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OPEN-FILE REPORT 80-UR - No. 15: MILBANK CITY

STATEWIDE LANDFILL STUDY:
MILBANK CITY LANDFILL SITE CHARACTERISTICS

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1996

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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 Milbank 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, that 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 Milbank 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 Environmental and Natural Resources in Pierre and the South Dakota Geological Survey in Vermillion. The following information was available regarding the Milbank City landfill in 1986.

MILBANK CITY LANDFILL

Location

The Milbank City landfill is located in the northeast corner of Milbank in Grant County. Its legal location is S½ NE¼ sec. 5, T. 120 N., R. 48 W. (fig. 2).

Topography, Drainage, and Climate

The information on topography and drainage was taken from the Milbank East Quadrangle (United States Geological Survey, 1973). In actuality, the present landfill surface may be significantly different because of activities at the landfill.

The topography at the Milbank City landfill slopes gently to the northwest toward the South Fork Whetstone River, located at the northwestern edge of the site (fig. 2). The elevation ranges from 1,098 to 1,145 feet for a maximum relief of 47 feet at the site.

Within the landfill, runoff drains to a draw in the northwestern part of the landfill. This draw drains directly into the South Fork Whetstone River near the northwestern corner of the site. An intermittent pond is located at the southwestern border of the landfill.

The average annual temperature in Grant County is 43 degrees Fahrenheit. Precipitation averages 22 inches per year. The average annual class A pan evaporation is 45 inches. Climatological data are from Spuhler and others (1971).

Geology

Surficial sediments near this site are characterized by glacial drift composed of till (fig. 3). Banner Associates submitted a report to the Office of Air Quality and Solid Waste on November 15, 1977, indicating that four test holes had been completed (legal locations uncertain). In a letter from the South Dakota Geological Survey dated November 22, 1977, the general subsurface geology of the landfill was summarized as follows:

"Reference is made to the report from J. T. Banner on the solid waste disposal facility located near the center of sec. 5, T. 120 N., R. 48 W. In looking over the report the logs of test holes a, d, and e indicate the presence of an aquifer beneath a good share of the proposed landfill site."

Six additional test holes were drilled within 1 mile of the landfill (fig. 4, app. A). Test holes A2-85-14 and A2-85-32 were drilled to depths of 28 feet. Only topsoil and clay till were encountered in these two holes. Four other test holes encountered sand or sand and gravel layers. Most of the sand or sand and gravel layers were 4 to 11 feet thick. Test hole C-7 encountered shale at 74 feet and the hole was completed at 80 feet. The sand and gravel layers encountered in test hole C-1 ended at a depth of 84 feet where till was encountered to the bottom of the hole at 160 feet. Test hole C-2 encountered sand from 27 to 34 feet and from 62 to 95 feet. This test hole was completed at 95 feet in sand and gravel so the total thickness of this sand layer is unknown. Test hole CO-84-52 encountered sand from 20 to 184 feet. This hole was completed in mudstone at 216 feet.

Only data meeting South Dakota Geological Survey criteria were used in this study. Lithologic logs were utilized if the legal locations were known to four quarter section (2.5 acres) and if they were located within the landfill site or within 1 mile of the site boundaries. Also, the source of a log must have been known or the log was not utilized; for example, all logs of test holes drilled by the South Dakota Geological Survey identify the drilling company as "SDGS."

Hydrology

The clay material at the base of the landfill consists primarily of till. The permeability of till is difficult to characterize due to the highly variable nature of its physical composition and texture (i.e., grain size) in both the vertical and horizontal directions. Fractures, if any, in the upper weathered portion of the till can also contribute to significant spatial changes in permeability. Let it suffice to say that till, as a unit, generally has much lower permeability than sand. 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 location and depth to the nearest ground-water supply (aquifer) are uncertain. According to the letter (mentioned previously) from the South Dakota Geological Survey dated November 22, 1977, an aquifer is present "beneath a good share" of the site. However, the depth and areal extent of an aquifer have not been documented.

