Contract Report 627

Potential Ground-Water Resources for Springfield, Illinois

by

Mark A. Anliker and Dorothy M. Woller
Office of Ground-Water Resources Evaluation

Prepared for the
City of Springfield, Illinois

May 1998

Illinois State Water Survey
Hydrology Division
Champaign, Illinois

A Division of the Illinois Department of Natural Resources

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EXECUTIVE SUMMARY

To help meet Springfield's water demands during drought conditions and provide additional water for the city's growing population, City Water Light and Power (CWL&P) is currently analyzing the feasibility of developing additional water supplies to supplement Lake Springfield, especially during droughts. Available options to meet water demands during drought conditions presently include developing temporary surface water supplies in the Sangamon River through the installation of a temporary dam for retention and subsequent pumpage of river flow to Lake Springfield. Additional options include recycling water from power-generating ash ponds and water filtration plant lime sludge blowdown, as well as water conservation measures. Whether these currently available options are viable as permanent alternatives to meet water demands during drought conditions is uncertain. Therefore, in 1996 Springfield CWL&P initiated studies of additional water supply alternatives to supplement the existing Lake Springfield supply. This report addresses the three ground-water alternatives chosen for further study.

The first ground-water alternative considered in this report is the development of a ground-water supply along the banks of the Sangamon River in the vicinity of Sangamon County, similar to the system formerly operated by Springfield in the late 1800s and early 1900s. Also, because Springfield is located in an area that does not have known areally extensive aquifer systems, consideration is also given to two more distant ground-water resource alternatives. These two alternatives include the sand-and-gravel aquifer systems in the Illinois River bottomlands west of Springfield (and Jacksonville) and the aquifer system in the vicinity of Mason County, an area commonly referred to as the Havana Lowlands.

The findings of this report indicate that the development of a 12-million-gallon-per-day (mgd) ground-water supply is likely feasible in two of the three areas considered, using a reasonable number of production wells and reasonable spacings between individual wells. Two areas where development appears feasible from a hydrogeologic perspective are along the Illinois River valley in the area west of Jacksonville and in the southern portion of Mason County which was considered in this study. In these two general areas, it appears feasible to use well fields of 6 to 12 wells, with well spacings varying between approximately 500 feet and ½ mile (mi) between individual wells. Resulting total well field lengths vary between about ½ mi and 3¼ mi. Individual well yields for the general well field configurations suggested above range from approximately 700 gallons per minute (gpm) to 1400 gpm.

ACKNOWLEDGMENTS

Sponsorship of this project was provided by the city of Springfield, Karen Hasara, Mayor. The authors gratefully acknowledge the cooperation of Mr. Michael J. Luepke, Supervisor of Water Resources, and Mr. Tom Skelly, Water Division Manager. Any opinions, findings, and conclusions or recommendations expressed in this report are those of the authors and do not necessarily reflect those of the city of Springfield.

Several Water Survey staff assisted with this project and the production of the final project report. Mr. Adrian Visocky, Director, Office of Ground-Water Resources Evaluation & Management, and Mr. Ellis Sanderson, Senior Engineer, provided guidance in the conduct of the study and reviewed the report manuscript. Mr. Sean Sinclair, Geographic Information System (GIS) Technical Assistant, produced several of the computer-generated figures for the report. Mr. John Blomberg, Database Programmer/Analyst, provided the detailed well and water-quality data from the Water Survey's computerized databases. Word processing to prepare the reproducible copy of this report was done by Ms. Pamela Lovett, Administrative Coordinator. Ms. Linda Hascall finalized the graphics, and Ms. Eva Kingston edited the report.

INTRODUCTION

Previous letter reports, as well as more formal reports, have fragmentally described various ground-water supply alternatives for the city of Springfield. This report attempts to systematically and comprehensively describe and analyze the feasibility of ground-water development in three areas in the vicinity of Springfield: the Sangamon River bottomlands, the Illinois River bottomlands, and the Havana Lowlands. The three regions addressed in this report reflect localities where potential ground-water development has been considered over the past several years and reflect the very limited availability of known, significant ground-water resources in the immediate vicinity of Springfield.

The main body of this report is divided into three parts corresponding to the three areas in which the feasibility of a 12-mgd ground-water supply were evaluated. Each part contains a review of the regional geology with an emphasis on its relevance to ground-water development, and a discussion of the ground-water hydrology in the subject area, including a review of regional and local ground-water pumpages to provide background information and insight into the potential for additional ground-water development.

Each of the three parts of this report examines the feasibility of additional ground-water development. Where applicable, an analytical approach is described and followed to analyze conceptual ground-water development scenarios. The magnitude of potential additional ground-water development that is considered in each case is 12 mgd during drought conditions. Conceptual well field designs are provided for each of the three areas examined.

POTENTIAL GROUND-WATER RESOURCES FOR SPRINGFIELD, ILLINOIS

PART I. SANGAMON RIVER VALLEY IN SANGAMON COUNTY

INTRODUCTION

From about 1884 until the mid-1930s, Springfield obtained a portion of its water supply from shallow sand-and-gravel aquifers associated with the Sangamon River just north of the city. This water supply system used a complex arrangement of infiltration galleries and several "banks" of wells that basically paralleled the south bank of the river for approximately 1 mile (mi). Habermeyer (1925) reported that this system supplied approximately 7 million gallons per day (mgd) in 1923, of which a significant portion was diverted flow from the Sangamon River. This system was abandoned in the mid-1930s following construction of Lake Springfield, which has since been Springfield's primary water source.

One of the ground-water resource development alternatives being considered by Springfield includes redeveloping the ground-water supplies along the Sangamon River floodplain north of the city. Of particular interest to Springfield is an estimate of the potential of the aquifers associated with the Sangamon River floodplain to supply as much as 12 mgd during extended drought conditions.

Part I of this report addresses the ground-water resources associated with the Sangamon River valley in Sangamon County (see figure I-1). This section reviews the general geologic environment in Sangamon County and along the Sangamon River and two of the more significant ground-water supplies (one abandoned, one existing) from an operational perspective. Past estimates for the ground-water yields of these systems are summarized, and the implications for the possible development of a future well field are addressed. Appendix I-1 summarizes the remaining existing public ground-water supplies along the valley. Appendix I-2 contains available records of wells in an area along and within 1 mi of the Sangamon River in Sangamon County, and Appendix I-3 lists the results of chemical analyses of ground-water samples for which the Illinois State Water Survey has records in the same area.

GEOLOGICAL CONDITIONS RELATED TO GROUND-WATER RESOURCES

Glacial Geology

The availability of ground water from sand and gravel in the unconsolidated deposits along the Sangamon River valley is related partly to the thickness of the glacial drift. The thickness of the drift deposits has been previously mapped (Bergstrom et al., 1976). In Sangamon County these deposits are less than 50 feet (ft) thick in most places, with bedrock cropping out in the bluffs and in the channels of many of the streams (Bergstrom et al., 1976).

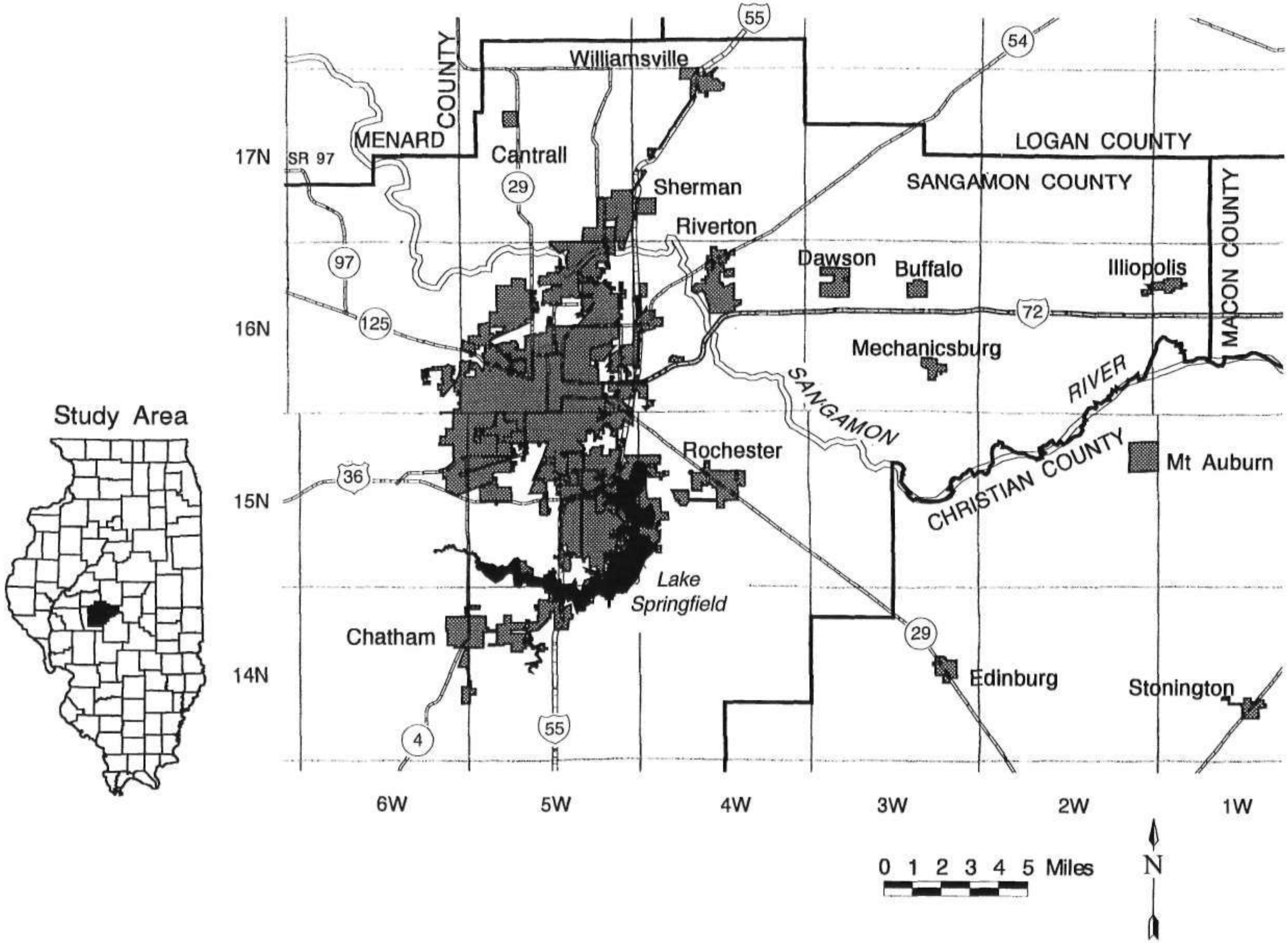


Figure I-1. Study area

In discussing the general geologic conditions related to ground-water development potential in Macon and Sangamon County, Bergstrom et al. (1976) described the Sangamon River valley as "The next most favorable area for ground water...", after the buried sand-and-gravel deposits of the Mahomet Bedrock valley found in Macon County. The Sangamon valley is described as containing extensive deposits of sand and gravel (Henry Formation) below a surficial cover of 10 to 20 ft of silt and clay (Cahokia Alluvium). The sand-and-gravel deposits are stated to be 15 to 40 ft thick and, in some places in the valley, more than a mile wide. However, Bergstrom et al. (1976) state further that "...suitable water-yielding sand and gravel are not present at all locations, thus test drilling is necessary in water-supply investigations..." to confirm the presence of significant deposits of sand and gravel at prospective locations. Figure I-2 shows the effects of these deposits upon general ground-water conditions along the Sangamon River in the vicinity of Springfield.

These deposits, sometimes supplemented with pumpage directly from the Sangamon River, provided the municipal water supply for Springfield for about 50 years, until Lake Springfield became the source of supply in about 1936.

Bedrock Geology

Two buried bedrock valleys are present in Sangamon County: the Middletown Bedrock valley and the Athens Bedrock valley (see figure I-2). Bergstrom et al. (1976) state that locally, thick beds of sand and gravel may be present in the Middletown Bedrock valley, but favorable beds are probably not present in the Athens Bedrock valley. In terms of ground-water potential, these bedrock valleys do not appear as promising as other, more favorable, areas associated with the Sangamon River valley (Bergstrom et al., 1976).

EXISTING AND ABANDONED GROUND-WATER SUPPLIES

This section examines the two larger (i.e., greater than about 1 mgd) ground-water supplies that either historically or presently use aquifers associated with the Sangamon River valley within Sangamon County. A review of these ground-water supplies provides insight into the potential for the development of a similar, supplemental supply for Springfield. The remaining smaller supplies shown in figure I-3 are described in Appendix I-1.

Borden Chemical and Illiopolis

Borden Chemical withdraws ground water from seven wells (9, 11, 13, 14, and 16-18) located within the lowlands of the Sangamon River (see figure I-4). Water is supplied for the company's manufacturing processes, to the village of Illiopolis, and to the nearby DeKalb Agricultural Research facility. Table I-1 shows historic pumpage from this well field, and Table I-2 shows detailed well data for each well currently operating.

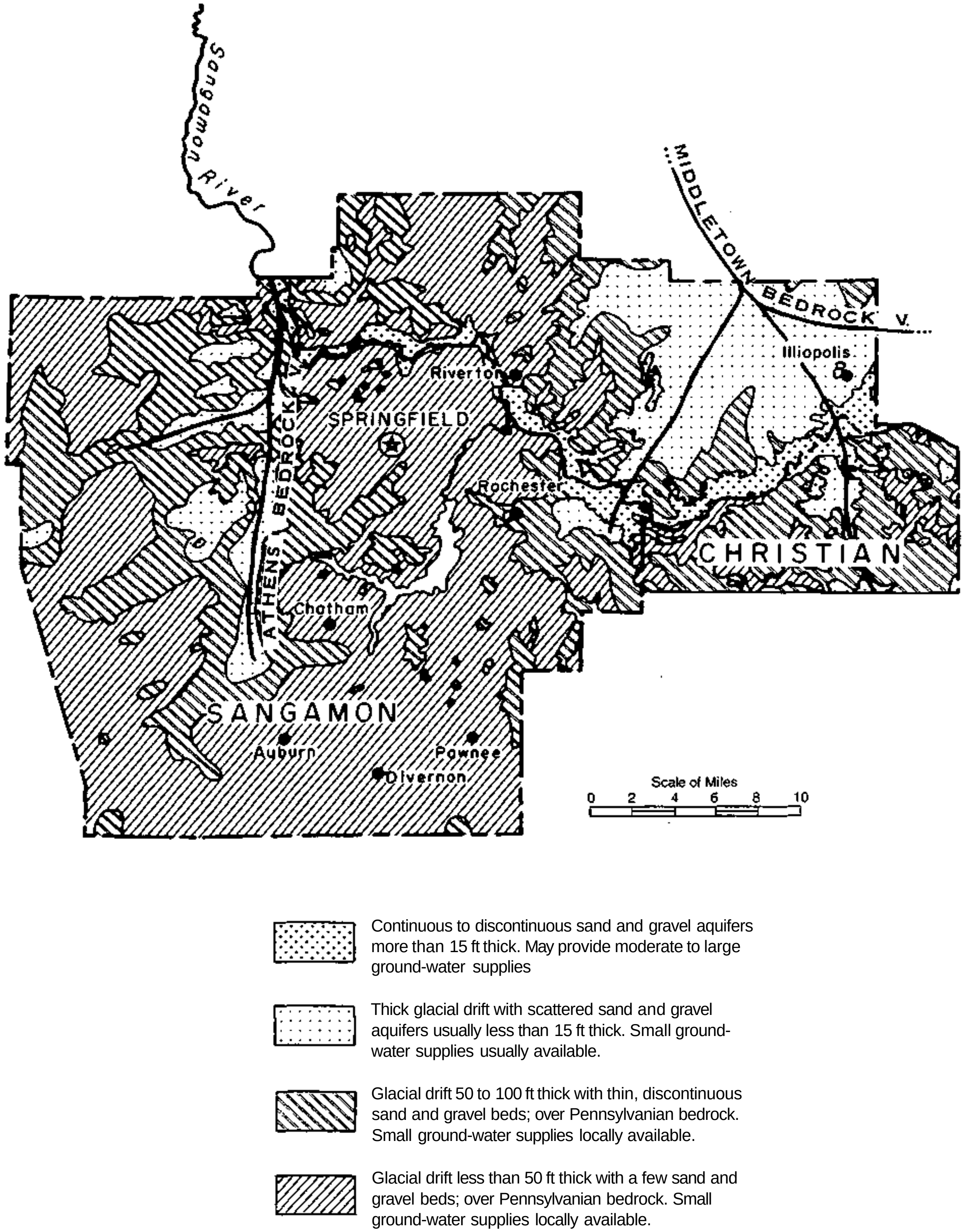


Figure I-2. Ground-Water conditions in the Springfield-Decatur Region (from Bergstrom, et. al., 1976)

