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OPEN-FILE REPORT 80-UR - No. 12: KADOKA CITY

STATEWIDE LANDFILL STUDY:
KADOKA CITY LANDFILL SITE CHARACTERISTICS

by

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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 Kadoka 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 Kadoka 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 Kadoka City landfill in 1986.

KADOKA CITY LANDFILL

Location

The Kadoka City landfill is located in the northeast corner of Kadoka in Jackson County. Its legal location is SW $\frac{1}{4}$ sec. 28, T. 2 S., R. 22 E. (fig. 2).

Topography, Drainage, and Climate

The information on topography and drainage was taken from the Belvidere SW Quadrangle and the Kadoka Quadrangle (United States Geological Survey, 1951a and 1951b). In actuality, the present landfill surface may be significantly different because of activities at the landfill.

The topography at the Kadoka City landfill is relatively flat in the western half of the site and it slopes gently to the northeast in the eastern half of the site (fig. 2). An intermittent stream begins in the eastern half of the landfill and it drains to the northeast. The Kadoka City landfill is located at the northern end of the White River drainage basin. The elevation ranges from 2,427 to 2,465 feet for a maximum relief of 38 feet at the site.

Surface drainage is controlled by the White River, located approximately 6 miles south of Kadoka. The intermittent stream at the landfill is dammed twice before it reaches the White River. The first dam and resulting pond are adjacent to the eastern border of the landfill.

The average annual temperature in Jackson County is 47 degrees Fahrenheit. Precipitation averages 17 inches per year. The average annual class A pan evaporation is 55 inches. Climatological data are from Spuhler and others (1971).

Geology

The area is represented by the White River Group overlying Pierre Shale near the Cretaceous-Tertiary unconformity (fig. 3). The lithologic log for the Kadoka municipal well (location unknown) shows 300 feet of White River Group overlying the Pierre Shale (Baker, 1953). No other lithologic logs were available within 1 mile of the site. According to a site inspection report dated October 9, 1984, during construction of a new trench: "progress was slow due to hard shale."

Hydrology

According to records from the Office of Air Quality and Solid Waste, 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 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 Belvidere SW Quadrangle and the Kadoka Quadrangle (United States Geological Survey, 1951a and 1951b) and the General Highway Map Jackson County (South Dakota Department of Transportation, 1973).

- * The nearest surface water is a pond located on the eastern boundary of the site. Several small ponds are located south and west of the site and three intermittent ponds are located three-quarters of a mile northwest of the site.
- * Interstate 90 is located half a mile north of the site.
- * Highway 16 - State Highway 73 crosses the northwest corner of the site.
- * Railroad tracks cut diagonally across the site.
- * A landing field is located directly south of the site.
- * The city of Kadoka is directly west and southwest 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: Kadoka City
2. Population served: 850
3. Method of disposal: Cut and fill (trench)

4. Estimated amount of waste received per unit time: 419 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: Grazing
- * Proposed post-operational land use: Grassland
- * Current land use within a quarter of a mile radial area: Grazing, airport