Water Quality

Although water quality data were available the legal locations and/or well depths were not known for wells within the landfill or within 1 mile of the landfill boundaries. Only data meeting the South Dakota Geological Survey criteria were used in this study. Water quality analyses were utilized if the legal locations were known to four quarter sections (2.5 acres) and if they were located within the landfill or within 1 mile of the site boundaries. Only wells with recorded depths less than 100 feet and with corresponding lithologic logs have been considered. This limit of 100 feet was arbitrarily chosen. Any major changes in water quality would probably be detected within this 100-foot depth limit

because of the relatively low permeability of the underlying till. Also, the analytical laboratory that produced water quality analysis must have been known or the analysis was not utilized.

Adjacent Land Use and Features

Information about adjacent land use and features was taken from the Milbank East Quadrangle (United States Geological Survey, 1973) and the General Highway Map - Grant County (South Dakota Department of Transportation, 1979).

- * The South Fork Whetstone River is located on the northwest boundary of the site. Two intermittent ponds are located southwest of the site and one pond is located half a mile southeast of the site. A marshy area is located 1,000 feet southeast of the site.
- * Railroad tracks and Highway 12 are approximately a quarter of a mile south 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: Milbank City
2. Population served: 6,500
3. Method of disposal: Cut and fill (trench)
4. Estimated amount of waste received per unit time: 3,202 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: No information available.
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 near intermittent streams, ponds, and the South Fork Whetstone River.

- * The geology at this site generally consists of till overlying aquifer material (presumably sand or sand and gravel). Within 1 mile of the site, thick sand or sand and gravel layers were identified in two test holes northeast of the site. The depth and areal extent of an aquifer have not been documented.
- * Six test hole logs were available for this site.
- * No monitoring wells were present near this site.
- * No water level data were available near this site.
- * No reliable water quality data were available near this site.

REFERENCES CITED

- Flint, R.F., 1955, Pleistocene geology of eastern South Dakota: United States Geological Survey Professional Paper 262, 173 p.
- South Dakota Department of Transportation, 1979, General Highway Map Grant County, South Dakota: South Dakota Department of Transportation in cooperation with the United States Department of Transportation, (revisions as of November 30, 1979).
- 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, 1973, Milbank East quadrangle, South Dakota: 7.5 minute series (topographic), scale 1:24,000.

