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. 11: JOHN CLEMENTS (PRIVATE)

STATEWIDE LANDFILL STUDY:

JOHN CLEMENTS (PRIVATE) LANDFILL SITE CHARACTERISTICS

by

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

Science Center
University of South Dakota
Vermillion, South Dakota

1996

CONTENTS

	Page
INTRODUCTION	1
Purpose and scope	1
Selection of sites	1
JOHN CLEMENTS (PRIVATE) LANDFILL	2
Location	2
Topography, drainage, and climate	2
Geology	2
Hydrology	3
Water quality	3
Adjacent land use and features	3
Operational and siting criteria – summary from the Office of Air Quality and Solid Waste records	3
SUMMARY	4
REFERENCES CITED	4

FIGURES

1. Sites considered for further evaluation 5
2. Location of the John Clements (Private) landfill 6

TABLE

1. List of sites considered for further evaluation 1

INTRODUCTION

Purpose and Scope

The purpose of this report is to summarize the geologic data, hydrologic data, and other site characteristics of the John Clements (Private) 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
2. Brookings City - Proposed
3. Brown County
4. Brule County
5. Byre (Private)
6. Davison County
7. De Smet City
8. Gregory County
9. Haarstad (Private)
10. Huron City
11. John Clements (Private)
12. Kadoka City
13. Marshall County
14. Miedema City
15. Milbank City
16. Miller City
17. Pierre City - Proposed
18. Pierre City - Old Site
19. Ralph Dawson (Private)
20. Rapid City
21. Sioux Falls (Runge) City
22. Vermillion City
23. Walworth County
24. Watertown City
25. Winner City
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 John Clements (Private) 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 John Clements (Private) landfill in 1986.

JOHN CLEMENTS (PRIVATE) LANDFILL

Location

The John Clements (Private) landfill is located 1½ miles east of Wall in Pennington County. Its legal location is S½ SE¼ sec. 33, T. 1 N., R. 16 E. (fig. 2).

Topography, Drainage, and Climate

The information on topography and drainage was taken from the Wall Quadrangle and the Lake Hill Quadrangle (United States Geological Survey, 1960 and 1983). In actuality, the present landfill surface may be significantly different because of activities at the landfill.

The topography at the John Clements (Private) landfill is relatively flat (fig. 2). The land slopes gently to the east-southeast. The elevation ranges from 2,705 to 2,743 feet for a maximum relief of 38 feet at the site.

Drainage is controlled by an intermittent stream which begins in the center of the site and flows to the southeast eventually draining into Cottonwood Creek.

The average annual temperature in Pennington County is 47 degrees Fahrenheit. Precipitation averages 16 inches per year. The average annual class A pan evaporation is 56 inches. Climatological data are from Spuhler and others (1971).

Geology

No site specific geological information was available for the location listed above. According to the Office of Air Quality and Solid Waste records (letter dated June 15, 1975), surface sediments at the site are represented by the Oligocene White River Group overlying the Cretaceous Pierre Shale. Separating these two lithologic units is the Interior Paleosol, an orange-tan, silty clay. No test hole logs were available for this site.

Hydrology

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

No monitoring wells have been installed 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 site boundaries.

Adjacent Land Use and Features

Information about adjacent land use and features was taken from the Wall Quadrangle and the Lake Hill Quadrangle (United States Geological Survey, 1960 and 1983) and the General Highway Map - East Half - Pennington County (South Dakota Department of Transportation, 1964).

* There are several stock ponds located within 1 mile of the site.
* Interstate 90 and Highway 14 are located approximately half a mile south of the site.
* The Chicago and Northwestern Railroad tracks are approximately half 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: John Clements (Private)
2. Population served: 1,600
3. Method of disposal: Open pit
4. Estimated amount of waste received per unit time: 3,744 tons/year

5. Access to site:

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

6. List industry present: Scotchman Industries

7. Land Use:

   * Preoperational land use: Badlands, grazing
   * Proposed post-operational land use: Grazing
   * Current land use within a quarter of a mile radial area: Grazing

SUMMARY

* This landfill has an intermittent stream that begins in the middle of the site.

* The geology at this site is reportedly represented by the White River Group overlying the Pierre Shale.

* 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.

REFERENCES CITED

South Dakota Department of Transportation, 1964, General Highway Map - East Half - Pennington County, South Dakota: South Dakota Department of Highway Research and Planning Division in cooperation with the United States Department of Transportation, (revisions as of April 30, 1970).