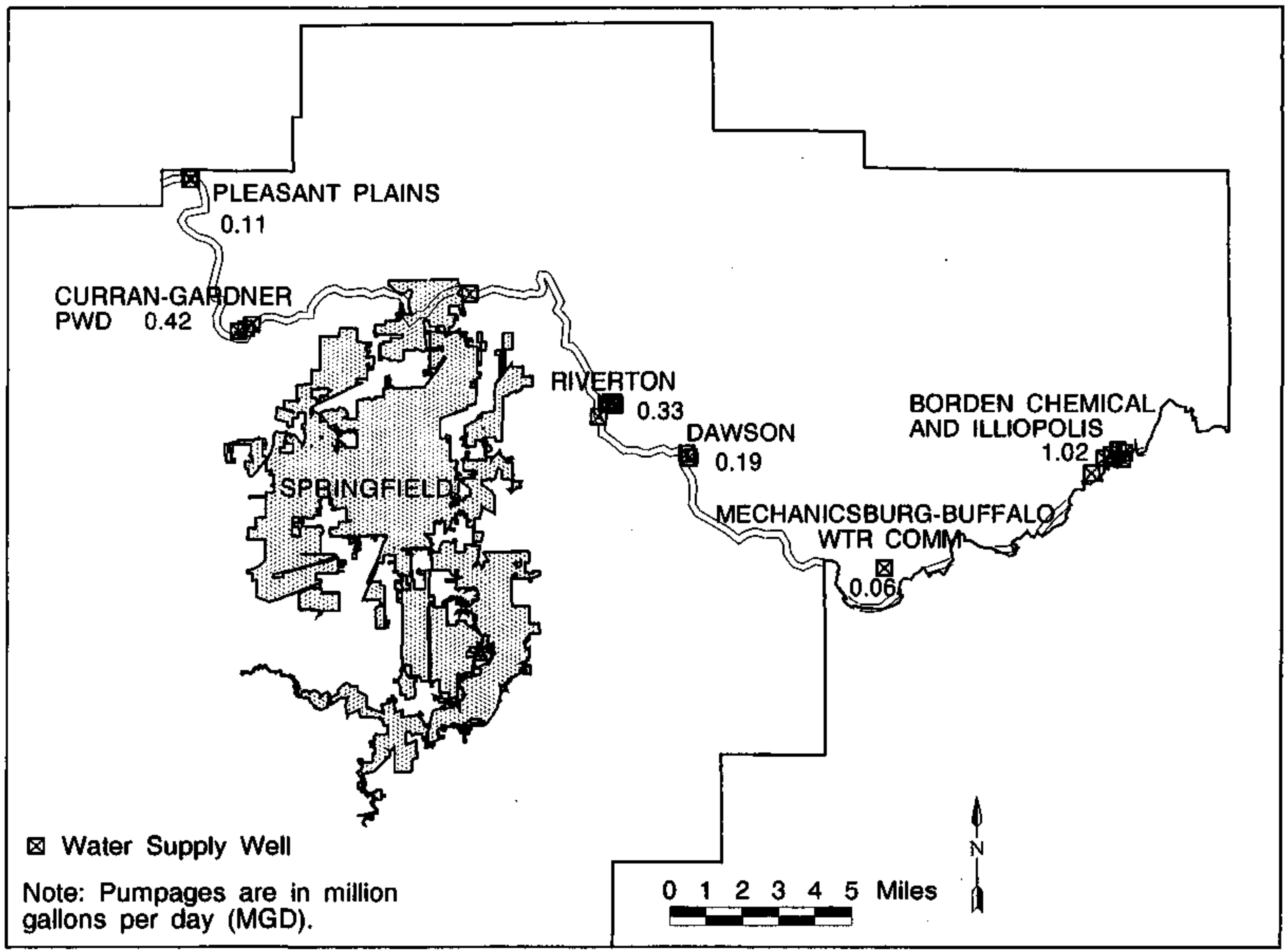


Figure I-3. Location of larger ground-water suppliers in Sangamon County

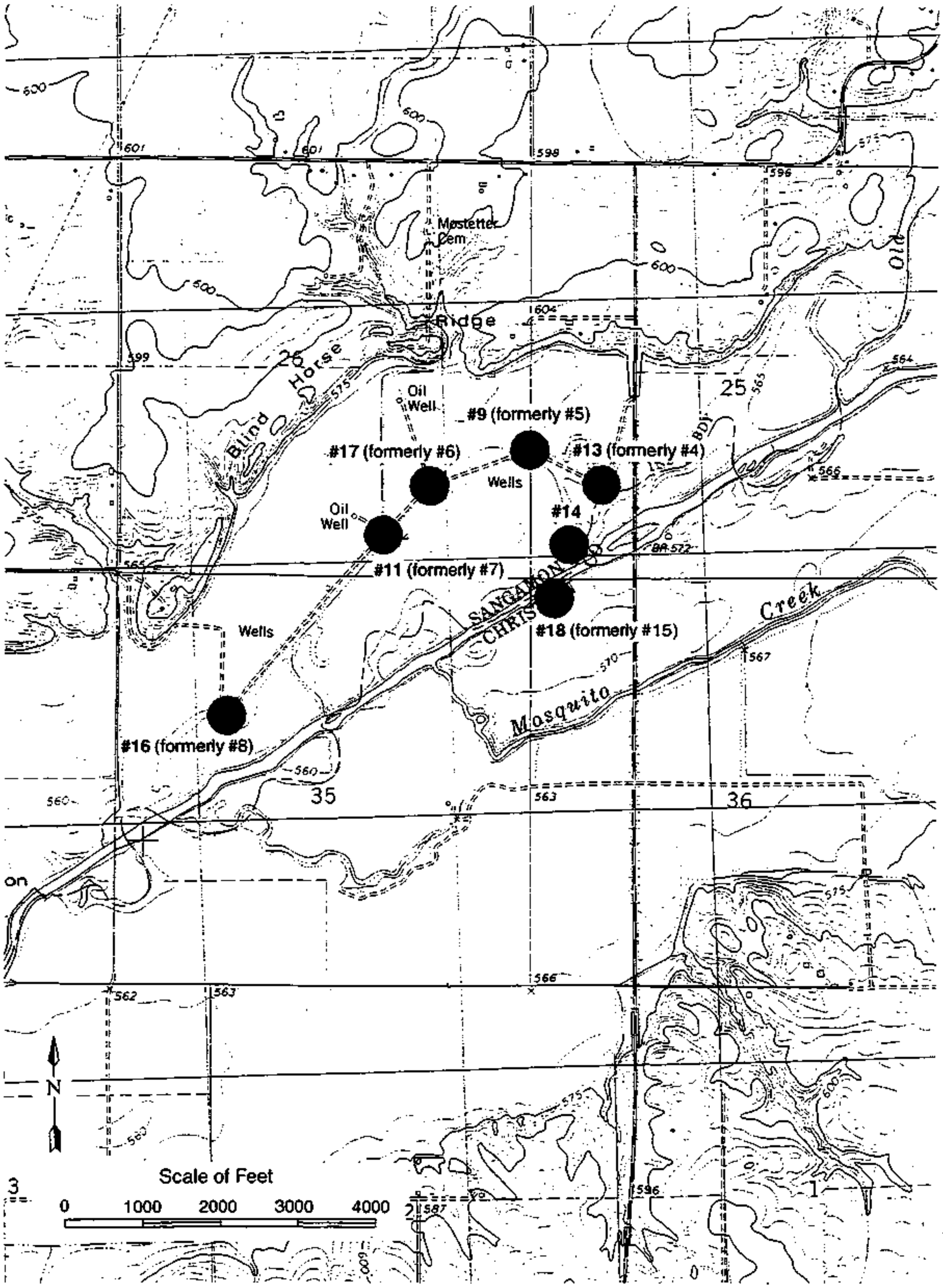


Figure I-4. Borden Chemical well field

Table I-1. Historic Pumpage at Borden Chemical

Year	*Pumpage (mgd)*	*Comments*
1979	1.35	all wells located north of Sangamon River
1980	1.17	"
1981	1.13	"
1982	1.28	Well 15 used - south of river
1983	1.25	"
1984	1.33	"
1985	1.29	"
1986	1.20	"
1987	1.35	"
1988	1.40	"
1989	1.32	"
1990	1.34	"
1991	1.29	"
1992	1.40	"
1993	1.36	"
1994	1.78	Well 18 (replaced Well 15) used - south of river
1995	1.19	Well 18 used - south of river

Table I-2. Borden Chemical Well Data

Well no.	*Production rate as per 1996 IEPA site survey (gpm)*	*Date drilled*	*Well depth (ft)*	*Borehole diameter (in.)*	*Screen type and interval*	*Well log Summary*	*Static water level below grade (ft)*
9	256	1969	56.5	unknown	15 ft of 16-in. 110 slot S.S.* from 42 to 57 ft	topsoil 0-2** clay 2-14 sand 14-57.5	15
11	170	1972	60	38	15 ft of 12-in. 40 slot S.S. from 44 to 59 ft	topsoil 0-6 clay 5-11 sand 11-59 clay 59-62	6.5
13	190	1977	47	36	15 ft of 16-in. 60 slot S.S. from 32 to 47 ft	clay 0-3 sand 3-15 gravel w/clay 15-20 gravel 20-47	10
14	180	1981	48	unknown	17 ft of 12-in. 40 slot S.S.	topsoil 0-3 sand 3-37 clay 37-40 sand 40-47 clay 47-48	5
16	300	1989	56	30	15 ft of 16-in. 40 slot S.S.	?	13.0
17	250	1992	55	30	15 ft of 16-in. 40 slot S.S. from 40 to 55 ft	clay 0-6 sand 6-55 clay 55-62 bedrock at 62	15.8
18 (Chr. Co.)	250	1994	53	30	15 ft of 16-in. 40 slot S.S. from 38 to 53 ft	clay 0-6 sand 6-53	9.0

Notes:
*S.S. = stainless steel.
**feet below land surface.

Estimated Aquifer Hydraulic Properties and Yield at Borden Chemical (Illiopolis)

A fairly extensive study to calculate the hydraulic properties of the sand-and-gravel aquifer(s) in the vicinity of the Sangamon River was conducted in 1959 and summarized in a letter report (Schicht, October 22, 1959, copy in Appendix I-4) to Mr. Donald Long, Plant Manager, Borden Chemical. Calculations conducted at that time used data collected from six pumping tests made during June and July 1942, using Wells 4-8. The locations of these wells correspond closely to the present locations of Wells 13, 9, 17, 11, and 16, respectively, and no wells were located south of the Sangamon River at that time (1942). As figure I-4 shows, these wells roughly parallel the Sangamon River for approximately 1 mi.

Schicht (1959) indicated that the transmissivity ranges from about 45,000 gallons per day per foot (gpd/ft) to about 100,000 gpd/ft, with an average value of 60,000 gpd/ft. The hydraulic conductivity, based on an average saturated thickness of 45 ft, was calculated to be 1300 gpd/sq ft (170 ft/day). The average value of the storage coefficient was found to be 0.04, indicating water-table conditions in the well field.

This prior study (Schicht, 1959) concluded that the sustained yield of the well field exceeded the total anticipated water demand at the time, which was 0.87 mgd (26 million gallons per month). It further postulated that if the five wells in operation at the time (Wells 4-8) were operated at pumping rates of 325, 323, 390, 390, and 252 gpm, respectively, the sustained yield of the sand-and-gravel aquifer in the vicinity of the well field might exceed 40 million gallons per month (1.3 mgd) under "favorable pumping conditions." (Note: Although not explicitly stated by Schicht (1959), "favorable pumping conditions" will be assumed to imply nondrought conditions for the purposes of this study.) More will be mentioned below regarding pumping rates of individual wells and also what may be implied by "favorable pumping conditions."

In 1979, Water Survey files (October 3, 1979 letter from H. Allen Wehrmann, Water Survey, to Brian Whiston, CM&T, copy in Appendix I-4) indicated that data collected since 1959 seemed to confirm the prediction for aquifer yield (1.3 mgd) for the Borden well field. Additionally, comments were provided suggesting that "favorable pumping conditions" may also be construed to mean proper well spacing, and a spacing between wells of 1,500-2,000 ft was suggested. Also, reduced pumping rates in the range of 200-300 gpm were recommended, as opposed to the rates that had been used up to that point in time (approximately 350-400 gpm).

Notably, up to this point, no mention was made by Schicht or Wehrmann of the possible influence of the Sangamon River on the estimate of sustained yield from the well field. In 1987, however, when the operation of wells *south* of the Sangamon River was being discussed, Water Survey files (June 17, 1987 letter to James Roth, CM&T from H. Allen Wehrmann, Water Survey) indicated that the river "...will act as a boundary to drawdowns created by withdrawals...." This implies, of course, that induced infiltration from the Sangamon River was assumed to be occurring. It was further stated that "...the present yield of the well field north of the river should stay the same as previous estimates...this is approximately 1.3 mgd."

No mention was made in any of this correspondence of an attempt to estimate the origin of the withdrawn ground water-or more specifically, the quantity derived (recharged) from induced infiltration (i.e., the Sangamon River) versus the quantity derived from precipitation. Additionally, no mention was made of an attempt to determine the areal extent of the aquifer under the influence of pumping from the well field. However, if one were to assume that the river is hydraulically connected with the aquifer and that the areal extent of aquifer significantly affected by pumping extends approximately 2,000 ft both upstream and downstream from the "end" wells of the well field (i.e., in accordance with suggested well spacing), then it would seem reasonable to estimate the minimum area to be approximately 2 mi (parallel to river) by ½ mi (approximate distance from the river to the bluff), or approximately 1 square mile (sq mi).

Following this reasoning, one could calculate a safe yield for the aquifer "normalized" for the approximate areal extent of the aquifer influenced by pumping to be no more than about 1.3 mgd/sq mi. As indicated above, induced infiltration from the Sangamon River is assumed in this estimate, and nondrought conditions, are assumed. In reviewing past correspondences on file at the Water Survey for the Borden Chemical well field, no reference to estimated yields for *drought* conditions was found.

The implications of the yield estimate for *nondrought* conditions will be addressed in the section entitled *"Feasibility of a 12-mgd Ground-Water Supply."*

Individual Well Yields

In 1973, Water Survey files (memorandum to files by E. W. Sanderson, dated May 15, 1973) indicated that four of the original five wells recently had been replaced at the Borden/Illiopolis well field. The new wells (Wells 9-12) were drilled in 1969 and 1972 with well depths ranging from 56 to 60 ft. They were gravel-packed wells with 16-in. diameter casings and 15 feet of screen. Upon completion these wells were test pumped at rates of 300 to 400 gpm.

In 1979, Water Survey files (dated October 3, 1979 letter from H. Allen Wehrmann, Water Survey, to Brian Whiston, CM&T) reflect concerns regarding individual well pumping rates at the well field, as expressed in an excerpt from the letter:

> "Previous failure of wells 4 through 8 located in the vicinity of the operating wells [wells 9 through 12] was felt to be due to overpumping. While individual wells may yield 350-400 gpm for several months or maybe even years, the sand and gravel material comprising the aquifer in that area is very fine and will migrate toward the well under the velocities generated by higher pumping rates (350-400 gpm) clogging the well screen and gravel pack."

In addition to concerns of fine sand near the well migrating towards the well gravel pack material and well screen and causing clogging problems, additional concerns centered around the high iron content of the ground water and its effects upon well efficiency, when wells are overpumped and increased drawdowns allow oxygen to come into contact with water at the well screen. Suggested reduced well pumping rates for individual wells were given as 200-300 gpm.

In 1983, the issue of individual well pumping rates was again addressed in Water Survey files (June 27, 1983 letter from H. Allen Wehrmann, Water Survey, to James Roth, CM&T) following well pumping tests at Wells 14 and 15. At Well 14 the specific capacity decreased from about 18 gpm/ft (July 1982) to about 9 gpm/ft (June 1983). At Well 15 the specific capacity decreased in a similar manner (18 gpm/ft to at least as low as 8 gpm/ft) during the same time period. In both instances, the decrease in specific capacity was attributed to an increase in the well-loss constants for the wells. (The well-loss constant is a term used to describe the turbulent flow losses as water passes through the gravel pack and well screen and inside the casing to the pump intake.) The decreases in well efficiency were again attributed to the effects of encrustation of iron oxides and/or iron bacteria caused by excessive drawdown at the wells from high pumping rates. Suggested remedies included decreasing pumping rates to 150 to 175 gpm following well rehabilitation activities such as well acidification, polyphosphate application, and shock chlorination treatment. It was further stated, "While decreasing pumping rates will affect the total output of the present well field, it will not affect the total sustained yield of the aquifer. What it does mean is that more wells will be needed to achieve that yield figure."

Springfield's Former Supply System along the Sangamon River

Water Survey open file report, "Report of the Public Water Supply of Springfield, Dlinois" (Hansen and Stromquist, 1913) contains much detailed information about Springfield's early water collection system along the Sangamon River. A later Water Survey report (Habermeyer, 1925) contains a summary of the system used to collect ground water and surface water from this site during the late 1800s and early 1900s. An open file report by Walker (1964) was produced by the Water Survey and addresses the availability of ground water in the Sangamon River valley north of Springfield for supplemental municipal supply. Much of the following text is taken from these three reports.

A public water supply was installed by Springfield in 1868. The initial source of water consisted of surface water pumped from the Sangamon River upstream of a dam built across the river at a location four miles north of the center of the city.

In 1884 a well was dug in the river floodplain near the NE corner, Sec. 10, T16N, R5W, Sangamon County, and for a few years the entire municipal supply was from this well. This original well is reported to have been 50 ft in diameter and 50 ft deep with 30-in. thick curbing (casing) constructed of brick laid in mortar. This well is denoted as "Large Well" (figure I-5).

With increasing municipal water demands, the system became inadequate, and two water infiltration galleries were installed in the period 1888-1890 near the location of the original surface water intake and the first municipal well (described above). These galleries collected surface water, which was impounded by the dam and allowed to infiltrate through the sandy floodplain materials of the Sangamon River. The original well became a collecting reservoir and "suction pit" for the surface-water collection system and infiltration galleries.

The first infiltration gallery extended about 1,000 ft in a southeasterly direction from the original well (see figure I-5). This infiltration gallery consisted of a wooden-framed structure

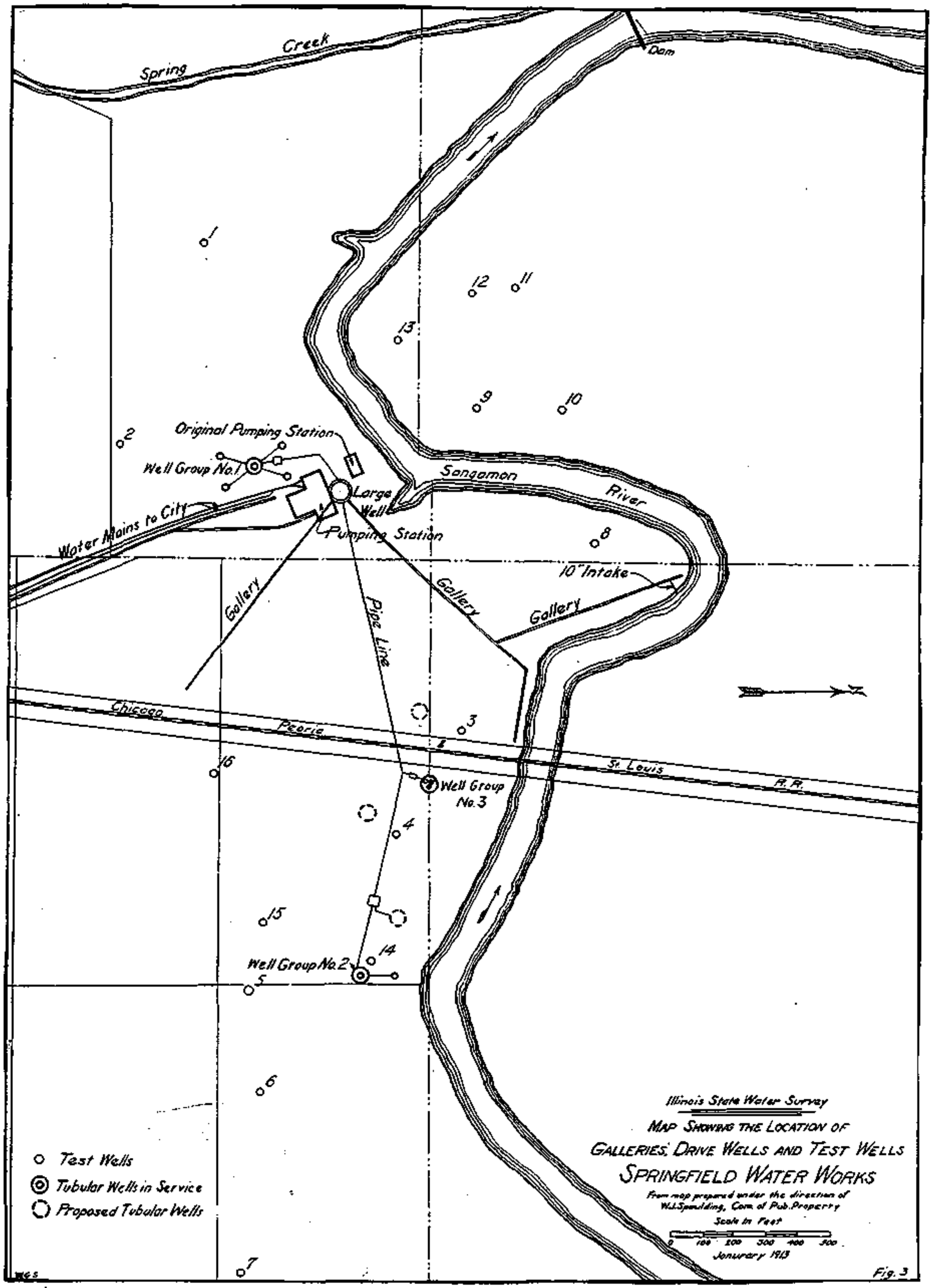


Figure I-5. Infiltration galleries and wells at the former Springfield Water Works
(from Hansen and Stromquist, 1913)

extending the entire length of the gallery, the cross section of which was 4 ft wide and 5 ft high. The interior of this structure was supported by oak ribs and walled and covered with 3-in. elm planks. This tunnel-like structure used for water collection was placed in a 25-ft deep trench dug into the sand and gravel of the river floodplain and was backfilled with broken stone.

Sometime before 1890, a second infiltration gallery was installed and extended from the location of the original well towards the northeast (see figure I-5). This gallery is reported to have been 1,563 ft long and 3 by 4 ft in cross section. Following this, a 450-ft extension consisting of 36-in. concrete pipe was added to this gallery in about 1910.

Bulletin 21 (Habermeyer, 1925) states that at times the yield from the one (original) well and two infiltration galleries was adequate to meet all water demands. At times of low water, however, the supply was not adequate, and in 1890 a direct connection was made between the Sangamon River and the end of the second infiltration gallery (according to figure I-5). During the next 12 years, an "admixture" of river water was used most of the time (Hansen and Stromquist, 1913).

First Four Drilled Wells (1902)

In 1902, four wells were constructed southwest of the water pumping station (see figure I-5). These wells were approximately 45 ft deep with 10-in. casings and had 14-ft screens with 0.008-in. slots. In 1911, a fifth well was sunk in the center of this group. The fifth well had a 12-in. casing and 24 ft of well screen with 0.020-in. slots. This center well acted as a central "collecting well" for the four surrounding wells, and a further description of this "bank" of wells is as follows (Hansen and Stromquist, 1913):

> "An 8 foot shaft was sunk to a depth of about 20 feet and in this is placed a centrifugal pump. The suction of the pump is connected to 4-inch pipes leading to the outer wells and a 6-inch pipe in the center well. The arrangement of these wells is shown in [figure I-5] and is denoted 'Well Group No. 1'."

New Dam Construction (1908-1909)

As reported by the National Board of Fire Underwriters in 1908, the original wooden dam (circa 1868), which was constructed just downstream of the original well and the two infiltration galleries, provided for small storage for periods of dry weather and served to hold the water level above the infiltration galleries. At that time, though, a (then) new 16-ft, reinforced concrete dam was being constructed at a location a half mile below the first dam. This new dam was to be finished by January 1909, and was to raise the water level 3.5 ft above the crest of the first dam and increase surface-water storage as well as the hydraulic head on the infiltration galleries.

Although the reported location of this (then) new dam is somewhat inconsistent, Hansen and Stromquist (1913) provide a similar account regarding its construction:

"The dam which was built at the site of the pumping stations at the time the water works were first installed, was in 1908 replaced by a dam of reinforced concrete. The new dam was built about 1/4 mile downstream from the pumping station. The object of the dam was to maintain a higher level of water in the river during dry seasons on the assumption that this would retard the flow of the ground water toward the river and maintain a higher ground water level; as well as to impound an ample quantity of water for an emergency supply...."

Additional Drilled Wells (1910-1924)

During the period from approximately 1910 to 1924, more wells were drilled in the vicinity of the first wide-diameter well (suction pit), pumping station, and infiltration galleries. Figure I-5 and figure I-6 show the general location of these additional wells in about 1913 and 1924, respectively. These wells were drilled to a depth of about 50 ft and again were constructed in groups or "substations". The central collecting well conveyed the collected water to the original wide (50 ft) diameter well being used as the collecting reservoir and suction pit. Figure I-7 is a schematic showing the general construction of these wells (substations), as well as a cross section of one of the infiltration galleries.

Seven groups of wells were reported to exist in 1921 (National Board of Fire Underwriters, 1921). At that time it was reported that the galleries supplied an average of 5,000,000 gpd, and that the wells (groups) each supplied from 750,000 to 1,660,000 gpd. The total supply available (presumably for firefighting purposes) was estimated to be 13 mgd.

The Pitometer Company made a test of the yield of the wells in 1923 (Habermeyer, 1925). The wells at that time were as represented in figure I-6 (from Bulletin 21). Although Habermeyer (1925) reports that some of the well screens were probably clogged at the time of the test, the "yield" of each group of wells was determined and is shown in table I-3.