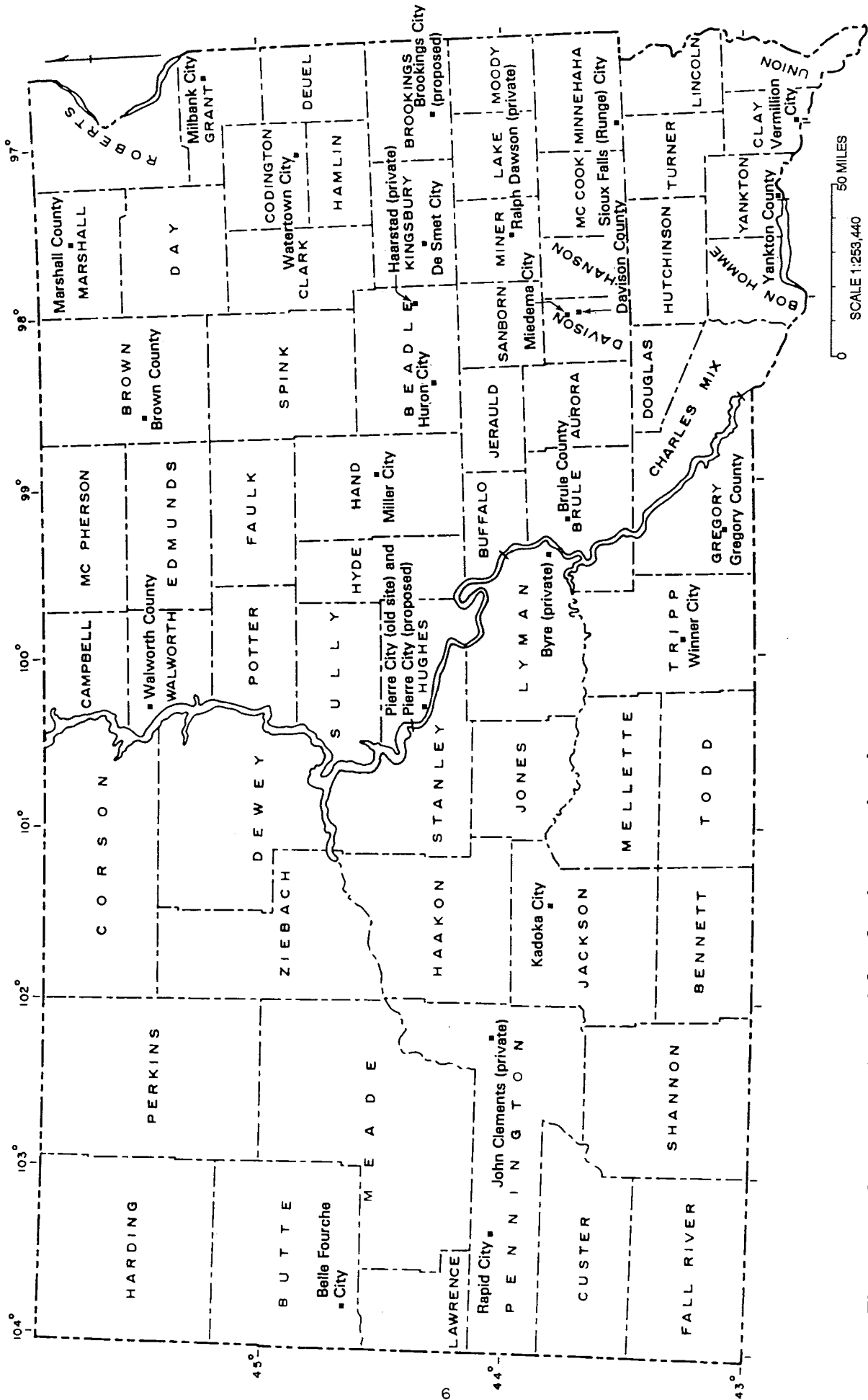
