

STATE OF SOUTH DAKOTA
William J. Janklow, Governor

DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
Nettie H. Myers, Secretary

DIVISION OF FINANCIAL AND TECHNICAL ASSISTANCE
Kelly A. Wheeler, Director

GEOLOGICAL SURVEY
C.M. Christensen, State Geologist

OPEN-FILE REPORT 80-UR - No. 25: WINNER CITY

STATEWIDE LANDFILL STUDY:
WINNER CITY LANDFILL SITE CHARACTERISTICS

by

Sarah A. Chadima
Carolyn V. DeMartino
Keith A. Swenson

Science Center
University of South Dakota
Vermillion, South Dakota

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INTRODUCTION

Purpose and Scope

The purpose of this report is to summarize the geologic data, hydrologic data, and other site characteristics of the Winner City landfill. This information was compiled as a part of the Statewide Landfill Study.

In 1984, the state of South Dakota had 38 permitted solid waste landfills, both private and public, which accepted waste other than ordinary household waste. A study was undertaken in an effort to evaluate selected landfills in South Dakota and identify those that may be best suited for the disposal of these special wastes.

This study was conducted by the South Dakota Geological Survey and the Office of Air Quality and Solid Waste of the Department of Water and Natural Resources, now known as the Department of Environment and Natural Resources. The Office of Air Quality and Solid Waste contracted with the South Dakota Geological Survey for certain geological services. The South Dakota Geological Survey contribution to this study was three-fold. First, available geologic and hydrologic data from landfills in South Dakota were reviewed and evaluated. Second, monitoring well systems were designed and installed at four landfills which were selected by the Office of Air Quality and Solid Waste. Finally, the geology was evaluated in more detail at these four landfills.

Selection of Sites

Existing information concerning 38 permitted and 2 proposed landfill sites was reviewed by the Office of Air Quality and Solid Waste in order to prioritize the sites. The Office of Air Quality and Solid Waste used this preliminary screening to reduce the number of potential sites from 40 to 26 (table 1 and fig. 1).

TABLE 1. List of sites considered for further evaluation

1. Belle Fourche City	14. Miedema City
2. Brookings City - Proposed	15. Milbank City
3. Brown County	16. Miller City
4. Brule County	17. Pierre City - Proposed
5. Byre (Private)	18. Pierre City - Old Site
6. Davison County	19. Ralph Dawson (Private)
7. De Smet City	20. Rapid City
8. Gregory County	21. Sioux Falls (Runge) City
9. Haarstad (Private)	22. Vermillion City
10. Huron City	23. Walworth County
11. John Clements (Private)	24. Watertown City
12. Kadoka City	25. Winner City
13. Marshall County	26. Yankton County

Subsequently, the South Dakota Geological Survey evaluated these 26 sites and prepared a draft report describing each site. No field checking was done. Topics such as topography, drainage, climate, soils, geology, hydrology, water quality, adjacent land use, hazardous waste records, and operational practices were addressed. These reports included copies of available maps, lithologic logs, and water quality analyses. Draft copies of these unpublished reports are on file at the Department of Environment and Natural Resources in Pierre and the South Dakota Geological Survey in Vermillion. The individual report on the Winner City landfill is the basis for this report.

After the initial assessment of the 26 sites, the Office of Air Quality and Solid Waste established criteria for further prioritizing the sites. Four sites were selected for the installation of monitoring wells. The South Dakota Geological Survey conducted detailed investigations at the Brown County, Watertown City, Yankton County, and Rapid City landfills (fig. 1). A draft copy of the unpublished summary report is on file at the Department of Environment and Natural Resources in Pierre and the South Dakota Geological Survey in Vermillion. The following information was available regarding the Winner City landfill in 1986.

WINNER CITY LANDFILL

Location

The Winner City landfill is located 2 miles west of Winner in Tripp County. Its legal location is NE¼ sec. 26, T. 99 N., R. 77 W. (fig. 2).

Topography, Drainage, and Climate

The information on topography and drainage was taken from the Dog Ear Buttes Quadrangle and the Miller Hill Quadrangle (United States Geological Survey, 1982a and 1982b). In actuality, the present landfill surface may be significantly different because of activities at the landfill.