Table I-3. Results of 1923 "Rate of Yield" Test

Substation number	*Rate of yield (gpd)*	
1	547,000	
2	600,000	
3	2,000,000	(one pump operating)
3	2,555,000	(two pumps operating)
4	1,096,000	
5	1,416,000	
6	362,000	
7	300,000	
8	1.390.000	
	10,266,000	

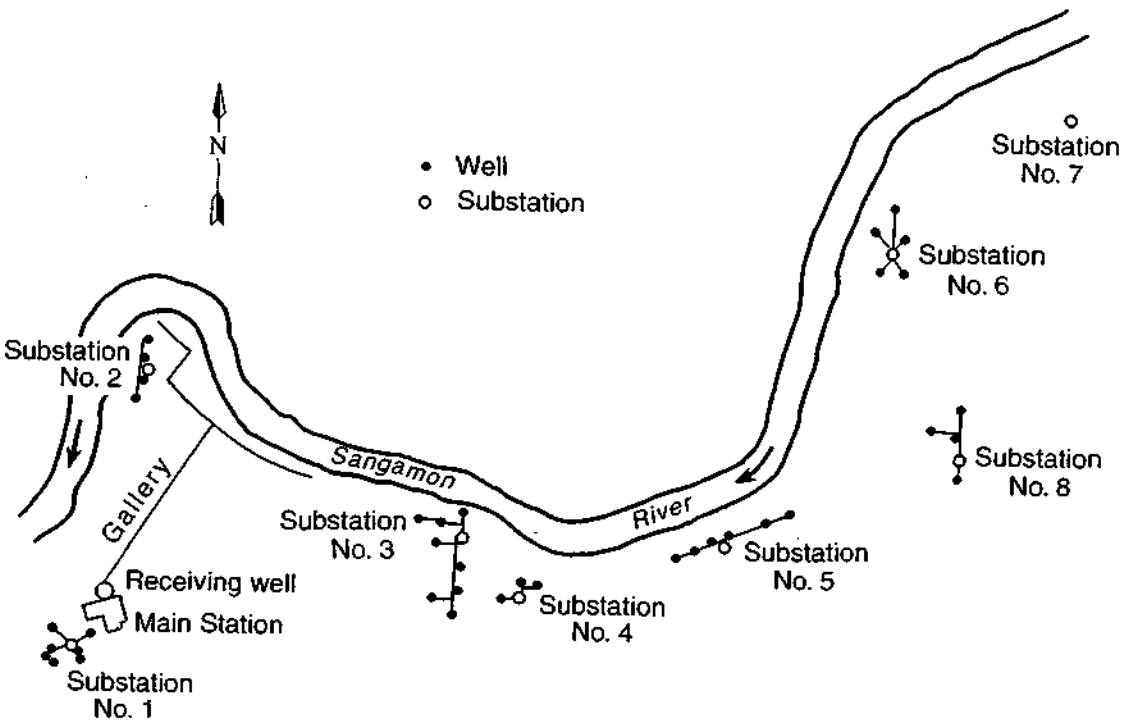


Figure I-6. Location of well substations
(from Habermeyer, 1925)

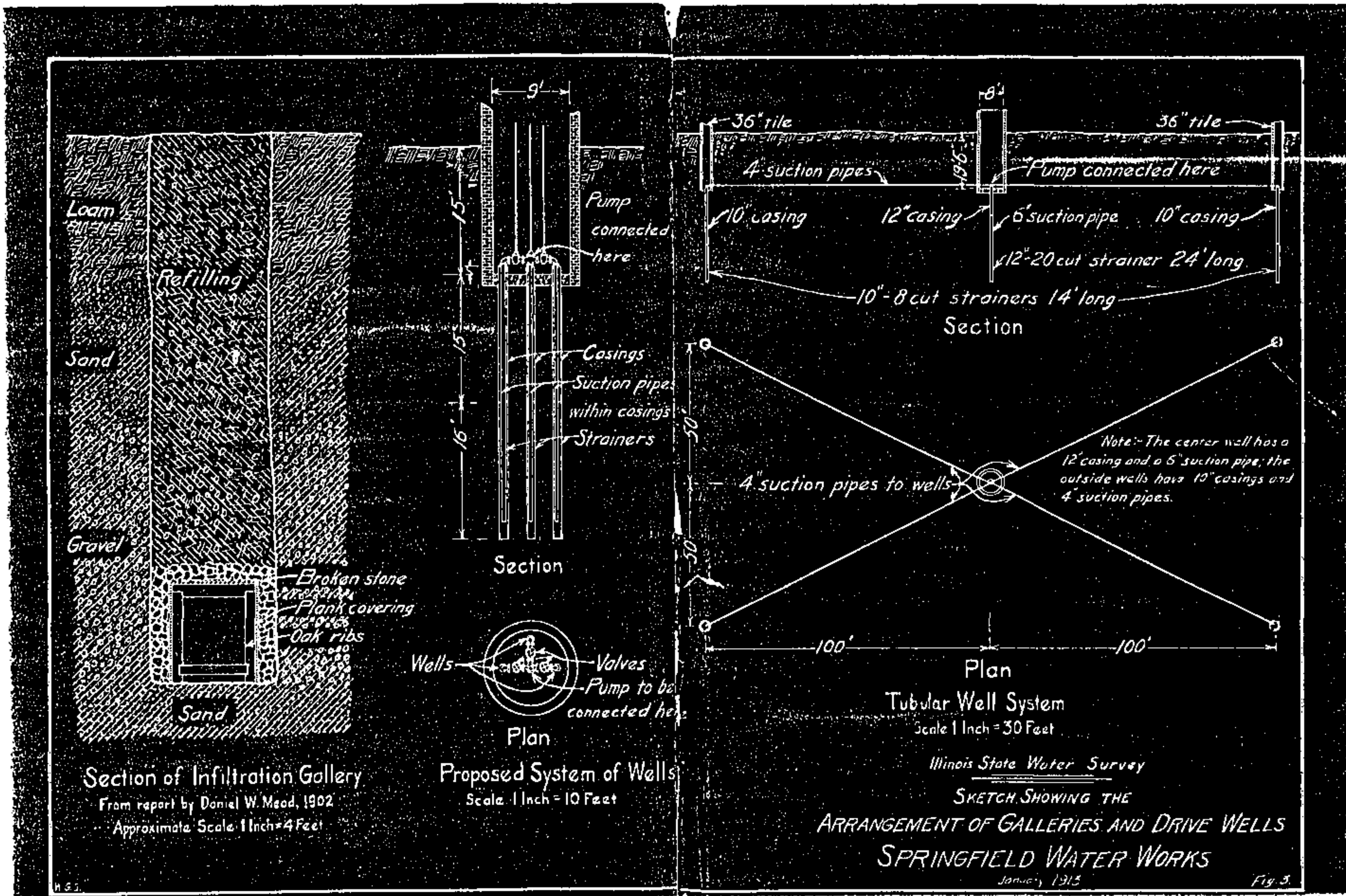


Figure I-7. Sketches of well substations and infiltration galleries
(from Hansen and Stromquist, 1913)

Based on a review of available information, the duration of this "rate-of-yield" test is unknown. It is stated that the "yield" of each group of wells was determined by measuring the discharge from each substation (Habermeyer, 1925). It is unclear whether the substations were operated simultaneously. Also lacking is a description of the analysis methodology used to examine the field data to arrive at an *aquifer yield.* Given this, current practice would more likely classify this "rate-of-yield" test as a "pumping" test. In other words, it is more likely that this test revealed the pumping capacity of the water collection system on a short-term basis, as opposed to providing insight into the ability of the aquifer to supply a sustainable yield of ground-water over an extended period of time.

Origin of the Withdrawn Water at the Former Site
and Historical Aquifer Yield Estimates

In estimating the aquifer yield from the river bottomlands in the vicinity of the former site north of Springfield, Walker (1964) examined the past operation of the system. Walker (1964) noted that part of the water pumped was obtained directly or indirectly from the Sangamon River, as one of the collection galleries was, at times, connected to the river. It was further noted that as much as 2,000 gpm of surface water used in cooling the light (power) plant was released on the ground in the vicinity of the tubular wells and permitted to infiltrate via infiltration ditches to the aquifer. In summarizing the possible "split" between surface- and ground-water use at the former site, Walker stated:

> "Thus, of the nearly 7,000,000 gpd pumped from the system, it is probable that no more than 3,000,000 gpd were derived from ground water."

Further indications of the use of surface water during the operation of this early water supply system come from Hansen and Stromquist (1913). They stated the following:

> "When the yield of the galleries and wells is insufficient to supply the demand, water from the Sangamon River is admitted into the galleries. Records were available to show the periods when this was done from March 1, 1911 to December 31, 1912. According to these records river water was admitted during the following periods:
>
> May 30 to June 26, 1911
> June 30 to September 8, 1911
> September 2 to November 8, 1912
> November 18 to December 31,1912.
>
> a total of 211 days or about 31% of the entire period. An effort will be made to develop the drive [tubular] well system to such an extent that river water need not be used during the summer and fall of 1913."

Having addressed the use of significant quantities of surface water at the former site of the Springfield water works, Walker (1964) focused on the (strictly) *ground-water* potential. He looked at the physical boundaries of the aquifer, the probable area encompassing the cone of influence for the early water withdrawal system (approximately 3 sq mi), and the normal average recharge rate from precipitation of about 300,000 gpd/sq mi (Walton, 1965) for aquifers similar in type to that in the bottomlands north of Springfield. Walker concluded that of the approximately 3 mgd of *ground water* pumped from this early system, during years of normal precipitation it was likely that only about 1 mgd was ground water recharged from precipitation; and probably about 2 mgd was ground water obtained from the Sangamon River by induced infiltration.

A review of letter correspondence on file at the State Water Survey shows that arriving at *the number* for ground-water development potential for the aquifer(s) along the Sangamon north of Springfield has long been the goal of numerous entities as various water supply alternatives have been explored for Springfield's water supply plan. On numerous occasions reference has been made to State Water Survey Bulletin 21 (Habermeyer, 1925), which summarizes the results of the "rate-of-yield" test (or pump test) conducted in 1923 at the former Sangamon River plant, as discussed above. After reviewing the historical operation of this former plant and examining results of the 1923 pump test, Crawford, Murphy & Tilly (CM&T), Inc., Consulting Engineers, (1965) stated the following:

> "Available data indicate that perhaps a 10 mgd firm supply could be obtained by constructing a number of new, comparatively small capacity, large size, gravel packed wells along the Sangamon River within reasonable distance of the Old Waterworks site. Development of such a well field would require an extensive collection system."

It was not specified what a reasonable distance along the Sangamon River might be or what was meant by an extensive collection system. This report (CM&T, 1965) did point out, however, that the old system consisted of approximately 40 wells, and that an extensive collection system would be necessary for the development of an approximately 10 mgd ground-water supply. The necessity of an extensive ground-water collection system for potential future development is in agreement with the conclusions of this report and will be discussed further below. Again, regarding the results of the 1923 "rate-of-yield" test, it is likely that these results should be viewed in the context of a pumping test, rather than an aquifer test addressing the sustainable yield of the aquifer(s) at this former site.

Following a conference addressing Springfield's emergency water supply held at the offices of CM&T on January 12, 1982, the Water Survey was prompted to re-address estimates for potential ground-water development via a well field in the Sangamon River valley (file correspondence dated April 20, 1982, from Adrian P. Visocky, Water Survey, to L. K. Crawford, CM&T). Again using the former well field as an example, and again assuming that it had an approximate area of influence (3 sq mi) as estimated by Walker (1964), specific mention was made on how drought conditions would affect that portion of ground water attributable to induced infiltration (i.e., 2 mgd). Visocky stated the following:

> "...in drought periods, at least, the amount of induced infiltration would be limited-probably no more than half of the amount obtained in a year of normal precipitation [2 mgd] and quite possibly much less. Therefore...we intentionally did not assume induced infiltration in our estimate of the yield of a groundwater supply during drought conditions."

Therefore, the estimate made at that time for the quantity of ground water that could be withdrawn from a well field during emergency (drought) conditions *did not* assume a contribution of water from induced infiltration, and the total "drought-condition" yield was estimated to be 1 mgd. If the *maximum* "drought-condition"-induced infiltration was assumed (i.e., 1 mgd), the total yield estimate for the well field would increase to 2 mgd. These yield estimates will be summarized and their implications will be discussed below.

Water Quality at the Former Springfield Facility

A sample (number 53531) of water collected at the pumping station on April 4, 1925, had a mineral content of 329, a total hardness of 282, and content of iron of 1 part per million. Habermeyer (1925) reported that some variation existed in samples collected from the different wells and galleries. Table I-4 shows the water quality analysis of the above mentioned sample.

FEASIBILITY OF A 12-MGD GROUND-WATER SUPPLY

Table I-5 summarizes the estimated ground-water yield numbers discussed above, and is based upon the various Water Survey correspondence that has examined operation of the water withdrawal facilities and corresponding yield estimates at Borden Chemical and the former Springfield facility. These estimates will be examined and discussed in the context of potential future ground-water development in the Sangamon River valley.

A preliminary observation upon looking at table I-5 is that the estimated "nondrought" ground-water yields for the Borden Chemical well field and Springfield's former system are in general agreement (i.e., less than 1.3 mgd/sq mi, and 1 mgd/sq mi, respectively).

Estimates for the total amount of ground water that can be withdrawn during drought conditions vary between 0.33-0.66 mgd/sq mi, and are based on estimates discussed in the correspondence and letter reports examined above. The total ground-water yield estimates vary depending upon what quantity is assumed for induced infiltration. So that the implications for potential ground-water development can be discussed conceptually, the aquifer materials associated with the Sangamon River bottomlands will be assumed to be 1 mi wide, which is the approximate width of the river bottomlands north of Springfield.

As was stated earlier, Springfield is currently exploring the potential of supplemental sources of water to augment the existing resources of Lake Springfield during drought periods. A quantity (rate) of water which has been deemed significant as a supplemental source is 12 mgd. Based on the above assumptions, the area of aquifer which could possibly supply the desired 12 mgd would be approximately 18-36 sq mi, corresponding to the range of estimated "drought-condition" yield rates of 0.66-0.33 mgd/sq mi. Assuming that the alluvial aquifer extends continuously along the bottomlands of the Sangamon River and is approximately 1 mi wide, then the required distance along the bottomlands of the river to develop a 12-mgd supply during drought conditions is in the range of 18 to 36 miles.

Table I-4. Sample Analysis from the Former Springfield Waterworks Facility (sample number 53531)

Constituent	*Concentration (ppm)*
Iron, Fe	1.0
Manganese	0.6
Silica, SiO_2	10.8
Nonvolatile	0.3
Alumina, A1203	1.8
Calcium, Ca	67.0
Magnesium, Mg	28.0
Ammonia, NH4	0.3
Sodium, Na	9.9
Potassium, K	1.7
Sulfate, SO4	56.7
Nitrate, N03	2.7
Chloride, C1	10.0
Alkalinity	
Phenolphthalein	0
Methyl Orange	228
Residue	340

Table I-5. Summary of Estimated Ground-Water Yields in Sangamon River Bottomlands

	Average (nondrought) conditions			*Drought conditions*	
	Borden Chemical well field	*Springfield's former wells and infiltration galleries*		*Springfield's former wells and infiltration galleries*	
Source of ground-water recharge	Estimated **YIELD** for cone of influence encompassing an estimated **1 sq mi area**	Estimated **YIELD** for cone of influence encompassing an estimated **3 sq mi area** (Walker, 1964)	Estimated **YIELD** "normalized" to **1 sq mi area**	Estimated **YIELD** for cone of influence encompassing an estimated **3 sq mi area** (Walker, 1964)	Estimated **YIELD** "normalized" to **1 sq mi area**
Precipitation:	-	1 mgd	-	1 mgd	-
Induced infiltration:	-	2 mgd	-	0-1 mgd	-
TOTAL:	1.3 mgd or less	3 mgd	1 mgd	I-2 mgd	0.33-0.66 mgd

Based on experience gained at the well field operated at Borden Chemical near Illiopolis, a reasonable pumping rate for each well appears to be approximately 250 gpm, or 0.36 mgd. Therefore, with an estimated "drought-condition" yield rate of 0.33 mgd/sq mi, wells spaced approximately every mile for 36 miles would be required; and with an estimated yield rate of 0.66 mgd/sq mi, wells spaced approximately every ½ mile for 18 miles would be required. These two scenarios are shown conceptually in figure I-8 and figure I-9, respectively. A detailed analysis of the impacts to existing ground-water users in the Sangamon River bottomlands is beyond the scope of this report, but would be required if ground-water development of this nature was pursued.

It should be noted that the existence of sand-and-gravel materials suitable for ground-water development of the magnitude described above is unverified. Any planning that might involve generating cost estimates to construct a series of wells in the fashion described above should include substantial costs for a fairly extensive test drilling program to verify that suitable aquifer materials exist extensively along the river bottomlands. Verifying both the extent and aquifer thickness would be required at each prospective well location.

SUMMARY

During the period from approximately 1884 to the mid-1930s, the city of Springfield operated a system for the collection of both ground water and surface water at a location just north of the city along the banks of the Sangamon River. This system first included a surface water intake located upstream of a dam. Shortly thereafter a single large-diameter well was constructed along the banks of the Sangamon River, and this well supplied the entire municipal demand for a few years. This was followed by the construction of approximately 3,000 ft of infiltration galleries; a direct connection to the river; and, finally, the construction of approximately 40 small-diameter wells operated in groups or "banks". Historical information indicates that this system use an "admixture" of both surface- and ground water. Following construction of Lake Springfield in about 1936, this system was abandoned.

Following a drought that severely depleted available water in Lake Springfield in the mid-1950s, there was renewed interest in estimating the availability of ground water for use as a supplemental municipal supply for Springfield. In 1964, the State Water Survey produced letter-type reports addressing this issue. At that time, discussions concerning the potential for ground-water development centered on past operation of the system of wells and infiltration galleries north of the city (Walker, 1964). In short, it was stated that the cone of influence for this system encompassed an area of about 3 sq mi, and of the nearly 7 mgd that was pumped from this system in about 1924, probably no more than 3 mgd were derived from ground water and induced surface/river water.

There was a resurgence of interest regarding this issue in the early 1980s following a meeting held on January 12, 1982, addressing Springfield's emergency water supply plan. Water Survey files for this time period reflect numerous correspondence reconciling the differences in

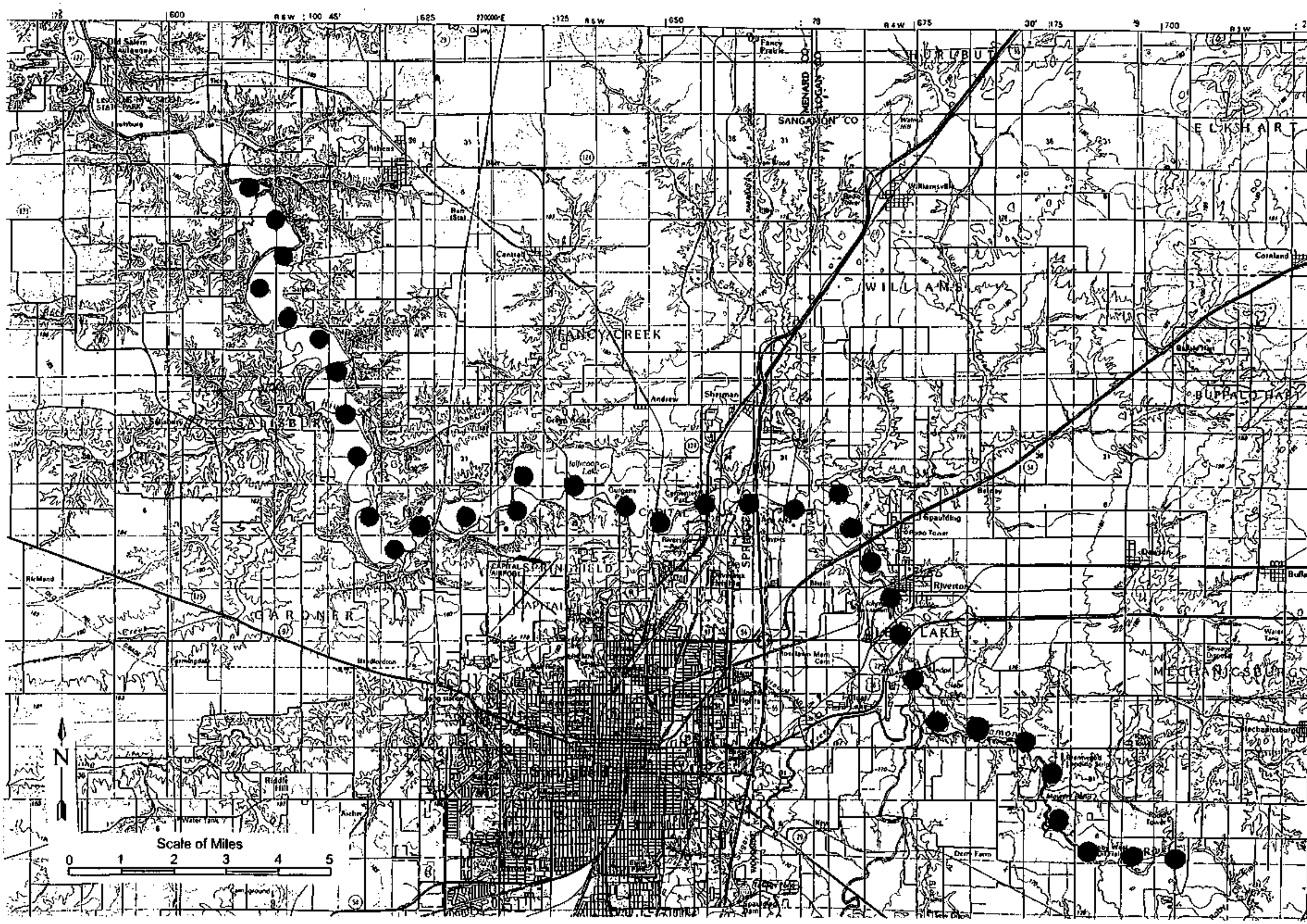


Figure I-8. Conceptual 12-mgd ground-water development under drought conditions
(assumed aquifer yield = 0.33 mgd/sq mi)

