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DAIRY NEWS

Flushing and scraping freestalls and drylot pens

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Flushing and scraping alleys in freestalls and drylot pens are two important management practices related to animal health, animal welfare, milk quality, labor cost, insects, and nowadays to the environmental concerns. Dust, odor, and nitrogen losses, by ammonia volatilization from manure could be affected by the frequency of flushing and scraping, representing a potential environmental problem. In terms of nitrogen, these losses can also decrease fertilizer value of the manure. A recent survey carried out in Merced County (CA) on more than 50 dairies indicate that there is a significant variation in some management practices related to manure handling and some associated technologies.

Farmers flush freestall alleys with lagoons water in average 3.2 times/day (from 2 to 6), and alleys in dry lot pens are flushed 2.6 times/day (from 1 to 6). The aims of keeping cows clean are: to reduce mastitis incidence, to control infectious foot disease, and to reduce preparation time in the milking parlor. From the animal health point of view, flushing 2 or 3 times a day is recommended in different technical reports as a minimum frequency. Currently, there is no scientific information which recommends on the frequency of flushing to decrease emissions and odors. For example, results from a research trial carried out at the University of Wisconsin shows that increasing the frequency of scraping manure in freestall alleys from 2 to 6 times/day could have an offsetting effect by enhancing volatile nitrogen loss through spreading urine on the larger floor area. Based on this, and the previous recommendation on animal health, flushing alleys more than three times a day needs to be reconsidered. Besides, information from UC Davis (Animal Science) indicates that animals significantly increase the frequency of urinations and defecations after feeding. Flushing or scraping alleys one or 2 hours after feeding, and 2 or 3 times/day might be a good strategy to help to maintain clean cows and decrease odors and air emissions.

According to the Merced County survey, open corrals are scraped in average 10 times/year (from 1 to 52). The state water quality regulations and the ordinances in some counties do require that

drylot pens be scraped at least 2 times per year. The South Coast AQMD (Air Quality Management District) recommends manure removal from corrals at least four times a year, starting in 2005. Practical experience from producers indicates that when drylot pens were scraped (harrowed) too frequently during the dry season, it caused a dust nuisance; in these cases scraping times might be reduced. On the other hand, some dairy farmers are covering drylot pens with straw to reduce dust and possibly air emissions. Seasonal differences and differences in management practices, like shades, sprinklers, type of animals, dust suppressants, equipment used, feeding management practices, etc, make it difficult to give a specific recommendation for all dairy producers. The recent publication of the California Dairy Quality Assurance Program (Air Curriculum) recommends as low risk odor and dust management to remove manure in drylot pens every 60 days or less.

During the wet season, it is also necessary to consider how to manage open corrals to avoid water accumulation. A new Federal rule is coming in December 2006 (The National Pollution Discharge Elimination System, NPDES). Remember, regulations now require that standing water in corrals must be removed to the lagoons within 5 days after rain storms by gravity flow, valved pipe, or sump pumps.

While awaiting for more research work, it is current recommended that freestalls alleys be flushed 2 or 3 times/day, at least one or 2 hours after feeding. This is an important strategy to minimize emissions and odors. In open corrals, and depending on each particular situation, to maintain low risk of odors and dust, the frequency of manure removal recommended is every 60 days or less. Finally, the recent survey carried out in Merced County, indicates that the average dairy producers are doing an excellent job, flushing and scraping more than ordinances and regulations recommend to control dust, odors and air emissions.

Effect of Clinical Mastitis on Production and Reproduction

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Mastitis has been reported to have a negative effect on both production and reproduction in dairy cattle. A recent farm trial on a two large, high producing Central California dairies confirms these previous findings. The study included 1001 Holstein dairy cows on two commercial dairies. On these two dairies, data was retrieved from the DairyComp 305 records to determine the date of their first case of clinical mastitis and AI breeding dates. Four groups of cows were studied from calving through the first 320 days of milking. The first group (C, controls, 501 cows) had no recorded cases of clinical mastitis during their lactation. The second group (MG1, 250 cows) had their first cases of clinical mastitis prior to the first AI breeding. The third group (MG2, 147 cows) had their first AI breeding and being diagnosed pregnant. The final group (MG3, 103 cows) had their first case of clinical mastitis after they were diagnosed pregnant. The distribution of cows by lactation and previous production was similar between the four groups.

