

Nonruminant Nutrition Symposium: Nutrition's Role in Environmental Management and Meeting Government Regulations

643 An update on current environmental regulations and standards for livestock facilities. D. Porter*, *Environmental Protection Agency, Region 7, Kansas City, KS.*

In 1972 Congress enacted the Clean Water Act which defined Concentrated Animal Feeding Operations or CAFOs as point sources. Subsequently, the EPA established National Pollution Discharge Elimination System or NPDES permit regulations for livestock facilities defined as CAFOs. These regulations created effluent limitation guidelines that permitted discharges from the CAFO production area during a 25-yr, 24-h rainfall event, assuming the CAFO was in compliance with the conditions of its NPDES permit. In 2003, EPA revised the regulations to require effluent limitation guidelines for land application areas through development of nutrient management plans (NMP) and require all CAFOs that discharge to obtain a permit. In 2005, the 2nd Circuit Court of Appeals Decision vacated the duty to apply for all CAFOs and required that all NPDES permits and NMPs must be available for public review and comment before issuance. In the CAFO Rule that became effective in December of 2008, EPA revised the duty to apply for an NPDES permit to CAFOs that discharge or propose to discharge to waters of the US; based on the CAFOs design, construction, operation, and maintenance. The 2008 CAFO Rule also established additional NMP-related requirements to be included as enforceable terms of the permit. Several site-specific terms to be included in the permit and NMP include: 1) fields available for land application, 2) outcome of a phosphorus risk assessment, 3) crops to be planted, 4) a realistic yield goal for each crop, and 5) nitrogen and phosphorus removal rates for each crop. Substantial revisions to the NMP, such as changes to land application fields, crops, and increases in the risk of phosphorus runoff, must be changed in the permit and public noticed.

Key words: CAFO regulation, nutrient management plan

644 Environmental management regulations in Europe. N. Penlington*, *BPEX, Warwickshire, UK.*

Environmental regulations in Europe are comprehensive and developed to address existing pollution issues such as water and air quality. Farmers and agri-businesses have to work within a complex regulatory framework including the need for some to have permits and licenses, minimum facilities, restrictions on how and when some activities can be carried out. Regulators and the public are demanding higher levels of performance from farmers and scrutinize proposals for new or expanding operations. Conflicts arise between regulations often developed in isolation for a specific purpose and economic viability. Cross media effects, factors including animal welfare, consumer requirements and local conditions become the issue rather than the Best Solution. Recent world events and significant rises in food costs, government focus on reducing greenhouse gas emissions, food security and a growing world population has changed the dynamic in which agri-businesses have to operate. The emphasis is shifting, the drivers being efficiency and increased production, but not at any cost. Businesses embracing this change are finding that environmental regulations become less of an issue, those who run their business to comply with regulation are unlikely to thrive. Regulations will change to allow pig and poultry producers working with processors to convert resources efficiently into meat and other products with minimal waste or loss from the system.

645 Nutritional practices that affect the environment-excretion of nitrogen, phosphorus, and sulfur; and emissions of odors and greenhouse gases from swine production facilities. B. J. Kerr*, *USDA-ARS-NLAE, Ames, IA.*

In growing swine, whole-body retention of nitrogen, phosphorus, and sulfur is approximately only 50% of total dietary intake. Consequently, excretion of these compounds in urine and feces (i.e., manure), and subsequently into the environment, can be relatively extensive, especially in areas where large numbers of livestock are produced on relatively small areas of land. Air, surface water, and ground water are 3 natural resource components that can be impacted by livestock production facilities. Although generally depicted separately, many avenues for nutrient or gaseous abatement in any of one these components are directly interrelated and can simultaneously increase, or decrease, the impact on the environment. From animal production facilities, release of nitrogen (NH₃), carbon (CO₂ and CH₄), phosphorus, sulfur (H₂S), volatile organic compounds (primarily short chain fatty acids, SCFA), particulates, and greenhouse gasses (CH₄, CO₂, and N₂O) are of highest interest since reduction in any of these compounds have short-and long-term environmental impact. Because a reduction of these compounds from animal production facilities will have a multiplicative effect on the total excretion process, these compounds need to be evaluated simultaneously and methods to reduce these compounds must be considered in diet formulation, especially because feed costs account for approximately 70% of the total cost of livestock production. The bottom line is that undigested feed products, endogenous animal secretions, and nutrients in excess of the needs of the animal are ultimately the nutrient input (carbon, nitrogen, phosphorus, sulfur, etc.) in manure storage systems, and subsequently, are potential contaminants into the environment; either air or water. Data will be summarized and new data will be presented evaluating diet modifications (focusing largely on dietary carbon, nitrogen, and sulfur) relative to nutrient excretion and the impact that these nutrients on the environment.

Key words: environment, nutrient excretion, gas emissions

646 Practical application of manure management plans of a swine production system to row crop production agriculture. B. S. Borg*, *Murphy Brown LLC, Ames, IA.*

During the past several years there has been tremendous change in the methodology, equipment used for application and regulatory emphasis on the accurate use of animal waste. Farmers have always understood the "value" of manure being applied to crop land but this understanding has grown to include intricate detail about the inputs and outputs of the fine balance of crop nutrient requirements, current soil nutrient content and manure nutrient content. Sustainable agriculture programs circulate around the balance of nutrient application and nutrient use. Environmental concerns about the leaching of nutrients into underground water reservoirs as well as nutrient run off have led to regulations in many states that now monitor and direct the use of manure more intelligently than the use of more nutrient dense, commercially available nutrients. Murphy Brown LLC, and former ownership entities, have included manure management plans as an important part of our hog production system since the early 1990s. Historical records of soil nutrient content that span over a 17 year period, with every other year manure application, show phosphorus and potassium content of

the soil to be on a slight decline over time. During this period of time, significant changes have occurred in feeding programs to include a greater use of crystalline amino acids, phytase as well as other ingredients that have a direct impact on the nutrient content of the manure. Understanding and monitoring soil nutrient content, waste nutrient content and the changing requirements of the crop being raised allow for a balanced system to occur. Animal waste is an excellent source of

highly available nutrients and can be very effectively used as a cost efficient source of nutrients while maintaining adequate focus on environmental concerns relating to nutrient loading of the land and surface waters.

Key words: swine, animal waste, soil nutrients