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GROUND-WATER RESOURCES OF WEST-CENTRAL INDIANA

Preliminary Report: Vermillion County

Prepared by the

GEOLOGICAL SURVEY

UNITED STATES DEPARTMENT OF THE INTERIOR

In cooperation with the

DIVISION OF WATER

DEPARTMENT OF NATURAL RESOURCES

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INDIANA DEPARTMENT OF CONSERVATION

John E. Mitchell, Director

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Charles H. Bechert, Director

GROUND-WATER RESOURCES OF WEST-CENTRAL INDIANA

Preliminary Report: Vermillion County

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By F. A. Watkins, Jr., and D. G. Jordan

ABSTRACT

Vermillion County, in west-central Indiana, has an area of about 263 square miles. Consolidated rocks of Pennsylvanian age and unconsolidated rocks of Pleistocene age are the major sources of ground water for domestic, stock, industrial, and municipal supplies. Wells in Vermillion County vary greatly in depth and yield. Wells tapping Pennsylvanian rocks range in depth from about 50 to 550 feet and in yield from less than 1 to about 75 gpm (gallon per minute). Some wells tapping the rocks of Pennsylvanian age yield no water. Wells tapping Pleistocene sand and gravel range in depth from about 15 to 230 feet and in yield from about 1 to 1,200 gpm. Field chemical analyses of water from these sources show that the chemical quality differs greatly. A modal grouping was used to find the most frequent values for the sulfate and chloride contents and for the hardness of water in Vermillion County. This method yields the following results for water from aquifers of Pennsylvanian age: sulfate, 14 ppm (parts per million); chloride, 15 ppm; and hardness, 345 ppm; and for water from aquifers of Pleistocene age: sulfate, 14 ppm; chloride, 7 ppm; and hardness, 341 ppm. Locally water from these sources may exceed the U. S. Public Health Service (1962) drinking-water standards for either iron, sulfate, or chloride content.

This preliminary report contains tabulated records of about 245 wells and other drilled holes giving information about well construction, water levels, conditions of occurrence, and character of the water-bearing material; selected logs for about 121 wells and other drilled holes giving the drillers' description of the material encountered and a tentative interpretation by the authors of the geologic age; records of 5 springs giving information about geologic source, yield and temperature of the water; results for 72 field chemical analyses of water from wells, 5 from springs, and 10 from streams, giving iron, bicarbonate, sulfate, and chloride contents, and the hardness of water; and water levels in 1 observation well indicating the magnitude of short and long-term water-level fluctuations in the unconsolidated rock. These basic data include much of the material to be used in an interpretive report on the ground-water resources and geology of the area.

A map of Vermillion County shows the location of all water wells, holes drilled for purposes other than water supply, springs, and stream sampling sites listed in this report. An additional map shows availability of ground water.

INTRODUCTION

Purpose and Scope

An investigation of the ground-water resources and geology of nine counties in west-central Indiana has been conducted intermittently since 1950. In 1956 the investigation was placed on a full-time basis and another county was added to the area of study. This investigation is being made by the U. S. Geological Survey in cooperation with the Division of Water Resources, Indiana Department of Conservation, as a part of a broad program of these agencies to inventory and evaluate the ground-water resources of Indiana.

This report is the last of a series of 10 preliminary reports to be published on the ground-water resources and geology of west-central Indiana. The purpose of this report is to make the basic data collected during the investigation available to the public and to provide a preliminary evaluation of the ground-water conditions and the geology as an aid to the development of the ground-water resources. A more detailed and comprehensive analysis will be published in an interpretive report on the ground-water resources and geology of the area.

The investigation was made under the immediate supervision of F. H. Klaer and C. M. Roberts, successive district geologists for Indiana.

Location and Areal Extent

Vermillion County is in the west-central part of Indiana (fig 1). The county is roughly rectangular and has an area of about 263 square miles. It is bounded on the north by Warren County, on the east by Fountain and Parke Counties, on the south by Vigo County, and on the west by the State of Illinois.

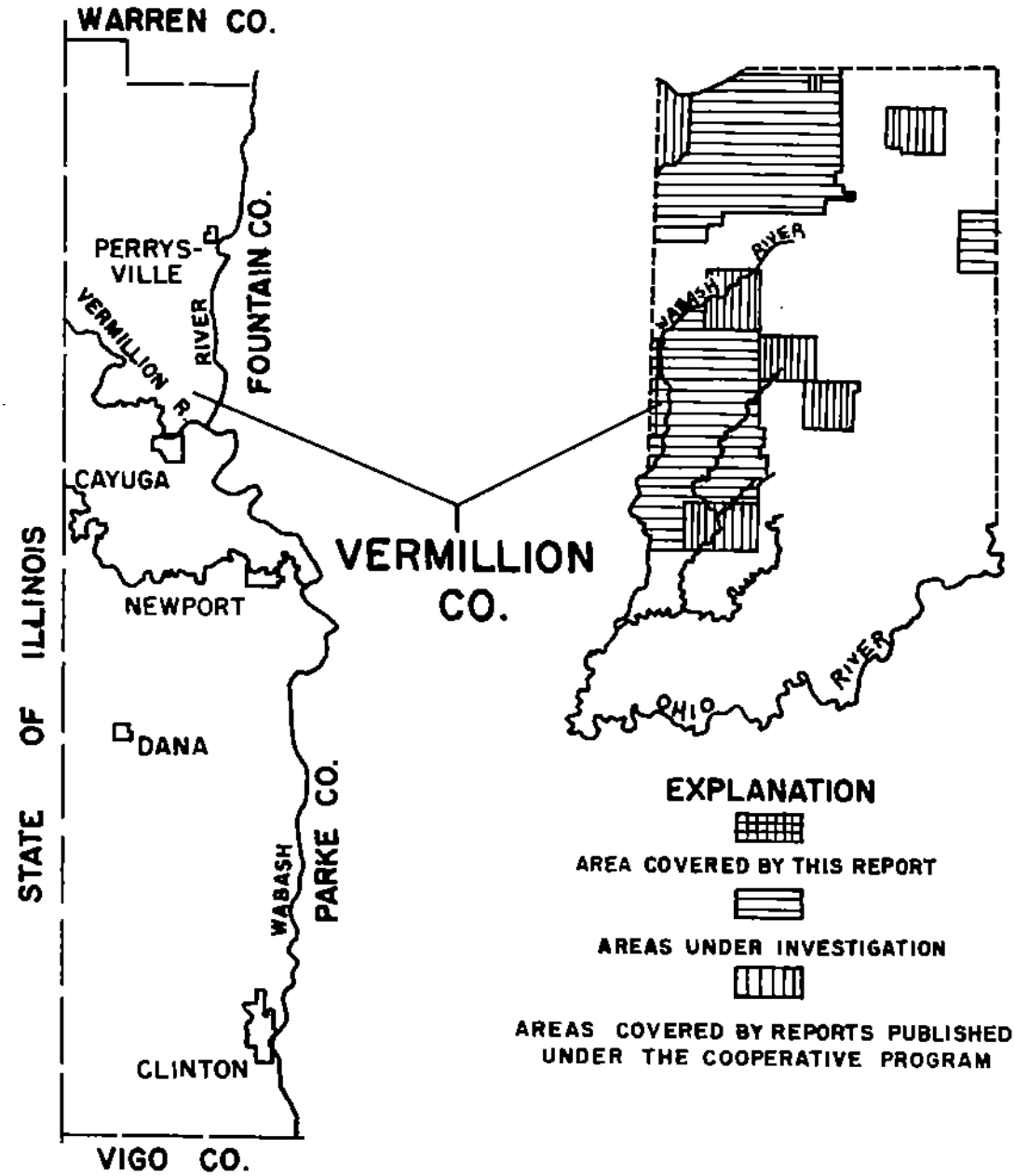

FIGURE 1.-- MAP OF INDIANA SHOWING AREA COVERED BY THIS REPORT, AREAS UNDER INVESTIGATION, AND AREAS COVERED BY REPORTS PUBLISHED UNDER THIS COOPERATIVE PROGRAM.

Well-numbering System

A numbering system is used to locate and identify the wells, holes drilled for purposes other than water supply, and springs in this report. The number assigned indicates the location according to the official rectangular survey of public lands. For example, in the number for well 14/9W-33N1, the part preceding the hyphen indicates that the well is in T. 14 N., R. 9 W. The first number after the hyphen indicates the section in which the well is located. Each quarter-quarter section (40-acre tract) within a section is given a letter symbol as shown on figure 2. Within the quarter-quarter section, wells are numbered serially. Therefore, well 14/9W-33N1 is the first well listed in SW¼SW¼ sec. 33, T. 14 N., R. 9 W.

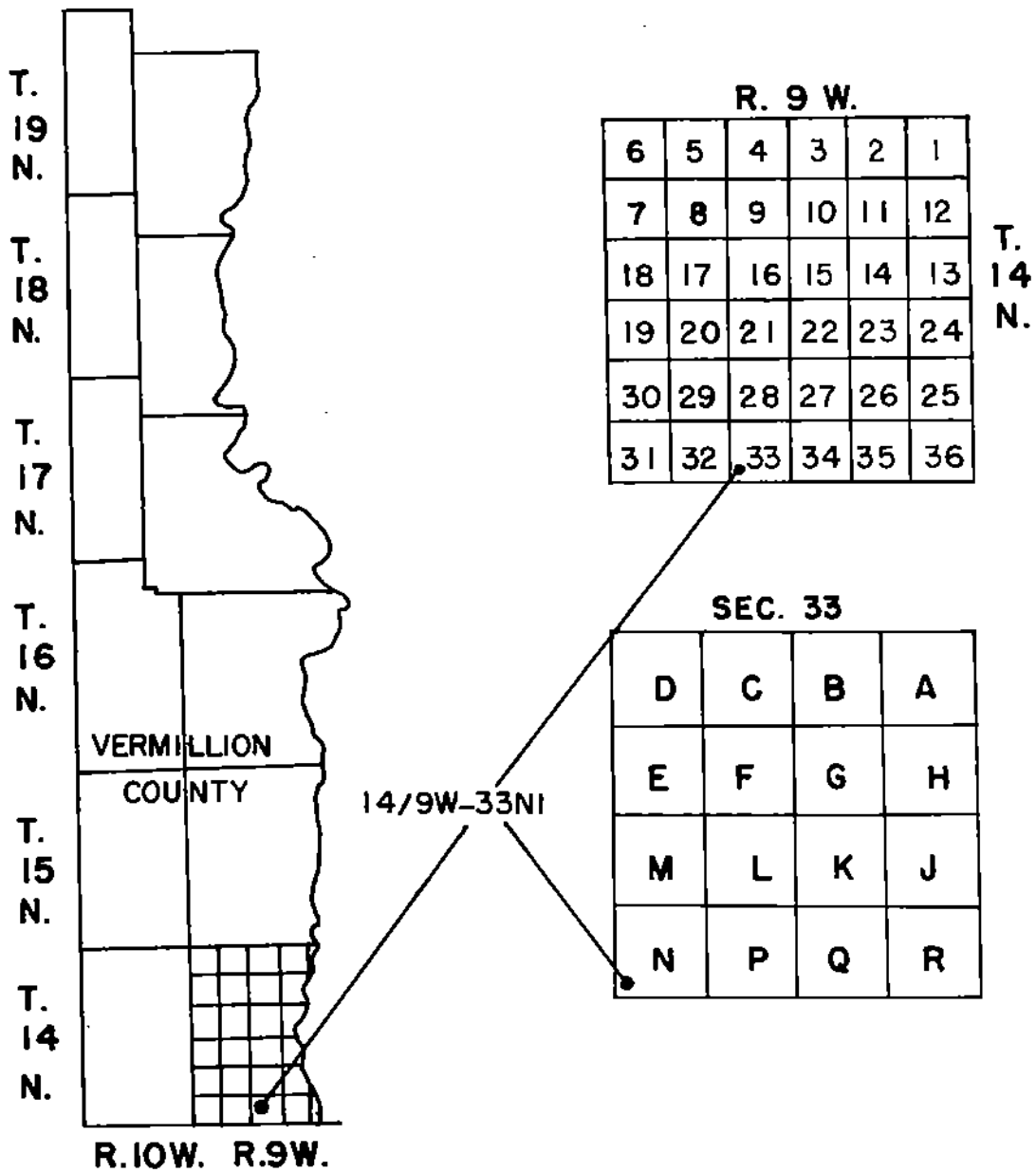

FIGURE 2. -- SKETCH SHOWING WELL-NUMBERING SYSTEM

Acknowledgments

The authors thank all persons who contributed time, information, and assistance during the collection, tabulation, and processing of data for this report. We especially thank the well drillers listed in the table of well records who furnished much of the information summarized in tables 4 and 5.

The authors also thank the following (state) agencies which provided information for the report: The Division of Oil and Gas, the Division of Water Resources, the Coal Section, and the Geophysics Section of the Geological Survey, all of the Indiana Department of Conservation; the Indiana State Highway Department; and the Illinois State Geological Survey Division.

DATA COLLECTION AND PROCESSING

The well data were collected from drillers, water works superintendents, and others. The well records obtained from drillers were of two types---- written records and reports from memory. A tentative driller's location of the well record was obtained at the time of collection and this was checked against the property records in the county courthouse to verify the location, to locate the property, and to obtain the name of the current property owner. The well location was then checked in the field and its location plotted on the appropriate U. S. Geological Survey 7½-minute topographic quadrangle map. The locations given on the records of test holes, oil or gas exploration holes, and wells from other reports were accepted without further verification.

Plate 1 shows the location of water wells, test holes, or holes drilled for purposes other than water supply, springs, and stream sampling sites. All locations are accurate to the nearest quarter-quarter section and most locations are shown to the nearest 10 acres or quarter-quarter-quarter section. The basic data for these wells and holes drilled for purposes other than water supply are summarized in table 4. Selected drillers' logs of wells and other drilled holes with tentative interpretations by the authors of the geologic age of the materials encountered are given in table 5. Basic data for the springs are summarized in table 7.

Samples of water were collected at the time well and spring sites were visited and from streams during a period of low flow. The samples were analyzed in the field for hardness of water, alkalinity (expressed as bicarbonate) and chloride content by standard titration methods. Sulfate was determined by a turbidimetric method using a colorimeter where concentrations were below 100 ppm (parts per million) and by a standard titration method where concentrations exceeded 100 ppm. The iron content was determined at the well site by the bipyridine method by comparison with standard color ampules having known iron concentrations. The results of these analyses (tables 6, 7, and 8) were used to select sites for collecting water samples for more comprehensive analyses by the U. S. Geological Survey.

During the investigation an observation well was established to measure the fluctuations of water level. Table 9 contains water-level measurements obtained from this well. The data from this observation well show seasonal and longer term variations of the ground-water level.

GENERAL GEOLOGY AND SOURCES OF GROUND WATER

Consolidated rocks of Early and Middle Pennsylvanian age crop out in Vermillion County. Overlying these rocks are unconsolidated glacial deposits of Pleistocene age.

Rocks of Early and Middle Pennsylvanian age form the bedrock surface of the county. The rocks are exposed in bluffs along the Wabash River and along streams flowing into the Wabash River. They consist chiefly of sandstone, shale, and minor amounts of coal, limestone, and fire clay. All these rocks are water-bearing to various degrees with the sandstones being the principal source of water. The rock of Pennsylvanian age is a major source of ground water for domestic and stock supplies in the county. Well depths range from about 50 to 550 feet, the most frequent depth being about 130 feet. Yields range from less than 1 to about 75 gpm (gallons per minute) with some dry holes reported.

Unconsolidated glacial deposits of Pleistocene age consisting of till and glaciofluvial sand and gravel overlie the consolidated rocks.

Preglacial streams eroded valleys in the bedrock surface in Vermillion County. Some of these valleys are followed in part by the present valleys of Little Raccoon and Brouilletts Creeks and by the Wabash River but the majority have been completely filled and buried by glacial materials and no surface expression remains.

Water-bearing sand and gravel, as much as 80 feet thick, has been penetrated by wells drilled into the deposits filling the preglacial valleys. These deposits may be lying on bedrock and overlain by till or Recent deposits or interbedded with till. The sand and gravel is not necessarily continuous--locally till, as much as 200 feet thick, may completely fill a preglacial valley.

Throughout the county there are relatively thin, irregularly shaped deposits of sand and gravel that are not associated with the sand and gravel filling the major preglacial valleys. Some are apparently tabular in shape covering several square miles whereas others are channel-like, a few tens of feet wide but possibly several miles long. The sand and gravel may be lying on bedrock, covered by till, or interbedded with till.

Well depths range from about 15 to 230 feet, the most frequent depth being about 65 feet. Yields from these sand and gravel deposits range from about 1 to 1,200 gpm. The saturated thickness and the grain size of the material in the deposits can change rapidly in a short distance, and are two factors controlling potential yield.

Yields sufficient for large industrial and municipal supplies are available from sand and gravel along most of the Wabash River and from the north-south trending preglacial channel west of Perrysville. Potential areas of high yield are the preglacial channels east and south of Universal and north and west of Dana. Yields sufficient for domestic, stock, and possible small industrial and municipal supplies are available from the thin irregularly shaped sand and gravel deposits present throughout much of the county.

Deposits of Recent age in Vermillion County consist mostly of flood-plain sediments, and wind-blown sand. They are thin and are not important as sources of ground water.

Plate 2 shows availability of ground water in the consolidated and unconsolidated rocks underlying the county.

The chemical content and the hardness of water vary greatly in the aquifers of Pennsylvanian and Pleistocene age. The maximum and minimum vales and the mode 1/ for sulfate and chloride contents and hardness of water for these aquifers are given in table 1. Values for the mode are based on a small sampling and therefore may not be valid but compare closely with data from adjoining counties. In addition table 2 indicates the significance of the various constituents and properties of the water that are listed in tables 6, 7, and 8.

Table 1.--Comparison of quality of ground water by source in Vermillion County

Pleistocene aquifers

	Sulfate ppm	Chloride ppm	Hardness ppm
Maximum----------	955	118	1,360
Minimum----------	10	<1	136
Mode----------	14	14	341

Pennsylvanian aquifers

Maximum----------	900	3,140	916
Minimum----------	11	4	4
Mode----------	14	15	345

1/ mode: The item, in a series of statistical data, which occurs oftenest. (Webster).

Table 2.--Significance of selected dissolved mineral constituents and properties of ground water [a/]

Constituent or property	Significance
Iron (Fe)----------	Oxidizes to reddish-brown sediment upon exposure to air. More than about 0.3 ppm stains laundry and utensils reddish-brown. More than 0.5 to 1.0 ppm imparts objectionable taste to water. Larger quantities favor growth of iron bacteria. Objectionable for food processing, textile processing, beverages, ice manufacturing, brewing, and other purposes.
Bicarbonate (HCO_3)-------	Bicarbonate in conjunction with carbonate (CO_3) produces alkalinity. Bicarbonate of calcium and magnesium decomposes in steam boilers and hot water facilities to form scale and release corrosive carbon-dioxide gas.
Sulfate (SO_4)----------	Sulfate in water containing calcium forms hard scale in steam boilers. In large amounts sulfate in combination with other ions gives bitter taste to water. Some calcium sulfate is considered beneficial in the brewing process.
Chloride (Cl)----------	Gives salty taste to drinking water when in large amounts in combination with sodium. Increases the corrosiveness of water when in large amounts.
Hardness as CaCO3 (Calcium magnesium)	Hard water increases amount of soap needed to make lather. Forms scale in boilers, water heaters, and pipes. Leaves curdy film on bathtubs and other fixtures and on materials washed in the water.

CONFINED AND UNCONFINED CONDITIONS

In Vermillion County ground water occurs in the consolidated and unconsolidated rocks chiefly under confined (artesian) conditions, but in some places it occurs under unconfined (water-table) conditions. Under confined conditions, the aquifer (water-bearing material) is overlain directly by relatively impervious material, and the water, which is under pressure will rise in the well above the bottom of the impervious material. Under unconfined conditions the aquifer is overlain directly by permeable unsaturated material and the water does not rise above the level at which it is encountered.

[a/] After Rosenshein and Hunn (1961), p. 17

TYPES OF WELLS

Drilled wells are the principal type of water wells used in Vermillion County. A small number of dug and driven wells are still in use and occasionally one is constructed. Most water wells are 4-inches or more in diameter and are constructed by the cable-tool or percussion method of drilling. A well drilled by the cable-tool method is constructed by a combination of drilling, bailing, and driving casing. Where the water-bearing material is consolidated rock, the well casing generally is driven a few inches to several feet into rock, and the well finished as an open hole in rock. Where the water-bearing material is sand and gravel, the well casing is driven into the water-bearing zone and either left as an open-end casing, or the lower end of the casing is slotted or perforated, or a well screen is set opposite the water-bearing zone below the end of the casing. A modification of the above type, the gravel-packed well, has a gravel lining between the well screen and the water-bearing material.

In Vermillion County the majority of industrial and municipal supply wells drilled in sand and gravel are equipped with well screens--a few are finished with slotted or perforated casing. Most domestic and stock wells that have been completed in sand and gravel do not have a screen but are finished with an open-end casing or the casing is slotted or perforated. The use of wire-wound, gauze-wrapped, or gauze-washer well points or screens in domestic and stock wells is becoming more widespread. Successful wells can be obtained by the use of screens in many water-bearing sand and gravel deposits from which it was once considered impossible to obtain water. Table 3 relates the grain-size in inches and millimeters to the slot and gauze size of screens commonly used in water wells.

Table 3.--Grain size and equivalent screen openings

Grain size: After Wentworth (1922). Slot size: In thousandths (0.001) of an inch.
Equivalent screen openings: From commercial catalogs for water-well supplies. Gauze size: Number of wire strands per lineal inch.

Material	Grain size		Equivalent screen opening	
	Inches	Millimeters	Slot size	Gauze size
Gravel----------	> 0.08	> 2	> 80	-------
Very coarse sand	.04 - .08	1 - 2	40 - 80	- 20
Coarse sand-----	.02 - .04	.50 - 1	20 - 40	40 - 20
Medium sand-----	.01 - .02	.25 - .50	10 - 20	60 - 40
Fine sand-------	.005 - .01	.125 - .25	6 - 10	90 - 60
Very fine sand--	.002 - .005	.062 - .125	-------	-------
Silt------------	.00015 - .002	.004 - .062	-------	-------
Clay------------	<.00015	<.004	-------	-------

In areas where the water level in the unconsolidated material is close to the surface some water wells are constructed by driving or digging. The driven well consists of a small diameter pipe with a drive-point screen on the end which is driven into shallow water-bearing material. The dug well is constructed by digging a hole, usually about 3 feet in diameter into the upper part of the water-bearing material and using concrete pipe, tile, brick, or stone as a casing.

The oil or gas exploration holes, test holes, and holes drilled for purposes other than water supply are drilled by either the cable-tool or rotary method in Vermillion County.

