangered Species Act, 16 U.S.C. § 1531 *et seq.*, even though HDF is aware of at least four native bird species that are listed by both federal and state statutes as endangered. EISPN at 3-2.

FOM's scoping comments below focus on both the EISPN and HDF's "Waste Management Plan," dated July 23, 2014. Both of these documents should be considered in the EIS process. FOM also hereby fully incorporates into its scoping comments the critique and review of HDF's Waste Management Plan by Mr. Mark Madison, dated August 21, 2014 and those by Dr. Deanne Meyer, dated August 11, 2014. These documents were submitted to the Wastewater Branch of the Department of Health by Goodsill Anderson Quinn & Stifel, on behalf Kawailoa Development LLP.

I. HDF's Proposed Dairy Would Contaminate the Environment.

Despite touting that the dairy will originally house only 699 animals,¹ HDF's Waste Management Plan ("WMP") clearly indicates that this facility is being designed from the ground-up to handle 2,000 head. A November 25, 2014 press release from HDF confirms that the dairy intends to expand its herd within months of beginning operation. As such, 2,000 head should be the number that is evaluated throughout this EIS process, not the deceptively low 699 figure used by HDF in its paperwork.

Even at 699 animals, however, there can be little doubt that this facility will cause and contribute to the contamination of the environment in and around the Māhā'ulepu Valley and Kaua'i's sensitive marine ecosystem. Dairies such as that proposed by HDF have been found across the country to contaminate surface water, groundwater, soil, and air. These negative environmental consequences primarily stem from the fact that a mature dairy cow produces significantly more waste than other animals. In fact, the U.S. Environmental Protection Agency estimates that a facility with 2500 dairy cattle creates a

¹ 699 animals is no arbitrary number. HDF picked it as a starting point to avoid being labeled as a "large" dairy animal feeding operation under federal law. That threshold is reached when, *inter alia*, a dairy has 700 mature dairy cows housed on site.

similar waste load as a city of 411,000 people. This means that HDF's 2,000 dairy cows will produce, on average, the same amount of waste generated by a human population of 328,800. By way of comparison, the entire population of Kaua'i is 65,689 as of 2008. Stated differently, HDF's proposed dairy would create five times more waste than the *entire human population* of Kaua'i. Unlike human waste, however, which is required to be treated, HDF will dump the waste created by its herd directly onto the 517 acres of land it has secured for grazing.

The pollution that originates from HDF's proposed facility will impact a variety of environmental media. Each is discussed in turn below, and each must be fully addressed by HDF in its EIS.

A. *The Proposed Dairy Would Contaminate Surface Waters, Detrimentially Impacting the Environment.*

HDF's proposed 2,000 head dairy will cause contamination of surface waters – waters that eventually discharge into the ocean near Gillin's beach. Figure 5 of the WMP show both natural watercourses and man-made ditches traversing the proposed HDF site. These watercourses can properly be construed as "Waters of the State," as well as "Waters of the United States," protected by water quality standards. All of these ditches eventually lead to a stream that discharges into the ocean just a short distance away. Importantly, the area where the discharges will occur has been designated as Class 1 critical habitat by the State. Critical Plant Habitat and Critical Cave Habitat designations also crisscross this coastline. In addition to these waters, there are two identified wetlands on the site, each of which receive runoff and likely groundwater originating from the pastures.

HDF offers absolutely no analysis of how manure-contaminated water will impact the coastline, the critical habitat designations, or the Class 2 inland water that leads to the Class A marine waters along the Māhā'ulepu coastline. HDF also offers no analysis or explanation for how it will prevent such surface water discharges. It suggests that it will conduct surface water monitoring at various points, but not whether it will take steps to eliminate discharge if manure-related pollutants are detected in the samples.