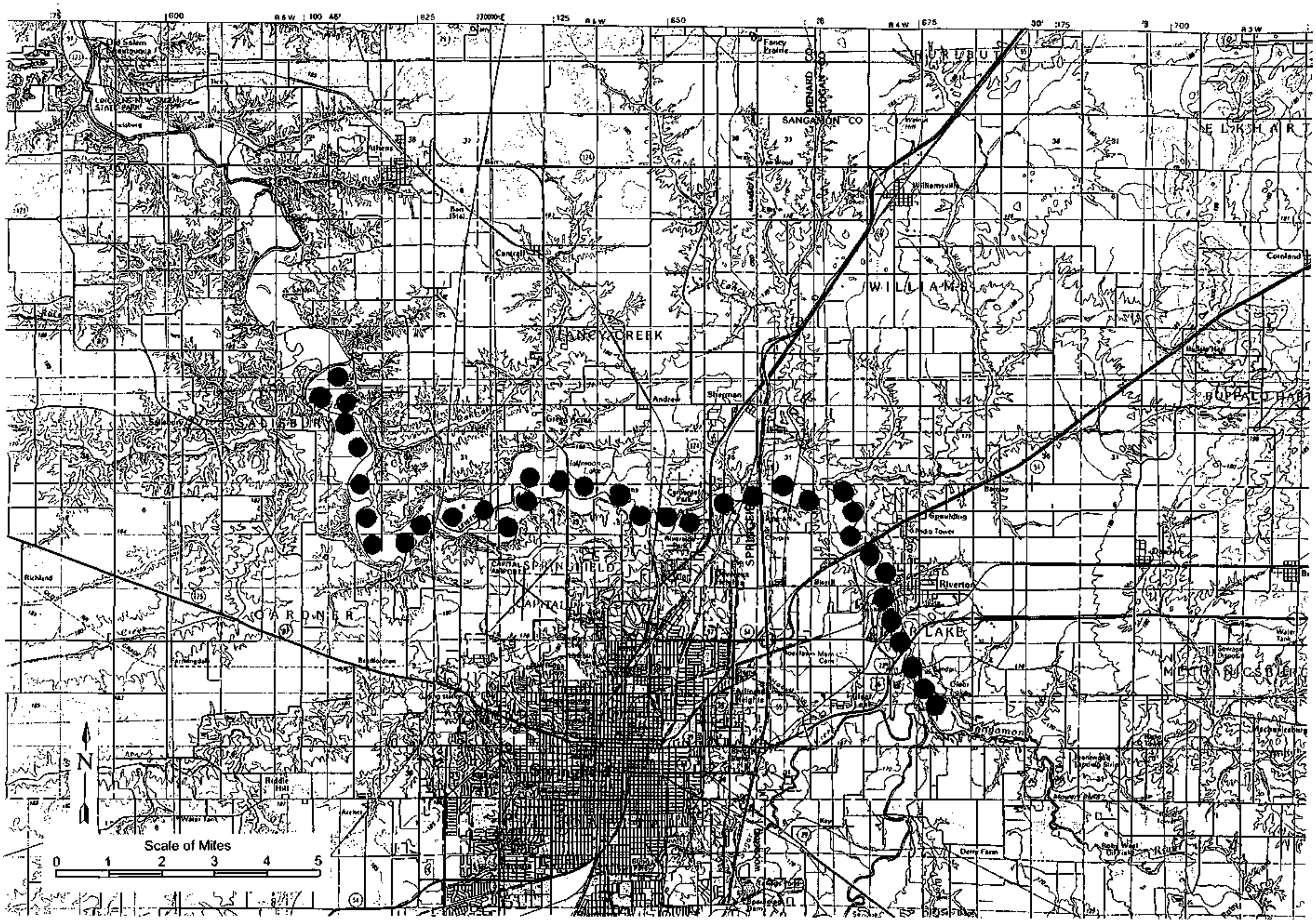


Figure I-9. Conceptual 12-mgd ground-water development under drought conditions
(assumed aquifer yield = 0.66 mgd/sq mi)

past estimated yields of the former system (infiltration galleries, river connection, and wells), and what might be achieved with a newly constructed well field with a comparable cone of influence. The effects of drought conditions upon yield estimates were also addressed.

Considerable discussion has occurred concerning redeveloping the operation of a well field in the Sangamon River bottomlands. Estimates for the yield of such a well field are shown above and range from approximately 1 mgd/sq mi for nondrought conditions, to 0.33-0.66 mgd/sq mi for drought conditions.

Verification of the yield estimates under nondrought conditions is provided through an examination of the operation of the well fields operated by Borden Chemical near Uliopolis. Prior to constructing additional wells south of the Sangamon River, the well field north of the river yielded approximately 1.0-1.3 mgd, using wells along an approximately I-mi reach of the Sangamon River. Correspondence on file at the Water Survey (and discussed above) indicates that attempts to withdraw ground water in excess of 1.0-1.3 mgd at that well field resulted in significant decreases in the performance of individual wells due to excessive drawdowns.

Figures I-8 and I-9 provide conceptual images of the magnitude of development/ construction which likely could be required for Springfield to develop an approximately 12-mgd supplemental ground-water supply for drought conditions. Based on available information describing the regional geohydrologic picture, the aquifers along the Sangamon River are limited, both in areal extent and in capacity to be recharged from precipitation and induced infiltration, particularly during drought conditions. For these reasons, major ground-water development would likely require an extensive array of relatively small capacity wells as shown conceptually above.

Again, a detailed analysis of the potential impacts to existing ground-water supplies in the Sangamon River valley was not conducted as part of this study, and would be required if ground-water development of this magnitude was pursued. The two conceptual ground-water development schemes shown in figures I-8 and I-9 and the corresponding range in the number of wells (18-36) required for a 12-mgd supply represent the degree of uncertainty associated with ground-water development of this magnitude in the Sangamon River valley.

PART II. ILLINOIS RIVER VALLEY IN MORGAN AND SCOTT COUNTIES

INTRODUCTION

The magnitude of the ground-water resources associated with the Illinois River valley is conveyed, at least partially, by the following quote (Gibb et al., 1979):

> "From DePue [mile 213] to the confluence of the Illinois and Mississippi Rivers [mile 0] extensive deposits of sand and gravel occupy the bottomland portion of the Waterway. Wells tapping these deposits range in depth from 30 to 165 feet. An estimated 30.2 billion gallons were withdrawn from wells during 1977."

Of particular interest to Springfield is obtaining an estimate of the potential of the aquifers associated with the Illinois River floodplain to supply as much as 12 mgd during extended drought conditions along the stretch of the Illinois River to the west of Springfield. For the purposes of this study, those areas of the river floodplain within Morgan and Scott Counties were examined. This area is approximately 50 mi from the center of Springfield, and corresponds approximately to river miles 50 to 75.

This report summarizes ground-water conditions in the study area (see figure II-1) and focuses on ground-water development potential, including pertinent geologic conditions. The study area includes all of Scott County and the two westernmost tiers of townships in Morgan County, and the analysis of ground-water conditions concentrates on the area between the Illinois River and the bluff line approximately 3 to 4 mi east of the river.

This report provides available historical ground-water pumpages along the Illinois River valley, reviews existing water supplies within the study area (Appendix II-1), and summarizes past estimates for the ground-water yields within the study area. Implications for potential additional ground-water development are also addressed. Appendix II-2 contains available records of existing wells in an area along and within 4 mi of the Illinois River in Morgan and Scott Counties, and Appendix II-3 lists the results of chemical analyses for which the Water Survey has records in the same area.

GEOLOGICAL CONDITIONS RELATED TO GROUND-WATER RESOURCES

The geology along the entire Illinois River waterway has been previously described in detail in reports produced by both the State Water Survey and the State Geological Survey (Suter et al., 1959; Walker et al., 1965; Prickett et al., 1964; Csallany, 1966; Hoover and Schicht, 1967; Marino and Schicht, 1969; Bergstrom, 1956; Selkregg and Kempton, 1958; and Willman, 1973). Two reports that specifically address the geology along the waterway with reference to ground-water development potential are entitled *Groundwater Conditions and River-Aquifer Relationships along the Illinois Waterway* (Gibb et al., 1979) and *Coal and Water Resources for Coal Conversion in Illinois* (Smith and Stall, 1975). Gibb et al. (1979) summarize the

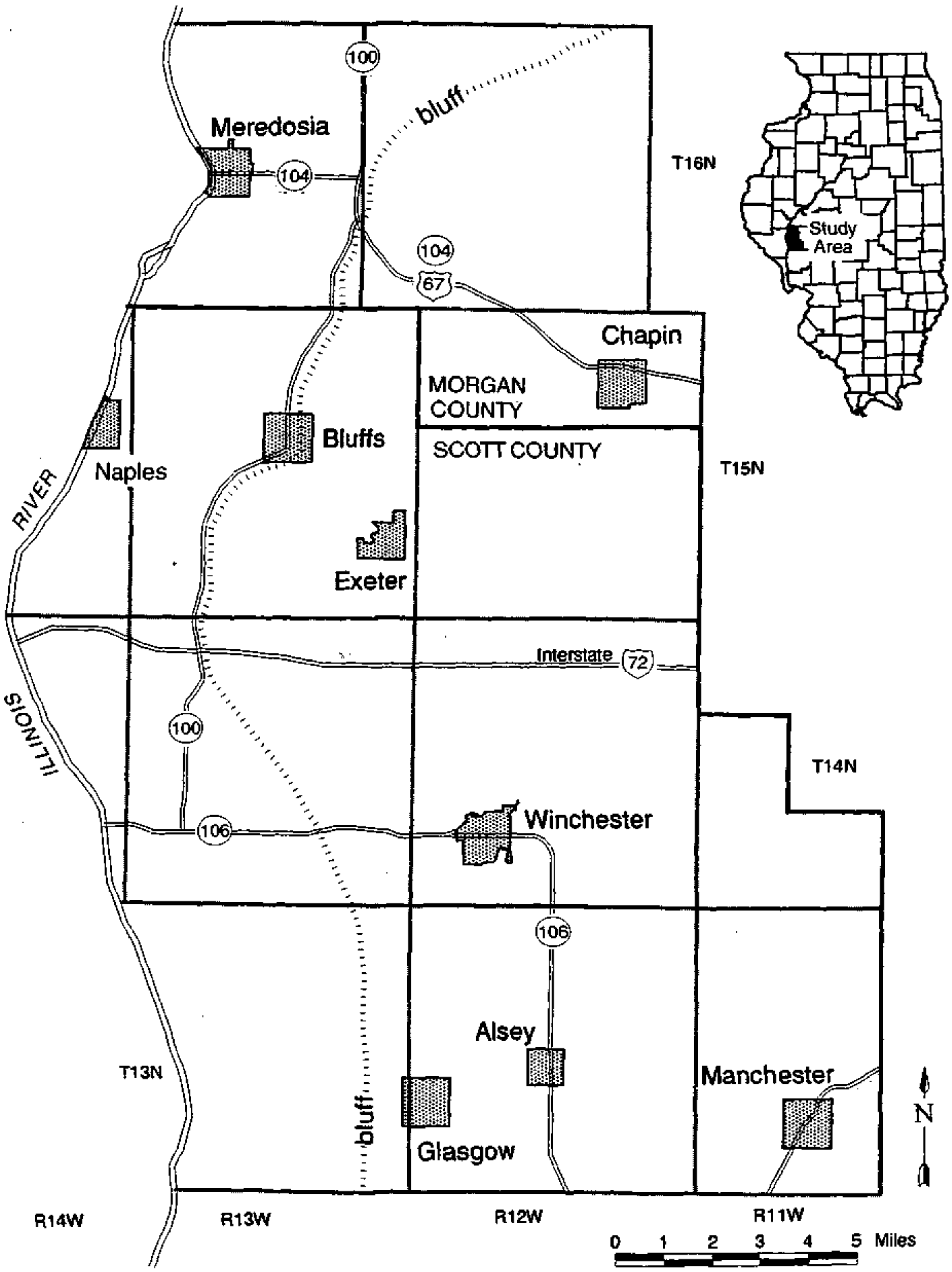


Figure II-1. Study area

unconsolidated geologic materials along the entire Illinois River waterway in general terms as follows:

> "The unconsolidated materials along the Illinois Waterway consist of gravel, sand, silt, clay, peat, marl, and distinctive variations having special names such as till, loess, alluvium, and colluvium. Most are deposits of streams, rivers, glaciers, lakes, and winds."

Gibb et al. (1979) mapped the *types* of unconsolidated deposits and their *thicknesses* in the vicinity of the Illinois River area, which are shown in figures II-2 and II-3, respectively. As can be surmised from these two figures, the geologic materials along and within about 3-4 mi of the waterway in Morgan and Scott Counties are depicted as alluvial deposits with thicknesses ranging from 100 to 300 ft. For the section of the Illinois River floodplain from Beardstown (about 10 mi north of the northern boundary of the present study area) to Grafton (near confluence of Illinois and Mississippi rivers), Gibb et al. (1979) state the following:

> "...the unconsolidated materials range in thickness from about 100 feet in the valley and from 0 to about 150 feet in the upland areas. The valley fill materials principally consist of alluvial sand and gravel overlain by thin (generally less than 20 feet) wind blown loess. Several municipal water supplies have been developed from wells tapping the sand and gravel materials at depths from about 50 to 100 feet."

More will be mentioned regarding the ground-water geology along the Illinois River, as well as the prior report by Smith and Stall (1975), later in this report in the section addressing the feasibility of further ground-water development in Morgan and Scott Counties, "Feasibility of a 12-mgd Ground-Water Supply."

REGIONAL AND LOCAL GROUND-WATER WITHDRAWALS

1977 Ground-Water Withdrawals for Counties along the Illinois Waterway

Although accumulating present levels of ground-water pumpage along the entire length of the Illinois River waterway is beyond the scope of this report, a previous enumeration of these pumpages is available for 1977 (Gibb et al., 1979) and is shown in table II-1. Although these data are somewhat dated, they reflect the past, *relative* level of ground-water development for the several counties along the river floodplain. As was pointed out in this previous study (Gibb et al., 1979), about 39 mgd was pumped for municipal use in 1977, with major pumpage in the Peoria-Pekin area (Peoria and Tazewell Counties). Industrial pumpage totaled about 29.6 mgd in 1977, again with the major pumpage in the Peoria-Pekin area.

Pumpages for Morgan and Scott Counties were relatively modest compared to pumpages for several counties along the Illinois River that used ground water from wells along the river in 1977. Total municipal and industrial pumpages were 8.163 mgd and 0.084 mgd for Morgan and Scott Counties, respectively, compared to the significantly larger pumpages of 28.599 mgd and 20.151 mgd in Peoria and Tazewell Counties, respectively. This comparison is not intended to

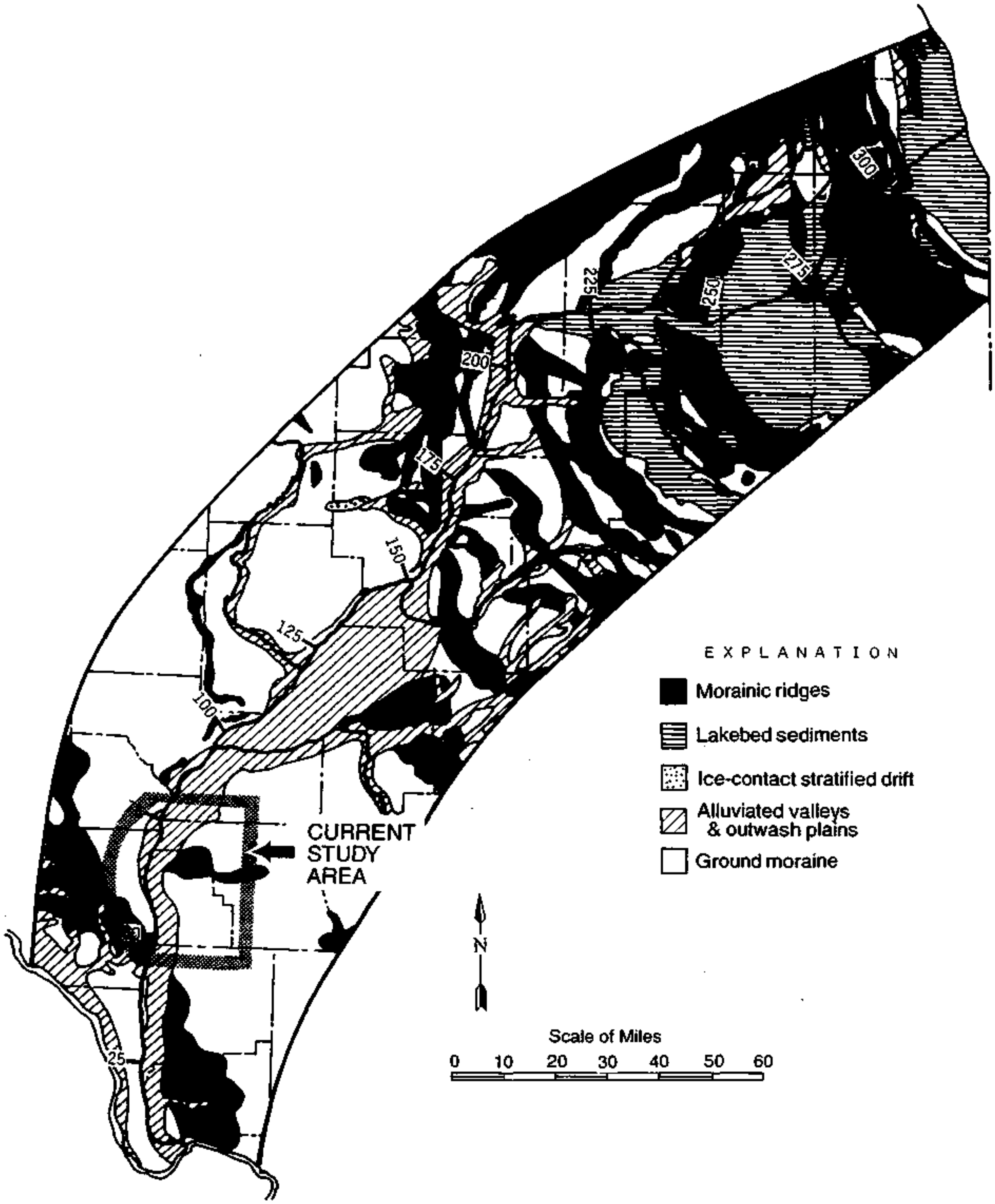


Figure II-2. Glacial map of the Illinois Waterway
(from Gibb et al., 1979)

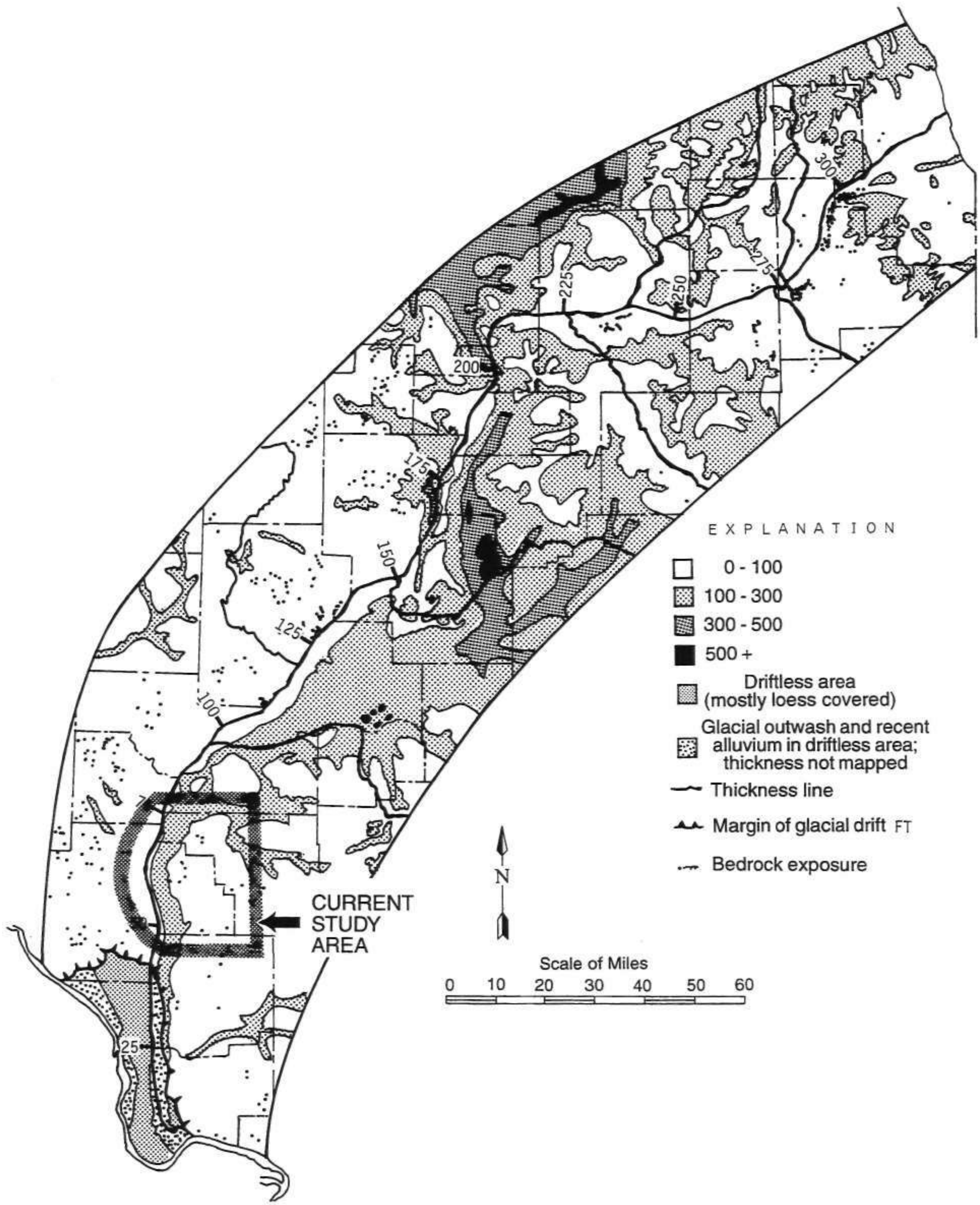


Figure II-3. Thickness of unconsolidated materials along the Illinois Waterway (from Gibb et al., 1979)

Table II-1. Pumpage from Sand and Gravel Wells along the Illinois Waterway during 1977 (from Gibb et al., 1979)

	Pumpase			
County	*Municipal (mgd)*	*Industrial (mgd)*	*Municipal & Industrial (mgd)*	*Annual Irrigation (mil gal)*
Bureau	------	1.000	1.000	------
Calhoun	0.275	------	0.275	------
Cass	1.100	1.130	2.230	147
Greene	0.042	------	0.042	226
Grundy	------	------	------	33
Jersey	0.680	------	0.680	------
La Salle	3.200	------	3.200	------
Marshall	0.752	0.165	0.917	8
Mason	0.810	2.106	2.916	4,470
Morgan	3.901	4.262	8.163	------
Peoria	19.781	8.818	28.599	------
Pike	------	0.059	0.059	------
Putnam	0.152	0.100	0.252	------
Schuyler	------	------	------	16
Scott	0.084	------	0.084	6
Tazewell	8.233	11.918	20.151	217
Totals	39.010	29.558	68.568	5,123

imply that equivalent hydrogeology exists in these counties; rather it is an observation that the aquifer system associated with the Illinois River valley has been more extensively developed in other areas along the Illinois River.

