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OPEN-FILE REPORT 80-UR – NO. 19: RALPH DAWSON (PRIVATE)

STATEWIDE LANDFILL STUDY:

RALPH DAWSON (PRIVATE) 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 Ralph Dawson (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 Ralph Dawson (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 Ralph Dawson (Private) landfill in 1986.

RALPH DAWSON (PRIVATE) LANDFILL

Location

The Ralph Dawson (Private) landfill is located 1½ miles south and 3 miles west of Howard in Miner County. Its legal location is E½ NE¼ SE¼ sec. 18, T. 106 N., R. 56 W. (fig. 2).

Topography, Drainage, and Climate

The information on topography and drainage was taken from the Canova West 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 Ralph Dawson (Private) landfill site consists of low-relief, hummocky terrain (fig. 2). A small hummock or knoll is located at the center of the landfill. The elevation ranges from 1,445 to 1,460 feet for a maximum relief of 15 feet at the site.

Drainage is controlled by an intermittent stream which cuts through the southern half of the landfill site (fig. 2), parallel to the southern border. Approximately 50 feet west of the site, the intermittent stream turns north and continues for 1,000 feet where it turns west and drains into a tributary to Wolf Creek. A natural pond is located along this intermittent stream at the western boundary of the site. The area is surrounded by several small marshes.

The average annual temperature in Miner County is 45 degrees Fahrenheit. Precipitation averages 22 inches per year. The average annual class A pan evaporation is 49 inches. Climatological data are from Spuhler and others (1971).

Geology

Surface sediments at this site are represented by glacial drift (fig. 3). Seven test holes have been drilled within 1 mile of the site (fig. 4, app. A). Test holes DLF-1 through 4 encountered only topsoil and clay-rich till to a depth of 12 to 16 feet. Test holes MA-76-63 and MA-76-80 also encountered

till to depths of 24 and 48 feet respectively. Test hole R-27 encountered till overlying gravel from 100 to 112 feet. Test hole R-27 was completed in chalk (112 to 155 feet).

Some available data were not included because they did not meet the South Dakota Geological Survey criteria used in this study. Lithologic logs were utilized if the legal locations were known to four quarter sections (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

According to records from the Office of Air Quality and Solid Waste, the material at the base of the landfill consists primarily of clay (presumably 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 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 Features

Information about adjacent land features was taken from the Canova West Quadrangle (United Geological Survey, 1979) and the General Highway Map – Miner County (South Dakota Department of Transportation, 1969).

* Two ponds are located on the western and northwestern boundaries of the site. Two other ponds are located within half a mile 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: Ralph Dawson (Private)

2. Population served: 2,500

3. Method of disposal: Cut and fill (trench)

4. Estimated amount of waste received per unit time: 1,053 tons/year

5. Access to site:

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

6. List industry present: Howard Beef

7. Land Use:

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

SUMMARY

* The landfill is located in low-relief, hummocky terrain.

* The geology at this site generally consists of glacial drift. Topsoil overlies clay-rich till. One test hole approximately 1 mile east of the site encountered till overlying 12 feet of gravel at a depth of 100 feet on top of chalk.

* Seven test holes logs were available for 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

Flint, R.F., 1955, Pleistocene geology of eastern South Dakota: United States Geological Survey Professional Paper 262, 173 p.

South Dakota Department of Transportation, 1969, General Highway Map Miner County, South Dakota: South Dakota Department of Transportation in cooperation with the United States Department of Transportation, (revisions as of April 30, 1974).

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, Canova West quadrangle, South Dakota: 7.5 minute series (topographic), scale 1:24,000.

Figure 1. Sites considered for further evaluation.