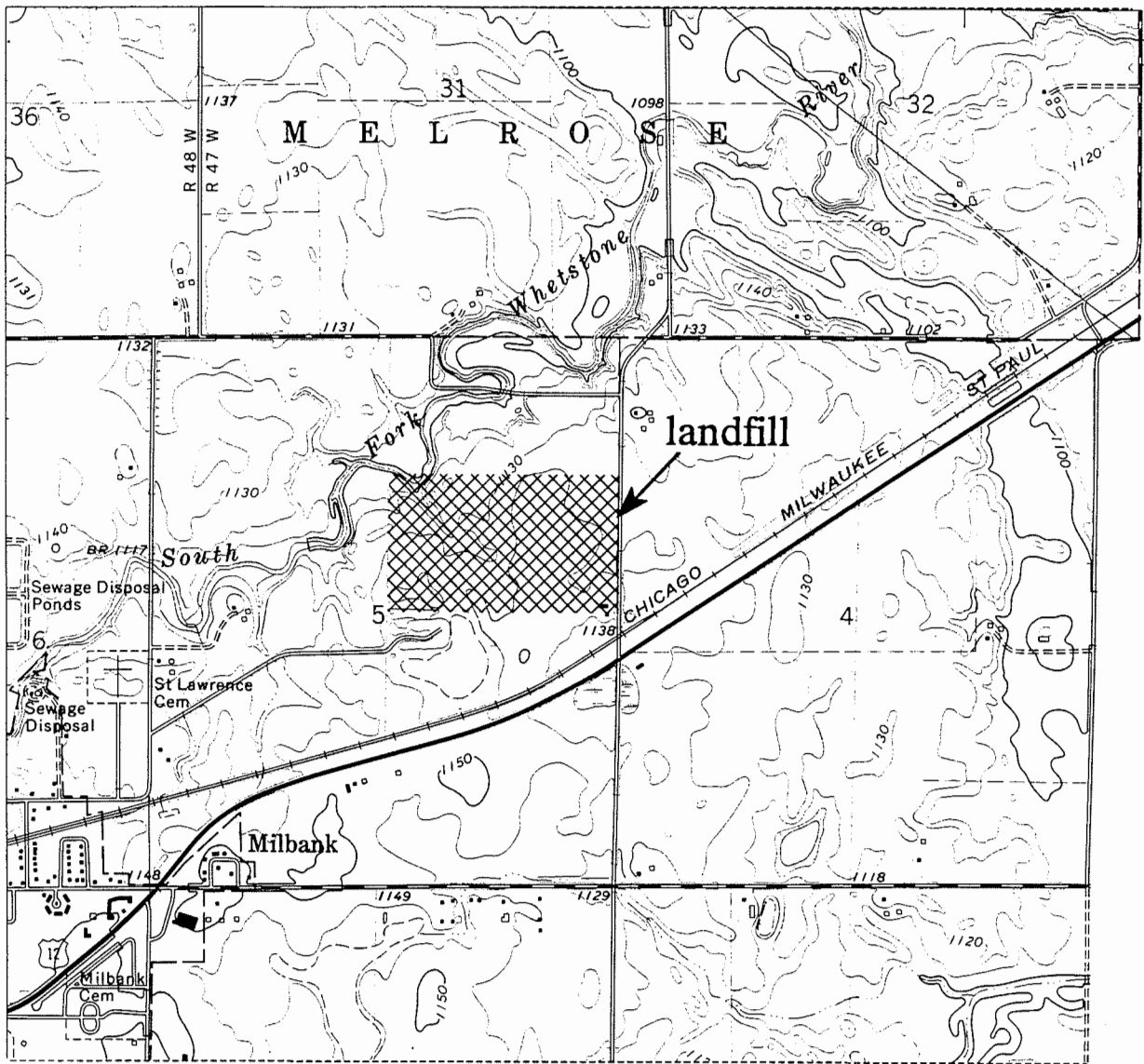