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, 1960, Wall quadrangle, South Dakota: 7.5 minutes series (topographic), scale 1:24,000, (photorevised in 1980).

_____1983 (provisional edition), Lake Hill Quadrangle, South Dakota: 7.5 minute series (topographic), scale 1:24,000.

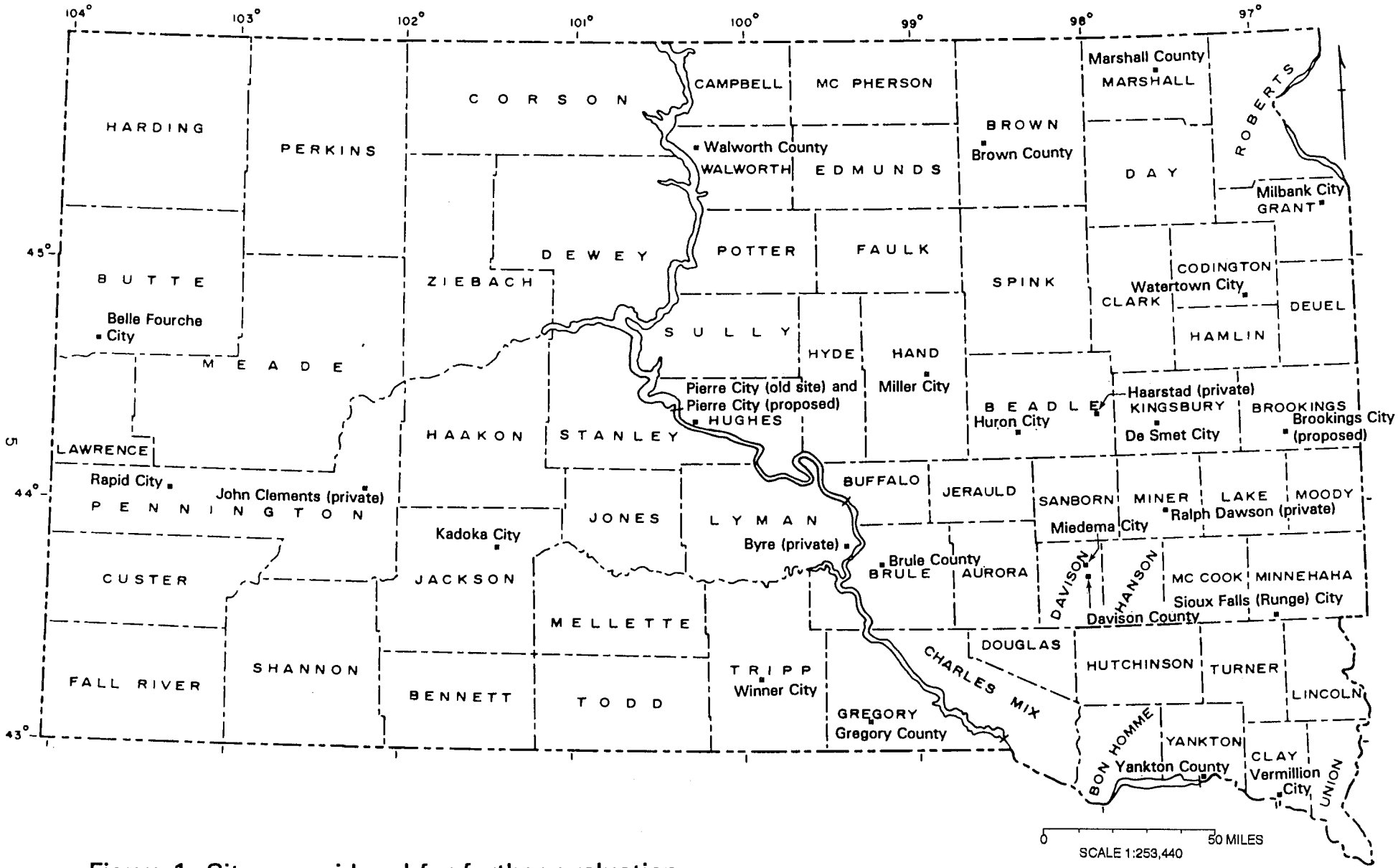
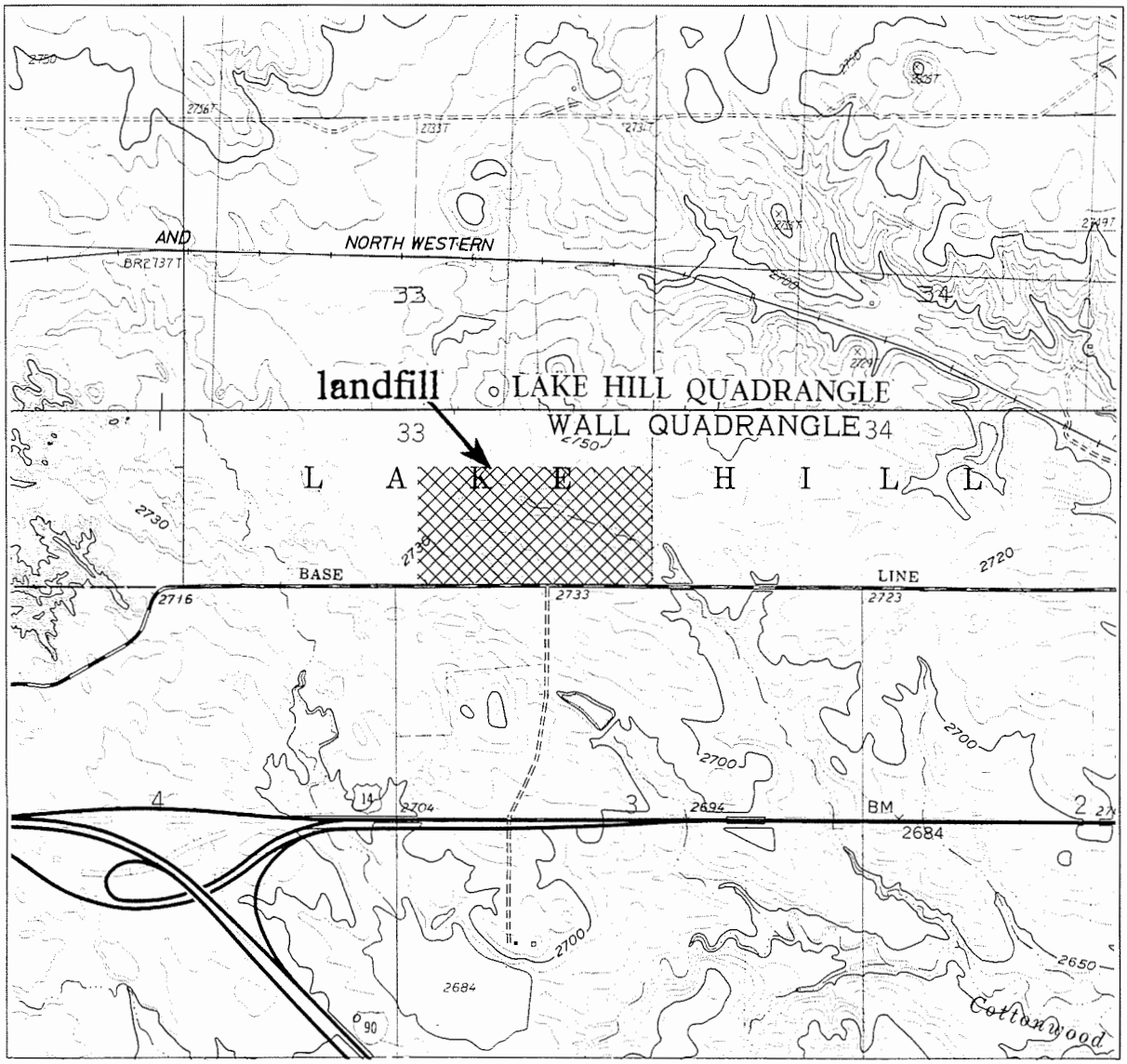


Figure 1. Sites considered for further evaluation.

R. 16 E.

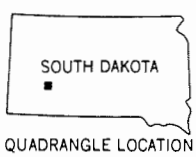


T. 1 S. | T. 1 N.

SCALE 1:24000

1 ½ 0 1 MILE

CONTOUR INTERVAL 10 FEET, LAKE HILL QUADRANGLE
CONTOUR INTERVAL 10 FEET, WALL QUADRANGLE



QUADRANGLE LOCATION

Landfill location: S½ SE¼ sec. 33,
T. 1 N., R. 16 E.
Pennington County

Adapted from United States
Geological Survey (1960 and 1983)

Figure 2. Location of the John Clements (Private) landfill.