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Chair Mary D. Nichols
California Air Resources Board

SUBJECT: COMMENTS ON PROPOSED SHORT-LIVED CLIMATE POLLUTANT REDUCTION STRATEGY (SLCP STRATEGY)

Dear Chair Nichols:

Section V.B.1 (p. 65) of the *Proposed Short-Lived Climate Pollutant Reduction Strategy* proposes the conversion of flush dairies to solid-scrape dairies as a means to reduce methane emissions. Others in UC have submitted comments that this may not result in the expected GHG emissions on dairies in addition to being impractical to implement on a widespread scale. I concur with Dr. Deanne Meyer and the rest of the UCCE dairy team's comments on this topic dated September 18, 2015. I would like to focus my comments on the negative consequences of this proposed measure on groundwater quality.

I have been the University of California Farm Advisor for agronomic crops in Stanislaus county for the past 38 years. This area is a major dairy area and I specialize in corn, winter cereal and alfalfa crops which are all mostly associated with dairies. For the past 20+ years my primary program emphasis has been in developing practical ways for dairies to use manure nutrients to produce crops while at the same time protecting groundwater quality. This is a complex and difficult task.

The proposal for dairies in my area to convert from flush to scrape utilizing existing technology would be disastrous from a nitrogen (N) management and groundwater quality standpoint. A majority of the soils in this Northern San Joaquin Valley area are light in texture and do not retain nitrogen. I have conducted studies that document that a high percentage of the nitrate nitrogen in the soil can be leached in a single irrigation. Widespread conversion of these low or no emission gravity surface irrigation systems to pressurized drip or sprinkler is not feasible at this time for many technical and economic reasons.

Crops cannot use nitrogen in an organic form such as dry manure or slurry directly because much of it is bound up in particles that must be broken down by bacteria, which themselves must then die and break down before the nitrogen is released into a mineral form that the roots can utilize. Slurry or scrapings can only be applied between crops and the rate of mineral N release is temperature and material dependent but is more or less steady throughout the season. However,

corn, and, to a lesser extent, winter cereals, has periods of peak N demand and other times of minimal demand. A 30-ton silage corn crop takes up 40% of its total nitrogen needs in about a 10-day period when it is pulling up to 6-10 lbs of nitrogen per day per acre out of the soil. An organic source of N applied at the beginning of the season will mineralize at a temperature dependent fixed rate and enough manure would have to be applied so that the peak needs can be met. The problem is, that if enough manure is applied to meet the peak need, it's not possible to turn off the mineralization mechanism when, a few days later, the crop's N need drops to practically nothing until grain fill begins. This un-utilized nitrate in the soil is subject to losses during irrigation or rainfall events.

Growers typically will use liquid manure (LM), as generated on flush dairies, to strategically meet the crop N needs throughout the crop growing season. Many dairy operators have installed a system using a flow meter and throttling valve that allows them to inject nitrogen-rich LM into the irrigation water during the growing season at the correct rate and timing the matches the crop N demand. This system allows lagoon water to be used as a nutrient source in a similar manner as commercial fertilizer because the LM contains large amounts of ammonium which does not need to be mineralized before the crop can use it. This strategic timing of nitrogen applications minimizes the amount of nitrogen that is potentially leached.

Most of the irrigation water in this area comes from district canals and is a gravity system. The only pump involved is a low head lagoon water pump over a short distance. Air quality impacts from pumping are therefore relatively low. Since there are multiple applications spread over the season the amount applied in any one application is relatively small, and minimal emissions can be expected from the land application process itself. Scraped systems, however, require that the material be trucked and applied at high rates that must then be disked into the soil. Since all dairies would have to apply during the same window between crops, many, many trucks would be required. Air impacts from the spreading process as well as increased truck traffic would be expected and these additional emissions should be considered in GHG emission computations.

Please reconsider this recommendation. Converting all dairies from lagoons to a scraped system, forcing all manure application to occur during the period between would eliminate the ability to strategically time applications and would necessitate that excess be applied in order to meet peak crop N demands.

Sincerely,

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