SUMMARY

Preliminary evaluation of the basic data shows that adequate quantities of ground water are generally available for domestic and stock use from the rocks of Pennsylvanian age.

Ground water for domestic, stock, and locally for industrial and municipal supplies is available from sand and gravel of Pleistocene age associated with preglacial bedrock valleys. Along most of the Wabash River and the preglacial channel west of Perrysville and possibly in the small areas near Universal and Dana large supplies are available from the aforementioned deposits. Ground water for domestic, stock, small industrial, and small municipal supplies may be available from thin irregularly-shaped sand and gravel deposits throughout much of the county.

The quality of the water from the rocks of Pennsylvanian and Pleistocene age varies greatly. Locally water from these sources may exceed the U. S. Public Health Service (1962) drinking-water standards for either iron, sulfate, or chloride content.

RECORDS

The records of about 245 water wells and holes drilled for purposes other than water supply are given in table 4. The table gives information about well construction, water levels, yields and drawdowns, thickness and character of the water-bearing material, conditions of occurrence, use, and other pertinent data. The altitude of the land surface at all wells, except oil or gas exploration holes, was determined from topographic maps. Altitudes of oil or gas exploration holes were on the records when received and were checked against the topographic maps.

Table 5 contains the selected logs of about 121 wells and other drilled holes. This table gives the drillers' description of the material encountered, pertinent remarks with regard to the material, and tentative interpretation by the authors of the geologic age of the material. The logs contain local terms used by drillers in describing the material penetrated. A glossary of drillers' terms is on page 12.

The results of 72 analyses of well waters are given in table 6. These chemical analyses were determined in the field by the U. S. Geological Survey. The table gives information about geologic source, temperature, concentration in parts per million of iron, alkalinity (expressed as bicarbonate), sulfate, and chloride contents, and hardness of water. The U. S. Public Health Service (1962) drinking-water standards state that the chemical constituents should not exceed the following concentrations: iron, 0.3 ppm; sulfate, 250 ppm; chloride, 250 ppm. Although no official standards have been established for hardness of water, the following classification (Lamar, 1942, p. 25, 26) is in general use: 0-60 ppm, soft; 61-120 ppm, moderately hard; 121-200 ppm, hard; more than 200 ppm, very hard.

Records of 5 springs are given in table 7. This table gives geologic source, yield, use, temperature of water, and the results of field chemical analyses.

Table 8 gives the results of 10 field chemical analyses of water from streams in Vermillion County with other data.

Water levels in 1 observation well in Vermillion County are given in table 9. The water levels were measured with a recording gage. Daily high water levels are given for the observation well. The location of this observation well is shown on plate 1.

GLOSSARY OF DRILLERS' TERMS

Band.--Thin shale or clay associated with coal.

Blackjack.--Black carbonaceous shale or a clayey or shaly coal.

Bluestone.--Blue-gray siltstone, sandy shale, or shaly sandstone.

Bone coal.--See blackjack.

Chip slate.--Very hard shale which breaks into small, thin, angular pieces.

Dark band.--See band.

Drift.--Any rock material, such as boulders, till, gravel, sand, or clay, transported by a glacier and deposited by or from ice or by or in water derived from the melting of the ice.

Hardpan.--A hard impervious layer, composed chiefly of clay, cemented by relative insoluble materials, does not become plastic when mixed with water.

Pan.--Clay of glacial origin; generally contains small pebbles and occasional boulders.

Shell.--Thin and usually hard layers of rock; rock which splits in thin pieces parallel with the bedding surface.

Slate.--Hard shale which splits into thin platy fragments, usually black.

Smut.--Soft coal containing much earthy matter.

Soapstone.--Hard smooth clay or shale, slippery to the touch.

Softpan.--Hard impervious layer composed chiefly of clay, partially cemented by relative insoluble materials, becomes plastic when mixed with water.

Sulfur.--Thin band or layer of pyrite in a coal seam.

Wash.--Water laid glacial material consisting of sand, silt, and clay with a high percentage of twigs, leaves, and other organic material.

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Table 4.--Records of wells, Vermillion County, Indiana

Well number: See text for description of well-numbering system.
Altitude: Altitude of land-surface datum from topographic map.
Type of well: Dr, drilled; Dn, driven; Du, dug; J, jetted.
Finish: Gp, gravel pack; Oo, open end; Oh, open hole; P, perforated casing, S, screen.
Material: G, gravel, Ls, limestone, S, sand; Ss, sandstone; Sd-sh, sandy shale; Sd-t, sandy till; Sh, shale; Sh-ss, shaly sandstone.
Geologic age: Pl, Pleistocene; P, Pennsylvanian.
Ground-water occurrence: C, confined (artesian); U, unconfined (water table).

Water level: In feet below land-surface datum on date of completion of well, except as noted in remarks.
Use: A, air conditioning; D, domestic, Dn, destroyed; I, industrial; N, not used; O, observation; Og, oil or gas; P, public supply; S, stock; T, test.
Remarks: A, field chemical analysis in Table 8; G, gamma ray log on file; L, log in Table 5; La, log on file; Lam, log from memory on file; Lm, log from memory in Table 5; W, water level measurements in Table 9; Dd, drawdown; gpm, gallons per minute.

Well No.	Owner	Driller	Date completed	Altitude (feet)	Type of well	Depth of well below land-surface (feet)	Diameter (inches)	Depth of casing (feet)	Finish	Water-bearing zone: Depth to top (feet)	Water-bearing zone: Thickness (feet)	Water-bearing zone: Material	Water-bearing zone: Geologic age	Water-bearing zone: Ground-water occurrence	Water level (feet)	Yield (gpm)	Use	Remarks
14/9W- 3E1	Town of Fairview Park	Layne-Northern Co., Inc.	1949	505	Dr	125	8	-----	Oh	-----	-----	-----	P	--	87	75	P	
3E2	----do----------	----do----------	1949	505	Dr	125	8	-----	Oh	-----	-----	-----	P	--	87	75	P	
4N1	Brazil Block Coal Co.	----------	1898	500	Dr	267	-----	-----	-----	-----	-----	-----	----	--	---	-----	T	L
4P1	T. Barnes	L. Adkins	1942	520	Dr	64	6	64	-----	57	7	S,G	Pl	--	----	-----	N	La; Reported sulfur water
4P2	M. Cline	----do----------	1942	515	Dr	90	-----	-----	-----	78	12	Sh	P	--	----	-----	N	L; Reported salt water
9B1	L. Akro	----do----------	9-23-42	505	Dr	59	6	59	P	45	14	S,G	Pl	--	---	-----	Do	L
10C1	Veitti Bros. Packing Co.	----do----------	11-42	500	Dr	130	4	-----	Oh	-----	-----	Sh	P	--	---	-----	N	L; Reported sulfur water
10D1	City of Clinton	Layne-Northern Co., Inc.	5-12-47	500	Dr	104	38 18	----- 104	S	38	66	S,G	Pl	U	38	1,000	P	La; Dd 9 ft pumping at 1,000 gpm; Screen, 25 ft of 18-in dia, no. 6 shutter
10D2	----do----------	----do----------	6-11-46	500	Dr	130	6	-----	-----	25	105	S,G	Pl	U	25	-----	T	La
10D3	----do----------	----do----------	7- 2-47	500	Dr	102	38 18	68 100	S	32	70	S,G	Pl	U	32	1,000	P	La; Dd 10 ft pumping at 1,000 gpm; Screen, 25 ft of 18-in dia, no. 6 shutter
10D4	----do----------	----do----------	6-18-46	500	Dr	131	6	-----	-----	32	98	S,G	Pl	U	32	-----	T	L
10E1	T. Fenoglio	----------	1940	500	Dr	80	5	-----	-----	-----	-----	S,G	Pl	--	---	-----	P	Data from owner; Water temperature 56°F
10N1	Almono Bros. Dairy	Smith Bros.	1947	505	Dr	78	8	78	P	43	35	G	Pl	U	43	100	I	A; Reported Dd 0 ft after 6 hr pumping at 100 gpm
15G1	R. Sherer	L. Adkins	10-42	490	Dr	78	8	78	P	-----	-----	S,G	Pl	--	---	-----	A	L
22Q1	H. L. Cheek	F. E. Larrabee	7- 8-52	490	Dr	68	3	66	S	40	26	S,G	Pl	U	40	20	D	A; Dd 2 ft after 3 hr pumping at 20 gpm
27C1	Mr. Cheek	----do----------	10-12-60	485	Dr	57	6	57	S	32	25	S,G	Pl	U	32	35	I	Reported Dd 0 ft after 2 hr bailing at 35 gpm; Screen, 4 ft of 6-in dia, no. 50 slot
27F1	V. Alkire	----do----------	1952	490	Dr	66	3	66	S	40	26	G	Pl	U	40	20	D	A
29H1	Brazil Block Coal Co.	----------	6-96	570	Dr	108	-----	-----	-----	-----	-----	-----	----	--	---	-----	T	L
29Q1	----do----------	----------	6-96	490	Dr	170	-----	-----	-----	-----	-----	-----	----	--	---	-----	T	L
29R1	----do----------	----------	1896	550	Dr	87	-----	-----	-----	-----	-----	-----	----	--	---	-----	T	La
30R1	U. S. Coal & Coke Predecessors	----------	1-28-09	480	Dr	254	-----	-----	-----	-----	-----	-----	----	--	---	-----	T	L
31C1	----do----------	----------	2-13-09	570	Dr	56	-----	-----	-----	-----	-----	-----	----	--	---	-----	T	L
31G1	S. Secondino	----------	1953	510	Dr	30	8	30	-----	-----	-----	S	Pl	--	---	-----	S	A; Data from owner
31H1	U. S. Coal & Coke Predecessors	----------	1-12-08	511	Dr	264	-----	-----	-----	-----	-----	-----	----	--	---	-----	T	La
31L1	----do----------	----------	12- 5-08	518	Dr	300	-----	-----	-----	-----	-----	-----	----	--	---	-----	T	L
32K1	Brazil Block Coal Co.	----------	6-96	500	Dr	104	-----	-----	-----	-----	-----	-----	----	--	---	-----	T	L
32L1	U. S. Coal & Coke Predecessors	----------	3-13-09	489	Dr	244	-----	-----	-----	-----	-----	-----	----	--	---	-----	T	L

14/9W-33B1	Brazil Block Coal Co.	----------	6-96	590	Dr	100	-----	-----	-----	-----	-----	-----	----	--	---	-----	T	L
33C1	----do----------	----------	6-96	595	Dr	86	-----	-----	-----	-----	-----	-----	----	--	---	-----	T	La
33G1	----do----------	----------	1898	530	Dr	106	-----	-----	-----	-----	-----	-----	----	--	---	-----	T	L
33J1	----do----------	----------	1898	475	Dr	98	-----	-----	-----	-----	-----	-----	----	--	---	-----	T	La
33K1	----do----------	----------	6-04	550	Dr	400	-----	-----	-----	-----	-----	-----	----	--	---	-----	T	La
33L1	Doring Coal Co.	----------	7-08	575	Dr	55	-----	-----	-----	-----	-----	-----	----	--	---	-----	T	L
33L2	----do----------	----------	7-08	480	Dr	56	-----	-----	-----	-----	-----	-----	----	--	---	-----	T	La
33L3	----do----------	----------	7-08	490	Dr	51	-----	-----	-----	-----	-----	-----	----	--	---	-----	T	La
33L4	Brazil Block Coal Co.	----------	6-96	470	Dr	60	-----	-----	-----	-----	-----	-----	----	--	---	-----	T	La
33L5	----do----------	----------	6-04	520	Dr	354	-----	-----	-----	-----	-----	-----	----	--	---	-----	T	L
33M1	Doring Coal Co.	----------	7-08	490	Dr	58	-----	-----	-----	-----	-----	-----	----	--	---	-----	T	La
33M2	----do----------	----------	7-08	470	Dr	58	-----	-----	-----	-----	-----	-----	----	--	---	-----	T	La
33M3	----do----------	----------	7-08	500	Dr	57	-----	-----	-----	-----	-----	-----	----	--	---	-----	T	La
33N1	E. Hargis	L. Schell	7-17-59	600	Dr	140	6	58	Oh	58	3	La	P	U	60	10	D	L, A; Dd 30 ft after 1 hr bailing at 10 gpm
33N2	Brazil Block Coal Co.	----------	1898	595	Dr	182	-----	-----	-----	-----	-----	-----	----	--	---	-----	T	La
33P1	----do----------	----------	1896	490	Dr	175	-----	-----	-----	-----	-----	-----	----	--	---	-----	T	La
33R1	----do----------	----------	1896	470	Dr	119	-----	-----	-----	-----	-----	-----	----	--	---	-----	T	L
34F1	W. Brown	Smith Bros.	12-26-60	480	Dr	52	4	52	P	10	42	S,G	Pl	--	---	6	D	Reported Dd 0 ft after 1 hr bailing at 6 gpm
14/10W- 1A1	W. Watson	L. Adkins	9-29-42	615	Dr	54	6	54	Oo	-----	-----	S,G	Pl	--	---	-----	D,S	L
10L1	Interstate Coal Co.	----------	--------	510	Dr	297	-----	-----	-----	-----	-----	-----	----	--	---	-----	T	L
12P1	Meadow Lark Farm	L. Adkins	1-49	600	Dr	400	-----	-----	-----	-----	-----	-----	----	--	---	-----	Do	L; Reported salt water at 400 ft
33K1	C. Shaw	V. Eaton	7-24-56	615	Dr	50	6	43	P	-----	-----	Sd-t	Pl	C	7	0.7	S	L, A
34K1	Interstate Coal Co.	----------	---------	560	Dr	403	-----	-----	-----	-----	-----	-----	----	--	---	-----	T	L
36F1	U. S. Coal & Coke Predecessors	----------	2-13-09	580	Dr	382	-----	-----	-----	-----	-----	-----	----	--	---	-----	T	L
15/ 9W- 2D1	F. Russel	Sutherland Bros.	1956	595	Dr	235	4	-----	Oh	178 228	9 5	Sh-ss Ss	P P	--	---	1	N	L
2D2	F. Brown	M. O. Schrader	9-30-57	500	Dr	100	6	3	Oh	-----	-----	-----	P	--	31	1	D	La, A
2E1	J. Pearman	L. Adkins	5- 5-42	500	Dr	60	6	43	Oh	-----	-----	-----	P	--	---	-----	D	L
2K1	H. Earlos	----do----------	1942	485	Dr	80	8	36	Oh	-----	-----	-----	----	--	---	-----	De	L
10L1	U. S. Coal and Coke Predecessors	----------	3-30-09	580	Dr	203	-----	-----	-----	-----	-----	-----	----	--	---	-----	T	Sand, hardpan, and gravel to 203 ft
22L1	E. Kauffman	F. E. Larrabee	9-12-59	530	J	96	2½	96	S	64	32	S,G	Pl	U	64	6	S	Dd 2 ft after 2 hr pumping at 8 gpm; Screen, 3 ft of 1¼-in dia, no. 50 slot
27A1	M. Miller	W. L. Laughlin	8- 5-56	515	Dr	66	2	66	S	52	18	S,G	Pl	U	52	5	D	L; Screen, 4 ft of 1¼-in dia, no. 40 slot
27A2	D. Haskett	F. E. Larrabee	5- 6-61	515	J	76	2½	76	S	58	18	S,G	Pl	U	58	6	D	Reported Dd 0 ft after 2 hr pumping at 6 gpm; Screen, 3 ft of 1¼-in dia, no. 50 slot
27A3	E. Bonebrake	L. Adkins	1942	510	J	72	2½	72	S	-----	-----	S,G	Pl	--	---	-----	D	La, A; Screen, 3 ft
29G1	U. S. Coal & Coke Predecessors	----------	3- 5-09	531	Dr	212	-----	-----	-----	-----	-----	-----	----	--	---	-----	T	L
32C1	J Bonacorsi	O. Thompson	11-12-61	610	Dr	80	6	80	P	69	3	S,G	Pl	C	15	5	D	L, A; Dd 15 ft after 10 hr pumping at 5 gpm
32D1	J. M. Crane	M. O. Schrader	--------	610	Dr	238	-----	-----	-----	-----	-----	-----	----	--	---	-----	T	L
34Q1	Standard Materials Corp.	W. L. Laughlin	8-11-51	500	Dr	68	8	68	S	36	32	S,G	Pl	U	36	10	De	L; Dd 3 ft after 2 hr pumping at 10 gpm; Screen, 4 ft of 6-in dia, no. 15 slot
15/10W- 3E1	D. Holbert	F. E. Larrabee	--------	620	Dr	167	8	-----	Oh	-----	-----	Sh	P	--	---	1.5	D	Reported trace of salt water
10A1	V. Peer	----do----------	1944	640	Dr	302	4	-----	-----	70	120	S?	Pl?	--	---	-----	D,S	Lam; Well pumped sand
10K1	R. D. Hobert	----do----------	11-12-59	640	Dr	150	6	87	Oh	95	55	Ss	P	C	35	5	D	L; Dd 105 ft after 2 hr bailing at 5 gpm
15M1	J. J. Newton	----------	4-16-23	620	Dr	1,727	-----	-----	-----	-----	-----	-----	----	--	---	-----	Og	Ohio Oil Co. 1; L (partial)
21R1	R. B. Morgan	McDaniel & Sons	5-19-61	610	Dr	250	4	-----	Oh	78	-----	Sh	P	--	---	-----	D	L, A; Reported salt water 244 to 248 ft; cement plug set 225 to 250 ft
22F1	R. James	Smith Bros.	8- 8-61	620	Dr	56	6	37	Oh	-----	-----	-----	P	C	5	3	D	Dd 51 ft after 3 hr pumping at 3 gpm
28N1	P. Davis	M. O. Schrader	--------	640	Dr	173	-----	-----	-----	-----	-----	-----	----	--	---	-----	T	Surface to 20 ft, sandy pan 20 to 173 ft
27M1	F. Simms	L. Adkins	11- 8-48	610	Dr	56	-----	56	Oo	48	8	S,G	Pl	--	---	-----	D	L
27R1	Allen & Garcia	----------	--------	630	Dr	377	-----	-----	-----	-----	-----	-----	----	--	---	-----	T	L
28J1	C. W. Shirey	----------	--------	610	Du	15	48	15	Oo	14	1	S,G	Pl	C	9	-----	D	Data from owner
34D1	Holt Township School	----------	1926	604	Dr	122	4	-----	Oh	-----	-----	-----	P	--	---	-----	P	A; Used for drinking water
34D2	----do----------	----------	1953	600	Dr	115	8	80	Oh	-----	-----	-----	P	C	40	-----	P	Used for sanitary purposes; Reported rock at 80 ft

Table 4.--Records of wells, Vermillion County, Indiana--Cont.

Well No.	Owner	Driller	Date completed	Altitude (feet)	Type of well	Depth of well below land-surface (feet)	Diameter (inches)	Depth of casing (feet)	Finish	Water-bearing zone: Depth to top (feet)	Water-bearing zone: Thickness (feet)	Water-bearing zone: Material	Water-bearing zone: Geologic age	Water-bearing zone: Ground-water occurrence	Water level (feet)	Yield (gpm)	Use	Remarks
15/10W-34N1	M. Jordan	----------	--------	570	Du	35	-----	35	Oo	25	10	S,G	Pl	--	20	-----	D,S	Data from owner
35D1	U. S. Coal & Coke Predecessors	----------	1-23-09	615	Dr	526	-----	-----	-----	-----	-----	-----	----	--	---	-----	T	L
35H1	A. Lamb	M. O. Schrader	--------	610	Dr	356	-----	-----	-----	-----	-----	-----	----	--	---	-----	T	L
16/ 9W- 3D1	D. Harger	F. E. Larrabee	12-18-00	630	Dr	185	6	102	Oh	102	83	Ss	P	C	20	5	S	L; Dd 150 ft after 2 hr bailing at 5 gpm
3N1	Vermillion County Home	----do----------	--------	630	Dr	140	6	-----	Oh	70	70	Ss	P	C	15	8	P	Lm, A
11N1	Arkotex Ceramic Corp.	W. L. Laughlin	8-48	520	Dr	84	5	26	Oh	-----	-----	-----	P	--	---	-----	D	L, A
14C1	O. McMaster	M. Crabb	1956	480	Dr	72	4	72	Oo	25	47	S,G	Pl	U	25	-----	D	
15N1	R. Parks	F. E. Larrabee	--------	620	Dr	152	6	-----	Oh	135	17	Ss	P	C	4	30	D,S	Lm, A; Dd 25 ft pumping at 30 gpm
22L1	Cains Brick School	L. Adkins	1942	650	Dr	51	4	51	P	45	6	S,G	Pl	--	---	-----	S	L
22P1	G. Gaddis	----do----------	1942	650	Dr	61	6	61	P,Oh	52	2	G	Pl	--	---	-----	N	L
30Q1	Indiana State Highway Department	C. B. Ruark	9- 4-41	630	Dr	250	6	-----	Oh	235	15	Sh	P	C	75	-----	P	L (partial), A
30R1	E. Redman	F. E. Larrabee	--------	630	Dr	120	6	120	Oo	-----	-----	G	Pl	--	---	-----	D	
31A1	F. Brewer	----do----------	11- 2-61	630	Dr	95	6	95	Oo	80	9	S,G	Pl	C	50	10	D	L, A; Dd 20 ft after 2 hr pumping at 10 gpm
32P1	E. A. Doud	Ringo & Son	3-47	640	Dr	100	-----	80	S	22	3	G	Pl	C	12	30	I	L, A; Dd 6 ft pumping 30 gpm; Screens set in both gravel units
										78	1	G	Pl					
34H1	Ohio Oil Co.	A. L. Stice	1948	590	Dr	550	6 4½	80 130	Oh	117 234	17 10	Ss Ss	P P	C	80	10	P	Lm, A; Reported salt water in upper sandstone; soda water in lower sandstone
16/10W- 4F1	M. Roe	M. Crabb	6-53	625	Dr	185	4	73	Oh	-----	-----	-----	----	--	---	-----	Do	Dry hole
4F2	----do----------	----do----------	6-53	625	Dr	206	4	77	Oh	-----	-----	-----	----	--	---	-----	Do	Do
6J1	A. J. Walthall	F. O. Warrick	--------	640	Du,Dr	320	4	-----	Oh	-----	-----	Sh	P	--	---	-----	D	Lm
9F1	T. Meyers	L. Adkins	1- 6-42	625	Dr	350	-----	-----	-----	-----	-----	-----	----	--	---	-----	Do	L; Dry hole
22G1	Bon Ayr Coal Co.	----------	1935	630	Dr	533	-----	-----	-----	-----	-----	-----	----	--	---	-----	T	L
23P1	U. S. Government	H. J. Brenner	1950	635	Dr	148	4	146	Oo	146	2	S	Pl	C	108	10	N	Lm
26G1	Town of Dana	Sims Drilling Co.	--------	650	Dr	78	12	-----	-----	-----	-----	-----	----	--	---	60	P	
26H1	----do----------	----do----------	--------	650	Dr	80	12	-----	-----	-----	-----	-----	----	--	52	50	P	Dd 2 ft after 12 hr pumping at 42 gpm
26H2	----do----------	----do----------	1951	650	Dr	387	10	-----	-----	-----	-----	-----	----	--	---	80	P	
26H3	----do----------	----do----------	1951	650	Dr	387	10	-----	-----	-----	-----	-----	----	--	---	40	P	
26Q1	W. Marshall	----------	--------	640	Du	17	-----	-----	Oo	9	8	G,S	Pl	C	7	-----	P	
26Q2	F. C. Sims	----------	--------	640	Dr	190	6	75	Oh	88	10	S,G	Pl	--	---	-----	P	A
27C1	E. Redman	F. E. Larrabee	--------	630	Dr	147	-----	147	Oo	147	-----	G	Pl	--	---	-----	D,S	A
34Q1	----do----------	----do----------	--------	635	Dr	72	-----	72	Oo	72	-----	G	Pl	--	---	-----	D,S	A
36F1	----do----------	L. Adkins	1-14-44	650	Dr	127	-----	127	P	120	7	S,G	Pl	--	---	-----	S	L, A
17/ 9W- 4F1	Town of Cayuga	Sims Drilling Co.	5-11-54	490	Dr	108	10	100	Gp	30	76	S,G	Pl	C	21	250	P	L; Dd 8 ft pumping at 250 gpm
4L1	New York, Chicago, and St. Louis Railroad	Layne-Northern Co., Inc.	11- 8-30	499	Dr	75	12	75	S	34	41	S,G	Pl	C?	28	300	O	L, G, W; Observation well Vermillion 1; Dd 4 ft pumping at 300 gpm; Screen, 12 ft of no. 125 slot
5H1	K. Harnaman	M. Crabb	1951	490	Dr	39	4	39	Ou	14	25	S,G	Pl	U	14	-----	D,S	A
5L1	Town of Cayuga	----------	1924	510	Du	15	42	15	Oo	-----	-----	S,G?	Pl	U	14	-----	N	
5Q1	Morgan Canning Co.	----------	--------	515	Du	17	30	17	Oo	-----	-----	G	Pl	U	15	-----	N	
6F1	W. H. Patrick	W. L. Laughlin	11-54	575	Dr	150	6	51	Oh	140	10	Ss	P	--	---	6	S	L, A; Dd 50 ft after 5 hr pumping at 6 gpm
8Q1	E. Edwards	Sutherland Bros.	3-47	590	Dr	225	7	21	Oh	-----	-----	-----	----	--	---	-----	N	L; Dry hole
8D1	Cayuga Clay Co.	F. Holdbrider	--------	550	Du	27	1¼	27	S	24	3	S,G	Pl	U	---	-----	I	Lm, A; Well used for drinking water
9E1	Wright Ice Cream Co.	Sutherland Bros.	3-47	520	Dr	46	0	46	Oo	-----	-----	G	Pl	U	40	-----	I	A
9M1	J. Wright	M. Crabb	1051	530	Dr	48	4	48	S	-----	-----	S,G	Pl	U	18	-----	D	