This is not surprising. Dairies across the United States have been subject to Clean Water Act lawsuits for manure-related discharges into surface waters, which cause a laundry list of negative environmental and health effects. This is especially true when soils contain clay, or are classified as "poorly drained" or unsuitable for receiving large amounts of animal waste by the Natural Resources Conservation Service ("NRCS"). Sloped locations, such as exist on the site, present a high likelihood of irrigation water and/or manure water runoff.

Here, the HDF site is composed of soils identified as "poorly drained" by NRCS, including Ka'ena Clay and Kalihi Clay soils, which comprise approximately 60% of the

total soil.² In fact, according to a NRCS custom soil resource report for the project area, virtually all of the soils underlying the site have “very limited” capacity for disposal of manure through irrigation. “Very limited” soils have “limitations [that] generally cannot be overcome without major soil reclamation, special design, or expensive installation measures...[p]oor performance and high maintenance can be expected.” HDF ignores this point, insisting that the soils in the facility area are conducive to manure applications, *which is simply not true*. HDF should be required to conduct a detailed soil survey of the site to evaluate whether manure can be applied to its fields in a manner that is environmentally protective. Based on the NRCS soil survey, this does not appear likely.

Additional soil complications can be traced to the soil’s high susceptibility to surface water runoff. Again, the NRCS states that the various soil types in the project area have anywhere from a “medium” to “very high” likelihood of surface runoff. This means that any excess water left on a field from manure applications and/or irrigation water applications can transport water – and the manure constituents contained therein, including those deposited by the herd within each pen – into surface waters and, from there, into the ocean.

Finally, the topography of the site also presents risks to surface water. Water naturally flows downhill. HDF’s WMP contains a topographical map and narrative explaining how the project site slopes downhill from 150 feet elevation, to 60 feet in elevation, and finally to sea level. Manure-contaminated water will therefore flow naturally to the low points – the ditches and canals – where it will then follow the predominant surface water flow into the ocean.

Besides runoff from fields to which manure is applied, there is also a distinct concern that precipitation will also convey nutrients from the fields and into surface waters – including the various wetlands located on and around the site. While HDF claims that it will apply manure with an eye toward the weather, as any resident of the area knows, storms can be unpredictable and deposit substantial amounts of rainwater over a very short period. This also applies to HDF’s proposed storage lagoons, divided into a solids settling basin and a storage pond. The settling basin will be full nearly 100% of the time, as it fills up before overflowing into the adjacent liquid storage pond. HDF should be required to explain, in detail, how its lagoons were sized to deal with a 25-year, 24-hour precipitation event in addition to average monthly precipitation depths. For instance, in September 1996, there were six days of continuous rainfall, followed by a week of intermittent rainfall, bookended with another seven days of continuous rainfall. If the dairy were approved and constructed, such a significant rainfall event could cause the lagoons to fail and almost certainly to overflow, releasing substantial amounts of manure that will eventually flow and runoff into surface waters. The EIS should anticipate the environmental and economic impacts of a catastrophic weather event, lagoon breach, or other severe emergency constituting a “worst-case” scenario at the proposed dairy. An extreme storm or earthquake resulting in a major waste discharge or

² HDF’s characterization of the soils is incomplete and, in many instances, conflicts with the actual NRCS soil survey data.

failed lagoon would likely cause irreparable harm to the environment, even if an emergency response is executed. HDF must also address how the expected impacts from climate change will affect precipitation frequency and quantity, including the aforementioned extreme weather events.

HDF must analyze all of these points in its EIS, as well as a careful examination of what problems each manure constituent can create. For instance, excess phosphorus in surface waters can lead to eutrophication; bacterial contaminants such as E-coli and fecal coliform can render surface waters unsuitable for consumption, recreation, and other uses; and nitrogen (in nitrate form) can move into surface waters and, from there, percolate into the underlying aquifer, rendering the groundwater unfit for human use.

