

## Land Application of Manure

Land application of manure is a standard practice by which manure is removed from a storage facility and applied to the land, primarily to use as a nutrient resource for crop production. While land application of manure is usually a safe practice and spills or leaks happen infrequently, producers should know they can run the risk of over-application of nutrients for crop production or runoff of land-applied manure. Over-application of manure is a waste of nutrient resources and can potentially lead to movement of those nutrients through the soil profile into groundwater sources. Runoff of manure nutrients can occur when the manure moves off-site due to volume of manure applied, slope, frozen or saturated soil, or rainfall events. Runoff can potentially cause manure to move to surface waters. In either case, the potential risk of over-application or runoff can be managed.

### Methods of Land Application

Manure is land applied in several ways; it can be injected, broadcast and incorporated, broadcast with no incorporation or it can be applied through irrigation. Each of these methods includes pros and cons and a producer must decide which method works best for him or her.

Application Practices	Pros	Cons
Injection	<ul style="list-style-type: none"> <li>•Will reduce odor</li> <li>•Can reduce nutrient runoff</li> <li>•Place nutrients closer to crop roots for uptake</li> <li>•Conserve nutrients</li> </ul>	<ul style="list-style-type: none"> <li>•Increased horsepower and fuel for application</li> <li>•Delay in application due to frozen or wet soils</li> <li>•Uniform distribution can be a challenge</li> <li>•Can place manure closer to tile lines</li> <li>•Can increase soil disturbance potentially increasing runoff</li> </ul>
Broadcast & Incorporation	<ul style="list-style-type: none"> <li>•Faster application time</li> <li>•Conserves more nutrients than no incorporation</li> </ul>	<ul style="list-style-type: none"> <li>•Increased odor</li> <li>•May take two trips to apply and incorporate</li> <li>•Can increase soil disturbance potentially increasing runoff</li> </ul> <p>Depending on length of time between application and incorporation increase risk of nutrient loss due to volatilization</p>

## Contributors

- Natural Resource Conservation Service
- Agribusiness Association of Iowa
- Iowa Farm Bureau Federation
- Iowa Poultry Association
- Iowa Turkey Federation
- Iowa Pork Industry Center
- Iowa Beef Center
- Iowa Pork Producers Association
- Iowa Department of Natural Resources
- Iowa Cattlemen's Association
- Division of Soil Conservation, Iowa Department of Agriculture and Land Stewardship
- Iowa State Dairy Association
- Iowa Commercial Nutrient Applicators Association
- Coalition to Support Iowa's Farmers
- Iowa Corn Growers Assoc.
- Iowa Soybean Association
- Iowa State University, University Extension
- Iowa State University, College of Agriculture

Application Practices	Pros	Cons
Broadcast without Incorporation	<ul style="list-style-type: none"> <li>•Quick application</li> <li>•Can allow for increased rates</li> <li>•Will minimize soil disturbance</li> </ul>	<ul style="list-style-type: none"> <li>•Increased odors</li> <li>•Can increase potential for runoff</li> </ul>
Irrigation	<ul style="list-style-type: none"> <li>•Application of nutrients as well as water source</li> </ul>	<ul style="list-style-type: none"> <li>•Increased odors</li> <li>•Requires specialized equipment</li> <li>•Increased electrical costs</li> <li>•Can increase potential for runoff</li> </ul>

### Regulations

The regulations affecting land application of manure are dependent on what type of facility the manure comes from and the size of that facility. Due to changes in land application regulations, you should consult your local Iowa Department of Natural Resources Field Office for the most current requirements.

### Incorporation vs. Injection

The first thing you should know is there are legal definitions of injected and incorporated manure coming from confinement facilities. If your operation is designated as a confinement facility you should understand these terms. According to the Iowa Administrative Code, Chapter 65, "Incorporation" means a soil tillage operation following surface application of manure which mixes the manure into the upper four inches or more of soil. "Injection" means the application of manure into the soil surface using equipment that discharges it beneath the surface.

### Separation Distances:

Separation distances are often defined by the buildings, areas or water sources they are intended to protect. Some separation distances apply only to liquid manure from confinement facilities and whether or not that manure has been injected or incorporated within 24 hours from the time of land application.