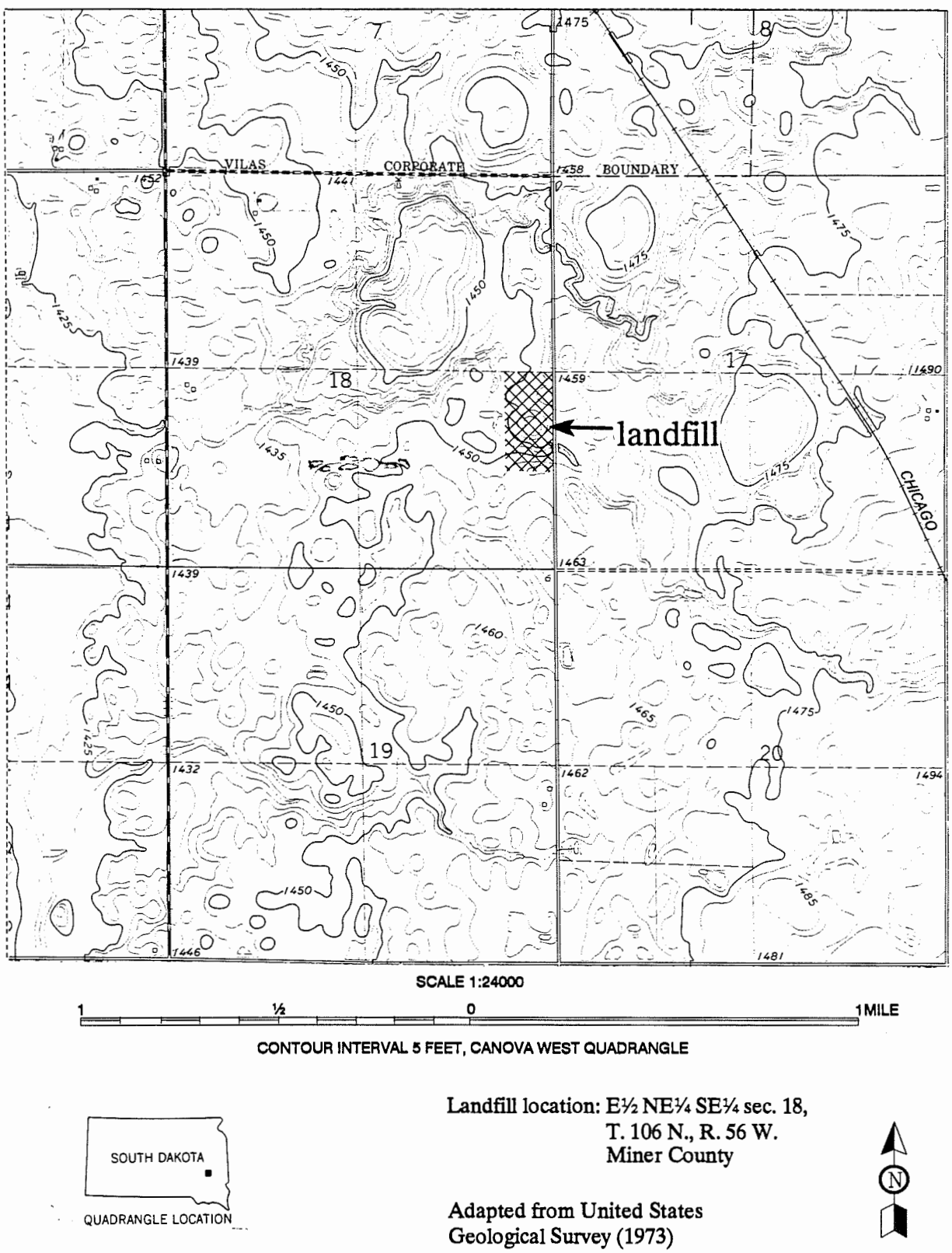
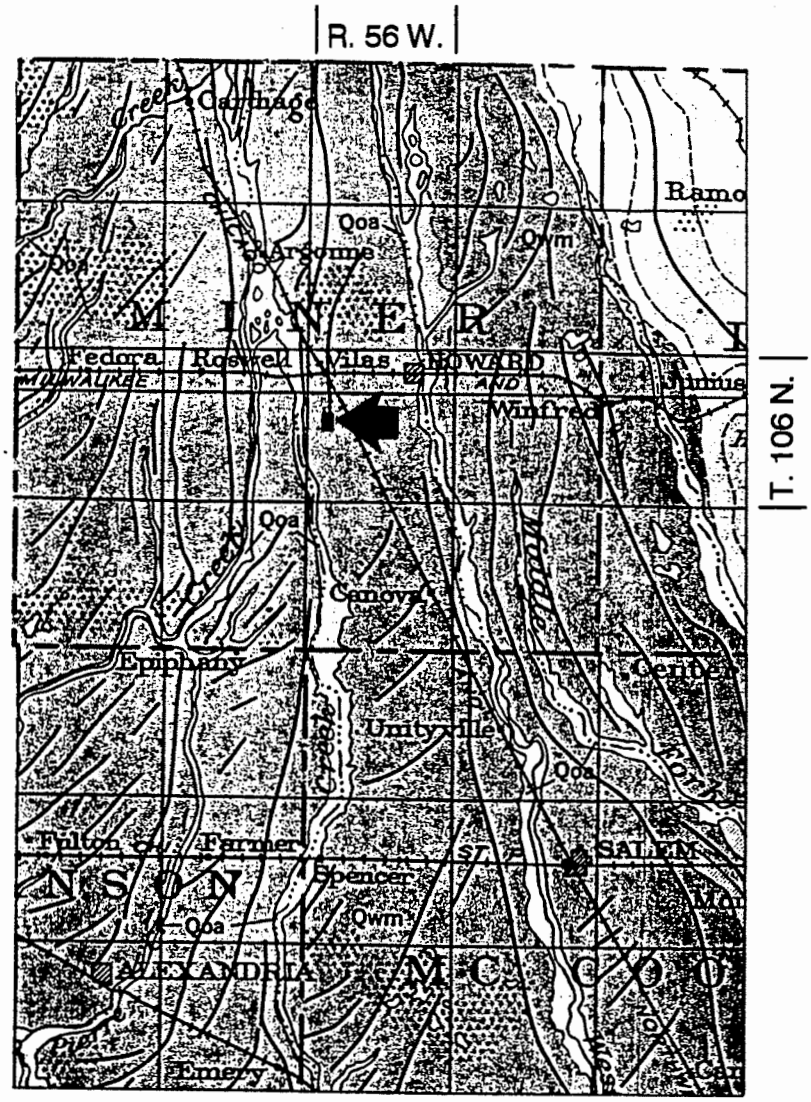


Figure 2. Location of the Ralph Dawson (Private) landfill.