B. The Proposed Dairy Would Contaminate Groundwater, Detrimentially Impacting the Environment.

Similar to surface water contamination, large dairies in the United States have also been found responsible for contamination of groundwater. Groundwater contamination is especially concerning for this project, as the aquifer in the area provides potable drinking water for the County of Kaua'i Department of Water Supply. In fact, HDF's WMP does not even identify all of the wells in the project area and provides a skewed picture of how far away those wells are; for instance, while HDF claims that one county well (Koloa F) is over a half-mile away, in reality it is only 750 feet from the paddock in which sludge from the settling basin is proposed to be deposited. HDF should be required to undertake an intensive groundwater study to determine the fate and transport of nitrate to the underlying aquifer. Additionally, multiple groundwater monitoring wells should be required to be installed both upgradient and downgradient of the facility to monitor whether the dairy, if approved, is impacting the groundwater. If it is, then the dairy must be required to take remedial action, including possible cessation of operation.

HDF should also be required to evaluate whether it can apply all of the manure generated by its herd on its land at agronomic rates-- that is, at the rate in which manure nutrients will be removed by the crop-- that will not result in excess nutrients escaping from the property. HDF bills itself as a zero discharge operation but must prove before it starts operation, including any construction activities, that it can live up to that promise. Excess nutrients are likely to be transported deeper into the soil profile with subsequent irrigation, manure application, and precipitation, where they will eventually discharge to groundwater. Along these lines, FOM is very concerned with the estimated nutrient requirements identified by HDF in the WMP. The dairy seems to believe that its grass crop requires in the neighborhood of 750 lbs./ac nitrogen yearly to be sufficiently fertilized. This is an excessively high number, and one that does not appear to be reflected in the literature for Kikuyu grass. If the grass does not use all of the nitrogen supplied by manure applications, then it will lead to contamination of the groundwater.

Additionally, the liner proposed by HDF for its lagoons is inadequate for this area, considering the numerous vital environmental and cultural resources nearby. HDF

indicates it will line its lagoons with a 1.5 mm HDPE lining with 5 mm bidim. FOM does not believe that the liner proposed by HDF will sufficiently stop seepage from the lagoons into groundwater given the concerns with the liner welds and potential punctures from installation and lagoon cleaning. Indeed, after conducting an intensive groundwater monitoring and modeling study, HDF may determine that is simply not feasible to put *any* type of manure storage lagoon in this area.

Finally, HDF needs to analyze how manure storage and applications will interact with the wetlands on and nearby the project site. It appears that the wetlands and, indeed, much of the project site itself, comprise a large portion of the watershed that feeds the aquifer – an aquifer relied upon for clean, safe drinking water. If manure is not agronomically applied, then excess manure nutrients, including nitrate and phosphorus, will runoff into surface waters and leach through the soil and into groundwater. But even if agronomically applied, some manure constituents will wind up in the aquifer. Nitrate, for instance, will move through the soil almost at the speed of water, such that any excess or residual nitrate after manure is applied is likely to leach deeper into the soil and eventually into the aquifer. Once it moves past a crop's root zones – for Kikuyu grass, this is a very shallow area – the excess nitrate will reach groundwater. It is only a matter of time. The concentration of nitrate in the aquifer may be further impacted by HDF's proposal to draw 3 million gallons of water per day from Grove Farm wells; as water is drawn for use in the dairy's daily operations, the concentration of nitrate in the aquifer will increase. An investigation into whether the aquifer can support the proposed use of groundwater for daily operations should be conducted and included in the EIS.

Additionally, the withdrawal of 3 million gallons of water per day from an already-sensitive aquifer presents its own concerns. HDF must analyze whether the significant water drain its proposed dairy will have is sustainable in light of limited supply of fresh water provided by this aquifer.

