



Selecting a Dairy Operation Site

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Space considerations

Plan for expansion 20 to 30 years into the future, consider doubling the presently anticipated size. Avoid locating facilities near property lines, streams, steep topography or other features that will limit expansion. Additionally, buildings should be spaced 50 feet apart (75 feet is better for fire trucks) to reduce fire spread.

Acreage depends on the soil/plant filter area needed for ultimate waste disposal plus a buffer area between the dairy operation and its neighbors.

Lagoons minimize the acreage required. As a rule of thumb, the number of cows per acre needed for waste application is 0.9 cows per acre (1350 pound cows) if handled as a slurry and up to five cows per acre if a lagoon is used. Avoid being dependent upon other landowners for waste disposal.

Proximity of neighbors

Avoid placing livestock facilities near present or future non-owned residences. Preferably, livestock facilities should be out of your neighbor's sight. Consider having a buffer zone or a tree windbreak to shield the operation. Depending upon facility size, minimum distance from non-owned residences should be 500 to 1500 feet, although this is no guarantee of immunity from complaints. A separation of one mile or more is recommended between large livestock operations and non-owned residences. See MU Guide # 1155.

Separation distance is influenced by prevailing wind and topography. Preferably, fields where waste is applied should be at least one-half mile from residences. Fewer odor complaints from land application occur if the waste is treated in a lagoon, injected into the soil, or immediately incorporated into the soil by tillage, but consider soil erosion.

Winds and odor complaints

Prevailing wind direction in relationship to non-

owned residences is important, especially during seasons when neighbors will be outside. If local knowledge is not available, wind data is available from National Oceanic and Atmospheric Administration (NOAA) or from the Midwest Plan Service Publication MWPS-2, "Farmstead Planning Handbook", which shows wind patterns for numerous locations during the months of January and July.

Air drainage and odor complaints

During calm, humid periods, topography can funnel odors down drainageways to distant locations, especially to residences located in valleys. Odors traveling in this way can remain intense over long distances. Topographical maps can determine potential paths of air drainage. Remember odors following drainage patterns may be more offensive than odors carried by prevailing winds.

Geological problems

Parts of southern Missouri, areas along the Mississippi River and the lower portion of the Missouri River have limestone deposits. These deposits may restrict the use of earthen waste impoundments because of potential groundwater pollution (ref. MU Guide # 1155). Be cautious when planning dairy facilities in an area known to have sink holes and remember, earthen storages should not be used where the collapse potential is high.

Shallow bedrock creates problems in the installation of underground utilities and may preclude the use of earthen storages for water or waste. A few hours of investigation with a backhoe or a drilling rig may be necessary to properly evaluate a site.

Streams and watercourses

Livestock facilities, especially open lots, should not be located close to streams and watercourses or on steep land along these areas. Runoff should be contained and applied to a soil/plant filter. Pastured

livestock should be fenced out of streams along with a 50 to 300 foot wide grass or forest filter strip.

Soil/plant filter area

High producing crops that remove large amounts of limiting nutrients should be selected when choosing a soil/plant filter area. Shallow and unproductive soils should be avoided, although irrigation could help shallow soils maximize crop production.

To reduce the possibility of runoff, select fairly level soils. If a sloping site is unavoidable, injecting the waste may be necessary. Slopes steeper than 10 percent are not suitable for the filter area.

Soil permeability

Soils with low permeability are desirable for earthen waste storage to prevent groundwater contamination. Much of the southern half of Missouri has highly permeable, gravely, rocky, sandy or block-structured red clay soils which may allow wastes to seep into the groundwater (ref. MU Guide # 1155 for a map of problem areas). Soil Conservation Service surveys rate soils for many factors, including permeability, drainage and suitability for waste lagoons, roadfill and irrigation.

For application of lagoon effluent by irrigation, the surface soil permeability rate must be higher than the application rate to prevent runoff.

Drainage

Good surface and subsurface drainage is important, but polluted water must not leave the premises or enter the ground water. Avoid building "in a hole", on a flood plain and on sites with a high water table, spring or seep.

Slopes of 2 to 5 percent will usually provide surface drainage without erosion, depending upon the soil type. A 5 percent minimum slope away from building foundations is recommended and south slopes are preferred for livestock feeding areas. Buildings built on high ground can take advantage of natural slopes for drainage and obtain a 2 percent minimum slope on conduits for lagoons. Diversions may be required to divert surface runoff from facilities. Building roads to follow ridges can take advantage of drainage and reduce snow drifts.

Accessibility

A dairy operation should have accessibility to a good market and a milk truck route.

Preferably, a state-maintained, hard-surfaced

highway with bridges permitting large trucks should be easily accessible. Prompt snow removal is important. Avoid sites where the cost of constructing/maintaining the road from the dairy operation to the public road will be excessive due to distance, required bridges, snow drifting or other topographical/soils problems.

Utilities

Water

A year-around supply of water is essential for the animals, sanitation and workers/residences. Water is also needed for waste dilution and fire protection.

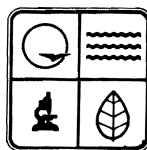
A well-sealed, high-capacity, deep well is usually preferred. Shallow wells are more likely to become contaminated from surface runoff and/or deep percolation. The well(s) should be located away from possible contamination sources, such as lagoons, livestock lots, septic tanks and septic fields. For deep wells with sealed casings and drawing water from bedrock formations, the recommended distance from contamination sources is 300 feet with 100 feet as the minimum distance (public water supply criteria). For unsealed wells and water from unconsolidated formations (sand, gravel), 1,000 feet from contamination sources is recommended with 300 feet as the minimum distance.

Public water supplies are expensive for watering livestock. Milking cows require 35 to 40 gallons of water per head per day. Surface water supplies (ponds/lakes) are an alternative, especially for livestock consumption.

Electricity

Electrical demand is high for most dairies. Power requirements are usually high for heating, lighting, pumping and materials handling. Large motors may require 3-phase power. Unless a 3-phase line is close, the cost of providing this line may be costly.

Dairies subject to frequent power outages may feel compelled to install a standby power source. Outages are more likely if the site is far removed from the electrical substation.



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