Adapted from Flint (1955, pl. 1)

Figure 3. Geology near the Ralph Dawson (Private) landfill.

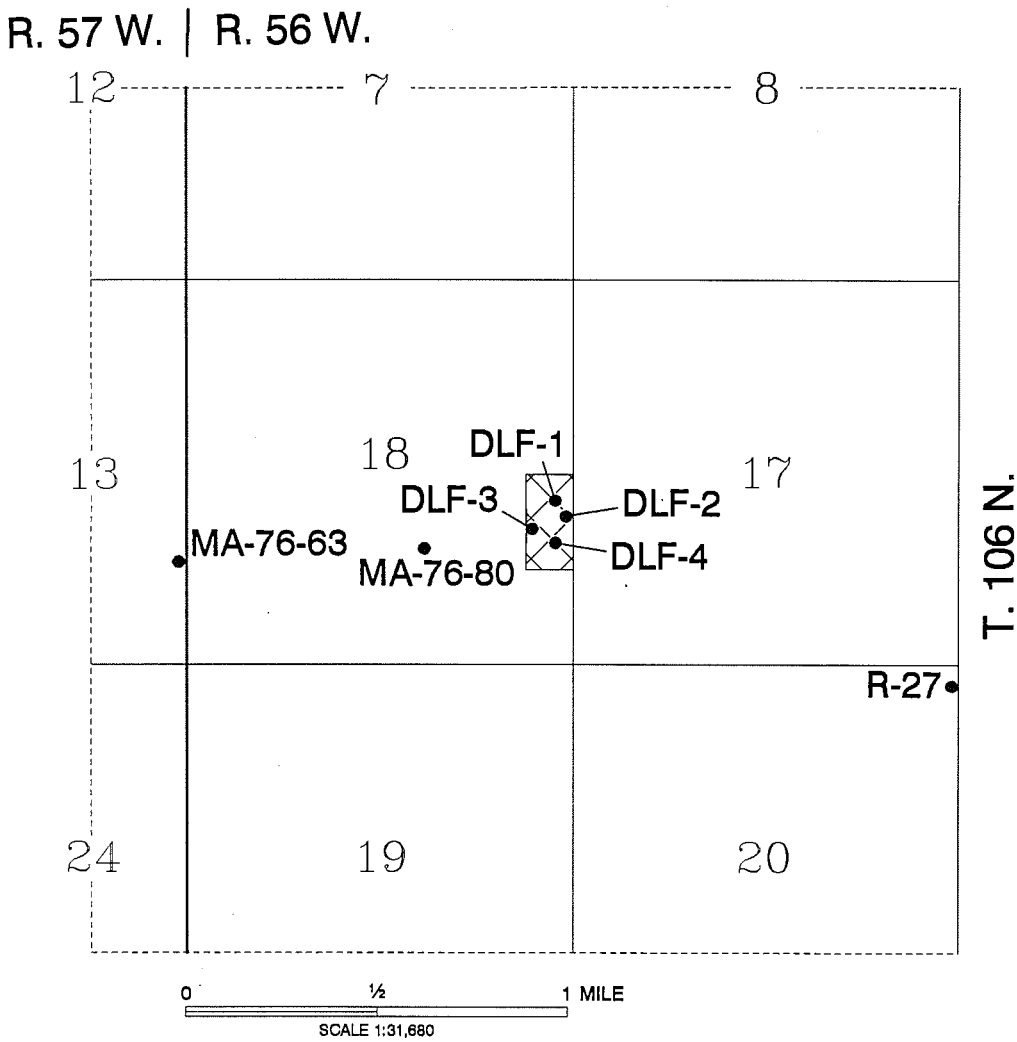


Figure 4. Locations of test holes drilled within 1 mile of the Ralph Dawson (Private) landfill.

APPENDIX A

List of Ralph Dawson (Private) landfill area logs of test holes

Listed below are the legal locations of the test holes cited in this report. Please contact the South Dakota Geological Survey if a copy of a lithologic log is needed. Where a legal location is duplicated, that means more than one test hole has been drilled at that location.

SE NE NE SE sec. 18, T. 106 N., R. 56 W.
SE NE NE SE sec. 18, T. 106 N., R. 56 W.
NE SE NE SE sec. 18, T. 106 N., R. 56 W.
NW SE NE SE sec. 18, T. 106 N., R. 56 W.
SE SW NW SE sec. 18, T. 106 N., R. 56 W.
NE NE NE NE sec. 20, T. 106 N., R. 56 W.
SE SE NE SE sec. 13, T. 106 N., R. 57 W.