In these two herds, the milkers check for abnormal milk or swelling of the udder at each milking. When the milkers detected clinical mastitis, they collected a sterile milk sample from the cow for culture to identify the causative bacteria. The common bacteria found in the milk samples from cows with clinical mastitis were environmental Streps (115, 23%), coliforms (75, 15%) and coagulase-negative Staphs (26, 5%). The most common finding was “no growth” (263, 52%). In most cases, the “no growths” are assumed to be coliforms. Most of the clinical cases occurred in the MG1 cows (250) followed by the MG2 cows (147) and MG3 cows (103). The distribution between the groups was similar in terms of culture results. Eight cows found with mycoplasma and 16 cows with Staph aureus were excluded from the study as they were immediately sent to market. The type of bacteria causing the mastitis did not affect the reproductive performance.

As is well known, clinical mastitis will result in increased somatic cell counts. In this study, this effect of increased somatic cell counts was seen for all three groups with clinical mastitis compared to the control group. The earlier the occurrence of clinical mastitis in the lactation, the quicker the increase in somatic cell counts were seen. Because of this trend, the MG3 cows with mastitis after pregnancy diagnosis had a similar pattern of somatic cells to the controls with clinical mastitis. More cows with clinical mastitis also left the herd compared to the controls without mastitis and they also left the herd earlier than the controls.

The cows in the control group (C, 80.3 lbs/day) and those with clinical cases after pregnancy diagnosis (MG3, 81.8 lbs/day) had similar milk yields. By comparison, the groups that had clinical mastitis earlier in lactation had reduced milk yields (MG1, 75.5 lbs/day; MG2, 77.2 lbs/day). It appears that the earlier in lactation the first case of clinical mastitis occurs, the greater the negative effect on production. Overall, the milk components were not significantly affected by clinical mastitis.

Days to first service were similar for all four groups of cows. However, cows that had a case of clinical mastitis prior to their first breeding had an extended interval from calving to first AI. The conception rates were similar between the controls and MG3 cows. The cows that had mastitis prior to pregnancy diagnosis had decreased conception rates compared to the controls. The greatest effect was seen in the MG2 cows that had the first clinical case of mastitis between AI and pregnancy diagnosis. The result at 320 DIM was that more cows were pregnancy in the controls and MG3 groups compared to the MG1 and MG2 groups. There was an increase in abortions in all the groups with clinical mastitis compared to the controls, but the increase was similar in all three groups.

The overall conclusion is that clinical mastitis reduces cow performance in terms of production and reproduction. The negative effect is greatest on those cows having mastitis early in lactation. Mastitis also increases culling rate and marketed cows leave the herd earlier than cows without mastitis. Control of mastitis early in lactation is based on total dry cow antibiotic treatment and continuous efforts to provide clean dry bedding for dry cows and cows in the calving areas.

Dairy air emissions science, technology and regulation

Dairies in the San Joaquin Valley submitted documents to the San Joaquin Valley Air Pollution Control District recently as required by new laws. Unfortunately, the new regulations were implemented before solid, science based information was available. Other requirements for dairies related to emission controls are being considered. Dairy producers are concerned about air quality just like other people who live and work in the valley, and they are willing to be a part of the solution. However, imposing costly requirements with questionable benefits is unwise and wasteful. Following are key points relating to this important issue.

