

INTRODUCTION
Previous water-level maps of shallow aquifers in the Powder River structural basin in Wyoming were based on water levels from wells completed in different stratigraphic intervals within thick sequences of sedimentary rocks. A potentiometric surface using water levels from a single aquifer had never been mapped throughout the basin.

The Wyodak-Anderson coal bed is extensively mined along the outcrop in eastern Campbell County. More coal is produced from the Wyodak-Anderson coal bed than from any other single coal bed in the Nation (Lowry, Wilson, and others, in press, p. 36). Presently (1984), all mining of the Wyodak-Anderson coal bed is by surface methods.

SITE-MARKING SYSTEM
Wells and springs in this report are numbered according to their location within the Federal system of land subdivision. The first number denotes the township north from the 40th Parallel Base Line, the second number denotes the range west from the sixth Principal Meridian, the third number denotes the section, and the letters denote the location within the section.

GEOLOGY
The Wyodak-Anderson coal bed occurs within the Powder River structural basin, which is bounded in Wyoming by the Black Hills uplift, the Hartsville uplift, the Laramie Mountains, the Casper arch, and the Highhorn Mountains, and extends northward into Montana (see location map).

The following description of the Wyodak-Anderson coal bed is from Lowry, Wilson, and others (in press, p. 28):

The subbituminous Wyodak coal bed is 25 to 175 feet thick, and probably averages 70 feet in thickness. The coal has variously been called the Wyodak-Anderson and the Anderson-Canyon coal bed. Because of correlation problems, the Wyodak coal bed was erroneously called the Roland-Smith coal bed in older reports.

North from Gillette, the Wyodak separates into an upper Wyodak and lower Wyodak. In places, the upper Wyodak separates into the Smith, Swartz, and Anderson coal beds and the lower Wyodak separates into the Canyon and Cook coals (Kent and others, 1980). When the Wyodak separates into 5 or more beds, the individual coal beds are 3 to 38 feet thick and separated by a few feet to 200 feet of claystone, shale, or sandstone.

WATER-LEVEL DATA

Water-level data representing prevailing conditions were collected during 1973-84 from observation wells at coal mines along the eastern outcrop of the Wyodak-Anderson coal bed and from observation wells outside the mine areas. East of Gillette, mining began in the 1920's, and prevailing water-level data are available. Water-level data outside the mine areas were from wells completed from coal-test holes by the U.S. Geological Survey and the U.S. Bureau of Land Management.

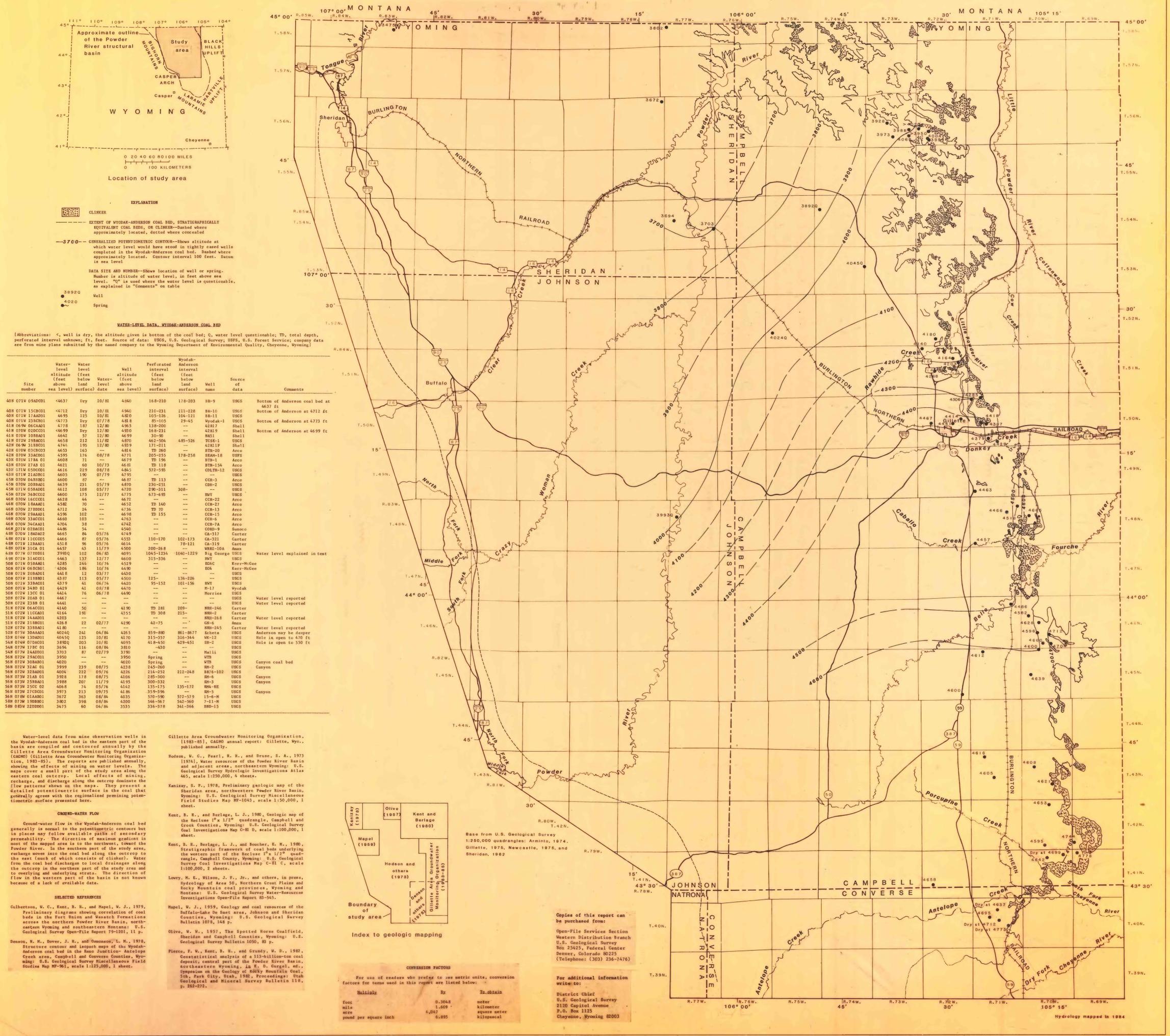
Because the extension of the potentiometric surface to the center of the map is based on one data point with a questionable water level, that water-level data is explained here. Well 488 0719 0730001 was 1,255 feet deep and was perforated through 186 feet of the Big George coal bed, correlated with the upper part of the Anderson. The water level in the casing and annular space was at land surface after completion of the well.