The Winner City landfill is located near the top of a ridge which trends northeast-southwest (fig. 2). The elevation ranges from 2,066 feet (630 meters) to 2,154 feet (657 meters) for a maximum relief of 88 feet (27 meters) at the site.

Locally, drainage is controlled by intermittent streams on either side of the ridge which drain to the north-northeast into the White River. Intermittent tributaries to Dog Ear Creek drain the southeast side of the ridge. Intermittent tributaries to Hollow Creek drain the northwest side of the ridge.

The average annual temperature in Tripp County is 48 degrees Fahrenheit. Precipitation averages 20 inches per year. The average annual class A pan evaporation is 55 inches. Climatological data are from Spuhler and others (1971).

Geology

Little site specific geological information was available for this area. The site occupies a terrace remnant and is underlain by terrace gravels which overlie the upper units of the Pierre Shale (fig. 3). The shale crops out along the boundaries of the site. According to the Office of Air Quality and Solid Waste records (Soil Conservation Service Report dated July 24, 1975), most of the area has

been excavated into the underlying clay shale. However, according to the Office of Air Quality and Solid Waste records (site inspection reports dated February 6, 1980, and April 10, 1981), the landfill is located in a gravel pit. No lithologic logs are available for the site.

Hydrology

The material at the base of the landfill consists primarily of clay (Office of Air Quality and Solid Waste records), presumably Pierre Shale. The permeability of this shale is not known but can be represented in qualitative terms. In general, the permeability of shale is less than the permeability of sand and gravel. No site specific permeability data are available.

No monitoring wells are present within 1 mile of the site. Without the presence of adequately constructed monitoring wells (a minimum of three) in the proper locations and at the proper depths, the lateral hydraulic gradient and direction of potential ground water movement cannot be estimated for the landfill area. The nearest ground water supply (aquifer) is unknown.

Water Quality

No water quality data were available within the landfill or within 1 mile of the landfill boundaries.

Adjacent Land Use and Features

Information about adjacent land use and features was taken from the Dog Ear Buttes Quadrangle and the Miller Hill Quadrangle (United States Geological Survey, 1982a and 1982b) and the General Highway Map - South Half - Tripp County (South Dakota Department of Transportation, 1980).

- * The nearest surface water is Dog Ear Creek located 1 mile east of the site. Two ponds are located 1 mile south of the site.
- * Highway 183-18 is three-quarters of a mile north of the site.

Operational and Siting Criteria – Summary from the Office of Air Quality and Solid Waste Records

The most common responses found on the Office of Air Quality and Solid Waste site inspection reports prior to 1986 are given in this section. Copies of the microfiche data are available from the Department of Environment and Natural Resources in Pierre.

1. Site: Winner City
2. Population served: 3,478
3. Method of disposal: Cut and fill (trench)
4. Estimated amount of waste received per unit time: 8,752 tons/year

5. Access to site:

- * Fenced: Yes ___ No Lockable gate: Yes ___ No
- * Litter fences present: Yes ___ No
- * All weather access road to site: Yes ___ No

6. List industry present: Baptist Community Hospital, Winner Nursing Home.

7. Land Use:

- * Preoperational land use: Agriculture
- * Proposed post-operational land use: Agriculture
- * Current land use within a quarter of a mile radial area: Agriculture