The irrigation pumpages in Morgan and Scott Counties in 1977 also reflect the relatively modest level of ground-water development that existed in comparison to other counties along the Illinois River. Again, although the data discussed herein are dated, they provide a general indication of the relative magnitude of ground-water development for the various regions along the river valley.

1995 Ground-Water Withdrawals along the Illinois Waterway in Morgan and Scott Counties

Figure II-4 shows the locations of the large-capacity wells (70 gpm or more) within the study area and within the Illinois River floodplain. These wells include public water supply, industrial, and irrigation wells. For the public water supply and industrial wells, average daily pumpages are based on total annual pumpages for 1995.

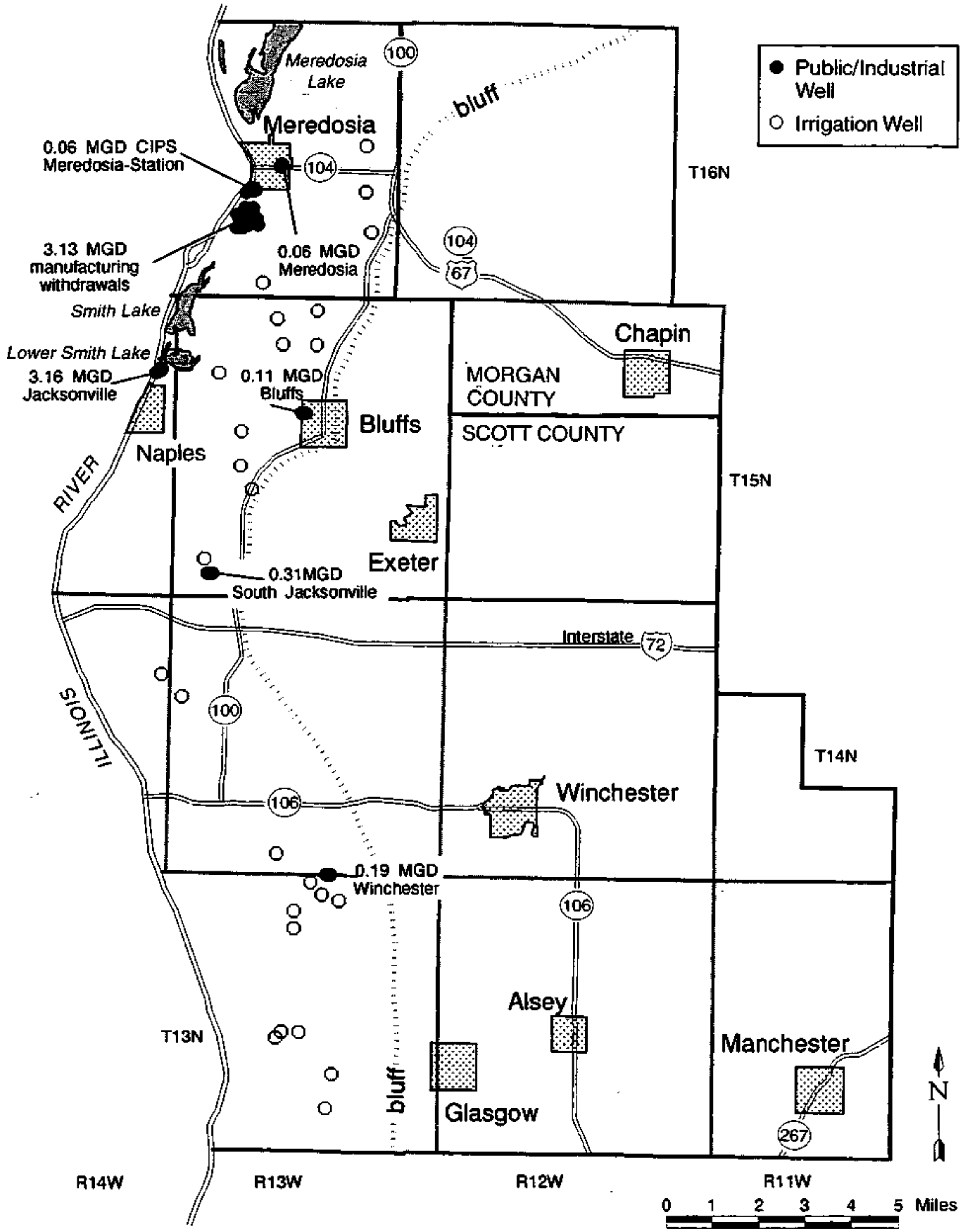


Figure II-4. Locations of large capacity wells within the Illinois River floodplain

Limited withdrawals occur in Morgan County near Meredosia, both for the village of Meredosia and for Central Illinois Public Service Company (CIPS) - Meredosia station. Significant industrial ground-water withdrawals (approximately 3.13 mgd) occur about 1 mi south of Meredosia.

In Scott County, the largest ground-water withdrawals occur at the site of Jacksonville's collector (Ranney) well just north of Naples. This well is located within approximately 200 ft of the Illinois River and was constructed such that some of the horizontal "laterals" extend beneath the riverbed materials to induce river water into the aquifer. This is Jacksonville's primary source of water. Two vertical "standby" wells are located just east and northeast (respectively) of the collector well and are within approximately 1,000 ft of the Illinois River. Jacksonville routinely withdraws approximately 3 mgd from the collector well system. The next largest ground-water withdrawal system in the Illinois River floodplain in Scott County is South Jacksonville's system south-southeast of Naples. Average daily pumpage to South Jacksonville is approximately 0.31 mgd.

The two remaining public water supplies withdrawing ground-water from the Illinois River floodplain in Scott County are for Winchester and Bluffs, which withdraw approximately 0.19 mgd and 0.11 mgd, respectively. The ground-water supply system at Bluffs also supplies water to the Exeter-Merritt Water Cooperative.

As indicated above, the Illinois River floodplain west of Jacksonville is the source of ground water for several towns in Morgan and Scott Counties. Appendix II-1 contains a description of each public water supply system and, where permission was granted, each industrial water supply system that uses the alluvial sands and gravels associated with the Illinois River valley in Morgan and Scott Counties.

FEASIBILITY OF A 12-MGD GROUND-WATER SUPPLY

Overview

The Illinois River floodplain in Morgan and Scott Counties, an area approximately 25 mi long and varying between about 3 to 4 mi in width, encompasses a relatively large area where relatively thick (50 to 150 ft) water-yielding sand-and-gravel deposits are present. These geologic conditions and the presence of large-capacity municipal and irrigation supply wells in the area suggest good to excellent possibilities for the development of a 12-mgd ground-water supply. Using data presently available in Water Survey files for this area to make reasonable assumptions regarding the width, thickness, texture, and hydraulic properties of the aquifer enables calculation of well field yields under several aquifer development strategies. Although one significant ground-water supply in this area uses a collector (Ranney) well system, the ground-water development strategies presented here are for well fields with vertical, drilled, gravel-packed wells.

This part of this report reviews a past study that examined ground-water development potential across the entire state in the context of the current study area. Analytical methodology presented was used to develop a set of conceptual well field designs for procuring 12 mgd of ground water within the study area during drought conditions. Finally, possible locations for the placement of these conceptual well fields were examined.

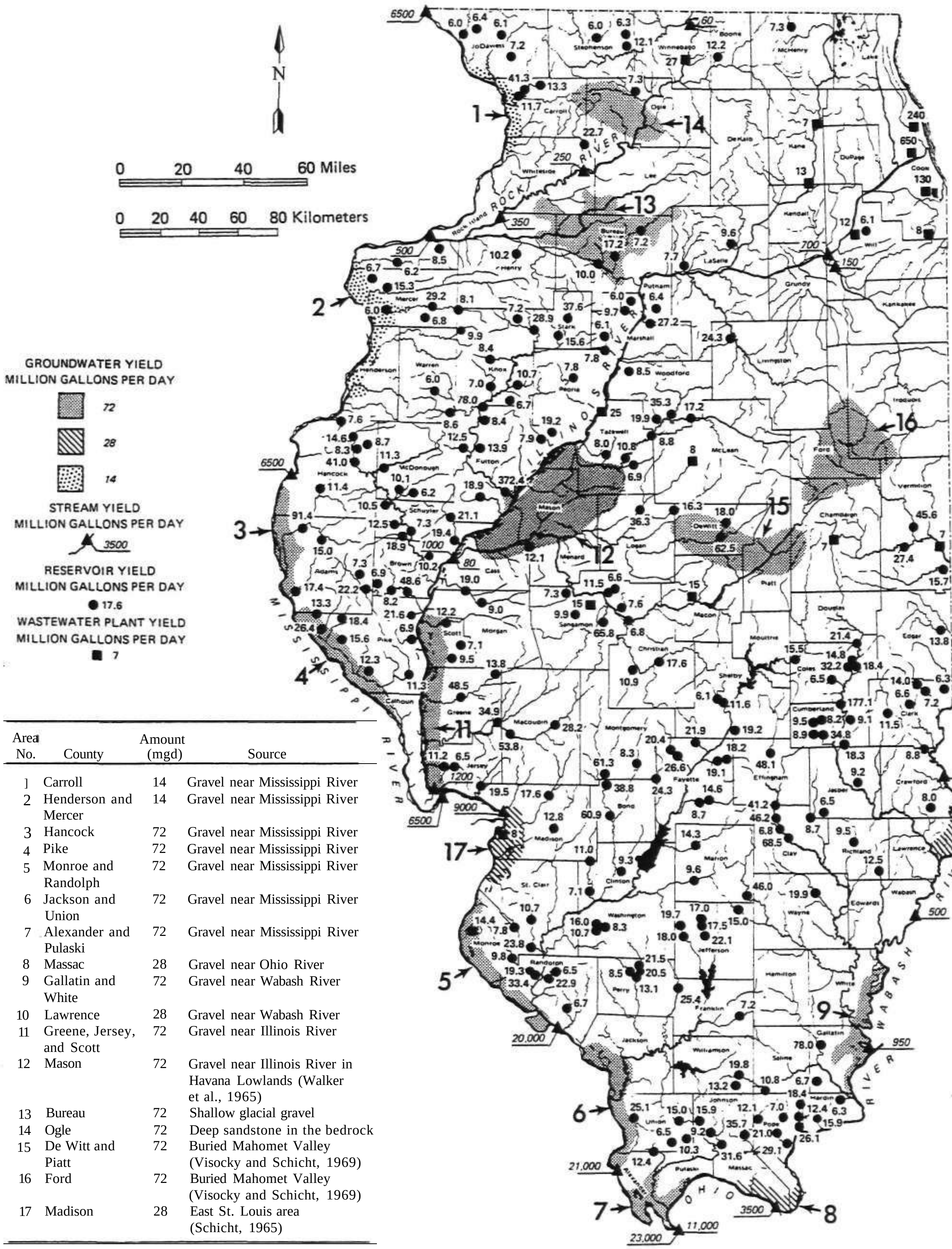
Prior Study of Potential Ground-Water Resources

A study by Smith and Stall (1975) enumerated 17 areas of Illinois where large-scale ground-water development was estimated to be possible. The impetus for that study was to summarize the availability of ground water for coal conversion, which was deemed to require between 6 and 72 mgd to make a conversion facility feasible. This earlier study identified a "strip" of land approximately 70 mi long and coinciding with the (east) floodplain of the Illinois River in Scott, Greene, and Jersey Counties as a potentially viable area for large ground-water supplies (see figure II-5). Smith and Stall estimated that the maximum design rate (for processing coal) of 72 mgd could be developed along this stretch of the river floodplain.

Smith and Stall (1975) also listed estimated hydrogeological properties for the subject areas. For the area along the Illinois River in Scott, Greene, and Jersey Counties, estimates of pertinent hydrogeological properties were listed, as shown below in table II-2. Corresponding values for aquifer hydraulic conductivity (permeability) and aquifer thickness estimated for this study were used in an analytical model to derive conceptual well field designs for a ground-water supply of 12 mgd. Water-table conditions and induced infiltration from the Illinois River were also incorporated into this model.

Table II-2. Hydrogeologic Properties Related to Potential Ground-Water Development in the Study Area (from Smith and Stall, 1975)

Estimated river infiltration rate (per acre of riverbed):	22,500 gpd/acre/ft
Estimated aquifer permeability:	2,000 gpd/ft^2
Estimated average aquifer thickness:	110 ft
General ground-water conditions:	Water table with induced infiltration from river



Area No.	County	Amount (mgd)	Source
1	Carroll	14	Gravel near Mississippi River
2	Henderson and Mercer	14	Gravel near Mississippi River
3	Hancock	72	Gravel near Mississippi River
4	Pike	72	Gravel near Mississippi River
5	Monroe and Randolph	72	Gravel near Mississippi River
6	Jackson and Union	72	Gravel near Mississippi River
7	Alexander and Pulaski	72	Gravel near Mississippi River
8	Massac	28	Gravel near Ohio River
9	Gallatin and White	72	Gravel near Wabash River
10	Lawrence	28	Gravel near Wabash River
11	Greene, Jersey, and Scott	72	Gravel near Illinois River
12	Mason	72	Gravel near Illinois River in Havana Lowlands (Walker et al., 1965)
13	Bureau	72	Shallow glacial gravel
14	Ogle	72	Deep sandstone in the bedrock
15	De Witt and Piatt	72	Buried Mahomet Valley (Visocky and Schicht, 1969)
16	Ford	72	Buried Mahomet Valley (Visocky and Schicht, 1969)
17	Madison	28	East St. Louis area (Schicht, 1965)

Figure II-5. Potential water supplies available from ground water (from Smith and Stall, 1975)

Conceptual Well Field Design

Overview of Approach

The following assumptions were made to arrive at conceptual well fields designs to illustrate the feasibility of developing a 12-mgd ground-water supply system in the Illinois River floodplain using vertical, drilled wells:

1. The aquifer within (along) the Illinois River floodplain can be characterized as a water-table (i.e., unconfined) aquifer. (Saturated thickness of the aquifer will be discussed below.)

2. It is reasonable to model the aquifer as being 3 mi wide, corresponding to the approximate distance between the Illinois River and the bluff line to the east of the river.

3. Induced infiltration will occur, i.e., the river will act as a recharge boundary that can be analytically modeled using (recharging) image wells.

4. The bluff line represents the aquifer boundary, which can be analytically modeled using (discharging) image wells.

5. A well field with vertical, drilled wells is used.

6. Water-level drawdowns in production wells can be described with the Theis nonleaky artesian formula while incorporating the correction factor derived by Jacob (1944), which accounts for increased observed drawdowns in pumped wells functioning under water table conditions. This correction factor, as described in Walton (1962), is:

$$s' = s - (s^2/2m)$$

where:

m = initial saturated thickness of aquifer, in ft.
s = observed drawdown under water-table conditions, in ft.
s' - drawdown that would occur in an equivalent nonleaky artesian aquifer, in ft.
= $(114.6Q/T)\ W(u)$

and

Q = discharge, in gpm
T = transmissivity, in gpd/ft
$W(u)$ = the well function for the nonleaky artesian formula

The primary constraint for the conceptual designs of the well field is that observed drawdowns, *s*, in the pumped wells not exceed one-half the initial saturated thickness of the aquifer, m, for a pumping duration of one year during drought conditions. This translates to limiting *s*' to 0.375m using the above correction factor. Thus, in conceptual designs for a well field to yield 12 mgd under drought conditions, the theoretical drawdowns calculated using the nonleaky artesian formula will be limited to 0.375m so that theoretical *observed* drawdowns do not exceed 0.5m. This constraint will apply to the critical (i.e., center) well(s) of the well field.

The approach followed in this study incorporates the above assumptions and constraints and consists of analytically modeling well fields placed at distances of ¼ mi, ½ mi, and 1 mi from the centerline of the Illinois River. The effects of well field placement upon the conceptual well field design are analytically modeled considering the centerline of the river to be a recharge boundary and using image well theory (Walton, 1962) to simulate both induced infiltration from the river and barrier boundary effects of the margin of the aquifer near the present bluff.

Aquifer Saturated Thickness and Allowable Drawdown

To apply the nonleaky artesian formula in the analytical approach described above, appropriate values for the hydrologic parameters (below) and the saturated thickness of the sand-and-gravel aquifer under drought conditions, m, are needed. The saturated thickness of the aquifer was estimated based on available well records (Appendix II-2) for wells within 4 mi of the Illinois River that were determined to be within the river floodplain. When a well record contained sufficiently detailed location information, depth information indicating the top and bottom of the water-bearing formation (aquifer), and depth information for the static water level (nondrought), an approximate saturated aquifer thickness was calculated. In the majority of the cases the well records indicated that the well bore holes were not drilled to the bedrock surface. In these cases, the calculated saturated aquifer thickness indicated a *minimum* saturated thickness for that particular location. This approach resulted in an estimated value of about 80 feet for the saturated thickness of the aquifer under *nondrought* conditions.

Water-level hydrographs for the nearest known observation wells in the Illinois River floodplain were then examined to estimate how much the saturated thickness of the aquifer might decrease during extended drought conditions. Sanderson and Buck (1995) conducted a study of ground-water levels in the vicinity of Mason County and included a hydrograph for an observation well located in Section 11.8b, Township 19 North, Range 10 West, Mason County. This well is within the floodplain of the Illinois River and within approximately 3 mi of the river. The period of record for this well is from March 1958 to the present. During the drought of 1989-1990, water levels in this well dropped approximately 5 ft.

Burch and Kelly (1993) present a hydrograph for an observation well (Section 17.5h, Township 8 North, Range 8 East, Peoria County) within about ½ mi of the Illinois River in Lincoln Park in Peoria. The period of record for this well is from 1942 to 1963. During the drought of the mid-1950s, water levels in this well dropped approximately 5-7 ft.

Allowing for a decrease of about 7 ft in the saturated thickness of the aquifer due to drought conditions appears reasonable, leaving a *drought-condition* saturated thickness equal to about 73 ft. The prior study conducted by Smith and Stall (1975) estimated the average aquifer thickness in Scott, Greene, and Jersey counties to be 110 ft. Therefore, the estimated drought-condition aquifer thickness of 73 ft used herein can be considered conservative for the purpose of estimating aquifer yield.

Recalling the constraint (described above) that the calculated drawdowns not exceed 0.375m, or 0.375-73 ft, a preliminary allowable drawdown of 27 ft results. Allowing that additional contributing losses (i.e., well loss, partial penetration effects, etc.) could increase observed drawdowns at the well an additional 10 percent, a theoretical allowable drawdown of 24 ft in production wells was used in this study.