- The San Joaquin air district's permit for dairies is based on the assumption that dairies produce large amounts of reactive gases that help form ozone (smog).
- The district reports that dairies contribute 10 % of the total amount of these precursors in the valley.
- In fact, these **ozone precursors from dairies have never been measured**. The current estimate is based on a well-documented error – a U.S. EPA technical manual published in 1980 included an analysis based on a misreading of source documents. Independent university scientists have confirmed this error, also widely reported in the press.
- Despite this and in addition to requiring permits, **the air district plans to require anaerobic digesters for manure** on new or expanding dairies – solely to control ozone precursors.
- Digesters only capture some emissions. A digester can't capture gas emissions directly from animals or from manure in corrals. The share of overall dairy emissions a digester could control is unknown.
- Until we know the overall emissions from a dairy, and the share of those a digester can control, we can't evaluate whether a digester can effectively control ozone precursors.
- Nearly \$2 million has been invested in ongoing studies of dairy emissions. Answers are expected within months. **A new law requires the state to review these studies and adopt a new emission factor by July 2005**. So why base regulations on an estimate known to be wrong?
- We must know if digesters are an effective control method before they are required. Digesters cost from \$500,000 to \$4 million to construct.
- We must also know digesters are reliable. There are only four digesters in operation among the state's 2,200 dairies. Nationwide, manure digesters have an average failure rate of 50 percent.
- Significant amounts of government funding helped build the four existing digesters. Programs that provided the funds will be unavailable for future projects because they have ended or are scheduled to end soon.
- The dairy industry supports digesters as a method for generating electricity. Wider adoption will occur as technology improves and issues are resolved, so **requiring digesters is not necessary**.

- Dairy producers are already taking many steps to improve air quality. San Joaquin Valley dairy farmers this year adopted special Conservation Management Practices to reduce dust emissions. Other standard practices are commonly employed to reduce odors and dust.
- Many dairy farmers use electric pumps to irrigate crops and to supply their milking facilities. The dairy industry and all of agriculture is actively working to convert more engines to cleaner burning fuels and electricity.
- Dairies help other farmers by providing an alternative to open-field burning of agricultural waste. For example, by-products such as almond hulls and rice straw are used for feed and bedding.

Science must come before regulation.

Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Lands

What is a Discharger?⁽¹⁾

Who must apply for coverage under a Waiver or a Permit (Waste Discharge Requirements)? The California Water Code requires that “**any person discharging waste**” must obtain a waiver or a permit if the discharge “**could affect the quality of water of the state.**” This discharge may be released as irrigation return flows, drain water, tail water or storm water. Water that leaves your property may enter surface water, including canals, creeks and rivers. The California Water Code applies to all discharges of waste that **might affect** water quality.

What is a “Discharger”? A Discharge occurs whenever water that contains waste leaves your property, if it could ultimately enter surface waters. A Discharge occurs whether the wastewater directly enters surface water from your property, flows over other lands first, or enters a drain. If any waste is in the water a waiver or a permit is required.

Who is a Discharger? A Discharger is any person who releases waste that might affect the quality of the waters of the state. “Persons” may include individuals, corporations, cities, and special districts.

What is “Waste”? Waste is defined as any and all waste substances including soil, salts, trace elements (e.g., selenium), pesticides, and fertilizers.

What are “Waters of the State”? Waters of the state include any surface or groundwater within the boundaries of the state. Waters of the state include natural streams, irrigation ditches or canals, and ponds. Waters in privately operated channels are water of the state. The Waiver applies to discharges to surface water, but not to groundwater.

Is Storm Water Runoff a Discharge? Storm water runoff is a discharge subject to the waiver. Storm water runoff likely contains waste. There is no minimum frequency of storm water discharges below which a waiver or permit is not required. Even if discharges occur only once every 10 or 25 years, a waiver or permit is required.

Is Tailwater Runoff a Discharge? Tailwater runoff is a discharge subject to the Waiver.

- (1) Information from the Central Valley Regional Water Control Board. Meeting Stanislaus County Ag. Center, Modesto, August 16/2004.

UC Dairy Nutrient Management Engineering Assistance Fact Sheet

Every dairy will need to be able to measure and control nutrient application rates within the next few years. In many cases, it will not be possible to simply install a flow meter and start managing nutrients because virtually all dairies lagoon systems were designed for disposal, rather than controlled application, and the system cannot effectively apply low rates without risk of plugging pipelines, running out of storage space, or other problems. Most systems will need to be re-engineered for nutrient management.

To address this issue in Stanislaus and Merced Counties, we (the University of California Cooperative Extension and the East Stanislaus Resource Conservation District and other partner organizations) have obtained grants which enable us to offer excellent, free engineering and agronomic advice on how best to approach setting up individual dairies so that they can effectively manage their nutrients. Also, and just as important, we can also help you learn to use your new system and develop a recordkeeping system that works for you. We can also provide up to \$1000 rebates on metering devices.