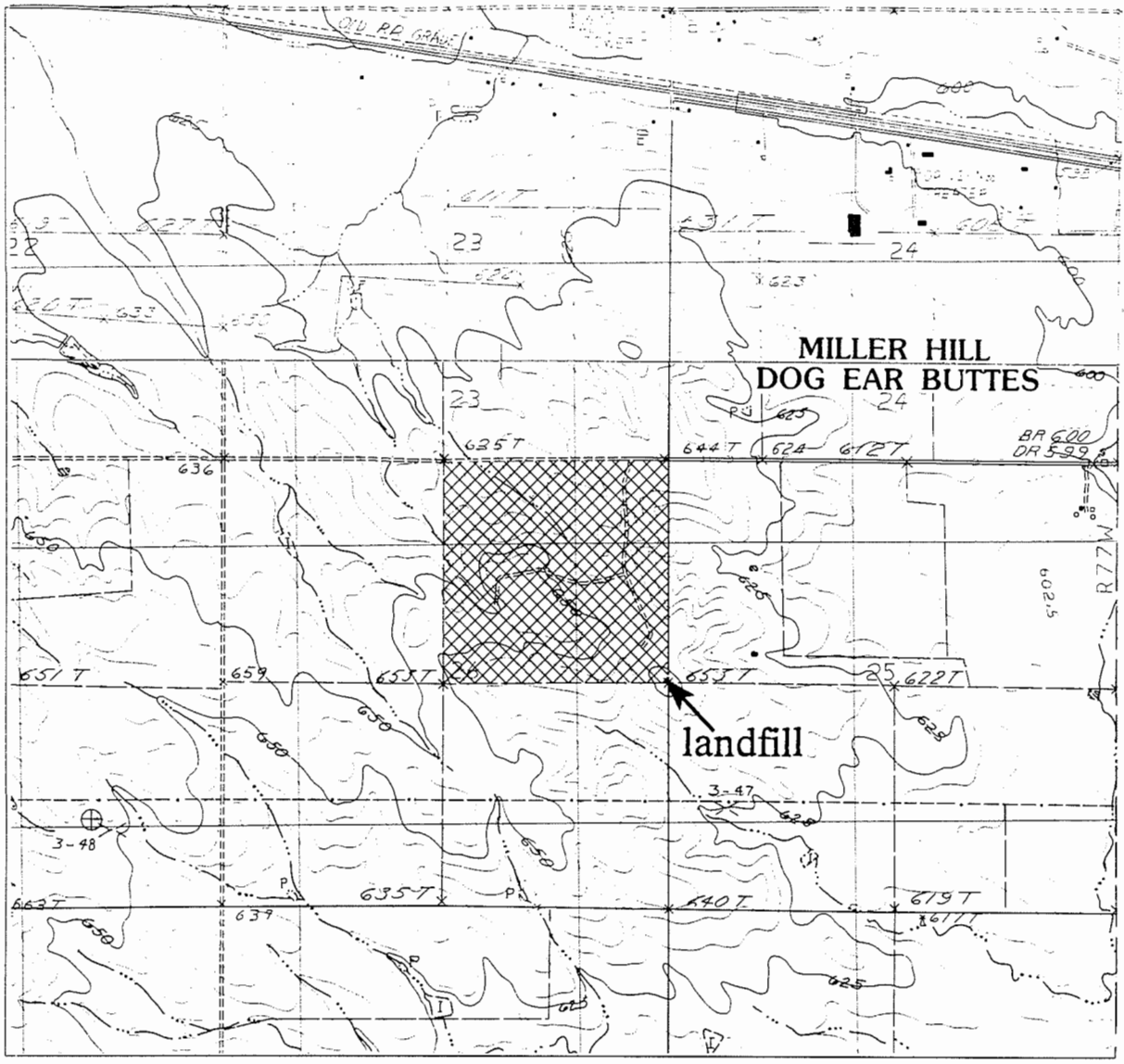
SUMMARY

- * This landfill is located on a ridge in close proximity to intermittent streams.
- * The geology at this site generally consists of terrace gravels overlying the Pierre Shale. A gravel pit is located at the site.
- * No test hole data were available near this site.
- * No monitoring wells were present near this site.
- * No water level data were available near this site.
- * No water quality data were available near this site.

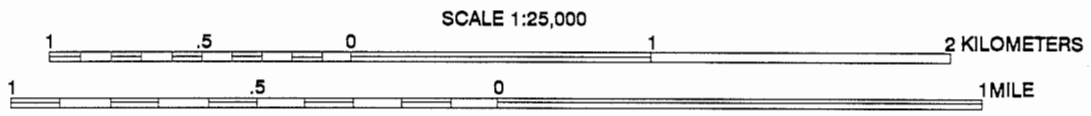
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- Spuhler, W., Lytle, W.F., and Moe, D., 1971, Climate of South Dakota: Brookings, South Dakota, South Dakota State University Agricultural Experiment Station Bulletin 582, 30 p.
- United States Geological Survey, 1982a (provisional edition), Dog Ear Buttes quadrangle, South Dakota: 7.5 minute series (topographic) scale 1:25,000.
- _____, 1982b (provisional edition), Miller Hill quadrangle, South Dakota: 7.5 minute series (topographic) scale 1:25,000.