Aquifer Hydraulic Properties

The yield of wells, the quantity of water moving through an aquifer, and the magnitude of water-level fluctuations due to recharge and discharge of ground water are largely dependent on the hydraulic properties of an aquifer. The principal hydraulic properties of an aquifer are its hydraulic conductivity, *K,* transmissivity, *T,* and storage coefficient, *S.* Hydraulic conductivity is defined as the rate of flow of water in gallons per day through a I-sq-ft-cross-sectional area of the aquifer under a hydraulic gradient of 100 percent. Transmissivity is the product of the saturated thickness of the aquifer and the hydraulic conductivity, and it describes the rate of flow of water in gpd through a vertical strip of the aquifer 1 ft wide and extending the full saturated thickness under a hydraulic gradient of 100 percent (1 ft per foot). The storage coefficient describes the storage properties of an aquifer and is defined as the volume of water released from storage per unit surface area of the aquifer per unit change in the water level. This parameter is dimensionless.

The hydraulic properties of an aquifer may be estimated by means of aquifer and well production tests. Table II-3 presents results of aquifer and well production tests from the Water Survey files for wells located within the bottomlands of the Illinois River in Morgan and Scott Counties.

The test results in table II-3 show that large variations in aquifer properties can be measured in wells located in the same general area. These variations may be due to actual changes in aquifer properties or the analysis of test data affected by poorly constructed and developed wells. An average hydraulic conductivity for the study area was calculated from the results of most of these tests (see table II-3) and used as a reasonable value in determining conceptual well field designs. An average hydraulic conductivity of about 2,400 gpd/ft^2 was used and compares favorably with the value of 2,000 gpd/ft^2 estimated by Smith and Stall (1975). Hence, a nominal value for transmissivity, *T,* is 2,400 gpd/ft^2-73 ft (i.e., *K-m),* or about 175,200 gpd/ft.

No published values for aquifer storage coefficient could be found for the study area. A conservative value of 0.1 for a water table storage coefficient was used and corresponds to the

Table II-3. Results of Aquifer and Well Production Tests within the Study Area

Well location	Well #	Well owner	Test date	Well depth (ft)	Static level (ft)	Saturated thickness (ft)	Pumping rate (gpm)	Specific capacity (gpm/ft)	Transmis-sivity (gpd/ft)	Hydraulic conductivity (gpd/ft^2)	Comments
Morgan County 16N 13W											
21.2c	6	C.I.P.S.	1978	103	25.65	74	500	89.9	89,795	1,213	Drilled to bedrock
22.5g	1	Meredosia	1950	40	21.90	>18	71	10.6	11,200	<620>	K considered an outlier (perhaps due to partial penetration effects) and not used in avg. K calc.
22.5g	2	Meredosia	1950	40	17.30	>23	120	11.9	16,000	<700>	K considered an outlier (perhaps due to partial penetration effects) and not used in avg. K calc.
22.5g	4	Meredosia	1980	92	26.85	>65	300	54.2	213,750	3,288	
28.2h	2	Nat'l Starch	1958	92	25.00	>67	500	66.7	395,000	<5,890>	K considered an outlier and not used in avg. K calc.
Scott County 15N 13W											
16.2h	1	Bluffs	1936	58	15.50	>30	170	27.4	50,000	1,660	
16.2h	2	Bluffs	1947	57	17.00	>22	90	12.5	28,000	1,270	
16.2h	3	Bluffs	1958	59	19.41	>28	159	29	31,700	1,130	
16.2g	4	Bluffs	1979	60	13.80	>38	250	15.7	28,700	760	
31.2d	1	S. Jacksonville	1967	80	17.40	-	412	30.5	154,000	2 370	Drilled to bedrock
31.2d	2	S. Jacksonville	1967	77	14.29	-	495	34.6	195,000	3 900	Drilled to bedrock
14N 13W											
34.8a	101	Winchester	1986	65	14.38	>53	280	52.1	211,000	4,000	
34.8a	102	Winchester	1986	58	13.95	>51	290	60.7	240,000	4,700	
									average K=	2,429	

value assumed and used by Gibb et al. (1979) in modeling ground-water conditions along the Illinois River at Meredosia.

Analysis Results

A series of conceptual well field designs was generated using the analytical approach, the aquifer geometry, and the aquifer hydraulic properties described above. As shown in table II-4,

Table II-4. Nominal Well Spacings, ft
(and corresponding total length of well field, ft)

Number of wells in well field	*Distance (ft) from Illinois River to proposed well field:*		
	¼ mi	*½ mi*	*1 mi*
6 wells @ 2.00 mgd (1,390 gpm) ea.	550 (2,750)	1250 (6,250)	2675 (13,375)
9 wells @ 1.33 mgd (925 gpm) ea.	275 (2,200)	575 (4,600)	1150 (9,200)
12 wells @ 1.00 mgd (695 gpm) ea.	175 (1,925)	375 (4,125)	725 (7,975)

the resulting designs are categorized by the distance from the Illinois River (center line) to the proposed well field. The conceptual well fields were planned as a line of production wells parallel to the Illinois River (i.e., along a north-south line) to enhance the recharge, or induced infiltration, potential of the river. Placing the well field as close as possible to the river is desirable to gain maximum benefit of its recharge potential.

Use of the above described aquifer hydraulic properties and the Theis nonleaky, artesian formula revealed that individual well yields of from 1 to 2 mgd could be obtained while allowing for influences of aquifer geometry and for interference drawdowns among the production wells in a conceptual well field. (Note that Jacksonville Wells 1 and 2 were operated at a rate of about 2,000 gpm or almost 2.9 mgd upon completion.) This range of individual well yields provided a starting point for conceptualizing a well field. Also knowing that well field yields can be enhanced by placement of wells adjacent to or near rivers to take advantage of induced infiltration of surface water, and incorporating the aquifer geometry by using image well theory to simulate the river (recharge boundary) and the margin of the aquifer (barrier boundary), a series of calculations were made to illustrate several aquifer development strategies. Table II-4 presents the results of these calculations for three conceptual well fields at three distances from the river.

One well field design used six production wells, each with a capacity of 2 mgd, located about *VA* mi from the edge of the river. To meet the observed drawdown limitation in the critical well(s), a well spacing of about 550 ft was determined requiring a line of wells just over ½ mi in length. Calculations for this well field located at distances of about ½ and 1 mi from the river indicated that production well spacings should increase to about 1,250 and 2,675 ft, respectively.

Another well field design used nine production wells, each with a capacity of 1.33 mgd (925 gpm), also located ¼, ½, and 1 mi from the edge of the river. Production well spacings of 275, 575, and 1,150 ft were calculated for this conceptual well field.

The third well field design used 12 production wells, each operating at a rate of 1 mgd (695 gpm), and similarly located ¼, ½, and 1 mile from the river. The calculations for this conceptual well field resulted in production well spacings of 175, 375, and 725 ft, respectively, while maintaining observed drawdowns within the design limit.

The results presented in table II-4 indicate that while the most "compact" conceptual well field requires 12 production wells, a well field located within ¼ mi of the river might achieve cost and management benefits with six production wells. These conceptual well fields assume a hydraulic connection between the sand-and-gravel aquifer and the Illinois River.

Possible Well Field Locations

A preliminary survey of possible well field locations was conducted by examining topographic maps and making a preliminary "windshield" survey of the study area to verify that the number and location of high-capacity wells were in general agreement with available Water Survey records. Potentially viable well field locations were identified. The identified locations shown in figure II-6 take into consideration the following:

- Sites close to the river.
- Well field orientation parallel to the river.
- Access via existing roads.
- Location of established significant ground-water pumping centers.
- Well field placement on the "land side" of existing river levees.

As shown in figure II-6, there are no preliminary well field locations identified in the northern half of the study area. In the area north of Meredosia, Meredosia Lake would appear to preclude locating a well field near the Illinois River. Also, the Meredosia National Wildlife Refuge is located in that area and would also, perhaps, preclude well field placement near the river in that area.

The existing pumping centers and the industrial activity at the south edge of Meredosia would likely preclude the area immediately south of Meredosia as a viable location for a well field. In the area between Meredosia and Naples (site of Jacksonville's Ranney well), Smith Lake and Lower Smith Lake preclude well field placement nearer than approximately 1 mi from the river, and would necessitate well field placement nearer (within about ¾ mi) an existing railway between Meredosia and Bluffs. Although we are not aware of any existing ground-water contamination in this area, the availability of other areas more remote from existing railways precludes our listing this area for further consideration.

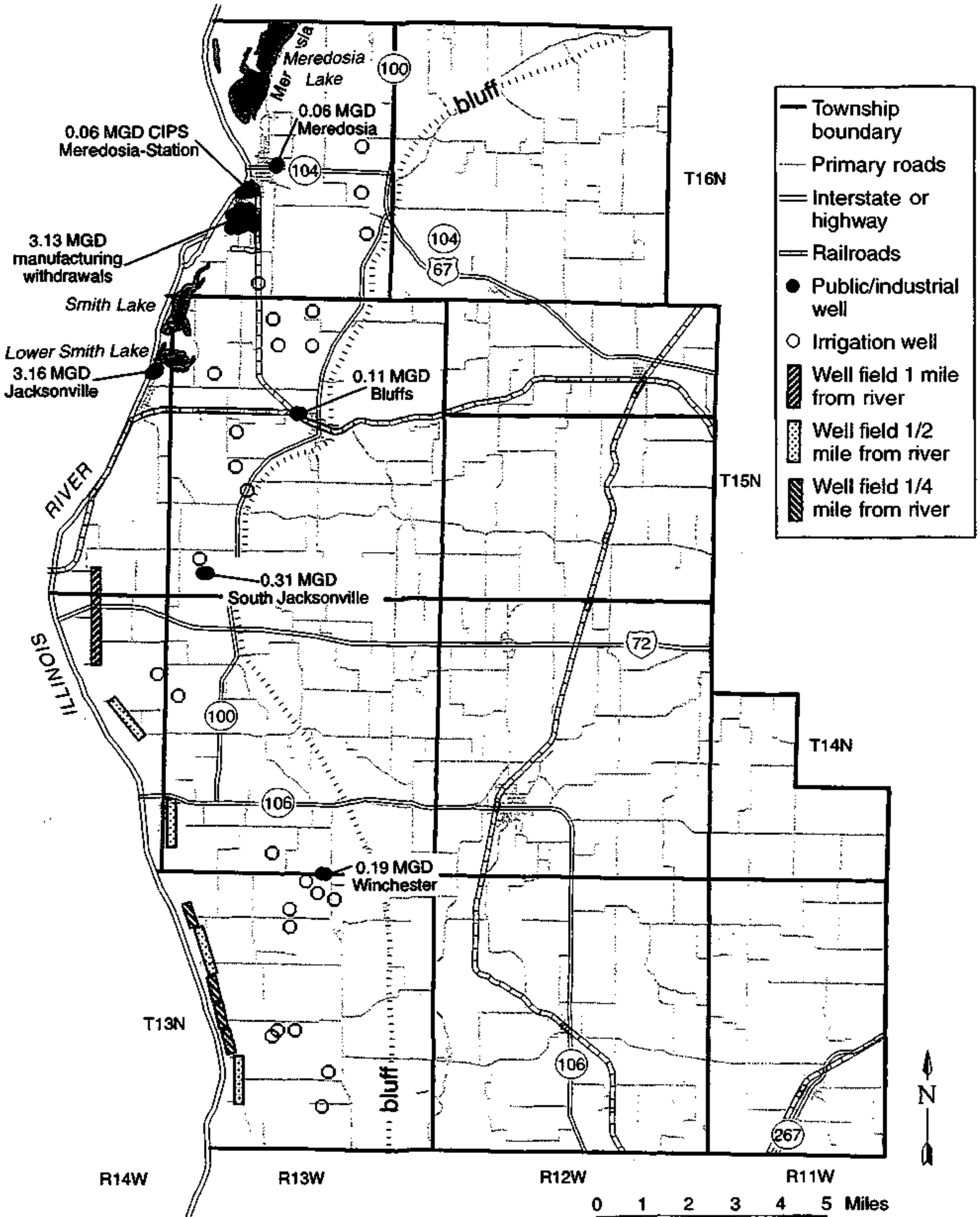


Figure II-6. Possible well field locations in the study area

Well field placement was not considered in the area extending south from Naples to approximately the southern boundary of Township 15 North, Range 14 West, due to the existing railway that parallels the river.

Figure H-6 shows that the southern half of the study area offers several areas that appear to be well suited for possible well fields. These areas appear to be viable locations based on: 1) the accessibility via existing roads, 2) the generally low degree of existing ground-water development in the area, and 3) the ability to locate near the river and remain on the "land side" of the levees. Different cross-hatch patterns for the well fields shown in figure H-6 coincide with the three "distance" categories shown in table II-4 and refer to well fields placed at ¼ , ½, and 1 mi from the Illinois River. The well fields shown in figure H-6 are approximately ½, 1, and 2 mi long at the distances of ¼ , ½, and 1 mi from the Illinois River, respectively, which approximates the information shown in table II-4.

A detailed analysis of the potential impacts to existing wells as a result of additional ground-water development at a particular site is beyond the scope of this report. If development at a particular site is pursued, further studies of possible impacts would be recommended. These further studies could better approximate localized water-level drawdowns and possibly suggest appropriate mitigative measures (such as lowering well pumps) for existing wells in the area. As the density of existing wells is sparse in the areas suggested in figure H-6, limited mitigative measures to existing wells would be expected.

It should be noted that the existence of saturated sand-and-gravel materials suitable for ground-water development of the magnitude described above is very likely, yet unverified. Any planning that might involve generating cost estimates to construct a well field in the fashion described above should include costs for a confirmatory test drilling program. Also, although the water quality data contained herein (Appendix II-3) and the use of ground-water by other public water supply systems in the study area indicate no cause for concern, cost estimates for preliminary planning purposes should also include allowances for test pumping to verify suitable water quality.

SUMMARY

The Illinois River floodplain in Scott and Morgan Counties, an area approximately 50 mi west of Springfield, encompasses a relatively large area where thick (50 to 150 ft) water-yielding sand-and-gravel deposits are present. This study has examined available data for the study area and estimated hydrologic parameters to describe a model aquifer. The model aquifer was used to evaluate a set of conceptual well field designs at locations relative to the Illinois River (see table II-4). This analytical evaluation indicates that a yield of 12 mgd is possible from a reasonable number of wells (6-12) spanning a reasonably sized (about 2,000 to 13,000 ft long) tract of land. A preliminary examination of the study area suggests several locations in the southern half of the area where well field development appears feasible (figure II-6).

PART III. HAVANA LOWLANDS IN SOUTHERN MASON COUNTY

INTRODUCTION

Sand-and-gravel deposits underlying the Havana Lowlands region of west-central Illinois constitute one of the largest aquifers in the state (Walker et al., 1965). The deposits are more than 100 ft thick in most places and were laid down in a wide "lowland" in the bedrock surface formed at the junction of several large bedrock valleys. The thickness of the unconsolidated deposits, which are mostly sand and gravel, locally exceed 150 ft where the deposits fill bedrock channels (Walker et al., 1965). The main aquifer consists of Sankoty sand and overlying Wisconsinan sand-and-gravel outwash in most of the region. The significance of the water-yielding character of the sand-and-gravel deposits and the recharge capability from precipitation for this regional aquifer was beginning to be recognized in the 1950s and 1960s. During that time period, pumpage for supplemental irrigation was relatively low, but expected to increase at a rapid rate (Walker et al., 1965).

At the present time, the city of Springfield, which lies approximately 35-40 mi south-southeast of the Havana Lowlands region, is interested in obtaining an estimate of the potential of the aquifer system to provide a supplemental supply of as much as 12 mgd during extended drought conditions. This report summarizes ground-water conditions, including pertinent geologic conditions, and focuses on the ground-water development potential in the study area (see figure III-1).

This report also examines estimates for ground-water withdrawals for Mason County, reviews existing water supplies within the county (Appendix III-1), and reviews past estimates for available ground-water yields within the study area. Implications for potential additional ground-water development are addressed. For general discussion purposes, the study area corresponds to Mason County. For purposes of estimating conceptual well field designs, listing available well record data (Appendices III-2), and listing available water chemistry data (Appendix III-3), the approximate southern half of Mason County is examined in more detail. This area corresponds to those townships in tiers 19N, 20N, and 21N in Mason County.

Previous Ground-Water Studies for Mason County

A benchmark study of the ground-water resources in the Havana Lowlands region was published in 1965 by the Illinois State Water Survey and the Illinois State Geological Survey (Walker et al., 1965). The study was undertaken in anticipation of extensive development of the available ground-water resource for agricultural irrigation and industrial supply. The report describes the geological setting and the hydrologic characteristics of the extensive sand-and-gravel aquifer and documents the resource development as of about 1960 using estimates of ground-water withdrawals. It also includes maps of the aquifer's potentiometric surface (water table) and provides an estimate of the potential yield of the aquifer system. The report notes that although a huge quantity of water is stored in the aquifer, the potential yield is ultimately limited by the amount of recharge to the aquifer from precipitation.

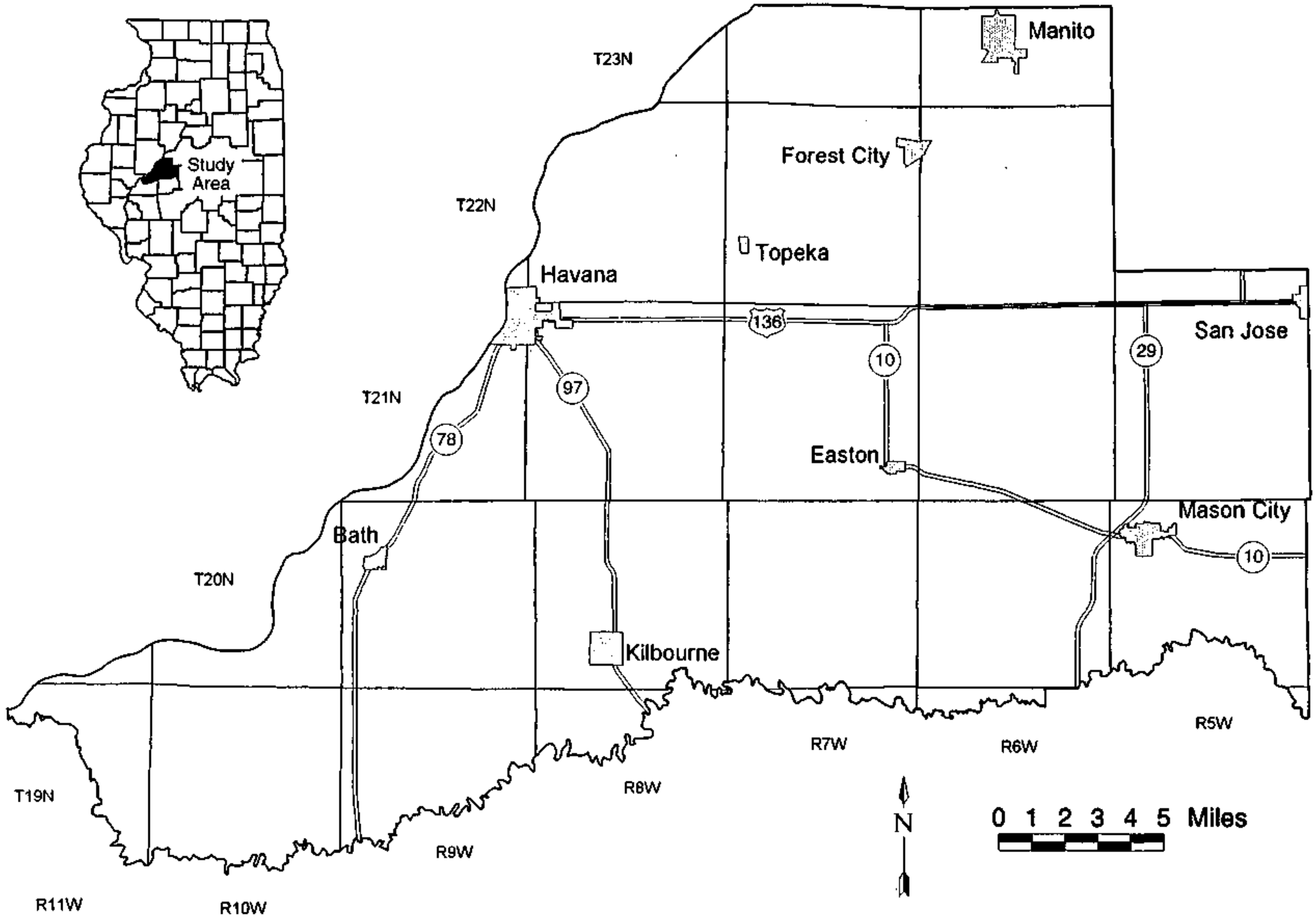


Figure III-1. Study area

Bowman and Kimpel (1991) studied irrigation amounts and scheduling practices at representative sites in the region. They found that, in general, irrigation farmers appeared to be applying appropriate amounts of irrigation water at appropriate times during the growing season. For 1989, Bowman and Kimpel (1991) estimated that annual ground-water withdrawals for agricultural irrigation were about 82.7 million gallons per day (mgd) in Mason County and about 23.3 mgd in Tazewell County. During the 1989 growing season (May 1 to August 31), seasonal pumpage in the Havana Lowlands region, which includes Mason County and the southwest portion of Tazewell County, was estimated to approach 425 mgd.