Figure 1. Sites considered for further evaluation.

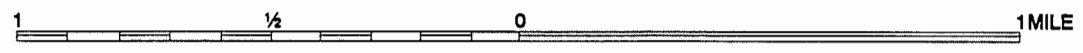
R. 48 W. | R. 47 W.



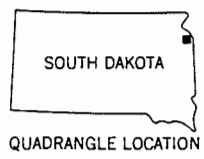
T. 120 N. | T. 121 N.

R. 48 W.

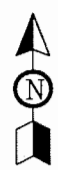
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CONTOUR INTERVAL 10 FEET, MILBANK EAST QUADRANGLE

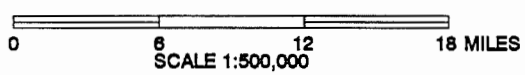
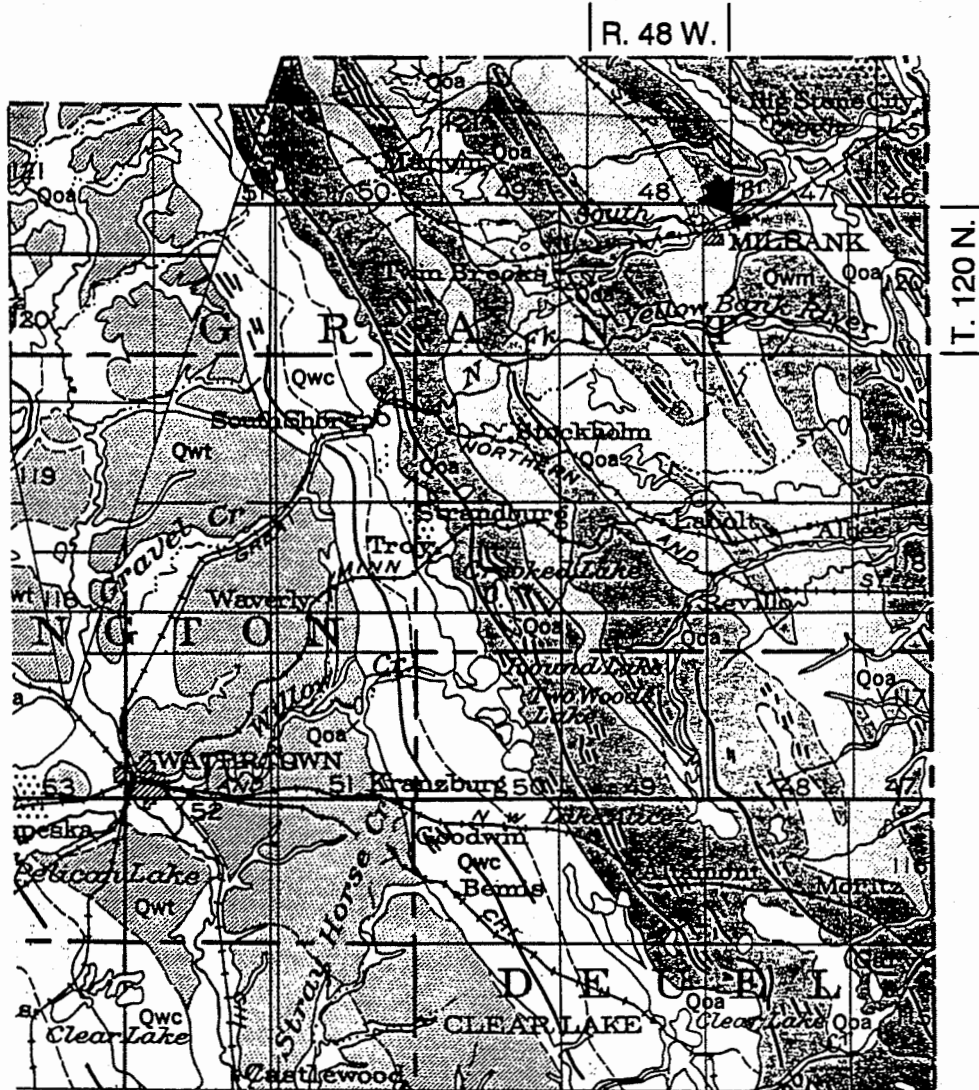


Landfill location: S½ NE¼ sec. 5,
T. 120 N., R. 48 W.
Grant County








Adapted from United States
Geological Survey (1973)

Figure 2. Location of the Milbank City landfill.