17/ 9W- 9Q1	Collette Home	----------	9-49	500	Dr	1,185	-----	-----	-----	-----	-----	-----	----	--	---	-----	Og	The Nation Oil Co. 1-A; La
15J1	S. Catlin	W. L. Laughlin	9-17-48	490	Dr	60	8	38	Oh	-----	-----	-----	p	--	25	-----	D	L, A
16D1	A. McGaughey	M. Crabb	6-54	530	Dr	126	4	47	Oh	-----	-----	Sh	P	--	30	-----	S	Lam
18D1	R. Jordan	W. L. Laughlin	1948	650	Dr	146	5	105	Oh	114	32	La	P	C	40	24	D,S	L, A; Dd 1 ft after 1 hr pumping at 24 gpm
21Q1	Indiana State Highway Department	----------	6- 3-54	533	Dr	45	-----	-----	-----	-----	-----	-----	Pl	--	30	-----	T	L
21Q2	----do----------	----------	6- 3-54	533	Dr	45	-----	-----	-----	-----	-----	-----	Pl	--	30	-----	T	La
22M1	M. Haggerty	F. O. Warrick	--------	530	Dr	90	-----	-----	S	40	15	G	Pl	U	40	10	D,S	
22M1	----do----------	----do----------	--------	530	Dr	265	-----	-----	-----	235	30	Ss	P	--	---	-----	N	Lam; Reported salt water; Well plugged
26P1	Town of Newport	Diehl Pump Co.	12-46	520	Dr	40	8	40	-----	-----	-----	S,G	Pl	--	14	80	P	Dd 8 ft after 30 hr pumping at 80 gpm
27E1	Indiana State Highway Department	----------	6- 3-54	509	Dr	25	-----	-----	-----	-----	-----	-----	----	--	---	-----	T	L
27E2	----do----------	----------	6- 3-54	510	Dr	22	-----	-----	-----	-----	-----	-----	----	--	---	-----	T	La
31N1	O. Downs	A. Dunavan	12- 1-61	610	Dr	80	6	80	-----	-----	-----	-----	----	C	8	-----	Do	L; Dry hole
31P1	----do----------	----do----------	11-30-61	620	Dr	135	6	80	-----	-----	-----	-----	----	C	8	-----	Do	Do
36P1	M. Haggerty	W. L. Laughlin	--------	530	Dr	94	6	28	Oh	-----	-----	-----	P	--	---	-----	D,S	La, A
36P2	----do----------	----do----------	7-18-50	530	Dr	140	6	32	Oh	-----	-----	-----	P	--	54	3	N	L; Dd 25 ft pumping at 3 gpm; Reported salt water
17/10W- 7K1	F. Naylor	----do----------	4-54	680	Dr	120	6	60	Oh	60	20	Sh	P	C	80	6	D	L, A; Dd 20 ft after 4 hr pumping at 6 gpm
										100	20	Sh,Ss						
7L1	N. Naylor	----do----------	7-22-55	680	Dr	192	6	115	Oh	147	20	Sd-sh	P	--	---	4	D	L, A
8N1	A. Edwards	----do----------	8-20-55	670	Dr	133	7	133	Oo	130	3	G	Pl	C	70	10	D,S	L, A; Reported Dd 0 ft after 3 hr bailing at 10 gpm
9A1	Vogelar Oil Exploration Co.	W. L. Laughlin	9-48	560	Dr	123	6	30	Oh	95	28	Ss	P	C	60	-----	Do	L; Reported salt water
17N1	O. Wesch	----do----------	10-58	650	Dr	250	6	138	Oh	230	20	Ss	P	C	59	5	S	L, A; Dd 35 ft after 2 hr bailing at 5 gpm
							4	220										
18R1	T. E. Henley	----do----------	11-53	600	Dr	174	6	70	Oh	148	2	Sh	P	C	28	15	S	L, A; Dd 3 ft after 7½ hr pumping at 15 gpm; Water from crevice between 148 and 150 ft
29C1	Indiana Geological Survey	G. Workman	2-14-61	543	Dr	348	-----	-----	-----	-----	-----	-----	----	--	---	-----	T	La
29F1	----do----------	----do----------	2-24-61	582	Dr	171	-----	-----	-----	-----	-----	-----	----	--	---	-----	T	La
31J1	A. Ellis	Ringo & Son	10-51	670	Dr	110	6	116	Oo	111	5	S,G	Pl	C	96	10	D	L, A; Dd 10 ft pumping at 10 gpm
31Q1	----do----------	----do----------	12-52	660	Dr	200	-----	-----	-----	-----	-----	-----	----	--	---	-----	Do	L; Dry hole
32A1	M. Canaday	A. Dunavan	9-18-61	635	Dr	50	6	50	P	47	3	S	Pl	C	18	5	D,S	L, A; Dd 10 ft after 3 hr bailing at 5 gpm
18/ 9W- 6N1	W. Parks	----------	--------	605	Dr	1,152	-----	-----	-----	-----	-----	-----	----	--	---	-----	Og	L (partial)
9D1	W. Easton	Walton Drilling Co.	5-31-49	500	Dr	1,115	-----	-----	-----	-----	-----	-----	----	--	---	-----	Og	The Nation Oil Co. 1; La
17C1	V. Morgan	Reynolds Bros.	1953	585	Dr	182	8	181	S	95	88	S,G	Pl	--	95	-----	Do	L
20K1	Material Service Corp.	J. P. Miller Artesian	11-30-49	500	Dr	123	6	123	-----	98	25	S,G	Pl	C	27	-----	T	L; Well in bottom of gravel pit which is about 45 ft below the original land surface
20K2	----do----------	----do----------	2-50	500	Dr	121	18	121	S	98	23	S,G	Pl	C	15	1,200	I	Dd 40 ft after 2½ hr pumping at 1,200 gpm; Screen, 22 ft of 16-in dia, 8 ft no. 120 slot, 10 ft no. 80 slot, and 4 ft no. 30 slot; well in bottom of gravel pit which is about 45 ft below the original land surface
20K3	----do----------	----do----------	12-49	500	Dr	121	18	121	S	-----	-----	S,G	Pl	C	18	1,200	I	Screen, 22 ft of 16-in dia, 8 ft no. 150 slot, 10 ft no. 80 slot, and 4 ft no. 30 slot; Well in bottom of gravel pit which is about 45 ft below the original land surface
20K4	----do----------	----do----------	3-11-57	500	Dr	122	18	122	Gp	-----	-----	S,G	Pl	C	31	1,200	I	A; Screen, 20 ft of 16-in dia; Well in bottom of gravel pit which is about 45 ft below the original land surface
28K1	G. Ellis	W. L. Laughlin	5-47	520	Dr	63	6	63	P?	21	19	G	Pl	U	30	-----	D,S	L, A

Table 4.--Records of wells, Vermillion County, Indiana--Cont.

Well No.	Owner	Driller	Date completed	Altitude (feet)	Type of well	Depth of well below land-surface (feet)	Diameter (inches)	Depth of casing (feet)	Finish	Water-bearing zone: Depth to top (feet)	Water-bearing zone: Thickness (feet)	Water-bearing zone: Material	Water-bearing zone: Geologic age	Water-bearing zone: Ground-water occurrence	Water level (feet)	Yield (gpm)	Use	Remarks
18/ 9W-30E1	L. Cheeseman	W. L. Laughlin	2-46	560	Dr	147	6	60	Oh	139	6	-----	P	C	70	-----	N	L
30M1	A. Bottag	Reynolds Bros.	5-27-53	550	Dr	240	4	69	Oh	-----	-----	-----	P	C	70	1	N	L; Reported salt water
31J1	F. Stevens	W. L. Laughlin	3-15-55	510	Dr	80	6	23	Oh	45	35	Sa	P	C	18	6	D	L; Dd 15 ft after 2 hr bailing at 6 gpm
31J2	D. Newman	----do----------	3-23-55	510	Dr	82	7	19	Oh	45	37	Sa	P	C	18	5	D	La
31J3	O. Dye	----do----------	5-47	510	Dr	18	6	19	Oa	-----	-----	S,G	Pl	U	---	-----	N	
31J4	----do----------	----do----------	3-19-55	510	Dr	78	6	22	Oh	22	56	Ss	P	--	---	4	D	La
31J5	R. Yoho	----do----------	3- 1-55	510	Dr	80	6	19	Oh	19	61	Ss	P	C	19	6	D	A; Sand to 19 ft
31Q1	T. Jones	----do----------	6-18-51	545	Dr	127	6	72	Oh	-----	-----	Ls,Sh	P	C	50	2	D	L, A; Dd 10 ft after 2 hr pumping at 2 gpm
31Q2	B. Davis	Reynolds Bros.	8-52	540	Dr	40	4	40	Oe	20	20	G	Pl	C	20	-----	D	La, A
31Q3	C. Lunsford	W. L. Laughlin	3-47	550	Dr	178	6	72	Oh	75	10	Ss	P	C	57	3	D,S	L, A
32H1	Mrs. Webber	----do----------	4-47	520	Dr	59	6	59	Oa	11	48	G,S	Pl	U	11	-----	D,S	A; Sand to 19 ft
32H2	J. Stitch	M. Crabb	7-18-51	505	Dr	68	4	08	Oe	40	28	G	Pl	--	40	-----	D	Lan
32H3	Indiana State Highway Department	----------	4-18-57	497	Dr	54	-----	-----	-----	-----	-----	-----	-----	--	---	-----	T	L
32H4	----do----------	----------	4-18-57	497	Dr	54	-----	-----	-----	-----	-----	-----	-----	--	---	-----	T	La
32H5	----do----------	----------	4-18-57	492	Dr	54	-----	-----	-----	-----	-----	-----	-----	--	---	-----	T	La
32H6	----do----------	----------	4-18-57	486	Dr	54	-----	-----	-----	-----	-----	-----	-----	--	---	-----	T	La
32H7	----do----------	----------	4-18-57	505	Dr	54	-----	-----	-----	-----	-----	-----	-----	--	---	-----	T	La
32H8	----do----------	M. Crabb	4-18-57	514	Dr	54	-----	-----	-----	-----	-----	-----	-----	--	---	-----	T	La
18/10W-16H1	W. Sayer, Jr.	H. J. Bronner	5-25-61	600	Dr	187	4	187	Oo	185	2	S,G	Pl	C	90	10	D	L, A; Dd 10 ft after 2 hr pumping at 10 gpm
17D1	C. Scuoton	----do----------	11-55	625	Dr	270	4	115	Oh	-----	-----	Sh	P	C	38	2	D,S	L, A; Dd 162+ ft pumping at 2 gpm
20B1	C. Spandau	F. O. Warrick	1953	600	Dr	252	-----	-----	-----	-----	-----	-----	-----	--	---	-----	N	L; Dry hole
30B1	Mr. Hall	----------	1905	612	Dr	1,030	-----	-----	-----	-----	-----	-----	-----	--	---	-----	Og	Peabody Coal Co. 1; L (partial)
31G1	R. Watts	W. L. Laughlin	1-49	630	Dr	185	6	-----	Oh	-----	-----	-----	P	C	20	-----	D	L, A
31Q1	N. Crowder	----do----------	12- 5-52	640	Dr	218	6	105	Oh	-----	-----	-----	P	C	75	4	D	L, A; Reported salt water
32J1	D. Hawkins	F. O. Warrick	1956	560	Dr	586	-----	-----	-----	-----	-----	-----	-----	--	---	-----	Og	F. O. Warrick 1; L
19/ 9W- 2C1	Indiana State Highway Department	----------	3-24-58	498	Dr	51	-----	-----	-----	-----	-----	-----	-----	--	18	-----	T	L
2C2	----do----------	----------	3-24-58	492	Dr	45	-----	-----	-----	-----	-----	-----	-----	--	12	-----	T	La
2C3	----do----------	----------	3-24-58	494	Dr	38	-----	-----	-----	-----	-----	-----	-----	--	12	-----	T	La
2C4	----do----------	----------	3-24-58	494	Dr	44	-----	-----	-----	-----	-----	-----	-----	--	15	-----	T	La
2C5	----do----------	----------	1-24-58	---	Dr	30	-----	-----	-----	-----	-----	-----	-----	--	---	-----	T	La; Hole drilled in river bottom, altitude of water surface 483 ft
2C6	----do----------	----------	1-23-58	---	Dr	34	-----	-----	-----	-----	-----	-----	-----	--	---	-----	T	Do
3E1	----do----------	----------	7-11-58	560	Dr	27	-----	-----	-----	-----	-----	-----	-----	--	---	-----	T	L
3E2	----do----------	----------	7-18-58	560	Dr	17	-----	-----	-----	-----	-----	-----	-----	--	---	-----	T	La
4B1	D. Clow	Reynolds Bros.	9- 2-54	550	Dr	77	4	77	Oe	65	12	S,G	Pl	C	52	4	D	L, A
4C1	----do----------	----do----------	5- 2-53	585	Dr	140	4	126	Oh	126	14	Sh	P	C	35	3	D	L; Dd 85 ft pumping at 3 gpm
4H1	Indiana State Highway Department	----------	7-11-58	560	Dr	22	-----	-----	-----	-----	-----	-----	-----	--	---	-----	T	La
4H2	----do----------	----------	7-11-58	560	Dr	22	-----	-----	-----	-----	-----	-----	-----	--	---	-----	T	La
4H3	----do----------	----------	7-11-58	560	Dr	27	-----	-----	-----	-----	-----	-----	-----	--	---	-----	T	L
4N1	Mr. Smith	----------	--------	600	Dr	1,050	-----	-----	-----	-----	-----	-----	-----	--	---	-----	Og	L (partial)
5E1	L. Rudolph	C. Knapp	7-59	620	Dr	150	4	-----	-----	-----	-----	Sh	P	--	---	-----	D	A; Data from owner
5Q1	V. Goodrich	----------	1961	620	Du	17	36	17	Oe	17	-----	S	Pl	C	10	-----	S	A; Hardpan to 17 ft; Data from owner
6M1	D. Prather	E. E. Doone	1921	630	Dr	165	4	161	Oh	160	5	Ss	P	C	8	-----	D	A
7A1	W. Crist	----------	--------	620	Du	22	60	22	Oe	-----	-----	S	Pl	--	---	-----	D	A; Data from owner
7R1	R. Crist	----------	--------	625	Du	22	48	22	Oe	-----	-----	S	Pl	--	---	-----	D,S	Data from W. Crist

19/ 9W-10Q1	Swallow, Bookwalter, Phillips, et al	----------	--------	485	Dr	208	-----	-----	-----	-----	-----	-----	----	--	---	-----	T	L
15A1	The Maples	F. O. Warrick	--------	500	Dr	90	4	-----	Oh	80	30	Sa	P	--	---	-----	D	A
15A2	C. Brown	----do----------	--------	500	Dr	110	4	-----	Oh	94	16	Sa	P	C	38	7	D	La
15E1	E. Drummett	----do----------	--------	620	Dr	45	-----	45	S	-----	-----	G	Pl	--	---	15	D	
15E2	R. Fortner	----do----------	--------	620	Dr	81	4	80	Oh	-----	-----	S	Pl	--	---	-----	N	A; Casing set on top of rock, Water from sand
16A2	W. Millor	----do----------	--------	610	Dr	260	4	-----	Oh	204	56	Sa	P	--	---	6	D,S	A
16R1	Q. Meyers	W. L. Laughlin	7-48	620	Dr	250	6	88	Oh	208	7	Sa	P	C	115	-----	S	L
										215	35	Sd-sh						
18E1	Illiana Farms	----------	--------	625	Du	28	72	26	Oo	-----	-----	G	Pl	--	---	-----	D,S	A; Data from farm manager
19N1	Swallow, Bookwalter, Phillips, et al	----------	--------	595	Dr	284	-----	-----	-----	-----	-----	-----	-----	--	---	-----	T	L
20E1	D. M. Hanna	----------	--------	620	Du	24	36	24	Oo	-----	-----	-----	Pl	--	---	-----	D,S	Data from owner
20G1	A. Morgan	Mr. Suiter	--------	620	Du	25	36	25	Oo	24	1	S,G	Pl	C	10	-----	D,S	A; Hardpan to 24 ft
21K1	W. Morgan	Reynolds Bros.	2-20-53	635	Dr	240	-----	152	Oh	-----	-----	-----	P	C	110	3.5	D,S	L, A; Can pump dry
22M1	Swallow, Bookwalter, Phillips, et al	----------	--------	547	Dr	281	-----	-----	-----	-----	-----	-----	----	--	---	-----	T	L
27D1	T. Carter	W. L. Laughlin	11-12-51	560	Dr	125	6	81	Oh	118	10	Sa	P	C	50	10	D	L, A; Dd 9 ft after 2 hr pumping 10 gpm
27M1	F. Allen	----do----------	6-47	535	Dr	130	6	30	Oh	125	5	Sa	P	C	22	-----	D	L
28G1	Swallow, Bookwalter, Phillips, et al	----------	--------	551	Dr	229	-----	-----	-----	-----	-----	-----	----	--	---	-----	T	L
28J1	A. Morgan	---------- ----------	11-23-47	547	Dr	1,020	-----	-----	-----	-----	-----	-----	----	--	---	-----	Og	W. Morgan 1; La
28P1	Town of Perrysville	Smith Bros.	12-31-61	540	Dr	100	6	100	S	50	50	S,G	Pl	--	33	180	P	L; Screen, 15 ft of 6-in dia, 3 ft no. 40 slot, 12 ft no. 80 slot; Dd 3 ft after 6 hr pumping at 180 gpm
28R1	E. Nail	Reynolds Bros.	6-52	500	Dr	87	4	44	Oh	75	12	Sa	P	C	40	4	D	A; Dd 10 ft pumping at 4 gpm
28R2	M. Jones	----do----------	--------	500	Dr	84	4	40	Oh	40	44	Sa	P	C	35	4	D	L; Dd 5 ft pumping at 4 gpm
20C1	H. Chrisler	W. L. Laughlin	8-23-50	625	Dr	228	0	228	Oo	201	27	G,S	Pl	C	125	-----	S	L, A
29F1	R. Chisler	----do----------	12-15-50	610	Dr	272	6	250	Oh	250	22	Sa	P	C	125	7	N	L
29N1	R. Hicks	Reynolds Bros.	3-23-53	600	Dr	140	4	140	Oo	125	15	G	Pl	U	125	3	D,S	L, A
30N1	B. S. Loach	----------	1892	620	Du	17	-----	-----	-----	-----	-----	S,G	Pl	--	---	-----	N	Data from owner
31B1	Swallow, Bookwalter, Phillips, et al	----------	--------	598	Dr	398	-----	-----	-----	-----	-----	-----	----	--	---	-----	T	L
31R1	H. Grosch	Reynolds Bros.	--------	590	Dr	149	4	149	Oo	114	35	G	Pl	C	98	4	D	L, A
32M1	Mr. Kelly	----------	3-22	560	Dr	2,442	-----	-----	-----	-----	-----	-----	----	--	---	-----	Og	Swallow, Bookwalter, Phillips, et al 1; La
32X1	J. Lawson	----------	12-27-48	564	Dr	1,038	-----	-----	-----	-----	-----	-----	----	--	---	-----	Og	W. Morgan 1; La
33A1	J. Sanders	W. L. Laughlin	8-47	550	Dr	80	6	26	Oh	80	15	Sa	P	C	18	-----	D	L
33A2	H. Winters	----do----------	5-47	545	Dr	54	-----	-----	-----	-----	-----	-----	P	C	18	-----	N	LA, A
33A3	R. Crowder	----do----------	6-21-50	535	Dr	115	6	23	Oh	100	15	Sa	P	C	50	7	D	La, A; Dd 10 ft after 12 hr pumping 7 gpm
33A4	Mr. Sproul	----do----------	7- 4-50	535	Dr	135	6	26	Oh	115	20	Ss,Sh	P	C	54	7	I	L
33A5	F. Criss	----do----------	8-47	535	Dr	154	6	23	Oh	136	18	Sa	P	C	54	-----	D	La
33B1	Mrs. Sullivan	----do----------	8-47	550	Dr	122	6	-----	Oh	-----	-----	-----	P	--	---	-----	D	La
33B2	L. Summers	----do----------	7-47	550	Dr	79	6	27	Oh	-----	-----	-----	P	C	18	2.5	D	L
33H1	B. H. Courtney	Reynolds Bros.	2- 9-53	550	Dr	125	4	19	Oh	-----	-----	-----	P	--	---	-----	D	La, A
33H2	R. Smith	W. L. Laughlin	7-17-51	530	Dr	122	8	18	Oh	112	10	Sa	P	C	46	8	D	L, A
34D1	Town of Perrysville	Holdt Monroe	7-53	490	Dr	104	8	85	Oh	-----	-----	Sa	P	C	12	40	N	Dd 40 ft pumping at 40 gpm
34D2	G. Lewis	W. L. Laughlin	10-47	530	Dr	84	8	20	Oh	-----	-----	-----	P	C	18	-----	D	L
19/10W- 9A1	C. White	Reynolds Bros.	4-18-52	635	Dr	154	4	147	Oh	147	7	Ss	P	C	28	5	D	L, A; Reported Dd 0 ft pumping at 5 gpm
17D1	Indiana State Highway Department	----------	7-11-58	647	Dr	27	-----	-----	-----	-----	-----	-----	----	--	2	-----	T	L
17D2	----do----------	----------	7-11-58	647	Dr	22	-----	-----	-----	-----	-----	-----	----	--	3	-----	T	La
17K1	D. Prather	H. J. Bronner	9-24-53	640	Dr	305	4	187	Oh	190	60	Sh	P	C	35	3	D,S	L, A; Dd 165 ft pumping 3 gpm; Reported salt water
18A1	Indiana State Highway Department	----------	7-11-58	647	Dr	27	-----	-----	-----	-----	-----	-----	----	--	3	-----	T	L
18A2	----do----------	----------	7-11-58	647	Dr	22	-----	-----	-----	-----	-----	-----	----	--	3	-----	T	La
18A3	----do----------	----------	7-11-58	647	Dr	27	-----	-----	-----	-----	-----	-----	----	--	3	-----	T	La
20E1	R. Carrigan	----------	--------	645	Du	30	36	30	Oo	30	-----	S	Pl	--	---	-----	N	Clay to 30 ft; Data from owner
20E2	E. Carrigan	----------	--------	645	Du	15	36	15	Oo	15	-----	S	Pl	C	3	-----	D	A; Clay to 15 ft; Data from owner
29J1	R. Clingon	----------	--------	620	Du	35	-----	-----	-----	30	5	S,G	Pl	--	15	-----	D	A; Data from owner
31K1	F. Kenna	----------	1944	640	Du	19	-----	-----	-----	18	1	S,G	Pl	C	4	-----	D	Gravelly clay to 18 ft; Data from owner
32Q1	F. Davis	Swisher & Swank	8-59	610	Dr	101	4	-----	-----	-----	-----	-----	P	--	---	-----	D	A; Data from owner

Table 5.--Selected well logs, Vermillion County, Indiana
Remarks: T. D., total depth in feet, complete log not given; W. B., water bearing

Well 14/9W-4N1

Type of record: Driller's log. Altitude: About 590 feet.