Example map showing separation distances

# Iowa Manure Manager Series

Other separation distances apply to all animal feeding operations no matter the size of the operation or whether it is a liquid or dry manure source. It is important that you know what kind of operation you have and the size of that operation. For specific information on separation distances for land application of manure, see the Iowa Department of Natural Resources (IDNR) facts sheet on separation distances as referenced in the resource section of this publication.

Applicator Certification Requirements: Confinement site operators with more than 500 animal units, must be certified to land apply their own manure, unless they are having the manure applied by a commercial manure applicator who also needs to be certified. Specific certification requirement can be found at: <http://www.iowadnr.gov/afo/appcert.html> or see the reference section for further information.

## Best Management Practices

Whether you are required to meet regulatory requirements or not for land application of manure, there are some practices that everyone should consider before applying manure.

- Watch the weather. If precipitation is forecasted, hold off on manure application. This can help reduce the risk of potential run-off of manure.
- Consider the slope of the ground receiving manure. Try to eliminate broadcast applications of manure on slopes of greater than 5 % unless the manure can be incorporated quickly to reduce off-site movement of the manure. When injecting or incorporating manure on slopes greater than 5%, make sure residue levels or conservation practices are adequate to reduce erosion and potential off-site movement of the manure. NOTE: While land application of manure on certain slopes or frozen or saturated soils is not a state requirement in Iowa, if you are required to have a nutrient management plan or Comprehensive Nutrient Management Plan by the USDA-NRCS, you may be subject to land application restrictions on certain slopes or frozen or saturated soils. Know what your plan requires.
- Know your soil conditions. Excessively wet conditions can cause manure not to infiltrate, causing it to pond on the surface and be subject to run-off conditions. Consequently, excessive dry soil conditions can cause manure to infiltrate through macropores, potentially providing a direct route to tile lines.
- Avoid manure application on snow-covered and frozen ground.
- Regularly inspect manure application equipment for wear and leaks.
- Develop an emergency action plan. Make this plan available

to all family members, employees and commercial applicators. Train family members and employees to respond appropriately in the event of a spill or leak.

## Frequently Asked Questions

**Q.** Do I have to knife-in or inject manure?

**A.** No. Injection of manure is not required in Iowa, however it can reduce odors, minimize separation distances and put the nutrients closer to the crop uptake zone. Injection of manure and the potential consequences of soil disturbance must be weighed against odor and run-off potential.

**Q.** Do I need to report a manure spill?

**A.** Any manure spill regardless of size or volume must be reported to the IDNR within 6 hours of occurrence or discovered. During normal business hours you should contact your local DNR field office. Spill occurring during after business hours, weekends and holidays should be reported to (515) 281-8694 and to the local police department or sheriff's office in the county where the spill occurred.

## Resources

Chapter 65 IAC Animal Feeding Operations  
<http://www.legis.state.ia.us/Rules/Current/iac/567iac/56765/56765.pdf>

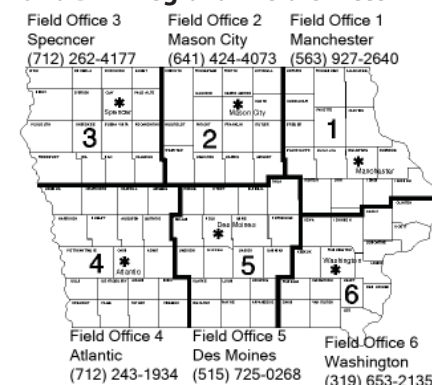
DNR 113 Separation Distances for Land Application of Manure from Open Feedlots & Confinement Feeding Operations, including SAFOs.  
<http://www.iowadnr.com/afo/files/sepdstb4.pdf>

DNR 117 High Quality Water Resources  
<http://www.iowadnr.com/afo/files/hqwr2.pdf>

PM 1859 Emergency Action Plans  
<http://www.extension.iastate.edu/Publications/PM1859.pdf>

EDC 328 Assessing Your Emergency Response Planning for Manure Spills  
[http://www.iowafarmbureau.com/newsissues/environment/pdf/fas\\_rev.pdf](http://www.iowafarmbureau.com/newsissues/environment/pdf/fas_rev.pdf)

## Iowa DNR Regional Field Offices



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