Oc.
3

MEMO. ON RECONN. OF GW COND. SE OF VALMONT, OTERO CO., N. MEX.

By

E. H. Herrick

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Reconnaissance of Ground-Water Conditions Southeast of Valmont, Otero County, New Mexico

By

E. H. Herrick

Prepared for
U. S. Army, Corps of Engineers

Open-file report

1960

Contents

Illustrations

Reconnaissance of Ground-Water Conditions Southeast of Valmont, Otero County, New Mexico

By

E. H. Herrick

Introduction

An area along the east side of Tularosa Basin, southeast of Valmont and north of the Orogrande pipeline, in Otero County, N. Mex., has been suggested as a possible source of potable ground water. At the request of the Corps of Engineers, a reconnaissance of the area was made by J. W. Hood and the writer in October 1956. The reconnaissance was restricted to the collection of readily available data from existing wells and a general reconnaissance of the topography and geology. The area investigated is shown on the attached map and comprises about 150 square miles adjacent to the Sacramento Mountains and northeast of the Jarilla Mountains, in the central part of Otero County, N. Mex.

Geography

The land surface in the basin or valley-floor part of the area slopes generally westward from the mountains at a gradient decreasing gradually from about 100 feet per mile near the mountains. In the western part of the area, in the vicinity of U. S. Highway 54, the land surface is almost flat but is broken locally by numerous sand dunes and shallow depressions. The Sacramento Mountains escarpment is very pronounced in the northeastern part of the area, in places rising more than 1,000 feet above the basin floor. In the southeastern part of the area, south of Grapevine Canyon, the mountain front is less pronounced, and there are numerous low foothills southeast of the Orogrande pipeline.

The escarpment is cut by numerous large canyons, at the mouths of which pronounced alluvial fans have developed. A particularly broad fan has developed beyond the mouth of Grapevine Canyon. There are no perennial streams in the area, with the exception of a small flow in Dog Canyon which issues from small springs at and near the floor of the canyon. Several arroyos extend from the mouths of the canyons across the alluvial fans to shallow depressions in the western part of the area.

Geology

The western part of the Sacramento Mountains in the northeastern part of the area shown on the attached map is composed mainly of Paleozoic limestone and lesser amounts of clastic rocks. In the southeastern part of T. 20 S., R. 11 E., are limestone, sandstone, siltstone, and shale of the Abo and Yeso formations of Permian age.

The bolson fill of the basin is composed mostly of unconsolidated gravel, sand, silt, and clay derived from the consolidated rocks of the mountains. In general, it can be expected that the bolson fill near the mountains is heterogeneous and contains boulders. In the western part of the map area, the fill probably is fairly well sorted but probably contains a large proportion of beds of silt and clay. The thickness of the bolson fill is not known. An oil-test hole in the NW$\frac{1}{4}$ sec. 15, T. 20 S., R. 9 E. apparently encountered the base of the fill at a depth of about 470 feet. It is probable that the base of the fill is somewhat deeper than this in the northern and central parts of the area shown on the map.

Ground water

Ground water in the bolson fill moves southwest and west from the mountains toward the lower part of the basin, as indicated by the water-table contours on the map. The water-table gradient apparently ranges from less than 15 feet per mile in the southeastern part of T. 18 S., R. 9 E., to about 25 feet per mile in the southeastern part of T. 19 S., R. 9 E. Data are not available with which to determine the nature of the water table in the southern part of T. 19 S., R. 10 E., and in T. 20 S., R. 10 E. It is probable that the ground water in these latter areas is moving westward at gradients of 25 to 50 feet per mile. The depth to water in the bolson fill in the area shown on the map ranges from less than 30 feet in the northwestern part of the area, in the vicinity of Valmont, to more than 200 feet in the southern part of T. 19 S. and the northern part of T. 20 S., R. 10 E.

The shapes of the water-table contours and the lines showing the approximate sulfate content of the ground water indicate that the water being recharged to the bolson fill in Tps. 19 and 20 S., R. 10 E., from Grapevine Canyon and other nearby canyons is not highly mineralized. Although data are not available with which to determine the exact position of the lines of equal sulfate in the central and southern parts of the map area, it appears that most of the ground water under Tps. 19 and 20 S., R. 10 E., contains less than 500 ppm of sulfate. Much of the ground water underlying those townships probably contains less than 300 ppm of sulfate and only minor amounts of chloride. However, within this area practically no subsurface information is available.

Recommendations

In order to delineate more precisely the boundary between potable and impotable ground water, to determine the nature of the bolson fill, and to determine the extent to which the potable water can be developed, it would be necessary to drill approximately 8 to 10 test holes in the area. These test holes should be designed to furnish as much information as possible regarding the occurrence of the ground water. Some test holes should be located in the vicinity of the range line between Rs. 9 and 10 E. in Tps. 19 and 20 S., primarily to determine the position of the contact between potable and impotable ground water. Others should be located in the northwestern part of T. 20 S. and in the central and southwestern parts of T. 19 S., R. 10 E., to determine the nature of the bolson fill and the quality of the ground water. It might be possible to design the test holes so that they could be developed into production wells if a satisfactory water supply were indicated.

It would be desirable also to do some reconnaissance geologic mapping along the escarpment and in the southeastern part of the area shown on the map. This would aid in an interpretation of the drill cuttings from test drilling and would permit a more complete and accurate analysis of ground-water conditions in the area.

It should be emphasized that the contours on the attached map have been drawn on the basis of very meager data, as indicated on the map, and are intended to give only an approximate idea of ground-water conditions in the area. Exploratory drilling may indicate that some of the contours are inaccurate in detail, but it is believed that the map presents the general ground-water conditions approximately as they exist.