Material	Thickness (feet)	Depth (feet)	Remarks
Quaternary System:			
Recent and Pleistocene Series:			
Sand and gravel	10	10	
Hardpan, soft	16	26	
Sand and gravel, dry	10	36	
Sand and gravel	16	52	W. B.
Quicksand	4	56	
Drift	33	89	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Shale, dark	25	114	
Slate, black	2	116	
Coal	1.2	117.2	
Fire clay and rock	3.8	121	
Shale, dark	14	135	
Coal	1	136	
Slate, chip, black	3.8	139.8	
Coal	4.8	144.6	
Fire clay	2.4	147	
Shale rock	4	151	
Sandstone	8	159	
Shale, light	14	173	
Slate, black	6	179	
Shale, light	21	200	
Slate, black	4	204	
Coal	2	206	
Fire clay	3	209	
Shale, limy	8	217	
Shale, light	16	233	
Shale, brown	27	260	
Coal	5	265	
Fire clay	1.7	266.7	

Well 14/9W-4P2

Type of record: Driller's log. Altitude: About 515 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Surface	4	4	
Sand	24	28	
Hardpan	27	55	
Sand, fine, white	3	58	
Hardpan	20	78	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Shale, light	12	90	W. B.

Table 5.--Selected well logs, Vermillion County, Indiana--Cont.

Well 14/9W-9B1

Type of record: Driller's log. Altitude: About 505 feet.

Material	Thickness (feet)	Depth (feet)	Remarks
Quaternary System:			
Recent and Pleistocene Series:			
Surface	4	4	
Sand	31	35	
Boulders	2	37	
Gravel	5	42	
Clay	3	45	
Sand and gravel	14	59	W. B.

Well 14/9W-10C1

Type of record: Driller's log. Altitude: About 500 feet.

Fill	10	10	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Shale	52	62	
Slate, black	10	72	
Shale, light	6	78	
Shale, sandy	40	118	
Shale, blue	6	124	
Slate, black	6	130	

Well 14/9W-10D4

Type of record: Driller's log. Altitude: About 500 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Soil and gritty dirt	12	12	
Sand and gravel, fine	18	30	
Gravel, fine	10	40	W. B. 32 to 130 ft
Gravel, medium	15	55	
Sand and gravel, coarse	25	80	
Sand and gravel, coarse	10	90	Cloudy
Sand and gravel, coarse	5	95	
Gravel, fine	25	120	
Sand and gravel, coarse	10	130	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Rock, hard	1	131	

Well 14/9W-15G1

Type of record: Driller's log. Altitude: About 490 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Surface	10	10	
Gravel	39	49	
Sand	4	53	
Sand and gravel, coarse	25	78	

Table 5.--Selected well logs, Vermillion County, Indiana--Cont.

Well 14/9W-29H1

Type of record: Driller's log. Altitude: About 570 feet.

Material	Thickness (feet)	Depth (feet)	Remarks
Quaternary System:			
Recent and Pleistocene Series:			
Surface	3	3	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Sandstone	27	30	
Shale, light	30	60	
Slate, dark	12	72	
Slate, black	1	73	
Coal	.8	73.8	
Fire clay	2	75.8	
Slate, gray	17.5	93.3	
Slate, hard, black	4	97.3	
Coal	4.7	102	
Fire clay	6	108	

Well 14/9W-29Q1

Type of record: Driller's log. Altitude: About 490 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Surface and gravel	5	5	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Slate, blue	24	29	
Slate, dark	9.8	38.8	
Coal	2	40.8	
Fire clay	3.2	44	
Shale, white	10	54	
Slate, black	6.8	60.8	
Coal and slate	2.5	63.3	
Sulfur and slate	.7	64	
Coal	5.2	69.2	
Fire clay	4.8	74	
Shale, light	16	90	
Slate, dark	15	105	
Shale, light	15	120	
Slate, dark	5	125	
Coal	2	127	
Fire clay	4	131	
Shale, light	4	135	
Shale, limy	4	139	
Shale, sandy, light	12	151	
Shale, brown	11.7	162.7	
Coal	5.7	168.4	
Fire clay, soft	.5	168.9	
Fire clay, hard	1	169.9	

Table 5.--Selected well logs, Vermillion County, Indiana--Cont.

Well 14/9W-30R1

Type of record: Driller's log. Altitude: About 480 feet.

Material	Thickness (feet)	Depth (feet)	Remarks
Quaternary System:			
Recent and Pleistocene Series:			
Loam, sandy	8	8	
Sand	9	17	
Gravel	6	23	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Shale	1	24	
Shale, sandy	22	46	
Shale, soft, blue	9.7	55.7	
Shale, dark	10	65.7	
Coal	1.5	67.2	
Fire clay	5	72.2	
Limestone	.8	73	
Limestone and shale	1.5	74.5	
Shale, soft, dark	4.5	79	
Limestone, broken	1	80	
Shale, dark	6	86	
Slate, hard, black	1	87	
Slate, black	3.6	90.6	
Coal	4.7	95.3	
Fire clay	4.5	99.8	
Conglomerate	1	100.8	
Shale, sandy	7.2	108	
Sandstone	4	112	
Shale, blue	8.3	120.3	
Shale, dark, and brown bands	23.7	144	
Shale, blue	8.5	152.5	
Slate, black	1.9	154.4	
Sulfur	.3	154.7	
Shale	.5	155.2	
Coal	2	157.2	
Fire clay	3.6	160.8	
Shale, sandy	3.3	164.1	
Limestone	4.4	168.5	
Shale, soft	3.1	171.6	
Shale, sandy	10.4	182	
Shale, blue, with hard bands	5.6	187.6	
Coal	4.6	192.2	
Shale, sandy	21.8	214	
Shale, blue, with hard bands	4.7	218.7	
Slate, black	6.3	225	
Coal	1.3	226.3	
Fire clay	2.5	228.8	
Sand shale	16.4	245.2	
Shale, blue	1.6	246.8	
Coal	3.3	250.1	

Well 14/9W-30R1--Cont.

Material	Thickness (feet)	Depth (feet)	Remarks
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Shale	0.1	250.2	
Coal	2.8	253	
Shale	.7	253.7	
Fire clay	.3	254	

Well 14/9W-31C1

Type of record: Driller's log. Altitude: About 570 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Surface	11	11	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Limestone	15	26	
Shale, light	3	29	
Blackjack	2	31	
Coal	2.8	33.8	
Fire clay	4.2	38	
Limestone	6	44	
Shale, blue	7	51	
Limestone	4	55	

Well 14/9W-31L1

Type of record: Driller's log. Altitude: About 518 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Surface	2	2	
Sand, hard	12.5	14.5	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Shale, light	9.5	24	
Shale, yellow	6	30	
Sand rock	10	40	
Shale, sandy	45	85	
Shale, blue	23	108	
Slate, black	2	110	
Shale, blue	4	114	
Slate, black	2	116	
Coal	1.5	117.5	
Fire clay	4.5	122	
Limestone	1	123	
Shale, light	3	126	
Limestone	1	127	
Shale, light	3	130	
Shale, blue	5.5	135.5	
Slate, black	1.5	137	

Table 5.--Selected well logs, Vermillion County, Indiana--Cont.

Well 14/9W-31L1--Cont.

Material	Thickness (feet)	Depth (feet)	Remarks
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Coal	.9	137.9	
Slate, black	4.2	142.1	
Coal	4.8	146.9	
Fire clay	2.1	149	
Limestone	5	154	
Shale, limy	6	160	
Shale, blue	22	182	
Shale, light	8	190	
Shale, brown	14	204	
Slate, black	1	205	
Rock, hard	1	206	
Slate, black	2.5	208.5	
Coal	1.8	210.3	
Fire clay	3.7	214	
Sand rock	8	222	
Slate, light	6	228	
Slate, gray	9	237	
Slate, soft, black	.6	237.6	
Coal	5.4	243	
Shale, sandy	2	245	
Sand rock	6	251	
Sand shale	6	257	
Shale, blue	11.5	268.5	
Slate, black	7	275.5	
Coal	1	276.5	
Fire clay	2	278.5	
Shale, blue	4	282.5	
Sand rock	4	286.5	
Slate, blue	12.7	299.2	
Coal	6	305.2	
Fire clay	1.3	306.5	

Well 14/9W-32K1

Type of record: Driller's log. Altitude: About 500 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Surface and sand	52	52	
Clay, blue	45	97	
Sand and gravel	7	104	

Table 5.--Selected well logs, Vermillion County, Indiana--Cont.

Well 14/9W-32L1

Type of record: Driller's log. Altitude: About 489 feet.

Material	Thickness (feet)	Depth (feet)	Remarks
Quaternary System:			
Recent and Pleistocene Series:			
Soil	1.5	1.5	
Clay	2.5	4	
Sand and gravel	17	21	
Boulder	.2	21.2	
Sand	19.8	41	
Clay, sandy	23.5	64.5	
Sand with coal	13.5	78	
Gravel	3.5	81.5	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Shale	2.5	84	
Sand shale	12.1	96.1	
Shale, blue, hard benches	38.9	135	
Shale, black	2.9	137.9	
Sulfur	.1	138	
Coal	1.7	139.7	
Sulfur	.1	139.8	
Coal	.5	140.3	
Fire clay	3.9	144.2	
Sand and limestone	6.8	151	
Shale, soft, blue, with hard bands	2.7	153.7	
Shale, blue	5.3	159	
Shale, blue, with hard bands	19.9	178.9	
Coal	4.7	183.6	
Fire clay	.4	184	
Sand shale	1	185	
Shale, blue	18.2	203.2	
Limestone	.3	203.5	
Shale, black	7.9	211.4	
Coal	.1	211.5	
Shale and sulfur	.6	212.1	
Coal	1.4	213.5	
Fire clay	1.5	215	
Sandstone	4	219	
Shale	3.7	222.7	
Shale, sandy	10.3	233	
Shale, blue	3.9	236.9	
Coal	5.9	242.8	
Fire clay	1.2	244	

Table 5.--Selected well logs, Vermillion County, Indiana--Cont.

Well 14/9W-33B1

Type of record: Driller's log. Altitude: About 590 feet.

Material	Thickness (feet)	Depth (feet)	Remarks
Quaternary System:			
Recent and Pleistocene Series:			
Surface sand	3	3	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Soapstone	11	14	
Shale, light	41	55	
Slate, dark	14	69	
Slate, black, and smut	2.5	71.5	
Fire clay	5	76.5	
Slate, dark	7.5	84	
Slate, black	10.5	94.5	
Coal	4.3	98.8	
Fire clay	1.2	100	

Well 14/9W-33G1

Type of record: Driller's log. Altitude: About 530 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Surface sand	4	4	
Hardpan	24	28	
Drift	2	30	
Gravel	1.5	31.5	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Shale, light	30.5	62	
Slate, dark	12	74	
Chip slate, dark	3	77	
Clay, soft	3	80	
Shale, light	6	86	
Slate, dark	10.5	96.5	
Chip slate, black	4	100.5	
Coal	4.7	105.2	
Clay	.5	105.7	

Well 14/9W-33L1

Type of record: Driller's log. Altitude: About 575 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Sand	32.4	32.4	
Clay	5	37.4	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Shale	7	44.4	
Coal	2.2	46.6	
Rock	.4	47	

Well 14/9W-33L1--Cont.

Material	Thickness (feet)	Depth (feet)	Remarks
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Slate----------	1.2	48.2	
Sandstone----------	1.4	49.6	
Slate----------	1.2	50.8	
Coal----------	4	54.8	

Well 14/9W-33L5

Type of record: Driller's log. Altitude: About 520 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Surface----------	8	8	
Hardpan----------	1.5	9.5	
Sand and gravel----------	3	12.5	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Shale, blue----------	22	34.5	
Shale, gray----------	12	46.5	
Shale, brown----------	16	62.5	
Slate, black----------	1.3	63.8	
Coal----------	1.4	65.2	
Fire clay----------	1.6	66.8	
Shale, light----------	4	70.8	
Slate, black----------	14.8	85.6	
Sulfur rock----------	1	86.6	
Slate, black----------	.2	86.8	
Coal----------	5.3	92.1	
Fire clay----------	2.9	95	
Slate, sandy----------	1	96	
Limestone----------	1.5	97.5	
Slate, brown----------	6	103.5	
Sandstone----------	9.5	113	
Shale, dark----------	30	143	
Slate, black----------	3	146	
Coal----------	2	148	
Fire clay----------	6	154	
Limestone----------	3.5	157.5	
Slate, sandy----------	13	170.5	
Shale, sandy----------	13	183.5	
Slate, blue----------	3	186.5	
Slate, brown----------	1.7	188.2	
Coal----------	5	193.2	
Slate, brown----------	25	218.2	
Slate, black----------	4	222.2	
Coal----------	1	223.2	
Sandstone----------	7.3	230.5	
Slate, sandy----------	15.5	246	
Coal----------	5.8	251.8	

Table 5.--Selected well logs, Vermillion County, Indiana--Cont.

Well 14/9W-33L5--Cont.

Material	Thickness (feet)	Depth (feet)	Remarks
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Bone coal	0.4	252.2	
Fire clay	3.3	255.5	
Coal	1	256.5	
Fire clay	1.5	258	
Slate, sandy	2	260	
Slate, black	4	264	
Limestone	4	268	
Fire clay	1	269	
Sandstone	10	279	
Slate, black	5	284	
Slate, sandy	10	294	
Lower Pennsylvanian Series:			
Slate, black	.5	294.5	
Coal	1	295.5	
Fire clay	2	297.5	
Slate, sandy, dark	12	309.5	
Limestone	5	314.5	
Slate, black	.3	314.8	
Coal	4.2	319	
Fire clay	5	324	
Sandstone	16	340	
Limestone	3	343	
Slate, black	7.5	350.5	
Sulfur	.5	351	
Coal	2.8	353.8	
Fire clay	.4	354.2	
Sandstone	----	354.2	

Well 14/9W-33N1

Type of record: Driller's log. Altitude: About 600 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Surface clay, yellow	20	20	
Hardpan, gray	30	50	
Pumice sand in blue hardpan	8	58	W. B.
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Limestone, soft, gray	3	61	W. B.
Shale, blue	39	100	
Shale, sandy, light	40	140	

Table 5.--Selected well logs, Vermillion County, Indiana--Cont.

Well 14/9W-33R1

Type of record: Driller's log. Altitude: About 470 feet.

Material	Thickness (feet)	Depth (feet)	Remarks
Quaternary System:			
Recent and Pleistocene Series:			
Surface clay	2	2	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Soapstone	21	23	
Shale, dark	49	72	
Slate, black	16	88	
Coal and slate	2	90	
Fire clay	4	94	
Shale, hard	2	96	
Slate, blue	5	101	
Slate, black	5	106	
Chip slate	6	112	
Coal	5	117	
Clay, soft	2	119	

Well 14/10W-1A1

Type of record: Driller's log. Altitude: About 615 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Surface	5	5	
Gravel	30	35	
Sand	17	52	
Gravel	2	54	

Well 14/10W-10L1

Type of record: Driller's log. Altitude: About 510 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Surface, sandy	7	7	
Sand	74	81	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Slate, blue	10	91	
Slate, black	3.5	94.5	
Clay	1.5	96	
Shale, sandy	5	101	
Slate, dark-blue	11	112	
Slate, black	2	114	
Coal	4.6	118.6	
Clay, dark	2.4	121	
Shale, sandy	5	126	
Shale, blue	53.5	179.5	
Slate, black	1.5	181	
Coal	1.5	182.5	

Well 14/10W-10L1--Cont.

Material	Thickness (feet)	Depth (feet)	Remarks
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Clay	1	183.5	
Sandstone	3	186.5	
Slate, sandy, blue	7.5	194	
Shale, sandy, light	14	208	
Slate, sandy, blue	3	211	
Slate, black	1	212	
Slate, sandy, blue	4.2	216.2	
Coal	3.7	219.9	
Sandstone	2.5	222.4	
Slate, sandy, blue	31.1	253.5	
Slate, black	6.5	260	
Coal	.5	260.5	
Clay	2	262.5	
Slate, sandy, blue	12.5	275	
Sandstone	9	284	
Slate, sandy, blue	6	290	
Coal	1	291	
Clay band	.4	291.4	
Coal	1.6	293	
Dark band	.2	293.2	
Coal	1.7	294.9	
Coal and slate	.4	295.3	
Clay	1.7	297	

Well 14/10W-12P1

Type of record: Driller's log. Altitude: About 600 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Surface	18	18	
Hardpan	17	35	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Limestone	15	50	
Shale, light	6	56	
Limestone	6	62	
Shale, gray	87	149	
Shale, dark	7	156	
Limestone	5	161	
Shale, light	4	165	
Shale, black	10	175	
Coal	4	179	
Fire clay	3	182	
Slate, gray	5	187	
Limestone	4	191	
Slate, gray	9	200	
Shale, dark	6	206	

Table 5.--Selected well logs, Vermillion County, Indiana--Cont.

Well 14/10W-12P1--Cont.

Material	Thickness (feet)	Depth (feet)	Remarks
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Slate, gray	33	239	
Coal	2	241	
Fire clay	1	242	
Shale, light	3	245	
Sandstone	2	247	
Limestone	3	250	
Sandstone	3	253	
Shale, light	7	260	
Coal	3	263	
Sandstone	14	277	
Shale, brown	7	284	
Shale, dark	19	303	
Slate and coal	4	307	
Shale, light	2	309	
Sandstone	7	316	
Shale, light	13	329	
Shale, sandy	11	340	
Coal	6	346	
Fire clay	2	348	
Shale, blue	2	350	
Slate	4	354	
Fire clay	1	355	
Shale, light	17	372	
Coal and slate	4	376	
Shale, gray	12	388	
Sandstone	11	399	
Shale, blue	1	400	

Well 14/10W-33K1

Type of record: Driller's log. Altitude: About 615 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Soil and clay	8	8	
Clay, yellow, and sand	13	21	Trace of water
Hardpan, solid, gray	9	30	
Hardpan, soft, gray, and sand	5	35	Trace of water
Hardpan, solid, gray	15	50	

Well 14/10W-34K1

Type of record: Driller's log. Altitude: About 580 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Surface	4	4	
Sand	11	15	
Softpan, sandy	29	44	

Table 5.--Selected well logs, Vermillion County, Indiana--Cont.

Well 14/10W-34K1--Cont.

Material	Thickness (feet)	Depth (feet)	Remarks
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Shale, light	8	52	
Sandstone	10	62	
Shale, light	16	78	
Shale, blue	15	93	
Blackjack	1.5	94.5	
Coal	5.5	100	
Clay	8	108	
Limestone	4	112	
Shale, gray	6	118	
Sandstone	17	135	
Shale, sandy	35	170	
Shale, blue	41	211	
Slate, black	2	213	
Coal	1	214	
Clay	2	216	
Limestone	2	218	
Shale, gray	5	223	
Shale, dark-blue	7	230	
Slate, black	1	231	
Shale, blue	1	232	
Rock slate, black	1.4	233.4	
Slate, black	2.2	235.6	
Coal	4.6	240.2	
Clay	4.8	245	
Limestone	4	249	
Sandstone	9	258	
Shale, blue	28	286	
Rock slate, black	2	288	
Slate, black	2	290	
Coal	2.4	292.4	
Clay	3.6	296	
Sandstone	5	301	
Slate, sandy	23	324	
Coal	2.5	326.5	
Clay	1.5	328	
Slate, black	.5	328.5	
Slate, sandy, brown	8.5	337	
Slate, black	1	338	
Coal	2	340	
Clay	5	345	
Sandstone	10	355	
Shale, sandy, blue	11	366	
Slate, black	5	371	
Clay	4	375	
Slate, sandy, blue	2	377	
Sandstone	18	395	
Slate, sandy, blue	2.3	397.3	

Well 14/10W-34K1--Cont.