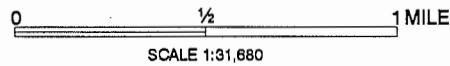
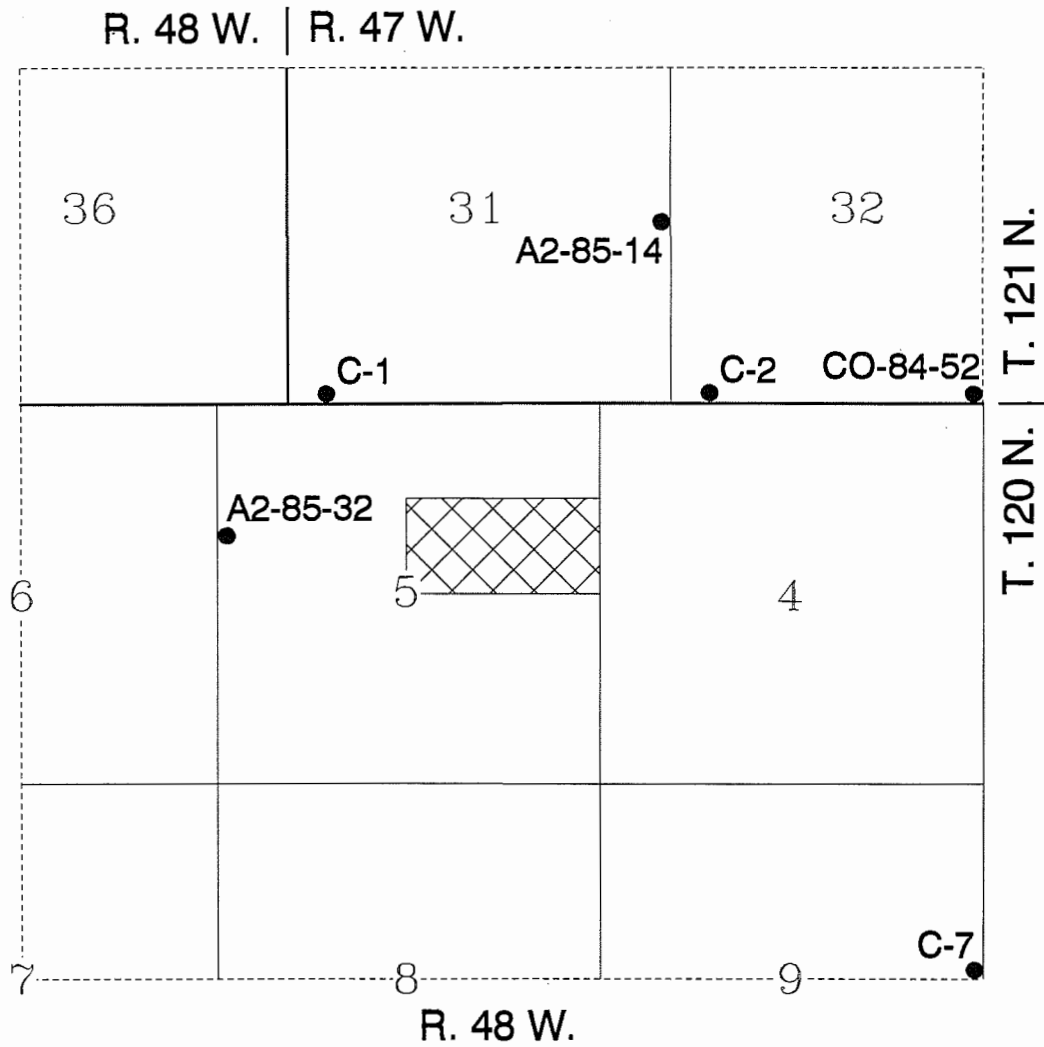
R. 48 W.

S. D.
MINN.

- Qoa..... Outwash and alluvium
-  Collapsed drift
- Qwm..... Glacial drift - Mankato substage
- Qwc..... Glacial drift - Cary substage
- Qwt..... Glacial drift - Tazewell substage
-  Principal crests of end moraines
-  Contact, dashed where approximately located
-  Indefinite contact
-  Landfill

Adapted from Flint (1955, pl. 1)

Figure 3. Geology near the Milbank City landfill.



Landfill

Landfill location: S $\frac{1}{2}$ NE $\frac{1}{4}$ sec. 5,
T. 120 N., R. 48 W.
Grant County



A2-85-14 ● Test hole. Letters and numbers are the test hole identifier.

Figure 4. Locations of test holes drilled within 1 mile of the Milbank City landfill.

APPENDIX A

Legal locations of Milbank City landfill area logs of test holes

Listed below are the legal locations of those test holes cited in this report. Please contact the South Dakota Geological Survey if a copy of a lithologic log is needed.

SW NW SW NW sec. 05, T. 120 N., R. 48 W.

SE SE SE NE sec. 09, T. 120 N., R. 48 W.

SW SE SW SW sec. 31, T. 121 N., R. 47 W.

NE NE NE SE sec. 31, T. 121 N., R. 47 W.

SW SE SW SW sec. 32, T. 121 N., R. 47 W.

SW SE SE SE sec. 32, T. 121 N., R. 47 W.