POTENTIOMETRIC SURFACE

The water-level data from the Wyodak-Anderson coal bed appear to represent a continuous potentiometric surface in the Campbell County part of the Powder River structural basin. Although the surface is well defined along the eastern outcrop of the coal bed where most of the data are concentrated, it may be affected in places by local recharge and discharge.

SELECTED REFERENCES

- Gilbertson, W. C., Kent, B. R., and Mapel, W. J., 1979, Preliminary diagrams showing correlation of coal beds in the Fort Union and Wash Formations across the northern Powder River Basin, northeastern Wyoming and southeastern Montana: U.S. Geological Survey Open-File Report 79-201, 11 p.



EXPLANATION
CLINKER
EXTENT OF WYODAK-ANDERSON COAL BED, STRATIGRAPHICALLY EQUIVALENT COAL BEDS, OR CLINKER--Dashed where approximately located, dotted where concealed.

WATER-LEVEL DATA, WYODAK-ANDERSON COAL BED
Water level, altitude, Well, Perforated interval, Wyodak-Anderson interval, Source of data, Comments

Table with columns: Site number, Water level, Well, Perforated interval, Wyodak-Anderson interval, Source of data, Comments. Contains detailed data for various wells.

Water-level data from mine observation wells in the Wyodak-Anderson coal bed in the eastern part of the basin are compiled and contoured annually by the Gillette Area Groundwater Monitoring Organization (GAMO) (Gillette Area Groundwater Monitoring Organization, 1983-85). The reports are published annually, showing the effects of mining on water levels.

Ground-water flow in the Wyodak-Anderson coal bed generally is normal to the potentiometric contours but in places may follow available paths of secondary permeability. The direction of maximum gradient in most of the mapped area is to the northeast, toward the Powder River. In the southern part of the study area, recharge moves into the coal bed along the outcrop to the west (each of which consists of clinkers). Water from the coal bed discharges to local drainages along the outcrop in the northern part of the study area and to overlying and underlying strata.

GROUND-WATER FLOW

Water levels in wells completed in coal beds correlated to the Wyodak-Anderson were used regardless of the "local" coal-bed name. Water levels in wells completed in the Anderson and in the Canyon were not significantly different from the outcrop in the northeastern part of the map. Water levels from wells in both coal beds were used.

INDEX TO GEOLOGIC MAPPING

- Mapel, W. J., 1979, Geology and coal resources of the Buffalo-Lake de Suet area, Johnson and Sheridan Counties, Wyoming: U.S. Geological Survey Bulletin 1074-B, 148 p.

CONVERSION FACTORS
For use of readers who prefer to use metric units, conversion factors for terms used in this report are listed below:
Multiply By To obtain