Will new regulations require the installation of a flow meter? While it is not certain exactly what the new regulations will be, what is certain is that sooner or later every dairy operator will need to report how much nitrogen (and possibly also phosphorus and/or salt) has been applied. This will require that each dairy be able to measure how much lagoon nutrient water and dry manure is applied. Even in the unlikely event that reporting of nutrient applications is not mandatory, dairy operators will still need to measure and control nutrient applications rates, because the only practical way to meet groundwater and drain water monitoring standards is to closely match application rates to expected crop uptake.

Who is sponsoring this program? The grants have been awarded to the East Stanislaus Resource Conservation District. They have contracted with University of California Cooperative Extension (Marsha Campbell Mathews) to run the program. The money comes from a 319h Water Quality grant (EPA money passed on to the State Water Resources Control Board) and a California Prop 13 water quality grant managed by the State Water Resources Control Board for the CALFED Drinking Water Quality Program.

What kinds of services do you provide? We can design pipelines, tailwater return systems, solids separation systems, recordkeeping systems, training in using the nitrogen quick test, advice on cropping patterns, etc. In short, anything that will help you to better manage your nutrients.

What quality of engineering service can you provide? The techniques for being able to apply measured, targeted amounts of nutrients have been developed by U.C. over the past few years. Currently, it is very difficult to find private people capable of providing the integrated whole-dairy approach to dairy nutrient management that we use. One of the goals of these grants is to train private consultants to provide similar services once these projects are ended. In the meantime, since we do not have to show a profit, we can design systems that are as inexpensive as possible, and provide innovative low-cost solutions for dairy operations that ordinarily couldn't afford to hire this caliber of engineering expertise.

What do I have to do to get the \$1000 rebate? Let us help you design your system. After your metering system is installed, give us a copy of your receipts. Demonstrate to us that you know how to use your new metering system. If your metering system costs less than \$1000, the entire amount can be refunded, according to your receipts. If you spend more than \$1000, you will receive the maximum of \$1000. Other than signing that we have permission to come on your property, and providing the receipts for materials and labor to install your metering system, there is no other paperwork related to the rebate. Supplies needed to run the UC nitrogen quick test also qualify for the rebate if they are purchased along with a metering system.

Is there a time limit? There is funding for only 40 rebates. The first 40 dairies that install metering systems after June 1, 2004 and meet the above requirements will receive rebates. The grant itself will expire in fall of 2005 but engineering support is scheduled to end much sooner.

Will my name be given to the State or Regional Water Quality Control Board if I participate? Only if you want a rebate. There are two grants. One grant provides for confidential engineering service, the other requires that a landowner sign permission for us to do work on the property. The permission signature sheets and list of people receiving rebates (and the receipts) will be kept in a local file that the State Board auditors will have access to. For the confidential grant, a coded list of improvements on dairies will be submitted, and receipts will have any information identifying the dairy removed.

What information do you need to design a system? That depends on what you want to do. We usually start with rough cows vs. acres calculation to see if the land base is adequate, and what degree of solids separation will be needed if excess manure must be moved off the site. We will need a list of fields and their irrigation run times, along with cropping patterns and expected yields. We will also need pond dimensions and water inputs into the pond. Those who have completed the Dairy Quality Assurance Program will already have most of this information compiled. This kind of information will NOT be released to anyone in any way that can be traced to a particular dairy.

Who do I contact to participate? Contact Marsha Campbell Mathews, U.C. Farm Advisor for forage crops in Stanislaus County. (209) 525-6800.

Dairy Herdsman Short Course

October 19-21 in Tulare - Register early – it fills up quickly!!

The UCCE Dairy Herdsman Short Course will be held at the UC Veterinary Medicine Teaching and Research Center (also known as the VMTRC) in Tulare in October. This program is designed for working dairy employees. The purpose of the program is to provide the people who do the actual work on dairies an opportunity to receive information about the latest technologies and to offer training in all aspects of dairy management. A brochure with registration information and more details is included with this newsletter. The registration fee of \$175 is very reasonable and includes the 3-day training, a notebook with handouts, lunches, a shirt and other perks. Join the nearly 200 people from throughout the state who have benefited from attending

previous short courses. Pre-registration is required and space is limited, so if you would like to improve the skills of your dairy employee, register today!