The extensive ground-water resource in the region furnishes the water supply for a fish hatchery owned and operated by the Division of Fisheries, Illinois Department of Natural Resources, and located near the Illinois River east of Manito. Visocky and Sievers (1992) studied the capability of the aquifer and the impacts and conditions of the well field supplying the hatchery.

Sanderson and Buck (1995) documented the water table (potentiometric surface) in the Havana lowlands in 1992 and 1993. The study established a network of 290 existing wells for repeated mass measurements. Mass measurements were conducted in Fall 1992 and Spring 1993. Due to record-high ground-water elevations during the summer and fall of 1993, the study was extended to also measure water levels in Fall 1993. The data from the three mass measurements were used to produce three maps of the potentiometric surface of the sand-and-gravel aquifer. A comparison of water levels in Fall 1992 to those mapped by Walker et al. (1965) indicated that ground-water levels were generally within 5 ft (plus or minus) of the 1960 elevations (Sanderson and Buck, 1995).

Clark (1994) created a three-dimensional finite-difference model of the Havana Lowlands region. A steady-state model was initially developed to test the sensitivity of the system to various boundary conditions. Model calibration was concluded when modeled elevations checked very nearly with the 1960 and 1992 water-table contour maps. Transient simulations were conducted for the drought year of 1989, for two consecutive drought years comparable to 1988, and for the flood of 1993. These transient models were developed by adding data to the basic steady-state model for storage coefficients; monthly recharge rates; and pumpage for irrigation, municipal, and fish hatchery operations. Regarding the drought simulations, the study indicated that drawdowns varied from 2 to 9 ft regionally for the 1989 drought year simulation, and from 7 to 15 ft for the simulation of two consecutive drought years similar to 1988.

Panno et al. (1994) examined the geology and ground-water chemistry of the Mahomet Bedrock valley aquifer system, including the Havana Lowlands region. The ground-water chemistry of the aquifer system was evaluated using detailed analyses of ground-water samples collected from public and private wells, water quality data selected from more than 500 analyses from the State Water Survey's ground-water quality database, and published analyses. The variability of the ground-water chemistry of the aquifer system was used to explore recharge and rock-water interactions with the aquifer system.

In response to flooding in 1993 in areas in western Mason County, Visocky (1995) conducted a study to map areas near Havana and Bath that are subject to flooding from elevated ground-water levels. That study prepared for the Illinois Emergency Management Agency involved detailed surveying activities and statistical analysis of available hydrologic data, and resulted in maps that indicated areas in and near Havana and Bath that are subject to ground-water flooding at a frequency of 1 percent, that is, a 100-year event. This study made extensive use of the data collected by Sanderson and Buck (1995), as well as historical records from a long-term observation well near Snicarte maintained by the Water Survey since 1958.

OVERVIEW OF GEOLOGY IN THE VICINITY OF MASON COUNTY

Walker et al. (1965) and Kempton et al. (1991) present detailed discussions of the geology of the Havana Lowlands. More recent reports present summaries of the geology within the area (Clark, 1994; Sanderson and Buck, 1995). Much of the overview of the geology presented herein is taken from these more recent studies.

The significant ground-water resources of the area have much to do with the nature of the bedrock surface and the unconsolidated materials that were deposited over the bedrock during periods of glaciation. The bedrock surface has been described as a wide bedrock lowland at the confluence of the ancient Mississippi River bedrock channel, which was roughly coincident in position with the present lower Illinois River valley, and the ancient preglacial drainageway system now identified as the Teays valley system (Melhorn and Kempton, 1991). In east-central Illinois, the Teays valley is known as the buried Mahomet Bedrock valley. Figure III-2 shows the general location of the ancient Mississippi, the Mahomet, and other tributary bedrock valleys in the vicinity of Mason County.

The ancient Teays valley system, a series of interconnected valley segments, at various times drained portions of the Midwest extending as far east as West Virginia. The energy of the preglacial drainage and advances of the glacial ice eroded valleys in the bedrock surface, and the confluence of the resulting bedrock valleys in the Havana Lowlands region was marked by a broad lowland. Figure m-3 shows the bedrock topography in the Mason County area as mapped by Walker et al. (1965).

Meltwater from Pleistocene glaciers supplied abundant sand and gravel to the ancient Mississippi River valley and the Teays-Mahomet valley system, slowly filling the valleys with sediment. The Teays valley system was abandoned during an early pulse of Pleistocene glaciation, which subsequent glacial advances buried under a thick blanket of comparatively fine-grained glacial sediment, known as glacial drift. Walker et al. (1965) mapped the total thickness of the unconsolidated deposits (glacial drift) in the Havana Lowlands region (see figure]H-4).

Throughout most of the Havana Lowlands region the upper part of the unconsolidated deposits is composed of sand and gravel and the lower part is mainly sand (Clark, 1994). In upland areas, such as at Mason City, the sand-and-gravel deposits are overlain by glacial till. Walker et al. (1965) mapped the general boundaries between the lowland (floodplain or terraced)

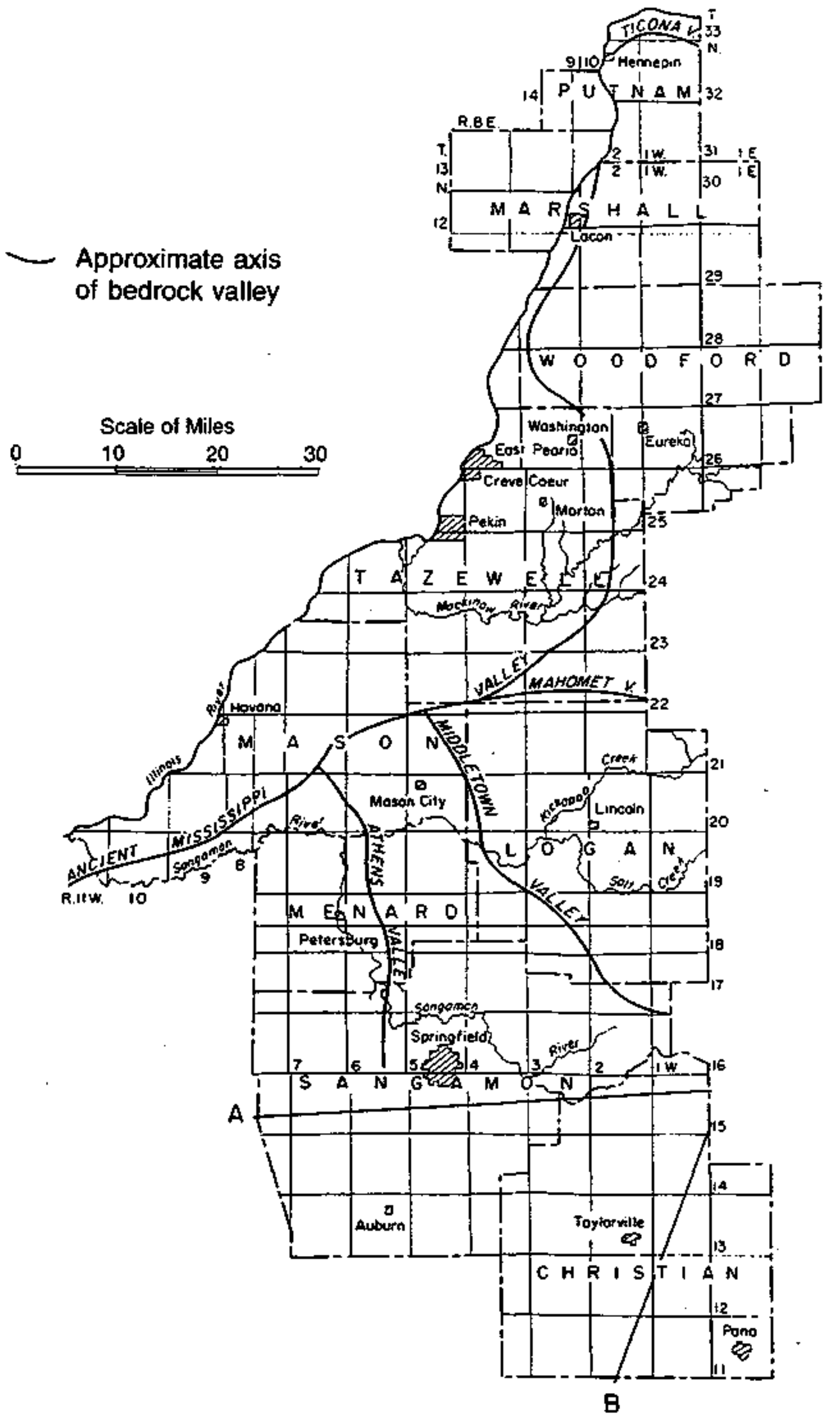


Figure III-2. Bedrock valleys in the vicinity of Mason County
(from Selkregg and Kempton, 1958)

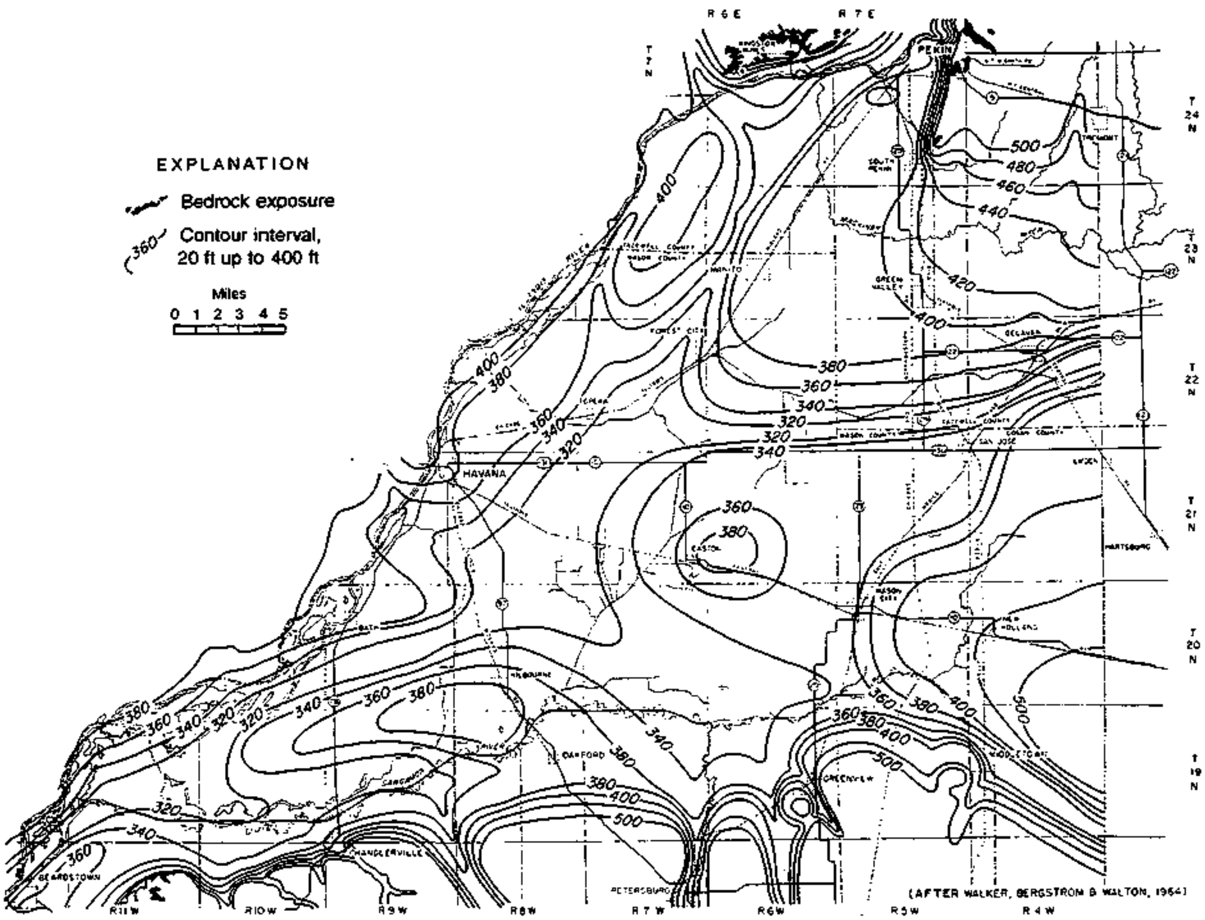


Figure III-3. Bedrock topography of the Havana lowlands
(from Walker et al., 1965)

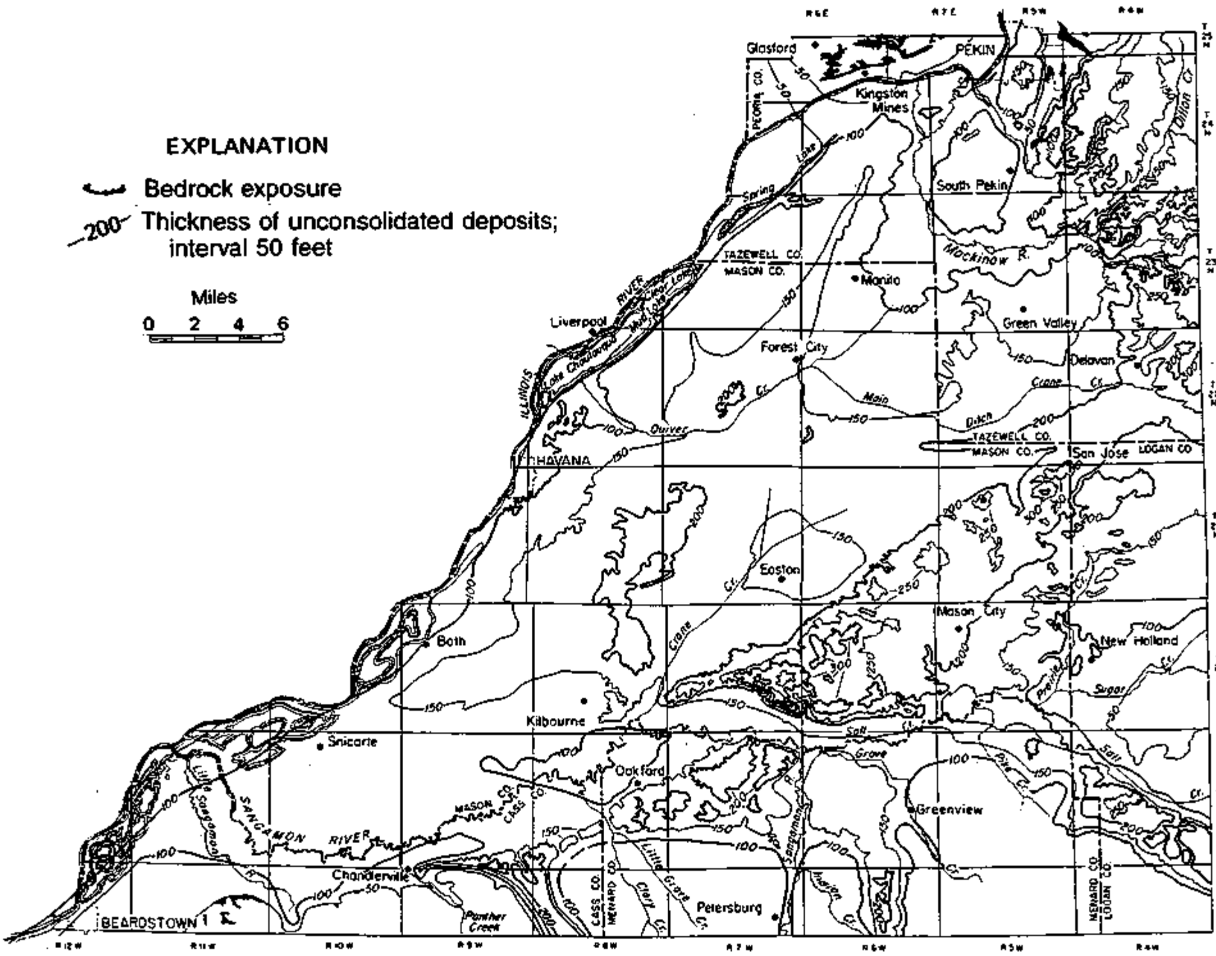


Figure III-4. Thickness of the unconsolidated deposits in the Havana lowlands (from Walker et al., 1965) areas and the upland areas within the Mason County area (figure III-5). Walker et al. (1965) summarize the general character of the geologic materials and the implications for regional hydrology.

> "The Sankoty Sand and the overlying Wisconsinan outwash constitute the main aquifer of the Havana region. They form a fairly homogeneous unit that extends from near land surface to bedrock in the broad Wisconsinan terrace area. Most wells on the terraces that are 100 or more feet deep penetrate at least the upper part of the Sankoty Sand. The Sankoty Sand also extends eastward beneath the Illinoian upland, where it is overlain by heterogeneous Illinoian deposits. In the area of the broad bedrock valley east of Delavan [Tazewell County], the Sankoty and the related Mahomet Sand are overlain by both Illinoian and Wisconsinan drift.
>
> Composed of well sorted, generally clean sand and gravel, the Sankoty Sand is a highly permeable reservoir with considerable areal extent. Recharge to the Sankoty Sand is most rapid where it is overlain by the Wisconsinan outwash, because the outwash itself is permeable and in much of the area is covered by dune sands that lack integrated drainage lines, which facilitates infiltration of rainfall. Recharge conditions are less favorable beneath the Illinoian uplands because layers of till overlie the Sankoty. Recharge to the Sankoty is poorest beneath the Wisconsinan drift uplands where it is overlain by both Illinoian and Wisconsinan tills."

Tables 1TJ-1 and III-2 are examples of the differences in stratigraphy (described in above quote) between the lowland and upland areas, respectively, in the vicinity of Mason County. Again, for a more complete discussion of the geology across the Havana lowlands region, the reader is directed to the State Water and Geological Surveys' Cooperative Report 3 (Walker et al., 1965).

GROUNDWATER HYDROLOGY IN MASON COUNTY

Ground water is derived from that portion of precipitation that seeps into the ground. The water infiltrates the connected open spaces between soil and rock particles, percolating downward to the point where all available openings in the earth materials are filled, or saturated, with water. Ground water is defined as the water in this zone of saturation. Saturated earth materials that have interconnected openings large enough to store and transmit water to wells in usable quantities are called aquifers.

Aquifer Saturated Thickness

The productive sand-and-gravel aquifer underlying the Havana lowlands region originated as a Pleistocene alluvial deposit at the site of the confluence of the ancient Mississippi River and the ancient preglacial drainageway identified as the Teays valley system (Melhorn and Kempton, 1991). The sand-and-gravel deposits within the aquifer are derived from various origins, and Walker et al. (1965) mapped the saturated thickness of these unconsolidated deposits in 1960 with water-level data collected from measurements taken in 103 wells. As shown in figure III-6, the saturated thickness in 1960 ranged from less than 60 ft near the Illinois River to as much as 200 ft immediately north of San Jose.