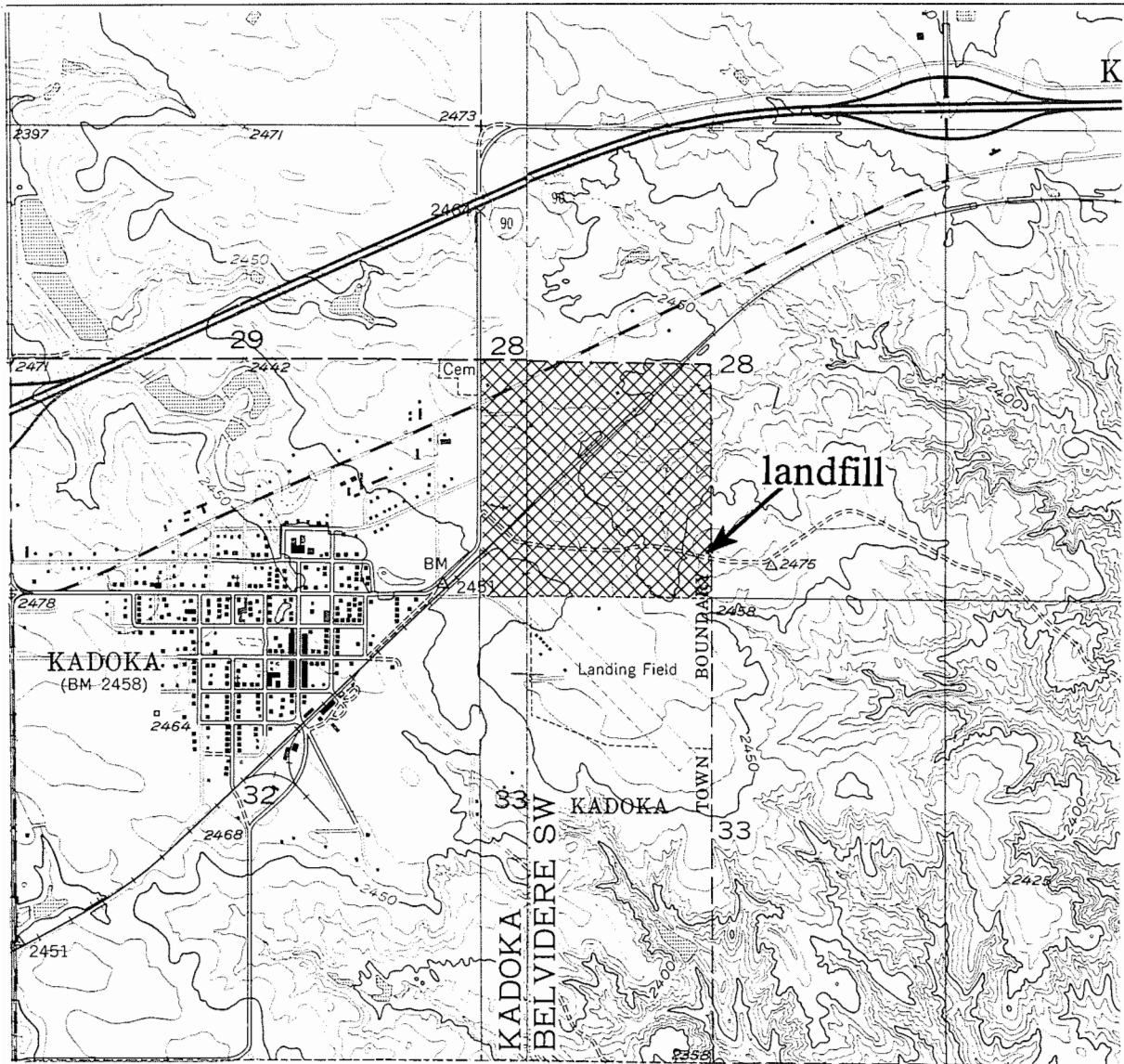
SUMMARY

- * An intermittent stream is located in the landfill site and a pond is located adjacent to the east boundary of the site.
- * The geology at this site consists of White River Group overlying Pierre Shale near the Cretaceous-Tertiary unconformity.
- * 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

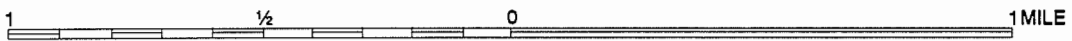
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R. 22 E.

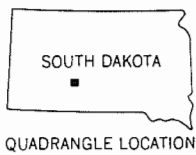


T. 2 S.

SCALE 1:24000



CONTOUR INTERVAL 10 FEET, BELVIDERE SW QUADRANGLE
CONTOUR INTERVAL 10 FEET, KADOKA QUADRANGLE



Landfill location: SW 1/4 sec. 28,
T. 2 S., R. 22 E.
Jackson County



Adapted from United States
Geological Survey (1951a and 1951b)

Figure 2. Location of the Kadoka City landfill.

