



## Selecting and Working with an Engineering Consultant to Design Animal Waste Management Facilities

John A. Hoehne, P.E., Extension Agricultural Engineer, University of Missouri-Columbia  
Charles Fulhage, P.E., Extension Agricultural Engineer, University of Missouri-Columbia  
David Williams, P.E., Curry-Wille Associates, Consulting Engineers, P. C., Columbia, Missouri

Animal waste management facilities in Missouri have traditionally been designed as “no discharge” systems using anaerobic treatment design procedures. Historically, these animal waste management systems have been planned and designed by agency engineers from University of Missouri Extension and the Soil Conservation Service. The “Missouri Approach to Animal Waste Management” was a voluntary program that promoted environmentally sound animal waste management systems eligible for approval from the Missouri Department of Natural Resources. Producers could voluntarily submit minimal designs and receive a “Letter of Approval” from the Department of Natural Resources.

During the past twenty years, livestock production trends in many operations, in particular those using confinement, have been toward larger and more concentrated production. The potential for environmental damage has increased as more animals are concentrated in smaller production areas. Public concern for protecting the environment has also increased in recent years.

Environmental Protection Agency rules and regulations at the national level have resulted in changes of the Missouri Department of Natural Resources regulations. The voluntary program has evolved so that Concentrated Animal Feeding Operations with 1000 or more animal units (Class I facilities) require both a Letter of Approval to Construct and a Letter of Approval to Operate. See MU publication WQ 217 for information on obtaining a Letter of Approval from the Missouri Department of Natural Resources.

Design criteria for animal waste management systems is found in DNR Manual 121, “Design



Consulting engineers provide technical services in designing livestock waste management systems.

Guidelines for Animal Waste Management for Concentrated Animal Feeding Operations.” This design guide is supported by a “parent” regulation, 10 CSR 20-8.020, “Design of Small Sewage Works.” Minimum requirements for the design and construction of wastewater management facilities are contained in this regulation. The regulation states that engineering reports, plans and specifications for wastewater management facilities are to be prepared, signed and stamped by professional engineers who are registered in the State of Missouri.

### Registered engineers

Registered professional engineers may be employed by governmental agencies or universities, privately employed by companies or employed as independent consulting engineers. Increased Letter of

Approval requirements and decreasing available manpower of University Extension and Soil Conservation Service engineers has resulted in a shift of design responsibility for animal waste facilities to the private sector.

A starting point for locating consulting engineers can be listings in the yellow pages of the telephone directory. Lists of engineering consultants are also maintained by some agencies and trade organizations. These lists are not inclusive and do not consist of an endorsement of the listed individuals or firms. The lists are provided as information in locating engineering design services.

## Livestock producer preplanning

Production decisions and preliminary facility plans made prior to contact with the consulting engineer will reduce the cost and time required to complete the project design. Livestock producers should know, determine and assemble as much information as possible concerning:

- Department of Natural Resources rules and regulations.
- Animal waste management methods and the terminology used to describe different systems.
- How site specific waste management facilities can be integrated into the overall farmstead and farm management plan.
- The numbers and live-weights of animals to be used in designing the waste management facilities. Expansion plans should be included when determining these design stocking rates.
- The type of livestock production facility and any preferences in the design of the animal waste management system.
- The development of a basic farmstead plan, waste management plan and nutrient management plan for the livestock production site.

Information on the above items can be obtained from such sources as publications from the University of Missouri and Midwest Plan Service. Contact your local extension specialist or county extension office for assistance in planning livestock waste management systems.

## Engineering services required

Livestock producers who plan to hire a consulting engineer should determine what services are required. These services could include:

- Site selection of the facility or waste management facility.
- An environmental site assessment.
- A topographic survey of the site.
- Preparing regulatory applications and providing necessary assistance to ensure environmental project certification.
- Preparation of detailed plans and design specifications.
- Preparation of construction bid documents.
- Construction supervision, management and review to insure successful completion of the project.

A consulting engineer retained to prepare an animal waste Letter of Approval must be professionally able to:

- Prepare an application that conforms to Missouri Department of Natural Resources rules and regulations.
- Provide assurance that the Letter of Approval application, plans and design specifications will be signed and stamped by a professional engineer registered in the State of Missouri.
- Provide adequate construction inspection to certify (sign-off) that construction of the waste management facility conforms to the submitted plans and specifications. This certification by the engineer is required to obtain the Letter of Approval for Operation of the facility.

## Selecting a consulting engineer

Livestock producers should identify potential engineering consulting firms and make an initial contact with those firms or individual engineers early in the planning process. An engineer hired as a consul-



Good communication is essential in working with a consulting engineer.

tant for an animal waste management project design should:

- Have knowledge and understanding of the livestock production business.
- Have knowledge and experience in animal waste facility design.
- Have knowledge of Missouri Department of Natural Resources and Letter of Approval requirements.
- Be able to assure that adequate design and construction supervision can be provided.

## Hiring a consulting engineer

It is recommended that livestock producers prepare a list of three or four consulting engineering firms that seem to best meet the preliminary qualifications for engineering services. Request that these firms prepare a project proposal to address the animal waste management problem of the livestock production unit.

The producer may also want to request a list of previous clients served by the firm. The project proposal should also address fee schedules, and the consulting firm can be requested to provide a cost estimate for engineering and design services necessary to complete the project.

Selection of a consulting engineer should emphasize engineering knowledge and experience. The reputation of the engineer is also very important when making this choice. Projected time schedules for completion of the design to include plans, specifications and application may be very important to livestock

production schedules and must also be evaluated when selecting the consultant.

Consultant fee comparisons should probably not receive much emphasis in the consultant selection process. The reputation and successfully completed projects of the engineer and consulting firm are better selection indicators. Comparison of fees may provide some basis for selection as a “tie breaker” if all other qualifications of the firms appear to be equal.

## Working with your consulting engineer

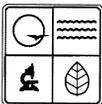
Many livestock producers have not worked with a consulting engineer. There are several things that should be accomplished after the consulting firm has been selected. A letter of agreement or contract should be signed by both parties that defines:

- The engineer’s duties and responsibilities in completing the project.
- The engineer’s fee schedule for the different phases and activities required by the project.
- A projected timetable for completion of the project.
- Any other pertinent design or inspection details required by the project.

Livestock producers must be prepared to **plan ahead**. It is imperative that producers know what type of animal waste system they **need** and **want**. Livestock producers need to have an open mind and be prepared to discuss animal waste system design options with their consulting engineer.

Consulting engineers should prepare quality designs of animal waste systems. Quality of design can and should be expected by a producer; however, perfection in design is not always possible due to time and experience constraints of engineers.

**Be patient** with your consulting engineer. There are factors involved with the design and approval procedures of animal waste management systems that depend on information and response by parties that cannot be controlled by the consultant. It is very important that both the producer and consultant **communicate** on a **regular** and **professional** basis to successfully complete and construct an approved animal waste system design.



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