R. 77 W.



T. 99 N.



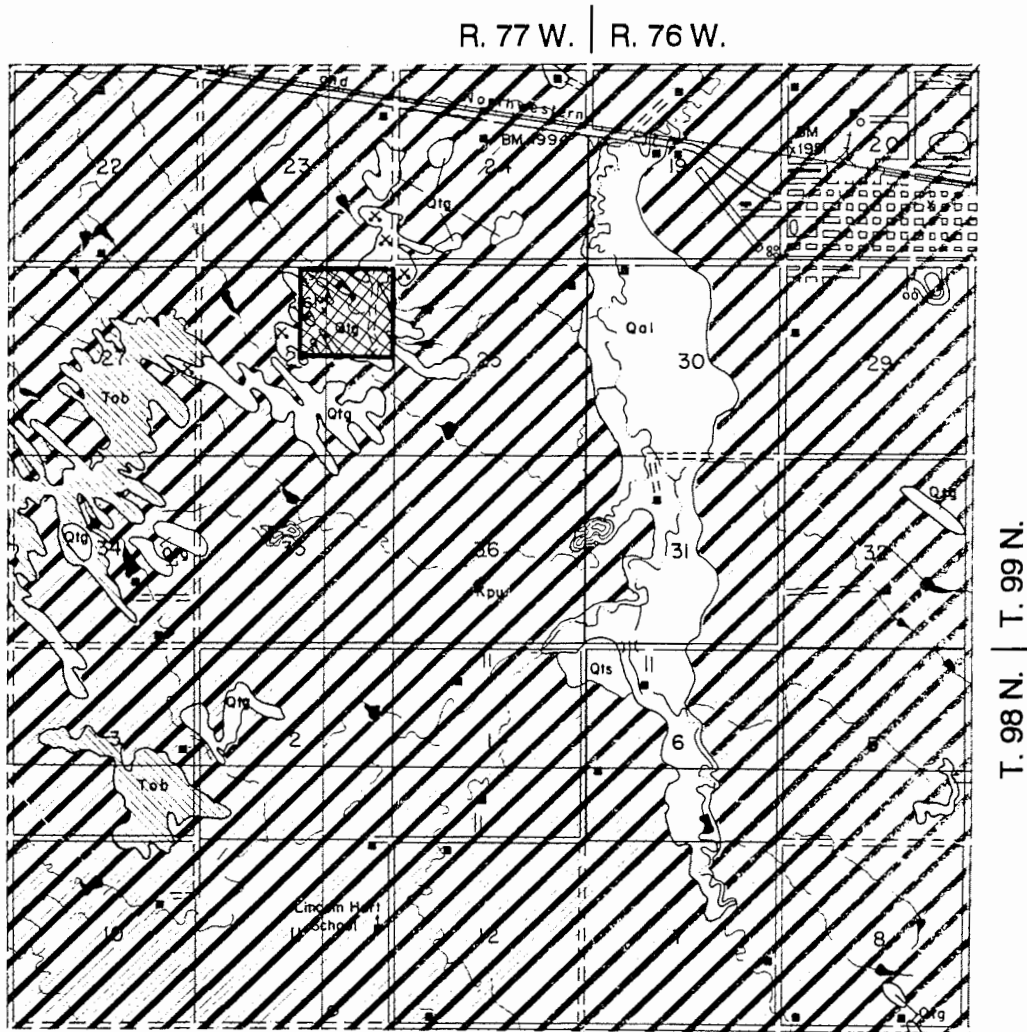
CONTOUR INTERVAL 5 METERS, MILLER HILL QUADRANGLE
 CONTOUR INTERVAL 5 METERS, DOG EAR BUTTES QUADRANGLE

Landfill location: NE $\frac{1}{4}$ sec. 26,
 T. 99 N., R. 77 W.
 Tripp County




Adapted from United States
 Geological Survey (1982a and 1982b)

Figure 2. Location of the Winner City landfill.



0 1 2 MILES

SCALE 1:62,500

- Qal..... Alluvium
- Qts..... Terrace sand
- Qtg..... Terrace gravels
- Tob..... Brule Formation
- Kpu..... Upper Pierre unit
-  Landfill

Adapted from Collins (1960)



Figure 3. Geology near the Winner City landfill.