C. The Proposed Dairy Would Contaminate the Air, Detrimentially Impacting the Environment.

The host of environmental concerns presented by dairies as large as the one proposed by HDF does not end with water resources. Large dairies generate significant amounts of hazardous airborne contaminants that can impact air quality, such as ammonia, hydrogen sulfide, mercaptans, particulate matter, and airborne pathogens, to name just a few of the more than 20 hazardous air pollutants (HAPs) emitted by animal feeding operations of the size proposed.³ Ammonia is one of the primary contributors to the degradation of air quality around large dairies. Ammonia is known to cause a variety of health impairments, discussed in greater detail below, which is why it has been

³ EPA has identified at least 168 chemical compounds in manure and in the air around livestock operations. In addition to the 20 HAPs, EPA also identified over 160 Volatile Organic Compounds (VOCs). *Emissions From Animal Feeding Operations, Draft*, U.S. Environmental Protection Agency, Emission Standard Division, Office of Air Quality Planning and Standards, EPA Contract No. 68-D6-0011, August 15, 2001.

designated an extremely hazardous substance by the United States Environmental Protection Agency. Hydrogen sulfide is a similarly designated hazardous substance released by dairies, and can also cause serious health risks, especially for the very young and very old. Recent literature also suggests that dairy-related pathogens have the capability of binding to particulate matter and then moving off-site with wind, where it can cause major health problems in nearby populations. And, of course, nobody enjoys the noxious odors that are created by large dairies. The horrendous smell of HDF's proposed dairy would leave downwind residents gasping for fresh air.

Air contamination from the dairy will also contribute to climate change. Fossil-fuel consumption and emissions by and from dairy-utilized vehicles, and emissions of greenhouse gases (GHGs) such as methane and nitrous oxide that result from the high number of cows and quantities of stored manure will exacerbate the already-urgent problem of the warming of the planet. The EIS should consider the degree of contribution that HDF's proposed dairy would have on GHG levels in the atmosphere and climate change.

Because of these (and potentially other) air quality issues, HDF should conduct an extensive air modeling survey to evaluate the impacts its facility will have on nearby residents and tourists. Each contaminant must be carefully analyzed to determine its potential impacts on residents and the environment.

D. The Proposed Dairy Would Harm Threatened, Endangered, and Culturally Significant Species.

Besides degrading various environmental media – the South Shore's land, air, and water – HDF's dairy will also result in harm to threatened, endangered, and culturally significant species. Pollution from large dairies like that proposed by HDF has been shown to change and degrade habitat and result in the destruction of other species, through both direct (e.g., contaminated water) and indirect (e.g., species die-off as a result of eutrophication) effects.

Kikuyu grass, slated to be the “primary” food source for the dairy cows, is known to be an extremely aggressive crop, and may crowd out other species. It is considered a weed pest in some areas. *See, e.g.,* <http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn7458.html>. There is a risk that, if not properly managed and contained, the kikuyu grass could spread to neighboring parcels and crowd out native plant species. The EIS should explain how HDF plans to contain this aggressive plant. And although the Kikuyu and Kikuyu-Guinea grasses are slated to be the cows' primary food source, the importation of any other crops for food sources present a risk that diseases and other invasive species will be introduced to the island. HDF should analyze the degree of risk posed to native plant and animal species by its proposed use of Kikuyu grass and other feed material.

Further, the entire coastline where discharges from the proposed dairy will enter the ocean is protected critical habitat. This habitat is home to a variety of native

Hawaiian species. HDF must present a detailed analysis evaluating how its dairy could potentially impact all of the species that live in this protected corridor. Special attention should be paid to *Sesbania tomentosa*, commonly referred to as 'ohai, a type of endemic coast vegetation that is a listed federally endangered species and a State of Hawai'i Species of Greatest Conservation Need. The critical habitat designation along the Māhā'ulepu coastal corridor is meant, at least in part, to provide assurance for the continued existence of this species – a continuation that is seriously threatened by the presence of a 2,000 dairy farm upstream. Other federally endangered species that require investigation in the EIS include *Anas wyvilliana* (Hawaiian Duck, Hanama'ulu); *Branta sandvicensis* (Hawaiian Goose, Nene); *Fulica alai* (Hawaiian Coot); *Gallinula chloropus sandvicensis* (Common Moorhen); and *Himantopus mexicanus knudseni* (Hawaiian Stilt, Ae'o). This list is not meant to be all-inclusive; it is incumbent upon HDF to conduct a thorough analysis of how its dairy could potentially impact all surrounding species, not just those that are federally endangered.