Material	Thickness (feet)	Depth (feet)	Remarks
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Coal	5.2	402.5	
Clay	.5	403	

Well 14/10W-36F1

Type of record: Driller's log. Altitude: About 580 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Clay and gravel	12	12	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Shale, black	2	14	
Shale, soft, light	6	20	
Clay shale	1.5	21.5	
Limestone	.7	22.2	
Clay shale	3.8	26	
Shale, soft, blue	9	35	
Shale, very soft, blue	11	46	
Shale, blue, with hard bands	26.2	72.2	
Blackjack	1.4	73.6	
Coal	4.9	78.5	
Fire clay	8.3	86.8	
Limestone	4.7	91.5	
Shale, sandy	84.5	176	
Shale, blue, with hard bands	12.1	188.1	
Shale, dark, with light streaks	8.1	196.2	
Coal	1.9	198.1	
Fire clay	.7	198.8	
Shale, clayey	2.7	201.5	
Shale, sandy	3.5	205	
Shale, dark	10.5	215.5	
Slate, black	3.7	219.2	
Coal	3.6	222.8	
Sulfur	.1	222.9	
Coal	.9	223.8	
Fire clay	2	225.8	
Limestone	1.5	227.3	
Shale, sandy	4	231.3	
Sandstone	5.5	236.8	
Shale, sandy	5	241.8	
Shale, tough	9.2	251	
Shale, blue	30.8	281.8	
Shale, black	1.2	283	
Sulfur	.2	283.2	
Coal	2.2	285.4	
Fire clay	4.1	289.5	
Shale, sandy	2.5	292	

Table 5.--Selected well logs, Vermillion County, Indiana--Cont.

Well 14/10W-36F1--Cont.

Material	Thickness (feet)	Depth (feet)	Remarks
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Shale with limestone bands	4	296	
Shale, blue	4.9	300.9	
Coal	2.1	303	
Shale, sandy	3.4	306.4	
Sandstone	1.6	308	
Sandstone, shale partings	21.5	329.5	
Shale, dark	1.2	330.7	
Coal	2.7	333.4	
Shale, blue	10.9	344.3	
Slate, black	5.3	349.6	
Coal	.9	350.5	
Fire clay	1.7	352.2	
Shale, sandy	3.8	356	
Shale, blue	2.4	358.4	
Shale, sandy	1.8	360.2	
Sandstone	13.1	373.3	
Shale, blue	1.5	374.8	
Coal	6	380.8	
Fire clay	1.2	382	

Well 15/9W-2D1

Type of record: Driller's log. Altitude: About 595 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Clay	10	10	
Drift, sandy	15	25	
Drift, blue-gray	10	35	
Drift, shaly, gray	13	48	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Slate, shaly, dark	12	60	
Fire clay	12	72	
Shale, gray	49	121	
Shale, dark	2	123	
Shale, gray	3	126	
Shale, dark	16	142	
Slate	2	144	
Slate, gray	9	153	
Shale, dark	15	168	
Shale, gray	8	174	
Sandstone	2	176	
Sandstone, shaly	9	185	W.B.
Shale, gray	31	216	
Shale, sandy	3	219	
Sandstone	9	228	
Sandstone	5	233	W. B.
Shale, dark	2	235	

Well 15/9W-2E1

Type of record: Driller's log. Altitude: About 500 feet.

Material	Thickness (feet)	Depth (feet)	Remarks
Quaternary System:			
Recent and Pleistocene Series:			
Surface	3	3	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Sandstone	8	11	
Shale, blue	26	37	
Limestone	3	40	
Shale, light	2	42	
Shale, black	16	58	
Shale, light	2	60	

Well 15/9W-2M1

Type of record: Driller's log. Altitude: About 485 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Surface	10	10	
Sand, hard	20	30	
Sand	4	34	
Hardpan	13	47	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Shale, light	13	60	

Well 15/9W-27A1

Type of record: Driller's log. Altitude: About 515 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Sand and rocks mixed with clay	30	30	
Gravel and sand	22	52	
Gravel and sand	8	60	W. B.
Gravel, fine	8	68	W. B.

Well 15/9W-29G1

Type of record: Driller's log. Altitude: About 531 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Surface	3.5	3.5	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Shale, blue	27.2	30.7	
Slate, black	2	32.7	
Coal	1.6	34.3	
Fire clay	.7	35	
Shale, sandy	10	45	

Well 15/9W-29G1--Cont.

Material	Thickness (feet)	Depth (feet)	Remarks
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Shale, brown	11.6	56.6	
Limestone	2	58.6	
Shale, blue	2.4	61	
Sandstone	7	68	
Shale, blue	31.7	99.7	
Slate, black	4.8	104.5	
Coal	1.1	105.6	
Fire clay	1.4	107	
Shale, sandy	1	108	
Sandstone	3.5	111.5	
Shale, light	.5	112	
Limestone	2	114	
Shale, blue	7.5	121.5	
Coal	2.4	123.9	
Fire clay	.7	124.6	
Shale, blue	25.4	150	
Slate, blue	4.1	154.1	
Slate, black	.8	154.9	
Coal	1.1	156	
Fire clay	1	157	
Limestone	1.2	158.2	
Shale, blue	2.8	161	
Slate, black	5.2	166.2	
Coal	1.4	167.6	
Fire clay	.9	168.5	
Shale, sandy	6.3	174.8	
Sandstone	3.2	178	
Shale, sandy	12	190	
Shale, blue	10.4	200.4	
Slate, black	1	201.4	
Shale, blue	10.2	211.6	

Well 15/9W-32C1

Type of record: Driller's log. Altitude: About 610 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Surface	16	16	
Hardpan, light-gray	3	19	
Hardpan, light-brown	5.5	24.5	
Sand	1.5	26	
Hardpan, dark-brown	1	27	
Hardpan, light-gray	6	33	
Sand	1.5	34.5	
Hardpan, light-gray	3.5	38	
Hardpan, sandy	4	42	
Hardpan, brown	27	69	
Sand and gravel	3	72	W. B.

Well 15/9W-32C1--Cont.

Material	Thickness (feet)	Depth (feet)	Remarks
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Shale, gray	8	80	

Well 15/9W-32D1

Type of record: Driller's log. Altitude: About 610 feet.

Quaternary System:		
Recent and Pleistocene Series:		
Surface	8	8
Pan, sandy	75	83
Pennsylvanian System:		
Middle Pennsylvanian Series:		
Shale, gray	5.2	88.2
Slate, black	.5	88.7
Coal	.5	89.2
Clay	.4	89.6
Shale, gray	11.4	101
Shale, sandy, gray	13	114
Sandstone	6	120
Shale, gray	1	121
Limestone	3.5	124.5
Shale, light-gray	4.5	129
Shale, sandy, gray	6	135
Sandstone	10	145
Shale, sandy, gray	22	167
Shale, dark-gray	6	173
Slate, black	1.6	174.6
Coal	1.2	175.8
Clay	2.2	178
Shale, sandy, gray	8	186
Shale, gray	16	202
Sandstone	5	207
Shale, sandy, gray	2	209
Sandstone	7	216
Shale, sandy, gray	2.3	218.3
Coal	.2	218.5
Sulfur	.2	218.7
Coal	.1	218.8
Sandstone	.8	219.6
Coal	.4	220
Band	.1	220.1
Coal	.7	220.8
Clay	2.1	222.9
Shale, sandy, gray	1.1	224
Shale, gray	5.8	229.8
Coal	.4	230.2
Clay	1	231.2
Shale, gray	1.8	233

Well 15/9W-32D1--Cont.

Material	Thickness (feet)	Depth (feet)	Remarks
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Shale, dark-gray----------	3.5	236.5	
Slate, black----------	1.5	238	

Well 15/9W-34Q1

Type of record: Driller's log. Altitude: About 500 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Surface fill and sand----------	12	12	
Gravel, fine----------	36	48	W. B. 36 to 67.5 ft
Sand and gravel----------	10	58	
Gravel, shot-sized----------	9.5	67.5	

Well 15/10W-10K1

Type of record: Driller's log. Altitude: About 640 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Clay, soft, yellow----------	18	18	
Hardpan, hard----------	32	50	
Sand, fine----------	10	60	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Shale, soft, light----------	7	67	
Shale, hard, light----------	28	95	
Sandstone, light----------	55	150	W. B.

Well 15/10W-15M1

Type of record: Driller's log. Altitude: About 620 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Soil----------	3	3	
Clay----------	32	35	
Gravel----------	15	50	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Shale, white----------	24	74	
Lime shell----------	2	76	
Slate, white----------	4	80	
Coal----------	3	83	
Slate, white and dark----------	87	170	T. D. 1,727 ft

Well 15/10W-21R1

Type of record: Driller's log. Altitude: About 610 feet.

Material	Thickness (feet)	Depth (feet)	Remarks
Quaternary System:			
Recent and Pleistocene Series:			
Clay, sandy	10	10	
Hardpan	10	20	Little water at 20 ft
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Shale, gray	25	45	
Shale, white	7.5	52.5	
Sandstone	12.5	65	
Shale	25	90	Little water at 78 ft
Shale, sandy	3	93	
Shale	31	124	
Slate	.5	124.5	
Shale, sandy	2.5	127	
Sandstone	5	132	
Shale, sandy	9	141	
Coal	1	142	
Shale, sandy, solid	33	175	
Shale, blue	40	215	
Slate, black	5	220	
Shale, sandy	10	230	
Sandstone, white	14	244	
Sandstone, yellow	4	248	Salt water
Shale	2	250	

Well 15/10W-27M1

Type of record: Driller's log. Altitude: About 610 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Surface	19	19	
Hardpan	29	48	
Sand and gravel	8	56	W. B.

Well 15/10W-27R1

Type of record: Driller's log. Altitude: About 630 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Surface	10	10	
Hardpan	42	52	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Shale, light	62	114	
Shale, blue	20	134	
Slate, soft, black	4	138	

Well 15/10W-27R1--Cont.

Material	Thickness (feet)	Depth (feet)	Remarks
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Fire clay	7	145	
Limestone	3	148	
Shale, light	4	152	
Slate, soft, black	5	157	
Slate, hard, black	1.7	158.7	
Coal	3.1	161.8	
Fire clay	5.1	166.9	
Shale, sandy, light	45	211.9	
Shale, blue	28	239.9	
Slate, soft, black	7	246.9	
Slate, hard, black	4	250.9	
Fire clay	3	253.9	
Sandstone	10	263.9	
Shale, light	9	272.9	
Slate, light	7	279.9	
Coal	2.8	282.7	
Fire clay	7.2	289.9	
Sandstone	16	305.9	
Shale, sandy, light	9	314.9	
Slate, sandy, brown	8	322.9	
Slate, soft, black	6	328.9	
Slate, hard, black	3	331.9	
Coal	1.2	333.1	
Fire clay	2.8	335.9	
Sandstone	8	343.9	
Slate, sandy, dark	16	359.9	
Sandstone	9.5	369.4	
Slate, soft, gray	.5	369.9	
Coal	6.3	376.2	
Fire clay	.7	376.9	

Well 15/10W-35D1

Type of record: Driller's log. Altitude: About 615 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Surface	8	8	
Sand	8	16	
Hardpan, sandy	17.3	33.3	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Shale, sandy	1.7	35	
Sandstone	17	52	
Shale, sandy	56	108	
Shale, blue	9	117	
Slate, black	1.4	118.4	
Coal	.6	119	

Table 5.--Selected well logs, Vermillion County, Indiana--Cont.

Well 15/10W-35D1--Cont.

Material	Thickness (feet)	Depth (feet)	Remarks
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Fire clay	2.1	121	
Shale, light	2	123	
Limestone	4.3	127.3	
Shale, blue	8.7	136	
Slate, black	1	137	
Coal	3.7	140.7	
Fire clay	1.3	142	
Shale, light	2	144	
Sandstone	23	167	
Shale, sandy	13	180	
Shale, blue	38.2	218.2	
Slate, black	.7	218.9	
Coal	.3	219.2	
Fire clay	1	220.2	
Shale, sandy	3.8	224	
Shale, brown	22	246	
Limestone	2	248	
Shale, gray	14.8	262.8	
Slate, black	.8	263.6	
Slate, black, and coal	1.6	265.2	
Shale, brown	4.5	269.7	
Sandstone	11.3	281	
Shale, brown	17.5	298.5	
Shale, black	6.7	305.2	
Coal	1.3	306.5	
Fire clay	2	308.5	
Shale, light	8.5	317	
Shale, gray	3	320	
Shale, brown	12	332	
Sandstone	13.2	345.2	
Coal	.8	346	
Slate	.1	346.1	
Coal	.6	346.7	
Slate, gray	.3	347	
Coal	3.7	350.7	
Fire clay	1.1	351.8	
Shale, brown	3.5	355.3	
Coal	.8	356.1	
Fire clay	.9	357	
Shale, blue	2.3	359.3	
Slate, black	3.5	362.8	
Coal	1.4	364.2	
Fire clay	.8	365	
Limestone	1	366	
Shale, brown	2	368	
Limestone	1	369	
Shale, blue	10.3	379.3	

Table 5.--Selected well logs, Vermillion County, Indiana--Cont.

Well 15/10W-35D1--Cont.

Material	Thickness (feet)	Depth (feet)	Remarks
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Slate, black	5	384.3	
Slate, blue	2.7	387	
Slate and coal	.6	387.6	
Fire clay	1	388.6	
Shale, brown	1.4	390	
Shale, blue	18	408	
Slate, blue	5.2	413.2	
Lower? Pennsylvanian Series:			
Coal	2.7	415.9	
Fire clay	1.1	417	
Shale, light	8	425	
Shale, brown	8	433	
Shale, blue	12	445	
Limestone	1.2	446.2	
Slate, black	.7	446.9	
Coal and slate	1.2	448.1	
Slate, dark	.5	448.6	
Limestone	48	496.6	
Shale, brown	29	525.6	

Well 15/10W-35H1

Type of record: Driller's log. Altitude: About 610 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Surface	10	10	
Pan, sandy	20.5	30.5	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Shale, sandy, gray	14.8	45.3	
Sandstone	.6	45.9	
Shale, sandy, gray	14.6	60.5	
Sandstone	2	62.5	
Shale, gray	9.5	72	
Slate, black	1	73	
Shale, gray	.5	73.5	
Slate, black	1	74.5	
Coal	.8	75.3	
Clay	2	77.3	
Shale, gray	3.7	81	
Limestone	2.5	83.5	
Shale, gray	2.5	86	
Shale, dark-gray	4	90	
Slate, black	4.3	94.3	
Coal	.9	95.2	
Band	----	95.2	
Coal	1.6	96.8	

Well 15/10W-35H1--Cont.

Material	Thickness (feet)	Depth (feet)	Remarks
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Clay	2	98.8	
Shale, gray	4.7	103.5	
Shale, sandy, gray	10	113.5	
Shale, gray	64.5	178	
Shale, dark-gray	1	179	
Slate, black	3.6	182.6	
Coal	1.2	183.8	
Clay	.5	184.3	
Shale, sandy, gray	3.7	188	
Sandstone	12	200	
Shale, sandy, gray	14.8	214.8	
Shale, dark-gray	.4	215.2	
Shale, sandy, gray	1.8	217	
Sandstone	3	220	
Shale, sandy, gray	6.5	226.5	
Shale, gray to brown	7.5	234	
Shale, sandy, gray	8.5	242.5	
Shale, gray	6.5	249	
Slate, black	4.5	253.5	
Clay	2	255.5	
Shale, light-gray	12.5	268	
Shale, sandy, light-gray	3.5	271.5	
Sandstone	2.5	274	
Shale, sandy, gray	5.5	279.5	
Shale, gray	10	289.5	
Shale, sandy, gray	37.5	327	
Shale, dark-gray	3	330	
Slate, black	3.7	333.7	
Shale, brown	.5	334.2	
Clay	.6	334.8	
Shale, sandy, gray	4.2	339	
Shale, gray	6.8	345.8	
Slate, black	3.2	349	
Shale, sandy, gray	3	352	
Smut	.5	352.5	
Clay	1	353.5	
Shale, sandy, gray	4.5	358	

Well 16/9W-3D1

Type of record: Driller's log. Altitude: About 630 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Clay, yellow	12	12	
Clay, sandy, yellow	5	17	
Muck, soft, blue	15	32	
Hardpan	35	67	

Table 5.--Selected well logs, Vermillion County, Indiana--Cont.

Well 16/9W-3D1--Cont.

Material	Thickness (feet)	Depth (feet)	Remarks
Quaternary System:			
Recent and Pleistocene Series:			
Clay, soft, blue	21	88	
Hardpan	6	94	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Shale, soft	8	102	
Sandstone	83	185	W. B.

Well 16/9W-11N1

Type of record: Driller's log. Altitude: About 520 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Riverwash and hillslide	18	18	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Shale, soft, blue	8	26	
Slate, carbonaceous, black	10	36	
Fire clay, plastic, white	8	44	
Limestone streaked with clay	12	56	
Limestone, coarse-grained, very hard, white	14	70	
Shale and slate with coal streaks	9	79	
Shale, gray	5	84	

Well 16/9W-15N1

Type of record: Driller's log from memory. Altitude: About 620 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Mud, sandy, soft	128	128	
Mud, sandy, firmer	7	135	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Sandstone	17	152	W. B.

Well 16/9W-22L1

Type of record: Driller's log. Altitude: About 650 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Surface	10	10	
Sand	12	22	
Hardpan	23	45	
Sand and gravel	6	51	W. B.

Well 16/9W-22P1

Type of record: Driller's log. Altitude: About 650 feet.

Material	Thickness (feet)	Depth (feet)	Remarks
Quaternary System:			
Recent and Pleistocene Series:			
Surface	15	15	
Hardpan	37	52	
Gravel	2	54	W. B.
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Slate, black	4	58	
Fire clay	3	61	

Well 16/9W-30Q1

Type of record: Driller's log. Altitude: About 630 feet.

Old hole	100	100	
Quaternary System:			
Recent and Pleistocene Series:			
Muck, sandy	70	170	Dry
Coal	.5	170. 5	Slight seepage
Mud	2	172.5	Dry
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Bluestone	2.5	175	Dry
Shale, gray	15	190	Slight seepage
Shale, dark	45	235	Do
Shale, gray	15	250	W. B.

Well 16/9W-31A1

Type of record: Driller's log. Altitude: About 630 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Clay, yellow	12	12	
Sand, hard	6	18	
Mud, soft, blue	4	22	
Hardpan	26	48	
Clay, blue	8	56	
Hardpan	7	63	
Mud, hard, blue	16	79	
Clay, blue	7	86	
Sand and gravel	9	95	W. B.

Well 16/9W-32P1

Type of record: Driller's log. Altitude: About 640 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Surface	10	10	
Hardpan	11.5	21.5	

Well 16/9W-32P1--Cont.

Material	Thickness (feet)	Depth (feet)	Remarks
Quaternary System:			
Recent and Pleistocene Series:			
Gravel	3.5	25	W. B.
Hardpan	53	78	
Gravel	.5	78.5	Not much water
Hardpan	23.5	102	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Shale, light	1	103	

Well 16/9W-34H1

Type of record: Driller's log from memory. Altitude: About 590 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Surface	6	6	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Clay, blue, and shale	111	117	
Sandstone, white	17	134	Salt water
Shale, soft	100	234	
Sandstone, yellow	106	340	Soda water in top 10 ft
Lower? Pennsylvanian Series:			
Shale	192	532	
Sandstone	3	535	
Shale	15	550	

Well 16/10W-9F1

Type of record: Driller's log. Altitude: About 625 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Surface	10	10	
Hardpan and sand	50	60	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Slate, black	3	63	
Coal	2	65	
Fire clay	3	68	
Shale, light	8	76	
Shale, dark	2	78	
Coal	2	80	
Shale, dark	42	122	
Limestone	4	126	
Sandstone	6	132	
Shale, light	8	140	
Shale, blue	51	191	
Coal	1	192	

Well 16/10W-9F1--Cont.

Material	Thickness (feet)	Depth (feet)	Remarks
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Shale, dark	8	200	
Coal	2	202	
Shale, dark	12	214	
Shale, light	5	219	
Limestone	3	222	
Shale, light	15	237	
Shale, dark	98	335	
Shale, light	21	356	

Well 16/10W-22G1

Type of record: Driller's log. Altitude: About 630 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Clay, surface	15	15	
Sand and hardpan	10	25	
Hardpan, sandy	25	50	
Gravel	10	60	
Sand	2	62	
Hardpan	31	93	
Sand and gravel	2	95	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Fire clay	2	97	
Shale, gray	48	145	
Slate, black	3.8	148.8	
Coal	1	149.8	
Fire clay	1.2	151	
Shale, gray	9	160	
Shale, sandy	4	164	
Slate, black	1	165	
Shale, light-gray	7	172	
Sandstone	2.5	174.5	
Shale, sandy, light	20.5	195	
Shale, gray	11	206	
Shale, dark	10.4	216.4	
Slate, black	2.6	219	
Coal	.8	219.8	
Fire clay	1.2	221	
Shale, dark	3	224	
Shale, light	2	226	
Shale, sandy, light	19	245	
Shale, soft, dark	1.7	246.7	
Coal	.5	247.2	
Shale, light	3.3	250.5	
Sandstone	12	262.5	
Shale, sandy, gray	27.5	290	

Well 16/10W-22G1--Cont.

Material	Thickness (feet)	Depth (feet)	Remarks
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Shale, gray	2	292	
Shale, sandy, gray	6	298	
Sandstone	25.7	323.7	
Lower? Pennsylvanian Series:			
Slate, black	.3	324	
Limestone, sandy	3	327	
Slate, dark	.3	327.3	
Coal	3.1	330.4	
Shale, sandy	14.6	345	
Sandstone	59	404	
Shale, sandy	40	444	
Sandstone	7	451	
Shale, sandy	2.5	453.5	
Sandstone	16.5	470	
Shale, sandy	18	488	
Shale, dark-gray	16	504	
Mississippian? System:			
Meramec? Series:			
Limestone and shale	16	520	
Sandstone and shale	8	528	
Limestone, white, with shale	5	533	

Well 16/10W-36F1

Type of record: Driller's log. Altitude: About 650 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Surface	18	18	
Hardpan	102	120	
Sand, coarse	2	122	W. B.
Gravel	5	127	W. B.

