DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY
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PREPARED IN COOPERATION WITH
THE COMMONWEALTH OF KENTUCKY, UNIVERSITY OF KENTUCKY
KENTUCKY GEOLOGICAL SURVEY
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HYDROLOGIC INVESTIGATIONS
ATLAS HA-178 (SHEET 2 OF 2)

EXPLANATION

The water-availability areas on this map show the occurrence and availability of ground water in the shallowest aquifer that may yield adequate amounts of water for domestic use in each area. As considered in this report, an adequate domestic supply will deliver approximately 500 gallons per day from a well equipped with a power pump and pressure-distribution system. The shallowest aquifer is underlain by deeper aquifers whose geologic and water-bearing properties are described in the generalized columnar section

Qal

AREA 1
Water in Quaternary alluvium

The alluvium is water bearing in area 1 at depths commonly less than 20 feet, although during the rainy seasons the water table rises to within a few feet of the flood plain. Driven wells, about 25 feet in depth, furnish perennial domestic supplies; shallow wells near the Mississippi River are reported to be dry during low river stages. Small diameter jetted wells, about 80 feet deep, furnish sufficient water for domestic and/or stock uses. The saturated thickness of alluvial deposits beneath the flood plain of the Mississippi River ranges from about 80 feet to more than 200 feet. Although the alluvium consists of silt and clay in places and is not suitable for the development of shallow water supplies, a well can tap deeper alluvial sand or the sand of Eocene age. Water from alluvial wells contains an objectionable amount of iron and manganese and is hard to very hard. Ground water of better quality occurs in the underlying Eocene sand at depths of 200 feet or more. This area has a large potential ground-water source for demands of irrigation or of industries

Tu

AREA 2
Water in Eocene sand

Abundant quantities of ground water are available in the Eocene sand at depths ranging from about 270 to more than 1,500 feet. One well 270 feet deep taps the Eocene. The water is moderately hard and contains an objectionable amount of iron, which may be caused by the reaction between acidic ground water on steel casing and pump apparatus. More than 0.3 ppm of iron imparts a disagreeable taste to water and may cause staining of porcelain and textiles

Area boundary

3162 — Oil-test well
Figure below line is depth of test well

Test hole

94–127 Tu / 142 — Saturated thickness of alluvial gravel; Depth to top of Eocene rocks; Geologic unit underlying alluvium or Pliocene (?) gravel; Depth of test hole

Dn — Water well

Dn, *Driven or jetted well, generally 1 1/4- to 2 1/2-inch steel casing with drive point or well screen on lower end*
B, *Dug well, wooden casing*

Qal–(5/8)m / 50 (H) — Aquifer (see below); Water level in well, in feet below land surface; m, if measured, r, if reported. Upper figure is the level measured in April of 1965; lower figure is level measured in October of 1965; Yield, in gallons per minute, or adequacy (see below); Depth of well, in feet below land surface

AQUIFER SYMBOLS

Qal — Alluvium of Quaternary age
Tu — Sand of Eocene age

YIELD OR ADEQUACY

(P) — Well reported adequate for power pump for domestic and/or stock supply
(H) — Well reported adequate for hand pump or bailer
(A) — Abandoned

280 — Water-level contour
Shows altitude of water level in the main zone of saturation. Contour interval 10 feet; datum is mean sea level. Depth to water is difference in feet between altitude of land surface and water-level contour. The water is confined where clay occurs at, or below, the altitude of the contour. Water-level measurements taken in October 1965

QUALITY

Na & K / Cl, F, & NO3 / Mg / SO4 / Ca / HCO3 / 457 / 543 / 12

Chemical composition of dissolved solids
Figure between circular diagram and well location refers to analysis number at end of text. Figure above line at center of circular diagram is carbonate hardness (calcium magnesium hardness as $CaCO_3$), in parts per million, figure below line is dissolved solids in parts per million. Hardness of water is classified by the U.S. Geological Survey as follows: 0–60 ppm, soft; 61–120 ppm, moderately hard; 121–180 ppm, hard; and 181 ppm or more, very hard. Dissolved solids in partial analyses are computed from specific conductances and are only approximate values. Areas of the segments of each circle are proportional to the mineral component in the dissolved solids in the water. Percentages are computed from equivalents per million of the anions and cations. Calcium and magnesium are shown as one segment in partial analyses. All wells sampled contained less than 45 ppm of nitrate. Water containing more than 45 ppm of nitrate may cause a type of methemoglobinemia in infants ("blue baby" disease), sometimes fatal, and should not be used in infants' formulas

MAP SHOWING AVAILABILITY OF GROUND WATER, LOCATION OF WELLS, AND QUALITY OF WATER

Hydrology by T. W. Lambert, 1965

Base from the U.S. Geological Survey, 1951

The Carter Coordinate System letters and numbers used to designate five-minute divisions of latitude and longitude are shown along the margins; tick marks indicate one-minute division.

SCALE 1:24 000
1 MILE
1 KILOMETER

CONTOUR INTERVAL 10 FEET
DOTTED LINES REPRESENT HALF-INTERVAL CONTOURS
DATUM IS MEAN SEA LEVEL

KENTUCKY — MAP LOCATION

APPROXIMATE MEAN DECLINATION, 1967

GENERALIZED GEOLOGIC SECTION FROM ISLAND NO. 8 TO UPLAND IN SOUTHEASTERN BONDURANT QUADRANGLE

Island No. 8 · Chute of Island No. 8 · Levee · Highest river stage, 1937 · Running Slough · STATE HIGHWAY 94 · Hamby Pond · STATE HIGHWAY 311 · STATE HIGHWAY 1282 · Blue Pond · FULTON CO KENTUCKY / OBION CO TENNESSEE

Inferred water level of main zone of saturation in alluvium
Average low water
Water level of main zone of saturation in alluvium (Fall 1965)
Inferred water level of main zone of saturation in Eocene rocks

Qal · Pebbly sand · Sand and silt · Clay · Tu · Sand and clay · Clay and sand · Sand and minor clay beds · Clay and basal sand · Tpc · Ku · Clay / Sand · Ql · QTg

SEA LEVEL · 200′ · 400′ · 600′ · 800′ · 1000′ · 1200′

VERTICAL EXAGGERATION X 10

EXPLANATION

Qal — Alluvium of Quaternary age
Ql — Loess of Pleistocene age
QTg — Gravel and sand of Pliocene (?) age
Tu — Sand and clay of Eocene age
Tpc — Porters Creek Clay of Paleocene age
Ku — Cretaceous sediments, undifferentiated

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Bondurant and eastern Hubbard Lake quadrangles

AVAILABILITY OF GROUND WATER IN PARTS OF THE NEW MADRID SE, HUBBARD LAKE, AND BONDURANT QUADRANGLES, JACKSON PURCHASE REGION, KENTUCKY-TENNESSEE

By
T. W. Lambert

1967

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