Similarly, animal waste has been shown to cause localized impacts on ocean acidification, and resulting impacts on wildlife of the broadest spectrum. These impacts must be addressed on their own as well as from cumulative impacts from climate change.

Finally, although the dairy cows themselves are not a protected species, a risk to the health of the herd exists due to the number of cows occupying a small area. As discussed above, it is clear that HDF plans to house up to 2,000 dairy cows in relatively short order. The EIS should include a discussion of potential risks to the health of dairy cows including risks for rapid spread of illness and disease based on the size of the herd and physical confinement or housing.

II. HDF's Proposed Dairy Would Substantially Affect Economic and Social Welfare.

A. The Proposed Dairy Would Significantly Impact Important Cultural and Historic Sites and Resources.

In traditional Hawaiian culture, natural resources and cultural resources are considered one and the same. A spiritual connection exists between people and their surroundings, including the land, water, and sky. Māhā'ulepu is a traditional Hawaiian ahupua'a, or socioeconomic/geologic/climatic subdivision of land, running from the Ha'upu mountain range to the shoreline on Kaua'i's southeast coast. In 2006, the National Parks Service identified certain natural and cultural resources in this area, which hold historical significance for the native Hawaiian population and provide recreational and other enjoyment opportunities for visitors. Those resources include: the undeveloped shoreline corridor from Makawehi northeastward through Māhā'ulepu and Kipu Hai to Nawiliwi Bay; the Hule'ia National Wildlife Refuge and historic Alekoko Fishpond along Hule'ia Stream; and parts of the Ha'upu mountain range overlooking these areas. NPS Study at 1. Hawaiian burials have been found along coastal sand dunes, and historic petroglyphs occur on Māhā'ulepu beach and on Grove Farm agricultural lands in Māhā'ulepu Valley. NPS Study at 38.

An industrial dairy like that proposed by HDF has the potential to significantly disrupt and damage the ability of the Hawaiian population to appreciate and enjoy their traditional cultural resources. Damage due to construction and increased industrial development and traffic, air and water pollution, and potential loss of species in these culturally-significant areas could lead to profound spiritual and emotional harm to those who value these areas for their cultural and historical significance. The EIS should investigate the presence of historical and cultural sites in and around the proposed dairy operation and conduct an intensive evaluation of how those sites may be affected; for example, whether and to what extent the ability of individuals to grow or gather traditional plants such as taro would be impaired.

B. The Proposed Dairy Would Have Significant Social Impacts.

HDF's industrial-sized dairy may cause additional social impacts to the population at large. Increased noise and traffic during the construction phase and during the dairy's daily operations will negatively affect quality of life for people living near the dairy and in areas receiving increased dairy-related vehicle traffic. The aesthetic and recreational value of areas in and around Māhā'ulepu would be diminished by the presence of an industrial dairy, especially from pollution of surface water and coastal waters traditionally used for recreation. The EISPN identifies certain traditional activities which take place along the Māhā'ulepu coast, including hiking, hunting, fishing, and gathering. EISPN at 3-3. A comprehensive evaluation of potentially-affected recreational activities would also include bird and animal watching, nature walking, wildlife photography and beachfront activities such as surfing, snorkeling, stand-up paddleboarding, and scuba, among others. For example, when water with elevated levels of nitrate and phosphorus reaches the coastal shoreline it will alter the pH, temperature, and chemical makeup of the existing marine water. In turn, coastal marine plant and animal life will suffer. A loss of wildlife and drastic alteration of the makeup of the marine nearshore ecosystems would diminish the enjoyment of individuals who recreate in the Māhā'ulepu Valley area and along Kaua'i's southern coastline, and may cause some of those individuals to cease those activities altogether. The EIS should consider the effects that HDF's proposal would have on noise levels and visual and recreational interests in and around the proposed project area.