Well 17/9W-4F1

Type of record: Driller's log. Altitude: About 490 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Soil	19	19	
Clay, gravelly	1	20	
Sand, silty, brown	2	22	
Clay, sandy, brown	8	30	
Sand and gravel, dirty, brown	50	80	
Sand, fine, fairly clean	20	100	
Sand and gravel, fine, dirty	5	105	
Gravel, dirty	1	106	
Pennsylvanian System:			
Lower Pennsylvanian Series:			
Sandstone	2	108	

Table 5.--Selected well logs, Vermillion County, Indiana--Cont.

Well 17/9W-4L1

Type of record: Driller's log. Altitude: About 499 feet.

Material	Thickness (feet)	Depth (feet)	Remarks
Quaternary System:			
Recent and Pleistocene Series:			
Clay	6	6	
Clay and gravel	28	34	
Gravel and sand, clean	41	75	W. B.

Well 17/9W-6F1

Type of record: Driller's log. Altitude: About 575 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Clay, yellow	5	5	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Shale, soft, blue	45	50	
Limestone, gray	25	75	
Shale, limy, gray	65	140	
Sandstone, fine-grained, blue	10	150	W. B.

Well 17/9W-6Q1

Type of record: Driller's log. Altitude: About 590 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Clay	11	11	
Gravel	3	14	Dry
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Sandstone	18	32	
Shale	59	91	
Slate	6	97	
Shale, blue	6	103	
Coal	3	106	
Shale, gray	12	118	
Sandstone	12	130	
Shale, black	9	139	
Shale, blue	6	145	
Shale, gray	15	160	
Shale, blue	5	165	
Shale, gray	60	225	

Well 17/9W-15J1

Type of record: Driller's log. Altitude: About 490 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Glacial drift and boulders	13	13	

Table 5.--Selected well logs, Vermillion County, Indiana--Cont.

Well 17/9W-15J1--Cont.

Material	Thickness (feet)	Depth (feet)	Remarks
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Shale, white	23	36	
Lower? Pennsylvanian Series:			
Slate, hard, blue	8	44	
Limestone, dense, hard, gray	6	50	
Coal	7	57	
Fire clay, white	3	60	

Well 17/9W-18D1

Type of record: Driller's log. Altitude: About 650 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Clay, yellow	18	18	
Streaks of gravel and clay, very dirty	86	104	W. B.
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Slate, hard, black	10	114	
Limestone, gray, containing large cavities	32	146	W. B.

Well 17/9W-21Q1

Type of record: Driller's log. Altitude: About 533 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Silt, some fine sand; medium-dense, dark-gray	4	4	
Sand, fine, some silt; medium-dense, brown	2	6	
Sand, fine, some silt and trace of gravel; medium-dense, brown-	3	9	
Sand, fine to coarse, some silt and trace of gravel; medium-dense, brown	4.5	13.5	
Clay, some silt and trace of sand and gravel; very tough, brown and gray	5	18.5	
Clay and silt, trace of sand and gravel; hard, brown and gray---	10	28.5	
Clay and silt, trace of sand and gravel; very tough, brown and gray	5	33.5	
Clay and silt, trace of sand and gravel; hard, brown and gray---	5	38.5	
Sand, fine to coarse, some fine to coarse gravel and silt; very dense, gray	2.5	41	

Well 17/9W-21Q1--Cont.

Material	Thickness (feet)	Depth (feet)	Remarks
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Shale, silty, soft, with trace of blue hard sand----------	4	45	

Well 17/9W-27E1

Type of record: Driller's log. Altitude: About 509 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Sand, fine, and silt; loose, dark-brown----------	2	2	
Sand, fine, with some silt; loose, brown----------	2	4	
Sand, fine, with trace of silt; loose, brown----------	2	6	
Sand, fine to medium, trace of silt; loose, brown----------	3	9	
Sand, fine to coarse, trace of silt and fine gravel; medium-dense, brown----------	5.5	14.5	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Shale, silty, soft, trace of blue sand----------	10.5	25	

Well 17/9W-31N1

Type of record: Driller's log. Altitude: About 610 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Soil----------	1	1	
Clay, yellow----------	14	15	
Hardpan, gray----------	41	56	
Clay, green----------	24	80	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Rock----------	--	80	

Well 17/9W-31P1

Type of record: Driller's log. Altitude: About 620 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Soil----------	1	1	
Clay, yellow----------	11	12	
Hardpan, gray----------	18	30	
Hardpan, dark----------	8	38	
Hardpan, gray----------	27	65	

Table 5.--Selected well logs, Vermillion County, Indiana--Cont.

Well 17/9W-31P1--Cont.

Material	Thickness (feet)	Depth (feet)	Remarks
Quaternary System:			
Recent and Pleistocene Series:			
Hardpan, dark	43	108	
Clay, light-blue	24	132	
Clay, dark	3	135	

Well 17/9W-36P2

Type of record: Driller's log. Altitude: About 530 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Gravel, yellow, and clay	24	24	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Shale, blue	8	32	
Fire clay, blue	18	50	
Slate, gray	10	60	
Fire clay, plastic, white	6	66	
Shale, limy	9	75	
Shale, sandy, with limestone streaks	11	86	
Lower? Pennsylvanian Series:			
Sandstone, gray	10	96	
Sandstone and gray slate streaks	64	160	

Well 17/10W-7K1

Type of record: Driller's log. Altitude: About 680 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Top soil	2	2	
Clay, yellow	48	50	
Clay, shaly, blue	10	60	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Slate, blue	20	80	W. B.
Shale, sandy, blue	20	100	
Shale, blue, and streaks of blue sandstone	20	120	W. B.

Well 17/10W-7L1

Type of record: Driller's log. Altitude: About 680 feet.

Basement	7	7	
Quaternary System:			
Recent and Pleistocene Series:			
Clay, yellow	28	35	
Clay, gravelly, blue	62	97	

Well 17/10-7L1--Cont.

Material	Thickness (feet)	Depth (feet)	Remarks
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Limestone	1	98	
Shale, caving, brown	3	101	
Shale, light-blue	14	115	
Slate, light-blue	32	147	
Shale, sandy, white	20	167	W. B.
Shale, light-blue	10	177	
Sandstone, blue	15	192	

Well 17/10W-8M1

Type of record: Driller's log. Altitude: About 670 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Soil and fill	2	2	
Clay, yellow	20	22	
Clay, gravelly, blue	58	80	
Hardpan, gravelly, yellow	50	130	
Gravel, coarse, yellow	3	133	W. B.

Well 17/10W-9A1

Type of record: Driller's log. Altitude: About 560 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Clay, yellow	14	14	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Shale, sticky, brown	16	30	
Shale, blue	30	60	
Shale, limy	20	80	
Slate, black	15	95	
Sandstone	28	123	W. B.

Well 17/10W-17N1

Type of record: Driller's log. Altitude: About 650 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Top soil	2	2	
Clay, yellow	16	18	
Clay, sandy, blue	66	84	
Hardpan and blue shale streaks	50	134	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Shale, sandy, blue	10	144	
Shale, hard, blue	34	178	
Fire clay, caving, white	2	180	

Well 17/10W-17N1--Cont.

Material	Thickness (feet)	Depth (feet)	Remarks
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Shale, gray, with streaks of slate	40	220	
Slate, hard, black	7	227	
Limestone, gray	3	230	
Sandstone, grading to white with depth	20.5	250.5	W. B.

Well 17/10W-18R1

Type of record: Driller's log. Altitude: About 600 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Gravel and clay	8	8	
Hardpan	13	21	
Gravel	1	22	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Shale, gray	48	70	
Shale, hard	5	75	
Shale, black	3	78	
Shale (slate), black	3	81	
Shale, gray	38	119	
Limestone, soft, gray	5	124	Some water
Shale, gray	24	148	
Shale (slate), dark-blue	2	150	W. B.
Coal	5	155	
Fire clay turning to sandy shale last 10 feet	19.5	174.5	

Well 17/10W-31J1

Type of record: Driller's log. Altitude: About 670 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Surface	18	18	
Softpan, gray	33	51	
Hardpan, gray	18	69	
Hardpan, dark	31	100	
Wash	6	106	
Hardpan, dark	5	111	
Sand and gravel	5	116	W. B.

Table 5.--Selected well logs, Vermillion County, Indiana--Cont.

Well 17/10W-31Q1

Type of record: Driller's log. Altitude: About 660 feet.

Material	Thickness (feet)	Depth (feet)	Remarks
Quaternary System:			
Recent and Pleistocene Series:			
Surface	15	15	
Wash, gray	15	30	
Softpan, gray	17	47	
Softpan, dark	68	115	
Wash	12	127	
Softpan, dark	3	130	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Shale, gray	37	167	
Slate, blue	9	176	
Shale, sandy, gray	24	200	

Well 17/10W-32A1

Type of record: Driller's log. Altitude: About 635 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Soil	1	1	
Clay, yellow	9	10	
Hardpan, gray	12	22	
Gravel and quicksand, light-brown	8	30	Some water
Hardpan, gray	7	37	
Gravel and sand, gray	3	40	Some water
Hardpan, black, and sand	7	47	
Sand, black and gray	3	50	Some water

Well 18/9W-6M1

Type of record: Driller's log. Altitude: About 605 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Gravel	120	120	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Coal	5	125	
Shale, blue	40	165	
Shale	2	167	
Sand	18	185	
Slate	5	190	T. D. 1,102 ft

Well 18/9W-17C1

Type of record: Driller's log. Altitude: About 565 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Clay, gravelly, dark	4	4	
Clay, sandy, brown	15	19	

Well 18/9W-17C1--Cont.

Material	Thickness (feet)	Depth (feet)	Remarks
Quaternary System:			
Recent and Pleistocene Series:			
Gravel and sand	43	62	
Gravel and sand, gray	58	120	W. B. 95 to 181 ft
Gravel and sand	27	147	
Sand, brown	28	175	
Sand, gray	6	181	
Pennsylvanian System:			
Lower Pennsylvanian Series:			
Sandstone	1	182	

Well 18/9W-20K1

Type of record: Driller's log. Altitude: About 500 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Sand and gravel	20	20	
Clay, blue	78	98	
Gravel and some sand	17	115	W. B.
Sand and some gravel, cemented	8	123	W. B.
Pennsylvanian System:			
Lower Pennsylvanian Series:			
Shale	--	123	

Well 18/9W-28K1

Type of record: Driller's log. Altitude: About 520 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Boulders and hardpan	21	21	
Gravel, yellow	19	40	W. B.
Clay, blue	23	63	

Well 18/9W-30E1

Type of record: Driller's log. Altitude: About 560 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Gravel, yellow	59	59	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Shale, blue	10	69	
Slate, blue	9	78	
Fire clay, white	5	83	
Limestone and fire clay	32	115	
Coal	5.8	120.8	
Fire clay	2	122.8	
Limestone, gray	14	136.8	
Shale	2	138.8	
Rock, porous, brown	8	146.8	

Table 5.--Selected well logs, Vermillion County, Indiana--Cont.

Well 18/9W-30M1

Type of record: Driller's log. Altitude: About 550 feet.

Material	Thickness (feet)	Depth (feet)	Remarks
Quaternary System:			
Recent and Pleistocene Series:			
Top soil	1	1	
Clay, brown	3	4	
Gravel, brown, and hardpan	17	21	
Sand and gravel	29	50	Dry
Sand, brown	17	67	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Shale, gray	27	94	
Shale, black	7	101	
Shale, gray	6	107	
Limestone, white	3	110	
Limestone	3	113	
Limestone, white	10	123	
Shale, black	5	128	
Lower? Pennsylvanian Series:			
Shale, gray	112	240	Salt water at 240 ft

Well 18/9W-31J1

Type of record: Driller's log. Altitude: About 510 feet.

Material	Thickness (feet)	Depth (feet)	Remarks
Quaternary System:			
Recent and Pleistocene Series:			
Sand and gravel	22	22	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Shale, blue	23	45	
Sandstone, gray	35	80	W. B.

Well 18/9W-31Q1

Type of record: Driller's log. Altitude: About 545 feet.

Material	Thickness (feet)	Depth (feet)	Remarks
Quaternary System:			
Recent and Pleistocene Series:			
Sand, dirty, yellow	16	16	
Sand and gravel	52	68	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Fire clay, white	4	72	
Limestone, gray	18	90	
Limestone and blue shale	37	127	

Well 18/9W-31Q3

Type of record: Driller's log. Altitude: About 550 feet.

Material	Thickness (feet)	Depth (feet)	Remarks
Quaternary System:			
Recent and Pleistocene Series:			
Gravel, yellow	60	60	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Shale, light-blue	15	75	
Sandstone, gray	10	85	W. B.
Shale, limy	93	178	

Well 18/9W-32H3

Type of record: Driller's log. Altitude: About 497 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Clay, brown	17	17	
Clay, sandy	4	21	
Sand	11	32	W. B.
Gravel, pea-sized	9	41	W. B.
Sand	13	54	W. B.

Well 18/10W-16H1

Type of record: Driller's log. Altitude: About 600 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Top soil	1	1	
Clay, sandy	18	19	
Clay, blue	11	30	
Sand, fine	2	32	
Clay, sandy, gravelly	26	58	
Clay, sandy, brown	19	77	
Sand, fine, blue	50	127	Dry
Sand, fine, and gravel	3	130	Trace of water
Sand, fine	30	160	W. B.
Clay, gumbo, brown	25	185	
Sand and gravel	2	187	W. B.

Well 18/10W-17D1

Type of record: Driller's log. Altitude: About 625 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Top soil	20	20	
Gravel	1	21	
Clay, brown	74	95	

Well 18/10W-17D1--Cont.

Material	Thickness (feet)	Depth (feet)	Remarks
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Shale, green	10	105	
Shale, gray	15	120	
Shale, light-brown	7	127	
Shale, gray	8	135	
Shale, white, and limestone	25	160	
Shale, blue	5	165	
Shale, black	30	195	
Shale, gray	10	205	
Shale, white, and limestone	5	210	
Shale, gray	5	215	
Shale, white, and limestone	55	270	

Well 18/10W-20B1

Type of record: Driller's log. Altitude: About 600 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Clay	22	22	
Hardpan	8	30	
Sand, hard	53	83	Dry
Sand	7	90	Dry
Sand	30	120	W. B.
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Stone	10	130	Limestone?
Fire clay	18	148	
Coal	4	152	
Fire clay	3	155	
Coal	2	157	
Sandstone	11	168	W. B.
Sandstone	14	182	Gas
Sandstone and clay	65	247	W. B.
Coal	5	252	
Sandstone	--	252	W. B.

Well 18/10W-30B1

Type of record: Driller's log. Altitude: About 612 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Soil and yellow and blue clay	70	70	
Sand and clay	3	73	
Clay, yellow	5	78	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Shale, brown	28	106	
Sandstone, hard, gray	5	111	

Well 18/10W-30B1--Cont.

Material	Thickness (feet)	Depth (feet)	Remarks
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Sandstone, soft, dark-gray with smut	13	124	
Shale, sandy, brown	2	126	
Shale, brown	5	131	
Fire clay	5	136	
Sandstone, fine, soft, waxy, white	5	141	
Sandstone, fine, a little coarser, soft, waxy, white	15	156	Trace of oil
Sandstone, fine, white, with mica specks	8	164	
Shale, brown	7	171	
Slate, black	10	181	
Shale, brown, and soapstone	9	190	
Coal	2	192	
Fire clay	4	196	
Shale, brown	4	200	
Coal	5	205	
Shell, hard	3	208	
Fire clay, white	8	216	
Clay, smooth, white, or slate	19	235	T. D. 1,036 ft

Well 18/10W-31G1

Type of record: Driller's log. Altitude: About 630 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Clay and glacial drift	64	64	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Slate, hard, gray	56	120	
Slate, black	9	129	
Slate, blue, with limestone streaks	31	160	
Limestone and sandstone	10	170	
Shale, limy	10	180	
Sandstone, blue	5	185	

Well 18/10W-31Q1

Type of record: Driller's log. Altitude: About 640 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Clay, hard, yellow	18	18	
Clay, blue	10	28	
Hardpan, sandy, blue	62	90	
Sand and clay	2	92	

Well 18/10W-31Q1--Cont.

Material	Thickness (feet)	Depth (feet)	Remarks
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Fire clay, blue	33	125	
Coal, hard	7	132	
Fire clay, gray	8	140	
Shale, limy, blue	50	190	
Fire clay, gray	7	197	
Sandstone, gray	18	215	
Shale, black	3	218	

Well 18/10W-32J1

Type of record: Driller's log. Altitude: About 560 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Clay, gravelly	22	22	
Gravel, fine	10	32	
Gravel, coarse	7	39	
Hardpan, gray	11	50	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Rock, coarse	2	52	
Sandstone, fine, hard, yellow	2	54	
Shale, gray	27	81	W. B. 55 to 60 ft
Shale, dark	9	90	
Shale, black	5	95	
Shale, gravelly, black	--	95	
Shale, dark-gray	35	130	
Lower? Pennsylvanian Series:			
Shale, blue	5	135	
Limestone, hard, black	2	137	
Limestone, hard, gray	3	140	
Shale, gray	4	144	
Limestone, hard, gray	2	146	
Shale, light-gray	2	148	
Sandstone, hard, brown	1	149	
Sandstone, hard, lighter-brown	9	158	
Shale, gray	22	180	
Shale, sandy	20	200	
Limestone, brown	20	220	
Shale, sandy, gray	28	248	
Sandstone	1	249	
Shale, sandy, gray	54	303	
Mississippian? System:			
Osage? Series:			
Shale, brown	7	310	
Shale, gray	6	316	
Sandstone, gray	20	336	
Shale, sandy, gray	4	340	

Well 18/10W-32J1--Cont.

Material	Thickness (feet)	Depth (feet)	Remarks
Mississippian? System:			
Osage? Series:			
Sandstone with shale breaks------	10	350	
Sandstone, gray----------	33	383	
Shale, gray----------	157	540	
Fire clay, white----------	3	543	
Shale----------	7	550	
Shale, hard, blue----------	14	564	
Fire clay, soft, white----------	2	566	
Shale, sandy, hard----------	--	566	

Well 19/9W-2C1

Type of record: Driller's log. Altitude: About 498 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Sand, fine to medium, some silt; loose, brown----------	2	2	
Sand, fine to medium, trace of silt; loose, brown----------	7	9	
Silt and clay; medium-dense, brown----------	4.5	13.5	
Sand, fine to medium, some brown silt; medium-dense----------	10	23.5	W. B. 18 to 46 ft
Sand, fine to coarse, trace of silt; medium-dense, brown------	3	26.5	
Sand, fine to coarse, some gravel; dense, brown----------	7	33.5	
Sand, fine to coarse, and gravel, trace of silt; dense, brown----------	5	38.5	
Sand, fine to coarse, trace of gravel and silt; dense, brown--	5	43.5	
Sand, fine to coarse, and gravel, trace of silt; very dense, brown and gray----------	2.5	46	
Pennsylvanian System:			
Lower Pennsylvanian Series:			
Sandstone, dense, gray and white-	5	51	

Well 19/9W-3E1

Type of record: Driller's log. Altitude: About 560 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Silt, sand, and gravel; medium-dense, brown and black---------	2.1	2.1	
Sand, fine to coarse, some gravel; medium-dense, brown----------	2	4.1	

Well 19/9W-3E1--Cont.

Material	Thickness (feet)	Depth (feet)	Remarks
Quaternary System:			
Recent and Pleistocene Series:			
Sand, fine to coarse, trace of silt and gravel; loose, brown--	5	9.1	
Sand, fine to coarse, trace of silt and gravel; medium-dense, brown----------	4.5	13.6	
Sand and gravel, some silt; very dense, brown and gray----------	13.4	27	

Well 19/9W-4B1

Type of record: Driller's log. Altitude: About 550 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Sand, brown----------	4	4	
Gravel, brown----------	28	32	
Hardpan, gray----------	33	65	
Sand and gravel----------	12	77	W. B.

Well 19/9W-4C1

Type of record: Driller's log. Altitude: About 585 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Soil and yellow clay----------	21	21	
Clay, dark-gray----------	33	54	
Sand, brown----------	16	70	
Sand, gray----------	18	88	
Hardpan, dark-gray----------	30	118	
Pennsylvanian System:			
Lower Pennsylvanian Series:			
Shale, gray----------	22	140	W. B.

Well 19/9W-4H3

Type of record: Driller's log. Altitude: About 560 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Sand and silt, some gravel; medium-dense, brown and black--	2	2	
Sand, fine to coarse, some silt, trace of gravel; medium-dense, brown----------	2	4	
Sand, fine to coarse, some gravel, trace of silt; medium-dense, brown----------	5	9	
Sand, fine to coarse, trace of gravel and silt; medium-dense, brown----------	4.5	13.5	

Well 19/9W-4H3--Cont.

Material	Thickness (feet)	Depth (feet)	Remarks
Quaternary System:			
Recent and Pleistocene Series:			
Sand and gravel, some silt; very dense, brown and gray-----	13.5	27	

Well 19/9W-4N1

Type of record: Driller's log. Altitude: About 600 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Clay and gravel----------	170	170	
Pennsylvanian System:			
Lower Pennsylvanian Series:			
Limestone, gray----------	2	172	
Shale, blue----------	65	237	
Sandstone, white----------	5	242	
Shale, dark-brown----------	23	265	
Sandstone, brown----------	14	279	
Shale, broken, blue----------	21	300	
Sandstone, soft, white----------	65	365	W. B.
Mississippian System:			
Osage Series:			
Shale, limy, soft, gray----------	35	400	T. D. 1,050 ft

Well 19/9W-10Q1

Type of record: Core description. Altitude: About 485 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Dirt, black----------	1	1	
Clay, yellow----------	2	3	
Alluvium----------	13	16	
Pennsylvanian System:			
Lower Pennsylvanian Series:			
Sandstone, fine-grained, dark, with lenses of black shale-----	38	54	
Sandstone, coarse-grained, light, with scattered lenses of black shale----------	51	105	
Shale, black, with lenses of light fine-grained sandstone---	10	115	
Sandstone, coarse-grained, light, interbedded with lenses of black shale----------	20	135	
Quartzite with thin lenses of black shale----------	6	141	
Sandstone, coarse-grained, brown, with lenses of black shale-----	42	183	
Quartzite----------	1	184	

Well 19/9W-10Q1--Cont.

Material	Thickness (feet)	Depth (feet)	Remarks
Pennsylvanian System:			
Lower Pennsylvanian Series:			
Sandstone, coarse-grained, brown and light, with lenses of black shale	16	200	
Shale, black, with lenses of fine-grained sandstone	6	206	
Sandstone, coarse-grained, brown-	2	208	

Well 19/9W-15A2

Type of record: Driller's log from memory. Altitude: About 500 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Surface	9	9	
Pennsylvanian System:			
Lower Pennsylvanian Series:			
Stone, hard	4	13	Sandstone?
Shale, harder with depth	65	78	
Sandstone, dark-gray	5	83	
Shale	11	94	
Sandstone, gray	16	110	W. B.