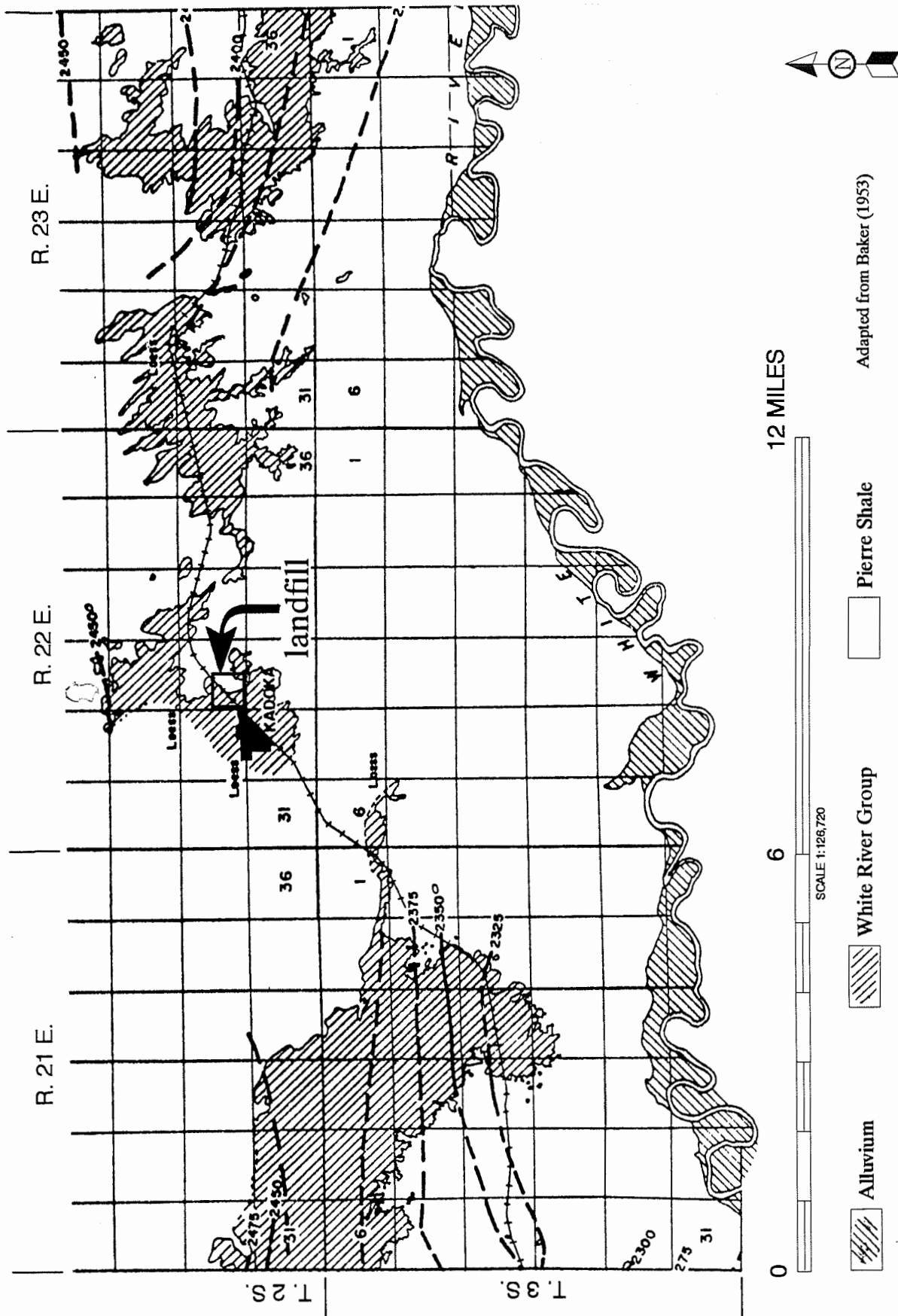


Figure 3. Geology near the Kadoka City landfill.