Finally, the need for employees (both short and long term) to construct and operate the CAFO would have impacts on the regional demographics and related social support services. The EIS should consider the impacts that HDF's proposed dairy would have on the local population, demographic trends and needs.

C. The Proposed Dairy Would Have Significant Negative Economic Impacts.

HDF's proposed project would significantly affect the local economy. As the EISPN recognizes, Māhā'ulepu is located in the Po'ipū area, which is one of two major tourist and luxury home destinations on Kaua'i. EISPN at 3-3. Concerns about water and air quality, increased noise, health risks, impacts on native plant and animal species

(both in the proposed project area and in the affected coastal areas), discussed elsewhere in these comments, in the Māhāʻulepū Valley and Poʻipū area would reduce the desirability of the area as a place to live, work, and visit.

The resident population of Kauaʻi is presently in the range of 63,000-70,000.⁴ The approximately 2500 people (EISPN at 3-3) who reside within the Koloa- Poʻipū Census tract are likely to see their home and property values diminish significantly if a large dairy is operating just a few miles away; property values elsewhere throughout the Māhāʻulepū Valley and around Kauaʻi may similarly decline. The EIS should conduct a thorough evaluation of the effects that a 2,000-cow dairy operation will have on land and home values in the area.

The tourism industry on Kauaʻi will also be greatly affected by the presence of a large dairy. Area resorts, hotels, and independent vacation rentals, as well as the recreational facilities, shops, and restaurants that cater to visiting tourists, are all likely to experience a decline in visitors—and consequently, income—if the desirability of the Poʻipū area and Māhāʻulepū Valley as a vacation and recreation destination is diminished. The 2008 NPS Study estimated that, at that time, Kauaʻi experienced a daily visitor population of about 21,000 tourists. NPS Study at 6. Those visitors infuse money into the local economy by renting hotel rooms and vacation properties, buying meals and souvenirs, and purchasing recreational experiences, such as a sightseeing tour or surf or paddleboard class. Visitors to Kauaʻi also frequently arrive by boat, with both local and international cruise lines including the port of Nawiliwi, among others, as a sailing destination. Itineraries including ports of call on Kauaʻi would likely lose some of their attractiveness when it becomes known, through sites, smells and other impacts, that an industrial dairy is operating mere miles from one of the island’s major resort areas.

Regardless of the method of travel, some tourists will be reluctant to visit a destination—presently known for being the lush and verdant “Garden Island”—on which a large, industrial dairy operates, and the EIS should thoroughly evaluate the ways in which the HDF project would affect the thriving tourism industry.

D. The Proposed Dairy Raises Infrastructure Concerns.

HDF’s proposed dairy will require substantial energy consumption, both during construction and daily operations. The EISPN indicates that some electrical power will be generated through the use of rooftop photovoltaic panels, but provides no information about the estimated number of panels or what the expected kilowatt output of those panels will be. The EIS should include a detailed analysis of the proposed dairy’s electricity demands and a realistic estimate of any on-site electricity generation. Because on-site power generation will not be available until the photovoltaic panels are installed and functional—or in the event that HDF determines that on-site power generation will

⁴ The EISPN notes that the 70,000 figure is “slightly above the total population,” while a 2008 National Parks Service Report on Māhāʻulepū estimates that the island has about 63,000 residents. NPS Study at 6.

be insufficient to meet the dairy's demand—an evaluation of impacts on Kaua'i's utility resources must be undertaken and included in the EIS.

The EIS also should include a thorough characterization of the site and evaluate whether any historic uses (legal/formally recognized or otherwise) render the site inappropriate for a dairy operation. For example, the EIS should investigate whether and to what extent the site may have been used as a landfill or for waste disposal, and whether any hazardous or solid wastes remain on the property. If HDF determines that solid or hazardous wastes are present, it may reconsider the suitability of this location for milk production.