Well 19/9W-16R1

Type of record: Driller's log. Altitude: About 620 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Glacial drift	87	87	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Sandstone, carboniferous, blue	25	112	
Slate, gray, with cherty concretions	27	139	
Lower? Pennsylvanian Series:			
Shale, limy	41	180	
Limestone, fossiliferous, gray	27	207	
Shale, carboniferous, with streak of pebbly conglomerate	1	208	
Sandstone, calcareous, gray grading to white	7	215	W. B.
Shale, sandy, white	35	250	W. B.

Well 19/9W-19N1

Type of record: Core description. Altitude: About 595 feet.

Material	Thickness (feet)	Depth (feet)	Remarks
Quaternary System:			
Recent and Pleistocene Series:			
Dirt, black	2	2	
Clay, blue	13	15	
Drift, glacial	124	139	
Pennsylvanian System:			
Lower Pennsylvanian Series:			
Shale, light	12	151	
Sandstone, fine-grained	25	176	
Coal	1.5	177.5	
Shale, sandy, light, and clay	12.5	190	
Sandstone, fine-grained, dark	2.5	192.5	
Shale, dark	15.5	208	
Shale, light	14	222	
Sandstone, fine-grained, light	8.5	230.5	
Sandstone, fine-grained, light, interbedded with lignitic streaks and lenses of light and dark shale grading down to dark shale	43	273.5	
Shale, light	5	278.5	
Sandstone, fine-grained, interbedded with streaks of light and dark shale	5	283.5	

Well 19/9W-21K1

Type of record: Driller's log. Altitude: About 635 feet.

Open well	27	27	
Quaternary System:			
Recent and Pleistocene Series:			
Clay, gray	8	35	
Sand, brown	17	52	
Soil, sandy, gray	6	58	
Hardpan	4	62	
Clay, sandy, yellow	4	66	Sulfur water
Hardpan	29	95	
Sand, brown	48	143	
Pennsylvanian System:			
Lower Pennsylvanian Series:			
Shale, gray	53	196	
Coal	.5	196.5	
Shale, light-gray	14.5	211	
Shale, sandy, light	4	215	
Shale, sandy, dark	18	233	
Sandstone	7	240	

Table 5.--Selected well logs, Vermillion County, Indiana--Cont.

Well 19/9W-22M1

Type of record: Core description. Altitude: About 547 feet.

Material	Thickness (feet)	Depth (feet)	Remarks
Quaternary System:			
Recent and Pleistocene Series:			
Glacial drift	12	12	
Pennsylvanian System:			
Lower Pennsylvanian Series:			
Sandstone, streaky-gray	10	22	
Shale, gray	1	23	
Sandstone, fine-grained, dark-gray	12	35	
Shale, black	1	36	
Sandstone	1	37	
Shale, black	1	38	
Clay	4	42	
Shale, dark	8	50	
Shale, sandy, gray	5	55	
Sandstone, fine-grained	32	87	
Shale, sandy, gray	1	88	
Sandstone, coarse, with interbedded shale	4	92	
Shale, carbonaceous, with streak of pebbly conglomerate	1	93	
Sandstone, coarse	2	95	
Sandstone, conglomeratic, with streak of shale	1	96	
Sandstone, fine-grained, with streaks of gray shale grading to black shale	6	102	
Shale, black	1	103	
Sandstone, with streaks of black shale	10	113	
Shale, black streaks in sandstone	1	114	
Sandstone, gray	17	131	
Clay, black	2	133	
Shale, sandy	2	135	
Sandstone, fine-grained, gray	3	138	
Shale, sandy	1.5	139.5	
Clay, dark	2	141.5	
Clay, black	2.5	144	
Coal	1	145	
Shale, sandy	15	160	
Sandstone, fine-grained, streaky, white	6	166	
Shale, black	2	168	
Sandstone, carbonaceous	1	169	
Shale, grading into sandy shale	7	176	
Sandstone, hard, white, almost quartzite	1	177	
Sandstone and shale, interbedded-	1	178	

Well 19/9W-22M1--Cont.

Material	Thickness (feet)	Depth (feet)	Remarks
Pennsylvanian System:			
Lower Pennsylvanian Series:			
Clay, sandy, clean	4	182	
Limestone, fossiliferous	4	186	
Mississippian System:			
Osage Series:			
Sandstone, calcareous	1	187	
Shale, almost clay	5	192	
Clay, calcareous, with cherty concretions	2	194	
Shale, calcareous	2	196	
Shale, soft, dark	5	201	
Shale, black grading to gray	5	206	
Clay, calcareous, fossiliferous, and sandy shale	3	209	
Limestone	6	215	
Shale, calcareous, dark	10	225	
Limestone with shale streaks	2	227	
Shale	2	229	
Limestone, cherty, with streaks of shale	1	230	
Limestone, crystalline, very dense, white	14	244	
Shale, fine-grained, sandy	17	261	
Limestone	1	262	
Shale, sandy	10	272	
Shale, black	1	273	
Sandstone, fine, dark-gray	8	281	

Well 19/9W-27D1

Type of record: Driller's log. Altitude: About 560 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Gravel	56	56	Dug well
Pennsylvanian System:			
Lower Pennsylvanian Series:			
Shale, blue	34	90	
Sandstone, hard, blue	28	118	
Sandstone, soft, white	10	128	W. B.

Well 19/9W-27M1

Type of record: Driller's log. Altitude: About 535 feet.

Dug well	30	30	
Pennsylvanian System:			
Lower Pennsylvanian Series:			
Slate, blue	15	45	
Sandstone, gray	5	50	

Well 19/9W-27M1--Cont.

Material	Thickness (feet)	Depth (feet)	Remarks
Pennsylvanian System:			
Lower Pennsylvanian Series:			
Shale, light-blue	60	110	
Fire clay, sandy, white	15	125	
Sandstone	5	130	W. B.

Well 19/9W-28G1

Type of record: Core description. Altitude: About 551 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Dirt, black	2	2	
Clay, blue	10	12	
Drift, glacial	48	60	
Pennsylvanian System:			
Lower Pennsylvanian Series:			
Sandstone, fine, gray	7	67	
Sandstone, fine, white, interbedded with streaky lenses of black shale	1	68	
Sandstone, grading to light, coarse-grained sandstone with lignitic streaks and cross bedding	34	102	
Sandstone, fine-grained, light	10	112	
Shale, interbedded gray and black	3	115	
Sandstone, coarse-grained, light-	7	122	
Shale, light-gray	10	132	
Shale, dark	3	135	
Coal	2	137	
Sandstone, fine-grained, light, containing near the bottom conglomeratic material made up apparently of materials like mud crusts	23	160	
Sandstone, fine-grained, light, with much lignitic streaking	38	198	
Sandstone, coarse-grained, light-	2	200	
Sandstone, fine-grained, light, interbedded with black shale	8	208	
Shale, black	21	229	

Well 19/9W-28P1

Type of record: Driller's log. Altitude: About 540 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Top soil, sandy, black	1	1	
Gravel, brown, mixed with clay	12	13	

Well 19/9W-28P1--Cont.

Material	Thickness (feet)	Depth (feet)	Remarks
Quaternary System:			
Recent and Pleistocene Series:			
Sand and gravel	31	44	W. B.
Mud, soft, brown	6	50	
Sand, fine, brown	21	71	W. B.
Sand and gravel	29	100	W. B.

Well 19/9W-28R2

Type of record: Driller's log. Altitude: About 500 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Top soil	3	3	
Clay and gravel, brown	31	34	
Gravel, dry	5	39	
Pennsylvanian System:			
Lower Pennsylvanian Series:			
Sandstone	45	84	W. B.

Well 19/9W-29C1

Type of record: Driller's log. Altitude: About 625 feet.

Dug well	18	18	
Quaternary System:			
Recent and Pleistocene Series:			
Hardpan, gray	62	80	
Clay and hardpan, blue	105	185	
Gravel and sand	1	186	
Clay and sand	15	201	
Gravel, coarse	1	202	W. B.
Gravel and coarse sand	26	228	W. B.

Well 19/9W-29F1

Type of record: Driller's log. Altitude: About 610 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Clay, yellow	14	14	
Hardpan, hard, blue	96	110	
Hardpan and sand, gray	92	202	
Sand mixed with clay	2	204	Gas
Clay, soft, blue	34	238	
Sand, fine	5	243	
Sand and clay	7	250	
Pennsylvanian System:			
Lower Pennsylvanian Series:			
Sandstone, grading to white	22	272	W. B.

Table 5.--Selected well logs, Vermillion County, Indiana--Cont.

Well 19/9W-29N1

Type of record: Driller's log. Altitude: About 600 feet.

Material	Thickness (feet)	Depth (feet)	Remarks
Quaternary System:			
Recent and Pleistocene Series:			
Gravel and clay, dark-brown------	4	4	
Clay, gray----------	16	20	
Hardpan----------	51	71	
Gravel----------	54	125	Dry
Gravel----------	15	140	W. B.

Well 19/9W-31B1

Type of record: Core description. Altitude: About 596 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Dirt, black----------	2	2	
Clay, yellow----------	8	10	
Glacial drift----------	146.5	156.5	
Pennsylvanian System:			
Lower Pennsylvanian Series:			
Shale, light-gray----------	32.5	189	
Shale, black----------	3.5	192.5	
Coal----------	.5	193	
Clay----------	3.5	196.5	
Sandstone, fine-grained, light---	22.5	219	
Sandstone, shaly, dark----------	1.5	220.5	
Clay----------	.5	221	
Sandstone, fine-grained, light---	1.5	222.5	
Coal----------	1.5	224	
Sandstone, fine-grained, dark----	2	226	
Sandstone, fine-grained, with irregular streaks of calcareous shale, grading down into black shale at the bottom-	26	252	
Sandstone, coarse-grained, white-	1	253	
Shale, black----------	12	265	
Sandstone, coarse-grained, brown, with lenses of gray shale------	117	382	
Shale, black----------	2	384	
Sandstone, fine-grained, brown---	2	386	
Sandstone, coarse-grained, brown-	11	397	
Mississippian System:			
Osage Series:			
Sandstone, shaly, hard, gray-----	.5	397.5	

Well 19/9W-31R1

Type of record: Driller's log. Altitude: About 590 feet.

Material	Thickness (feet)	Depth (feet)	Remarks
Quaternary System:			
Recent and Pleistocene Series:			
Soil, dark-gray	4	4	
Clay, yellow	16	20	
Hardpan, gray	48	68	
Sand, brown	6	74	
Gravel	31	105	Dry
Hardpan, gray	9	114	
Gravel, gray	35	149	W. B.

Well 19/9W-33A1

Type of record: Driller's log. Altitude: About 550 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Gravel, coarse, yellow	21	21	
Pennsylvanian System:			
Lower Pennsylvanian Series:			
Slate, dark-blue	35	56	
Shale, light-blue	4	60	
Sandstone, white	15	75	W. B.
Shale and slate	5	80	

Well 19/9W-33A4

Type of record: Driller's log. Altitude: About 535 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Gravel, yellow, and boulders	9	9	
Pennsylvanian System:			
Lower Pennsylvanian Series:			
Shale, soft, blue	17	26	
Limestone, dense, blue	9	35	
Fire clay and shale, blue	45	80	
Shale, sandy, grading to white	35	115	
Sandstone with slate streaks	20	135	W. B.

Well 19/9W-33B2

Type of record: Driller's log. Altitude: About 550 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Gravel, yellow	19	19	
Pennsylvanian System:			
Lower Pennsylvanian Series:			
Slate, blue	30	49	
Sandstone, gray	9	58	
Fire clay	2	60	
Shale, blue	19	79	

Well 19/9W-33H2

Type of record: Driller's log. Altitude: About 530 feet.

Material	Thickness (feet)	Depth (feet)	Remarks
Dug well	10	10	
Pennsylvanian System:			
Lower Pennsylvanian Series:			
Limestone, blue	6	16	
Fire clay, blue	44	60	
Limestone, brown	4	64	
Fire clay, grading to white	42	106	
Coal	6	112	
Sandstone	10	122	W. B.

Well 19/9W-34D2

Type of record: Driller's log. Altitude: About 530 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Gravel and boulders	6	6	
Pennsylvanian System:			
Lower Pennsylvanian Series:			
Shale, soft, blue	14	20	
Limestone, blue	7	27	
Shale, light-blue	53	80	
Slate, brown	4	84	

Well 19/10W-9A1

Type of record: Driller's log. Altitude: About 635 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Top soil	4	4	
Clay and sand	12	16	
Soil, sandy, brown	84	100	
Hardpan	47	147	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Sandstone	7.5	154.5	W. B.

Well 19/10W-17D1

Type of record: Driller's log. Altitude: About 647 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Sand, fine to coarse, with some silt and gravel; dense, brown	2	2	
Silt and clay, trace of sand; medium-dense, black	2	4	
Clay, some silt, trace of sand; tough, yellow and gray	1.9	5.9	
Silt and clay, trace of sand and clay; loose, yellow	3	8.9	

Well 19/10W-17D1--Cont.

Material	Thickness (feet)	Depth (feet)	Remarks
Quaternary System:			
Recent and Pleistocene Series:			
Silt, some clay, trace of sand; medium-dense, brown	4.5	13.4	
Silt and sand, trace of clay and gravel; very dense, brown and gray	5	18.4	
Hardpan, gray	8.2	26.6	

Well 19/10W-17K1

Type of record: Driller's log. Altitude: About 640 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Clay, yellow	15	15	
Hardpan	67	82	
Clay, brown	94	176	
Pennsylvanian System:			
Middle Pennsylvanian Series:			
Coal, trace	--	176	
Shale	76	252	W. B. 190 to 250 ft
Lower? Pennsylvanian Series:			
Limestone, sharp	6	258	
Shale, gray	12	270	
Coal, trace	--	270	
Shale?	35	305	

Well 19/10W-18A1

Type of record: Driller's log. Altitude: About 647 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Silt and sand, some gravel; medium-dense, brown	2	2	
Clay, some silt and trace of sand; tough, brown and black	2	4	
Silt, some clay and trace of sand; loose, yellow and gray	3.9	7.9	
Silt, some sand and clay, trace of gravel; medium-dense, brown	3.5	11.4	
Silt and sand, trace of clay; dense, brown	2	13.4	
Silt and sand, some clay and trace of gravel; very dense, brown and gray	5	18.4	
Hardpan	8.2	26.6	

Table 6.--Field chemical analyses of water from wells, Vermillion County, Indiana
(Results in parts per million)

Well number: See text for description of well-numbering system.
Geologic age: Pl, Pleistocene; P, Pennsylvanian.
Material: G, gravel; Ls, limestone; S, sand; Sd-sh, sandy-shale; Sd-T, sandy till; Ss, sandstone; Sh, shale.

Well	Material	Geologic age	Date of collection	Temperature (°F)	Iron (Fe)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Hardness as $CaCO_3$ (Calcium, magnesium)	Remarks
14/ 9W-10N1	G	Pl	2-14-62	53	0.1	342	160	18	368	
22Q1	S,G	Pl	9-21-61	57	.1	195	260	16	280	
27F1	G	Pl	2-14-62	55	.5	361	210	18	424	
31G1	S	Pl	2-14-62	55	.1	468	175	24	524	
33N1	Ls	P	2-14-62	55	.1	532	140	26	480	
14/10W-33K1	Sd-T	Pl	9-14-61	54	2.0	361	270	54	552	
15/ 9W- 2D2	----	P	9-14-61	--	<.1	307	180	30	312	
27A3	S,G	Pl	9-14-61	--	.1	224	36	26	208	
32C1	G,S	Pl	2-14-62	52	3.5	595	19	10	360	
15/10W-21R1	Sh	P	2-14-62	56	1.0	561	60	32	424	
34D1	----	P	9-14-61	52	1.0	342	18	8	208	
16/ 9W- 3N1	Ss	P	9-13-61	--	.1	586	16	150	124	
11N1	----	P	8-13-61	--	5.0	317	900	88	916	
15N1	Ss	P	9-14-61	--	1.0	649	18	36	132	
30Q1	Sh	P	9-14-61	57	.1	678	16	124	72	
31A1	S,G	Pl	2-15-62	56	.5	561	19	6	304	
32P1	G	Pl	9-14-61	55	1.0	332	270	26	496	
34H1	Ss	P	9-13-61	--	.1	615	365	3,120	188	
16/10W-26Q2	S,G	Pl	9-13-61	59	3.0	478	10	<1	276	
27C1	G	Pl	2-15-62	56	.5	503	15	12	228	
34Q1	G	Pl	9-13-61	59	4.0	454	14	28	284	
36F1	S,G	Pl	9-13-61	56	.2	473	210	118	492	
17/ 9W- 5H1	S,G	Pl	8-31-61	--	.3	356	100	14	368	
6F1	Ss	P	8-31-61	--	.2	615	12	56	36	
8D1	S,G	Pl	8-31-61	--	.2	512	955	16	1,360	
9E1	G	Pl	8-12-61	56	<.1	488	54	28	240	
15J1	----	P	9-11-61	58	5.0	576	12	24	108	
18D1	Ls	P	8-31-61	56	.5	547	14	14	248	
36P1	----	P	9-13-61	--	.1	151	150	42	448	

Table 6.--Field chemical analyses of water from wells, Vermillion County, Indiana--Cont.

Well	Material	Geologic age	Date of collection	Temperature (°F)	Iron (Fe)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Hardness as $CaCO_3$ (Calcium, magnesium)	Remarks
17/10W- 7K1	Sh,Ss	P	8-31-61	--	1.5	551	13	6	332	
7L1	Sd-sh	P	8-31-61	--	.2	600	13	32	40	
8M1	G	P1	8-31-61	--	.5	512	11	6	136	
17N1	Ss	P	8-31-61	57	.1	576	11	182	56	
18R1	Sh	P	8-31-61	56	.5	449	14	10	84	
31J1	S,G	P1	8-31-61	--	2.0	693	13	12	464	
32A1	S	P1	10-24-61	53	.5	425	220	14	452	
18/ 9W-20K4	S,G	P1	3-10-57	56	.4	-----	---	16	316	
28K1	G	P1	8-30-61	59	3.0	366	37	16	316	
31J5	Ss	P	8-31-61	--	.1	376	53	12	340	
31Q1	Ls,Sh	P	8-31-61	56	.1	410	53	12	360	
31Q2	G	P1	8-31-61	57	.1	371	48	10	340	
31Q3	Ss	P	8-31-61	--	.1	800	13	72	4	P alkalinity present
32H1	G,S	P1	8-30-61	56	1.0	410	43	6	352	
18/10W-16H1	S,G	P1	8-31-61	--	.3	527	14	8	276	
17D1	Sh	P	8-31-61	--	.2	464	15	12	176	
31G1	----	P	8-31-61	57	.1	556	46	20	144	
31Q1	----	P	8-31-61	58	.3	1,760	13	3,140	68	
19/ 9W- 4B1	S,G	P1	8-29-61	57	1.0	312	39	6	264	
5E1	Sh	P	8-29-61	--	1.0	527	15	4	340	
5Q1	S	P1	3- 2-62	54	.1	307	44	2	288	
6M1	Ss	P	8-29-61	--	.1	395	145	46	428	
7A1	S	P1	3- 2-62	--	<.1	395	210	16	428	
15A1	Ss	P	8-29-61	56	.3	478	90	268	276	
15E2	S	P1	8-29-61	--	2.0	444	22	4	340	
16A2	Ss	P	8-29-61	--	.1	307	62	12	300	
18E1	G	P1	3- 1-62	--	.1	244	97	26	300	
20G1	S,G	P1	3- 1-62	56	<.1	288	95	34	424	
21K1	----	P	8-30-61	--	.1	517	55	100	48	
27D1	Ss	P	8-30-61	55	.8	444	20	40	224	
28R1	Ss	P	8-29-61	--	.8	371	100	14	368	
29C1	G,S	P1	8-30-61	58	1.0	561	15	32	180	
29N1	G	P1	8-30-61	--	1.0	517	11	36	300	
31R1	G	P1	8-29-61	--	2.0	522	16	8	272	
33A2	----	P	8-30-61	--	1.0	386	100	14	368	

Table 6.--Field chemical analyses of water from wells, Vermillion County, Indiana--Cont.

Well	Material	Geologic age	Date of collection	Temperature (°F)	Iron (Fe)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Hardness as $CaCO_3$ (Calcium, magnesium)	Remarks
19/ 9W-33A3	Ss	P	8-30-61	--	0.3	566	155	28	10	
33H1	----	P	8-30-61	--	.3	351	115	14	356	
33H2	Ss	P	8-30-61	--	.3	439	270	16	336	
19/10W- 9A1	Ss	P	8-29-61	56	1.5	508	23	4	328	
17K1	Sh	P	8-29-61	57	.3	752	18	1,690	132	
20E2	S	Pl	3- 1-62	--	.1	161	62	17	164	
29J1	S,G	Pl	8-29-61	56	.1	420	335	28	640	
32Q1	----	P	8-29-61	--	.1	512	20	22	272	

Table 7.--Records of springs, Vermillion County, Indiana

Spring number: See text for well-numbering system.
Altitude: Altitude of land-surface datum from topographic map.
Water-bearing material: G, gravel; S, sand; Sd-sh, sandy-shale.
Geologic age: Pl, Pleistocene; P, Pennsylvanian.
Flow: e, estimated; m, measured.
Use: D, domestic; N, none; P, public supply; S, stock.
Field chemical analyses: In parts per million: water sample collected on date of measurement.

Spring	Owner	Popular name	Altitude (feet)	Water-bearing material	Geologic age	Flow (gpm)	Date of measurement	Use	Temperature (°F)	Iron (Fe)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Hardness as $CaCO_3$ (Calcium & Magnesium)	Remarks
14/9W-29F1	L. Huffman	----------	500	Sd-sh	P	---	2-14-62	D	53	<0.1	356	46	8	300	
16/9W-29L1	R. D. Nickle	----------	675	S,G	Pl	5e	5-24-61	S	56	<.1	390	75	12	392	
19/9W-16A1	C. Kay	Tree Spring	600	S,G	Pl	15m	5-25-61	S, P	52	<.1	312	45	16	312	
21J1	Vermillion County Highway Dept.	----------	600	S,G	Pl	1e	6-27-61	N	55	.3	171	22	2	332	Calcareous tuffa being deposited
34D3	Town of Perrysville	----------	520	S,G	Pl	2m	5-25-61	N	56	<.1	386	125	18	424	At contact with bedrock

Table 8.--Field chemical analyses of water from streams, Vermillion County, Indiana
(Results in parts per million)

Name	Location	Date of collection	Temperature (°F)	Iron (Fe)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Hardness as $CaCO_3$ (Calcium & magnesium)	Remarks
			T. 14 N., R. 9 W.						
Wabash River	NW¼SE¼ sec. 15	10-3-60	64	0.2	259	50	20	260	Sample taken at bridge on state highway
			T. 14 N., R. 10 W.						
Brouilletts Creek	SW¼SW¼ sec. 11	10-3-60	59	.2	342	190	14	436	Do
			T. 15 N., R. 9 W.						
Little Raccoon Creek	NE¼NE¼ sec. 3	10-3-60	59	.2	415	63	60	244	Do
			T. 17 N., R. 9 W.						
Little Vermilion River	SE¼NE¼ sec. 28	10-3-60	60	.2	312	95	14	340	Sample taken at bridge on county road
			T. 17 N., R. 10 W.						
Do	NE¼NW¼ sec. 29	10-3-60	60	.2	342	115	14	368	Do
			T. 18 N., R. 9 W.						
Vermilion River	SE¼NE¼ sec. 32	10-3-60	59	.2	307	140	42	356	Sample taken at bridge on state highway
			T. 18 N., R. 10 W.						
Coal Creek	SW¼SW¼ sec. 21	10-3-60	64	.2	356	290	12	444	Sample taken at bridge on county road
Vermilion River	SW¼NE¼ sec. 28	10-3-60	63	.2	298	200	42	356	Do

Table 8.--Field chemical analyses of water from streams, Vermillion County, Indiana--Cont.