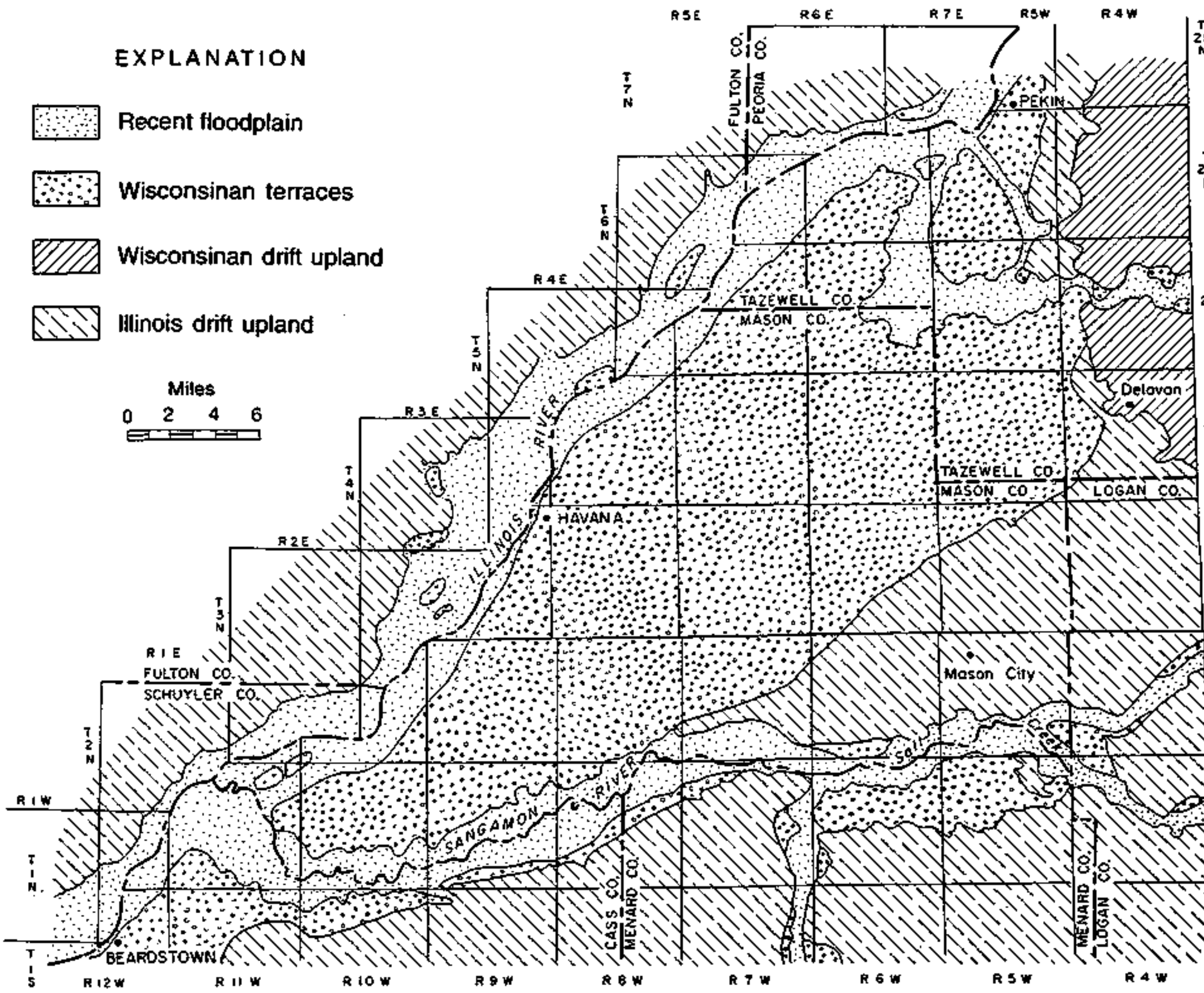


Figure III-5. Major physiographic areas of the Havana region
(from Walker et al., 1965)

Table III-1. Sample Study Log for "Lowland" Well Located between Havana and Kilbourne (MSN 21N6W-28.1g) (from Walker et al., 1965)

Formation Description	*Thickness (ft)*	*Depth to base (ft)*
Pleistocene Series		
No samples	18	18
Wisconsinan Stage (Bloomington outwash)		
Sand, fine to medium; yellowish brown subangular grains; ferruginous staining; abundant yellowish quartz grains; some brown silt	8	26
Sand, medium, as above; some granule gravel	10	36
Silt, brown, calcareous	2	38
Sand, medium; yellowish brown subangular grains	4	42
Sand, medium to coarse with granule gravel, yellowish brown; granules of dolomite, quartz, and granite	12	54
Sand, fine to coarse, some very coarse, yellowish brown; abundant grains of yellowish quartz and feldspar	12	66
Kansan Stage		
Sankoty Sand		
Sand, medium to coarse, pinkish gray; subangular to rounded grains; abundant pink and pink-stained quartz grains; some granule gravel and fine sand beds	22	88
Sand, fine to very coarse, pinkish gray; abundant pink grains; some granules of dolomite, quartz, feldspar, and igneous rock	10	98
Sand, fine to medium, reddish brown, subangular; abundant pink grains; many grains with pink clay skins	8	106
Sand, medium to very coarse, pinkish gray; pink grains; granules of chert dolomite and dark igneous rock	12	118
Gravel, granule, with very coarse sand; granules of dolomite, granite, sand-stone, felsite, and dark igneous rock	4	122 (total depth)

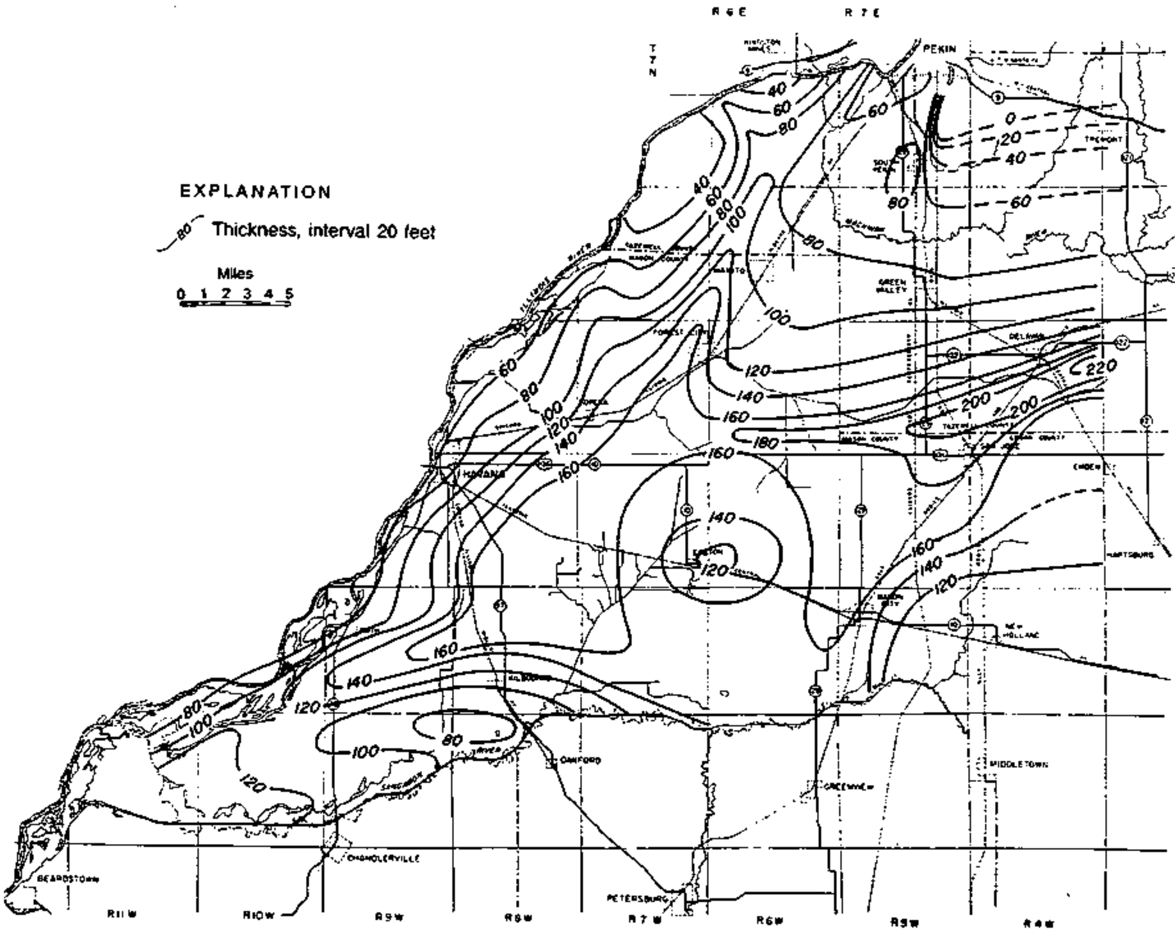


Figure III-6. Saturated thickness of unconsolidated deposits in 1960
(from Walker et al., 1965)

Table III-2. Sample Study Log for "Upland" Well Located in Mason City (MSN 20N5W-7.g2) (from Walker et al., 1965)

Formation Description	*Thickness (ft)*	*Depth to base (ft)*
Pleistocene Series		
Wisconsinan Stage		
Soil	5	5
Sand, fine (wind-blown), brown, noncalcareous	35	40
Silt, brown, noncalcareous	5	45
Illinoian Stage		
Till (?), brown, silty	5	50
Sand, medium to coarse	5	55
Sand, very coarse; granule gravel; dirty (till?)	10	65
Till, yellowish brown, calcareous	20	85
Sand, fine to medium, calcareous	5	90
Kansan Stage		
No samples	105	195
Sankoty Sand		
Sand, very fine to fine, brown, abundant pink grains	4	199
Sand, medium to very coarse; granule gravel	21	220 (total depth)

A more recent study (Sanderson and Buck, 1995) compared the difference in ground-water elevations from 1960 to Fall 1992. Sanderson and Buck (1995) concluded that throughout most of the study area, Fall 1992 ground-water levels generally were within ±5 ft of the 1960 levels. Sanderson and Buck (1995) further stated, "The extensive development for agricultural irrigation since about 1960 has not caused a lowering of ground-water levels or depletion of the ground-water resource."

Ground-Water Development and Withdrawals in Mason County

Aquifer withdrawals in the Havana lowlands have been discussed in the relatively recent study by Sanderson and Buck (1995). Much of the following text, which addresses general ground-water withdrawals in Mason County, is extracted from this prior study.

Irrigation

Wells finished in sand-and-gravel deposits in Mason County supply all of the area's water needs except cooling for power generation, which uses Illinois River water. Agricultural irrigation is extensively practiced in Mason County due to the predominance of sandy soils with low moisture-holding capacity. In 1960, only 11 irrigation systems were in use in Mason County and estimated irrigation withdrawals for 1959 and 1960 were about 0.25 mgd per year (Walker et al., 1965).

The magnitude of irrigation pumpage in the Havana Lowlands region relative to other counties along the Illinois River was addressed in Part II of this report. Again, although the pumpage data shown in table II-1 are somewhat dated, it is reasonable to assume that the data are indicative, in general, of the relative magnitudes of present-day withdrawals. Examination of the last column in table II-1 conveys the magnitude of irrigation withdrawals in Mason County compared to the remaining counties. Regarding irrigation pumpages in Mason County, Gibb et al. (1979) stated the following:

> "Irrigation pumpage in 1977 was estimated to be about 5.1 billion gallons [for the several counties listed in Table II-1].... Mason County accounts for about 80 percent of the total pumpage along the Waterway. It should be emphasized that the Mason County irrigation pumpage is for a 6 mile wide strip of land bordering the Illinois River. Total irrigation pumpage for the entire county would be much larger."

By 1993, more than 1,200 irrigation systems were in use in the entire Havana Lowlands region (Rockford Map Publishers, 1993), which includes all of Mason County and the southwestern portion of Tazewell County. For 1986, Kirk (1987) indicated that reported and estimated ground-water withdrawals totaled about 54.3 mgd and 32.6, respectively, in Mason and Tazewell Counties. Estimates of irrigation withdrawals for 1989 were made as a result of an extensive two-year field study at 195 sites in the Havana Lowlands region (Bowman and Kimpel, 1991). The 1989 estimates were 82.7 mgd and 23.3 mgd for average annual irrigation use in Mason and Tazewell Counties, respectively. Peak seasonal pumpage rates for irrigation approached 425 mgd in 1989 for the Havana Lowlands region. It should be noted that 1989 was a drought year with higher than average ground-water withdrawals.

Figure III-7 (Rockford Map Publishers, 1993) is one of the primary sources of information that conveys the present-day magnitude of irrigation across the Havana Lowlands area. This map was developed with the cooperation of several entities, including the Central Illinois Irrigated Growers Association, and is based on data collected from well drillers in the Havana region, the Mason County Farm Bureau, irrigators, and others.

Another approach was followed to produce an additional figure that also maps irrigation wells in a portion of Mason County. Because of the relatively high density of wells in the Havana Lowlands area and the fairly limited timeframe scheduled for a review of available well records, only the southern portion of Mason County (township tiers 19N, 20N, and 21N) was selected for examination. Well data from the "PICS" (i.e., Public, Industrial, and Commercial

Survey) and "Private Well" computer databases of the State Water Survey were merged into a single database for township tiers 19N, 20N, and 21N in Mason County. The information in the resulting database was checked for accuracy against available paper copies of well records, and well "use" was assigned to each well that had been previously uncategorized. Table III-3 shows the resulting number of wells in each "well use" category. Appendix III-2 lists all the wells.

Figure III-8 shows the irrigation, industrial/commercial, and municipal wells for this southern portion of Mason County, as well as the ground-water withdrawals for the public and larger industrial/commercial ground-water suppliers in this area. A comparison of figures III-7 and III-8 shows a generally favorable agreement regarding the regional density of irrigation wells.

Other Withdrawals

Table 1TJ-4 shows other reported and estimated ground-water withdrawals for Mason County. Reported withdrawals for public systems and estimated withdrawals for self-supplied industries totaled 1.15 mgd and 0.94 mgd, respectively, for 1995. Withdrawals for fish and wildlife were reported to be 4.25 mgd at the Jake Wolf Memorial Fish Hatchery, which is located approximately 5 mi west of Manito and is the dominant ground-water user for this use category. The importance of agricultural irrigation in Mason County is reflected in the 1989 estimate of irrigation ground-water use (82.7 mgd), which amounts to about 93 percent of total daily ground-water use in Mason County (using reported and estimated withdrawals for 1995 for other use categories). Actual daily irrigation ground-water use during the growing season (May I-August 31), the period of greatest irrigation, greatly exceeds the figures reflected in table III-4. These figures represent averages over a one-year period so that irrigation can be compared to other ground-water withdrawals. As was stated previously, estimates of seasonal irrigation pumpage in the Havana Lowlands approached 425 mgd in 1989 (Bowman and Kimpel, 1991).

Table III-3. Number of Wells and Well Use for Township Tiers 19N, 20N, and 21N in Mason County

	No. of wells	*Well use*
	880	domestic
	469	irrigation
	43	industrial/commercial
	28	municipal
	23	monitoring
	14	noncommunity
	13	school
	10	test hole
	4	state
	2	test well
	1	community supply
	1	observation
Total	1,488	

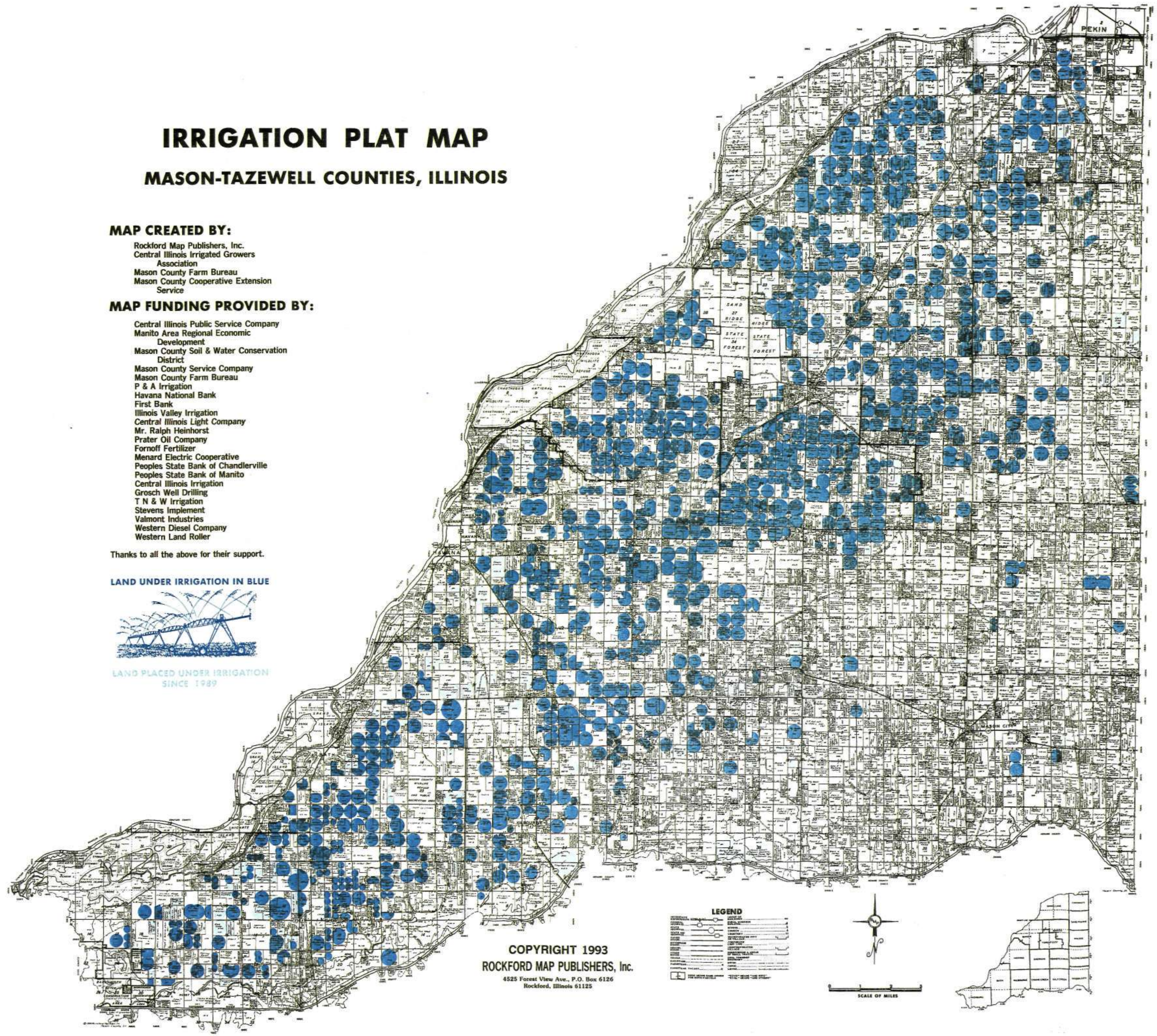


Figure III-7.
Irrigation plat map
(Reproduced with permission
of Rockford Map Publishers, Inc.,
Rockford, Illinois)

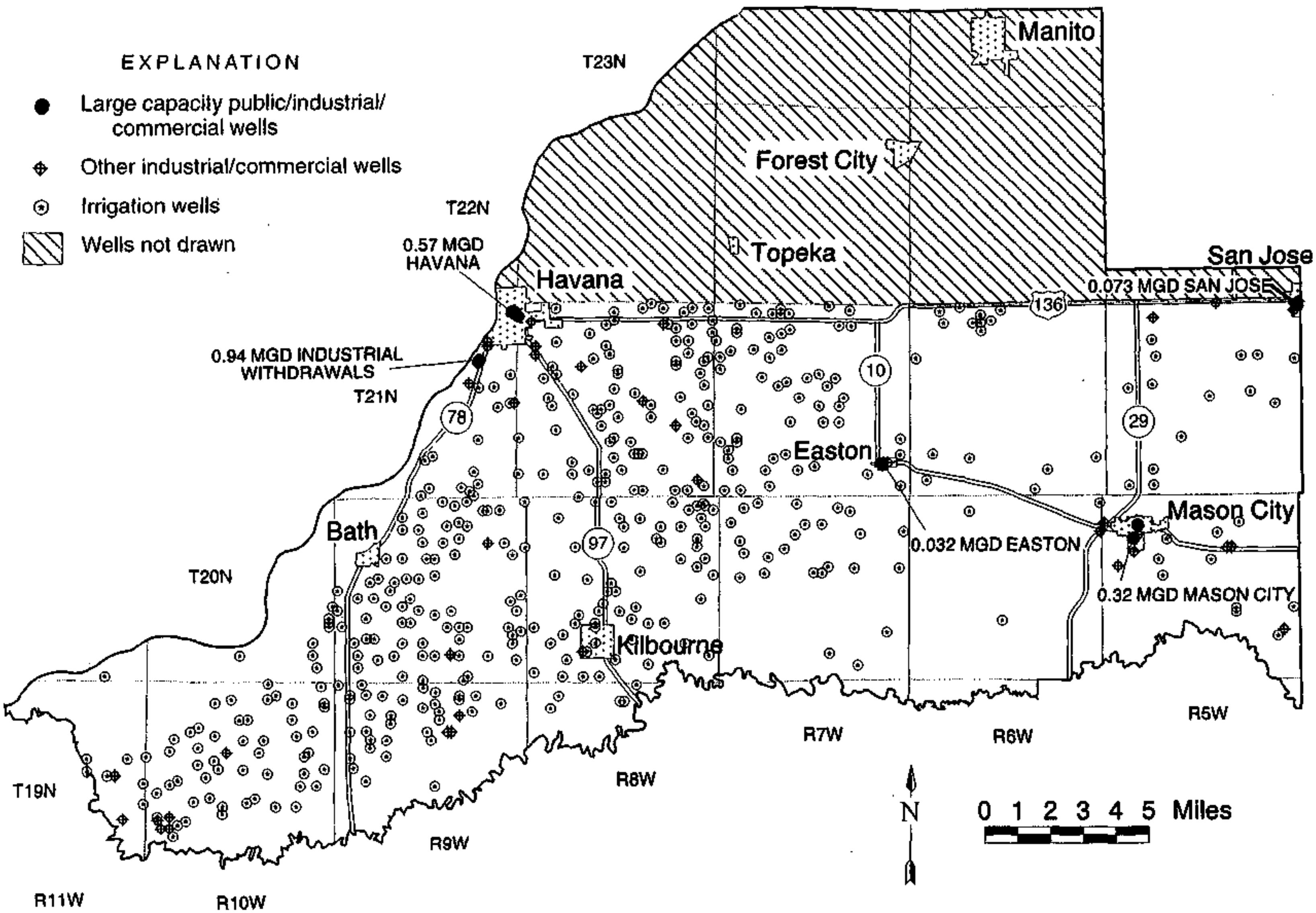


Figure III-8. Public, industrial, commercial, and irrigation wells in southern Mason County

Table III-4. Mason County Ground-Water Use

Use category	*Withdrawal (mgd)*	
Public (1995 reported withdrawals)		
Easton	0.03	
Havana	0.57	
Manito	0.16	
Mason City	0.32	
San Jose	0.07	
Total public	1.15	
Self-supplied industry (1995 estimate)	0.94	
Fish and wildlife (1995 reported withdrawals at the Jake Wolf Fish Hatchery)	4.25	
Rural		
Irrigation, Domestic, and Livestock (1986 estimate)*	44.14	(43.299 irrigation only)
Irrigation only (1989 estimate)**	82.70	
Totals		
(with 1986 total rural estimate)*	50.48	
(with 1989 irrigation estimate)**	89.04	

Notes:
*From Kirk (1987)
**From Bowman and Kimpel (1991)

Water-Level Fluctuations

Ground-water levels fluctuate seasonally in response to changes in the amount of water stored in the aquifer. This change in storage is affected by the direct recharge from precipitation, evapotranspiration, withdrawals from wells, discharge to streams, and changes in surface water stage. