



# Legislative FACT SHEET

January 17, 2001



Minnesota Pollution Control Agency

## Karst Workgroup recommendations

### Introduction

Due to its unique karst geology (fractured limestone bedrock overlaid with shallow soil, often with sinkholes), much of southeastern Minnesota represents a sensitive environment for contamination of ground water and surface waters. One of the environmental concerns about karst geology is the potential for sinkholes to form below wastewater- or manure-storage structures, causing contaminants to be channeled directly into the ground water. Sinkholes have formed below three poorly lined municipal wastewater-treatment ponds in Minnesota and at several poorly lined wastewater and liquid manure storage areas in other states. Ground water contamination problems have also resulted from chronic seepage of liquid manure into cracks in the bedrock that are directly connected to aquifers.

### Background

Recognizing the environmental sensitivity of the karst region, the Minnesota Pollution Control Agency (MPCA) recently incorporated into rule (Chapter 7020) several standards for construction of liquid manure-storage systems in areas prone to sinkhole development. In response to the rule changes, the Legislature requested that a workgroup be convened to review and propose standards related to this topic according to the requirements in section 13 of 2000 Session Laws, Chapter 435.

The MPCA convened a workgroup consisting of 10 engineers, none of whom are employed by state regulatory agencies, in accordance with the guidelines set forth by the Legislature, which specified that engineers in the workgroup be from the private sector. At the request of the workgroup, two or more

hydrogeologists experienced in the karst region were present at each meeting to advise on issues pertaining to karst geology, soils and hydrogeology. The workgroup met over eight days between August and November. The workgroup did not build from existing MPCA policy, but rather took a fresh look at standards needed for the karst region.

The workgroup considered areas “susceptible to soil collapse or sinkhole formation,” to include all land where the depth to carbonate bedrock is less than 50 feet, and the uppermost bedrock is fractured carbonate materials or other bedrock where soil collapse or sinkhole formation occurs.

### Karst Workgroup recommendations

Following considerable study of technical information from Minnesota and other states, the workgroup developed several standards for these areas.

#### *Location restrictions*

- Maintain a 300-foot setback from sinkholes.
- Relocate site if subsoil inspections during excavation indicate soil subsidence or sinkhole development.
- Avoid construction over mapped caves that become registered with the state.

#### *Design specifications*

- Use dual liners, concrete liners or above-ground, glass-fused metal tanks.
- Limit maximum capacity of a single cell to three million gallons (no total-capacity limit per farm and no restrictions based on animal-unit numbers).
- Maintain a five-foot minimum separation between manure and bedrock, with some exceptions.





- Convey roof and site runoff waters away from the manure-storage area.

### ***Identifying and responding to failures***

- Monitor manure levels regularly and conduct an annual inspection of the liner.
- Develop an emergency response plan.

The workgroup recommended that the proposed standards replace existing MPCA rules pertaining to design standards in areas susceptible to sinkhole formation. It also suggested that these recommendations be reviewed and refined after further sinkhole-formation studies are completed.

### **Similarities between recommendations and existing regulations**

Many similarities can be found when comparing current Minn. R. ch. 7020 and workgroup recommendations for areas susceptible to soil collapse or sinkhole formation. For example, both the existing rules and workgroup recommendations:

- establish 300-foot setbacks from sinkholes.
- include major restrictions for use of cohesive soil liners alone.
- allow for use of concrete-lined, dual-lined and above-ground storage.
- establish a similar minimum soil thickness needed above bedrock for use of concrete, composite and above-ground liners at small to moderate-size feedlots.

### **Differences between recommendations and existing regulations**

- Current rules for minimum separation-to-bedrock restrictions vary from five to 15 feet for concrete pits, dual-lined basins and above-ground tanks, depending on the type of liner and the number of animal units on the farm. The workgroup recommends that separation to bedrock be a minimum of five feet, except for two types of designs where separation to bedrock can be less than five feet.
- MPCA rules allow cohesive soil liners alone where there is a substantial soil thickness (*e.g.*, 20 to 40 feet). between manure and bedrock The workgroup recommends that no cohesive soil liners be used alone without another liner in areas with less than 50 feet from ground surface to

carbonate bedrock until further geologic study identifies the areas with less than 50 feet to bedrock that have a low potential for soil collapse or sinkhole formation.

- MPCA rules set a 250,000-gallon limit per storage cell in areas where there are four or more sinkholes within 1,000 feet. No other storage-capacity limits are set in rules. The workgroup recommends a three-million-gallon limit in all areas susceptible to sinkhole formation

### **Recommendations for additions to existing regulations**

Other recommendations that the workgroup made are consistent with MPCA policy and past permit conditions, but are not currently established in rule for all new liquid-manure-storage facilities in sinkhole-prone areas. The workgroup proposes that the following be added to state rules for areas susceptible to sinkhole formation:

- inspections of subsoil during construction,
- diverting fresh water away from the manure-storage area,
- annual liner inspections,
- monitoring of manure levels and
- emergency response plans.

### **What's next?**

The MPCA intends to implement workgroup recommendations in the following ways:

- 1) Study technical information from the workgroup proposals as a basis for future rule revisions.
- 2) Issue permits with the workgroup standards until the rule can be revised (where an equivalent level of environmental protection is achieved).
- 3) Modify MPCA guidelines to reflect workgroup proposals.
- 4) Discuss with other agencies how and when to implement recommendations for further study.

### **For more information**

If you have any questions or would like more information about the Karst Workgroup's recommendations, call David Wall at (651) 296-8440 or e-mail him at [david.wall@pca.state.mn.us](mailto:david.wall@pca.state.mn.us) .