Name	Location	Date of collection	Temperature (°F)	Iron (Fe)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Hardness as $CaCO_3$ (Calcium & magnesium)	Remarks
			T. 19 N., R. 9 W.						
Spring Creek	NW¼NE¼ sec. 15	10-3-60	63	0.2	312	33	12	304	Sample taken at bridge on county road
Wabash River	SW¼NW¼ sec. 34	10-3-60	64	.2	234	61	20	248	Sample taken at bridge on state highway

Table 9.--Water levels in observation well in Vermillion County, Indiana
(In feet below land-surface datum.
Water level: e, estimated; h, tape measurement)

Vermillion 1. (17/9W-4L1). New York, Chicago, and St. Louis Railroad, Cayuga. NW SW sec. 4, T. 17 N., R. 9 W. Drilled unused water-table well in sand and gravel, diameter 12 inches, depth 75 feet. Land-surface datum is about 499.4 feet above msl. Recording gage installed July 23, 1958. Highest water level is 7.45 below lsd, Feb. 11, 1959; lowest 28.25 below lsd, Sept. 25, 26, 1959. Records available 1958 to 1961.

Table 9.--Water levels in observation well in Vermillion County, Ind.--Cont.

(Daily highest water level from recorder graph, 1958)

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	----	----	----	----	----	----	----	16.67	18.39	22.90	25.45	23.10
2	----	----	----	----	----	----	----	15.72	18.61	23.00	25.50	23.10
3	----	----	----	----	----	----	----	14.94	18.85	23.10	25.55	23.15
4	----	----	----	----	----	----	----	14.94	19.10	23.20	25.60	23.20
5	----	----	----	----	----	----	----	15.12	19.29	23.30	25.60	23.30
6	----	----	----	----	----	----	----	15.51	19.37	23.30	25.65	23.40
7	----	----	----	----	----	----	----	15.86	19.60	23.55	25.70	23.45
8	----	----	----	----	----	----	----	15.92	19.80	23.65	25.75	23.50
9	----	----	----	----	----	----	----	15.97	20.02	23.75	25.80	23.55
10	----	----	----	----	----	----	----	16.14	20.22	23.85	25.85	23.65
11	----	----	----	----	----	----	----	16.27	20.44	23.95	25.90	23.70
12	----	----	----	----	----	----	----	16.19	20.55	24.05	25.95	23.75
13	----	----	----	----	----	----	----	16.45	20.70	24.10	26.00	23.80
14	----	----	----	----	----	----	----	16.65	20.85	24.20	26.05	23.80
15	----	----	----	----	----	----	----	16.51	21.05	24.25	26.05	23.85
16	----	----	----	----	----	----	----	16.34	21.25	24.35	26.00	23.90
17	----	----	----	----	----	----	----	15.96	21.35	24.40	25.70	23.90
18	----	----	----	----	----	----	----	14.99	21.50	24.50	25.55	24.00
19	----	----	----	----	----	----	----	14.62	21.60	24.60	25.30	24.00
20	----	----	----	----	----	----	----	14.61	21.70	24.65	25.05	24.10
21	----	----	----	----	----	----	----	15.22	21.80	24.75	24.85	24.15
22	----	----	----	----	----	----	----	15.75	21.90	24.80	24.75	24.20
23	----	----	----	----	----	----h	14.97	16.17	22.00	24.90	24.70	24.25
24	----	----	----	----	----	----	15.15	16.44	22.10	24.95	24.70	24.30
25	----	----	----	----	----	----	15.58	16.72	22.20	25.00	24.40	24.35
26	----	----	----	----	----	----	15.90	16.95	22.30	25.10	24.00	24.40
27	----	----	----	----	----	----	16.13	17.16	22.40	25.15	23.65	24.50
28	----	----	----	----	----	----	16.30	17.37	22.55	25.25	23.30	24.55
29	----	----	----	----	----	----	16.34	17.61	22.65	25.30	23.15	24.60
30	----	----	----	----	----	----	16.50	17.86	22.75	25.35	23.10	24.70
31	----	----	----	----	----	----	16.59	18.11	----	25.40	----	24.80

(Daily highest water level from recorder graph, 1959)

1	24.80	----	15.80	16.80	10.20	18.85	22.70	25.45	27.50	27.90	27.80	26.40
2	24.80	----	15.85	16.70	10.25	19.10	22.80	25.55	27.50	27.90	27.85	26.45
3	24.80	----	16.00	16.60	10.85	19.25	22.95	25.60	27.55	27.90	27.85	26.50
4	24.85	----	16.15	16.70	11.75	19.40	23.05	25.65	27.55	27.95	27.85	26.55
5	24.90	----	16.15	14.85	12.85	19.60	23.15	25.75	27.60	27.95	27.85	26.60
6	24.90	15.85	16.25	14.75	14.15	19.80	23.30	25.80	27.60	28.00	27.80	26.65
7	24.90	16.15	16.30	15.00	15.00	20.00	23.45	25.85	27.65	28.00	27.75	26.70
8	24.95	16.45	16.30	15.55	15.30	20.20	23.60	25.95	27.70	28.05	27.65	26.70
9	24.95e	13.90	16.20	15.95	15.65e	20.35	23.70	26.00	27.70	28.05	27.60	26.75
10	24.95e	10.45	16.10	16.00	15.85	20.50	23.80	26.05	27.75	28.00	27.55	26.80

Table 9.--Water levels in observation well in Vermillion County, Ind.--Cont.

(Daily highest water level from recorder graph, 1959, Cont.)

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept	Oct.	Nov.	Dec.
11	24.95	7.45	16.05	16.15	16.05	20.65	23.95	26.15	27.75	27.80	27.55	26.80
12	25.00	----	15.95	16.30	16.25	20.80	24.05	26.20	27.80	27.70	27.60	26.80
13	25.00	----	15.90	16.45	16.35	20.95	24.20	26.25	27.80	27.60	27.55	26.75
14	25.00	7.85	15.90	16.65	16.55	21.10	24.30	26.35	27.85	27.60	27.20	26.50
15	24.95	----	15.85	16.85	16.65	21.30	24.45	26.40	27.90	27.50	26.95	26.20
16	24.90	----	15.80	17.00	16.80	21.45	24.55	26.45	27.95	27.50	26.70	25.90
17	24.85	----	15.55	17.20	16.95	21.65	24.65e	26.50	28.00	27.50	26.45	25.75
18	24.80	11.05	15.55	17.40	17.10	21.80e	24.70e	26.60	28.00	27.50	26.30	25.70
19	24.80	11.80	15.65	17.45	17.30	21.95	24.75e	26.70	28.05	27.50	26.20	25.70
20	24.75	12.55	15.85	17.30	17.55	22.10	24.85e	26.75	28.10	27.55	26.15	25.70
21	24.20	13.70	16.05	17.05	17.70	22.25	24.90e	26.85	28.10	27.60	26.10	25.70
22	23.55	14.60	16.30	17.00	17.85	22.40	25.00e	25.95	28.15	27.65	26.15	25.75
23	23.10	14.95	16.45	17.05	17.85	22.60	25.05e	27.00	28.15	27.65	26.15	25.75
24	22.60	15.25	16.65	17.15	17.95	22.70	25.10e	27.10	28.20	27.70	26.15	25.80
25	21.40	15.30	15.85	17.30	18.05	22.85	25.20e	27.15	28.20	27.70	26.20	25.85
26	16.40	15.40	16.95	17.55	18.10	22.95	25.20e	27.25	28.15	27.70	26.20	25.90
27	e15.20	15.50	17.10	17.15	18.20	23.10	25.20	27.30	----	27.75	26.25	25.95
28	----	15.65	17.25	15.30	18.30	23.00	25.20	27.35	----	27.75	26.25	25.80
29	----	----	17.25	11.85	18.40	22.75	25.25	27.40e	27.90	27.75	26.30	25.55
30	----	----	17.20	10.50	18.55	22.70	25.30	27.45	27.90	27.75	26.35	25.35
31	----	----	17.20	----	18.75	----	25.40	27.45	----	27.80	----e	25.15

(Daily highest water level from recorder graph, 1960)

1	e25.05	23.95	----	13.25	19.65	21.55	17.50	----	24.90	26.75	27.65	27.90
2	e25.00	23.95	----	13.00	19.80	21.55	17.80	----	25.00	26.75	27.65	27.90
3	e24.95	23.95	----	13.00	19.95	21.60	18.20	22.60	25.10	26.80	27.65	27.95
4	e24.90	23.95	----	13.55	20.10	21.70	18.40	22.50	25.20	26.85	27.70	27.95
5	e24.85	24.00	----	14.55	20.30	21.85	18.55	22.35	25.25	26.85	27.70	27.95
6	e24.75	23.70	----	15.65	20.45	21.95	18.70	22.35	25.35	26.90	27.75	27.95
7	e24.75	23.30	----	16.20	20.35	22.05	18.95	22.40	25.45	26.90	27.75	27.95
8	e24.75	22.90	----	16.65	20.35	22.15	19.20	22.55	25.50	26.95	27.75	28.00
9	e24.75	22.45	----	16.95	20.40	22.30	19.45	22.70	25.60e	27.00	27.80	28.00
10	e24.80	21.95	----	17.25	20.50	22.15	----	22.85	25.65e	27.00	27.80	28.00
11	e24.90	17.20	----	17.50	20.60	21.90	----	23.00	25.70e	27.05	27.80	28.00
12	e25.00	15.65	----	17.75	20.60	----	----	23.15	25.75e	27.10	27.80	28.00
13	e24.95	14.80	----	17.65	20.65	----	19.40	23.30	25.85e	27.10	27.80	28.05
14	e24.90	14.30	----	17.95	20.75	----	19.35	23.45	25.95e	27.15	27.85	28.05
15	e24.75	14.25	----	18.15	20.90	22.30	19.40	23.55	26.00e	27.20	27.85	28.05
16	e24.50	14.65	22.25	18.45	21.05	22.25	19.60	23.70	26.05e	27.25	27.85	28.05
17	e24.20	15.60	22.65	18.40	21.15	22.00	19.60	23.85	26.15e	27.25	27.80	28.05
18	e23.85	16.25	22.80	18.30	21.30	21.90	19.70	23.95	26.20e	27.30	27.80	28.05
19	23.75	16.75	22.95	18.00	21.25	21.90	19.90	24.05	26.20e	27.30	27.80	28.05
20	23.70	17.15	23.05	17.90	21.25	21.80	20.05	24.20	26.25e	27.35	27.80	28.05

Table 9.--Water levels in observation well in Vermillion County, Ind.--Cont.

(Daily highest water level from recorder graph, 1960, Cont.)

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
21	23.70	17.35	23.20	17.90	21.30	21.50	20.15	24.30	26.30e	27.40	27.80	28.10
22	23.75	----	23.25	18.00	21.35	20.35	20.30	24.30	26.30e	27.40	27.80	28.10
23	23.80	----	23.40	18.10	21.35	14.10	20.40	24.30	26.35e	27.45	27.80	28.05
24	23.85	----	23.50	18.25	21.40	14.05	20.50	24.30	26.40e	27.50	27.80	28.05
25	23.95	----	23.60	18.45	21.45	14.50	----	24.35	26.45e	27.50	27.80	----
26	24.10	----	23.65	18.65	21.50	15.35	----	24.40	26.50	27.55	27.85	----
27	24.15	----	23.45	18.90	21.60	16.00	----	24.55	26.55	27.55	27.85	----
28	24.10	----	23.00	19.10	21.65	16.35	----	24.65	26.60	27.55	27.90	28.10
29	24.05	----	22.35	19.30	21.65	16.85	----	24.75	26.60	27.55	27.90	28.05
30	24.05	----	17.30	19.45	21.45	17.15	----	24.85	26.65	27.60	27.90	28.05
31	24.00	----	15.00	----	21.45	----	----	24.80	----	27.60	----	28.05

(Daily highest water level from recorder graph, 1961)

1	28.05	28.15	27.15	----	----	18.90	21.65	23.90	----	26.10	26.70	25.45
2	28.05	28.15	26.90	----	----	19.10	21.80	23.60	----	26.10	26.70	25.50
3	28.05	28.15	26.70	----	----	19.35	21.95	23.35	----	26.15	26.70	25.50
4	28.05	28.20	26.50	----	----	19.55	22.10	23.15	----	26.15	26.65	25.55
5	28.05	28.20	26.30	----	----	19.80	22.20	23.00	----	26.20	26.65	25.60
6	28.05	28.15	26.20	----	----	20.00	22.35	22.90	----	26.25	26.60	25.65
7	28.05	28.15	25.95	----	----	19.95	22.50	22.75	----	26.30	26.60	25.65
8	28.05	28.15	25.65	----	----	19.55	22.65	22.60	----	26.30	26.60	25.65
9	28.05	28.15	25.20	----	----	19.40	22.75	22.60	----	26.35	26.60	25.65
10	28.05	28.15	24.95	----	13.05	19.40	22.90	22.60	----	26.40	26.65	25.70
11	28.05	28.15	24.75	----	12.60	19.45	23.00	22.65	----	26.45	26.65	25.70
12	28.05	28.15	24.50	----	12.55	19.55	23.15	22.75	----	26.50	26.70	25.75
13	28.05	28.15	23.85	20.00	12.55	19.55	23.25	22.85	----	26.55	26.75	25.80
14	28.10	28.10	23.35	----	12.75	19.50	23.40	22.95	----	26.60	26.75	25.80
15	28.10	28.05	22.95	19.95	13.45	19.65	23.50	23.10	----	26.65	26.75	25.80
16	----	28.00	17.65	19.90	14.60	19.75	23.60	23.15	----	26.65	26.75	25.85
17	28.10	27.95	15.80	19.85	15.30	19.80	23.70	23.25	----	26.65	26.70	25.85
18	28.10	27.90	15.35	19.55	15.70	19.90	23.80	23.40	----	26.70	26.55	25.85
19	28.10	27.80	15.35	19.25	16.05	20.00	23.85	23.50	----	26.70	26.35	25.85
20	28.10	27.70	15.50e	18.30	16.25	20.15	23.95	23.60	----	26.75	26.20	25.85
21	28.15	27.55	15.40	----	16.45	20.25	24.00	23.75	----	26.80	26.15	25.85
22	28.15	27.50	14.95	----	16.70	20.35	24.05	23.90	26.25	26.80	26.10	25.90
23	28.15	27.45	14.80	----	16.90	20.40	24.00	24.00	26.30	26.85	26.00	25.85
24	28.20	27.40	14.70	----	17.10	20.55	24.00	24.15	26.35	26.90	25.85	25.85
25	28.20	27.40	14.60	----	17.30	20.70	24.00	24.55	26.30	26.90	25.65	25.80
26	28.20	27.35	14.60	----	17.55	20.80	24.00	25.10	26.30	26.90	25.55	25.80
27	28.20	27.35	14.65	----	17.75	20.95	24.05	----	26.25	26.95	25.45	25.80
28	28.15	27.30	15.35	----	18.00	21.10	24.10	----	26.20	26.85	25.40	25.85
29	28.15	----	----	----	18.20	21.30	24.20	----	26.15	26.75	25.40	25.90
30	28.15	----	----	----	18.50	21.45	24.25	----	26.15	26.70	25.40	25.85
31	28.15	----	----	----	18.65	----	24.10	----	----	26.70	----	26.00

PUBLICATIONS OF COOPERATIVE GROUND-WATER PROGRAM

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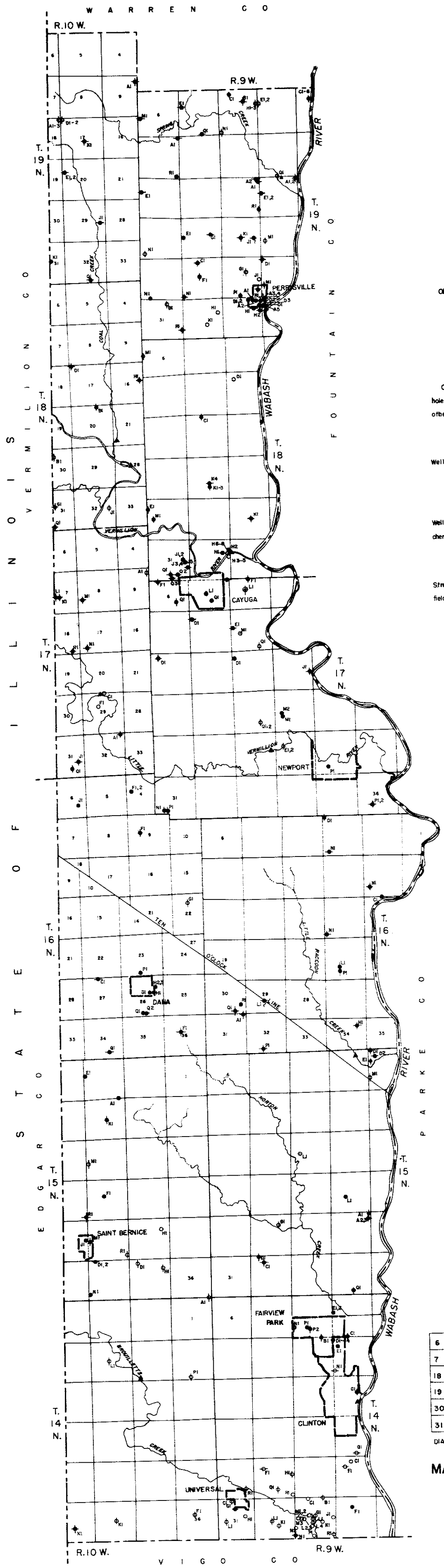
INDEX

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
DIVISION OF WATER RESOURCES

PREPARED BY
UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY



EXPLANATION

B1
Water well

L1
Observation well

A1
Spring

R1
Oil well, test hole, or hole drilled for purposes other than water supply.

P1
Well for which log is listed in table 5.

C2
Well or spring for which field chemical analysis is listed in table 6 or 7.

Stream-water sampling site-field chemical analysis of water in table 8

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

DIAGRAM OF TOWNSHIP

D	C	B	A
E	F	G	H
M	L	K	J
N	P	Q	R

SECTION LETTER SYMBOLS IN WELL NUMBERING SYSTEM

MAP OF VERMILLION COUNTY, INDIANA, SHOWING LOCATION OF WELLS AND SPRINGS

0 1 2 3 4 5 6 MILES

0 3000 10000 15000 20000 FEET

BY F.A. WATKINS, JR. AND D.G. JORDAN

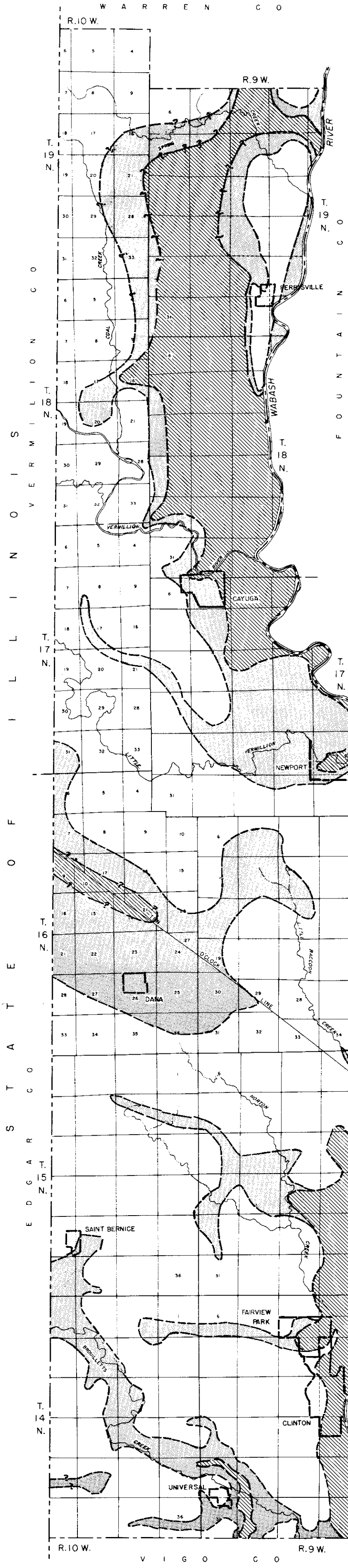
1962

BASE MODIFIED FROM INDIANA DEPARTMENT OF CONSERVATION GEOLOGICAL SURVEY, BASE MAP OF VERMILLION COUNTY, NO. 43 APRIL 3, 1958

STATE OF INDIANA
DEPARTMENT OF CONSERVATION
DIVISION OF WATER RESOURCES

PREPARED BY
UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

BULLETIN 29 PLATE 2



EXPLANATION

Production from sand and gravel

Water from sand and gravel of Pleistocene age overlain by till or recent alluvium or interbedded with till. Well depths range from 40 to 230 feet. Yields more than adequate for domestic and stock use. Areas of municipal production and relatively large yields or in which large yields may be possible.

Water from sand and gravel lenses and stringers of Pleistocene age interbedded with till or overlain by Recent alluvium. Well depths range from 15 to 150 feet. Yields usually adequate for domestic and stock use. Some wells cased through the sand and gravel tap the underlying bedrock.

Production from bedrock

Water predominately from sandstone of Pennsylvanian age. Well depths range from 50 to 550 feet. Yields generally adequate for domestic and stock use.

Boundary approximate

Boundary uncertain

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

DIAGRAM OF TOWNSHIP

MAP OF VERMILLION COUNTY, INDIANA, SHOWING AVAILABILITY OF GROUND WATER

0 1 2 3 4 5 6 MILES

0 5000 10000 15000 20000 FEET

BY F.A. WATKINS, JR. AND D.G. JORDAN

1962

BASE MODIFIED FROM INDIANA DEPARTMENT OF CONSERVATION GEOLOGICAL SURVEY, BASE MAP OF VERMILLION COUNTY, NO. 43 APRIL 3, 1958