III. HDF's Proposed Dairy Would Substantially Affect Public Health.

HDF's proposed project raises multiple public health concerns that must be thoroughly researched and carefully considered. While the examples below are not meant to be an exhaustive list, at minimum, the EIS should include an in-depth investigation of the risks posed to public health by virtue of the proposed dairy's potential contamination of water and air, and the potential that the dairy will serve as a source of vectors for disease transmission.

A. Groundwater and Surface Water Contamination Resulting from HDF's Proposed Dairy Would Threaten Public Health.

Nitrate found in drinking water sources presents risks to human health. In recognition of these risks, the EPA has established the Maximum Contaminant Level (MCL) of nitrate at 10 mg/L. *See* <http://water.epa.gov/drink/contaminants/basicinformation/nitrate.cfm>. Infants, pregnant women, the elderly, and persons with compromised immune systems are particularly vulnerable to harmful health consequences of consuming water with elevated levels of nitrate. Infants below the age of six months who consume water with elevated levels of nitrate may experience shortness of breath and become seriously ill, and if untreated, may die. *Id.* Maternal exposure to environmental nitrate may increase the risk of pregnancy complications, such as anemia and preeclampsia. *See, e.g.*, U.S. Department of Health & Human Services, Agency for Toxic Substances and Disease Registry, "ATSDR Case Studies in Environmental Medicine Nitrate/Nitrite Toxicity," at 53 (Dec. 5, 2013). Epidemiologic studies of adverse health outcomes and high nitrate levels in drinking water have reported an increased risk of hyperthyroidism from long-term exposure to nitrate levels above the MCL, specifically between 11 mg/L and 61 mg/L. Burkholder, J. et al. "Impacts of Waste from Concentrated Animal Feeding Operations on Water Quality." *Environ. Health Persp.* Vol. 115, No. 2 pp. 308-312 (Feb. 2007).

Further, even nitrate levels **below** the MCL of 10 mg/L may be cause for concern; nitrate at levels less than 10 mg/L has been associated with insulin-dependent diabetes, and increased risk for adverse reproductive outcomes, including central nervous system malformations and neural tube defects, have been reported for drinking water nitrate levels less than 10 mg/L. Accordingly, some public health experts believe that the MCL

for nitrate is set too high to effectively protect human health from known or anticipated adverse health effects. As discussed above, the potential for land-applied and stored manure to result in elevated levels of nitrate in groundwater is high. Potential mitigation through the use of reverse osmosis systems or other filtration may ameliorate the risk to a certain degree, but even those systems are not necessarily effective: they must be maintained properly to provide protection to the residents of the home, and there is evidence that high levels of nitrates may not be fully removed by reverse osmosis systems. *See, e.g.*, J. Schoeman, “Nitrate-nitrogen removal with small-scale reverse osmosis, electrodialysis and ion-exchange units in rural areas,” *Water SA*, Vol. 35 No. 5 (Oct. 2009). Furthermore, reverse osmosis systems deplete natural minerals from water that can cause the filtered water to damage existing plumbing systems and strip important micronutrients from the human body.

Industrial dairies like that proposed by HDF also present public health concerns due to the risk of surface water contamination to river and stream ecosystems. Increased amounts of phosphorus and nitrogen in surface waters--resulting from agricultural runoff--may lead to large algal blooms, which cause a variety of illnesses in humans. *See, e.g.*, <http://www.cdph.ca.gov/healthinfo/environhealth/water/pages/bluegreenalgae.aspx>. Risks to the public may occur when individuals are recreating in water in which an algal bloom is present, or from drinking water sourced from surface water in which an algal bloom is present. *Id.* Certain strains of algae, such as blue-green algae, produce neurotoxins, which are highly dangerous to humans and other species. Microorganisms in animal waste, such as *E. coli* and enterococcus, are also frequently present in dairy-derived agricultural runoff to surface waters and pose a threat to human health when ingested. Any veterinary pharmaceuticals or antibiotics used by the dairy will likely wind up in downstream and downgradient water sources. These pharmaceuticals and antibiotics, on their own, may present a health risk to humans and other species, but may also contribute to increased numbers of antibiotic-resistant bacteria, which are of particular concern to humans.

B. Air Contamination Resulting from HDF's Proposed Dairy Threatens Public Health.

Second, industrial dairies like HDF's proposed dairy also present multiple air quality concerns. As discussed above, stored manure emits major pollutants, including hydrogen sulfide, ammonia, airborne pathogens, and particulate matter. Exposure to ammonia can irritate the eyes, skin, and respiratory system, causing bronchiolar swelling or even tracheal/nasopharyngeal burns. The threat posed by exposure to ammonia is not taken lightly; in fact, if a dairy releases more than 100 lbs. of ammonia into the air on a daily basis, then it is required to report its releases under the federal Emergency Planning and Community-Right-to-Know Act (“EPCRA”), 42 U.S.C. § 11001 *et seq.* Exposure to hydrogen sulfide causes skin and eye irritation, and exposure in high levels may lead to even more severe health effects such as seizures, comas, and death. Releases of hydrogen sulfide are thus also required under EPCRA.

In addition to harmful air pollutants, the handling and disposal of manure and production of animal feed at industrial dairies creates airborne particles and dust, which may cause or exacerbate respiratory conditions such as asthma and bronchitis. While the airborne particles themselves pose a problem when they lodge in people's lungs and respiratory tracts, they may also serve as a mechanism for the transfer of airborne pathogens. Employees and individuals who reside near or frequently visit areas near the dairy are especially susceptible to harmful health impacts from chronic exposure to air with high concentrations pollutants and particulate matter.

Harmful air pollution may also result from the carbon emissions generated by HDF's operational vehicles. The transportation of thousands of gallons of milk (either to other Hawaiian islands or to the contiguous United States) for processing on a regular basis is certain to contribute to an increase in emissions of volatile organic compounds (VOCs) and other toxic pollutants resulting from frequent truck and tanker trips to and from the dairy. In addition to the health risks posed by the inhalation of polluted air, toxic air pollutants can be deposited onto soil and water, where they may bioaccumulate in plants or animals that are later consumed by humans as food.

C. HDF's Proposed Dairy Threatens Public Health Because it Increases the Risk of Disease Transmission.

Third, HDF's proposed dairy poses a public health risk as a means of disease transmission. The dense concentration of livestock would result in proliferating populations of rats, mosquitos, flies, and other pests. A surge in rodent and insect populations presents at least two major problems: first, swarming and biting flies and insects create a nuisance for swimmers, beachgoers, and other residents and tourists who wish to spend time in outdoor areas. Second, and more troubling, rats, flies, and mosquitos are vectors for disease transmission, and an increase in the populations of these animals increases the risk of transmission to humans. For example, the bacteria leptospirosis, already a recognized problem in freshwater streams and rivers on Kaua'i, is transmitted in the urine of infected animals; rodents and livestock are typical vectors. <http://health.hawaii.gov/about/files/2013/06/leptobrochure.pdf>. The livestock crowding at HDF's dairy, combined with the siting of the industrial dairy in a location with freshwater streams present increases the risk of transmission of leptospirosis and other diseases.

The potential public health threats identified above are just some examples of the types of public health risks that should be thoroughly discussed in the EIS and seriously considered by the approving agencies. To the extent that state waste management guidelines or other state laws or regulations require a plan for pest management, HDF should complete such a plan and include it in its EIS.

CONCLUSION

After HDF has an opportunity to take a hard look at all of the negative consequences of its proposed dairy, FOM believes it should abandon this ill-advised

project. Kaua'i in general, and the Māhā'ulepu Valley in particular, are extremely poor locations for intensive, industrial dairy farming. These lands should be preserved and protected, not irretrievably harmed.

Sincerely,

Charles M. Tebbutt
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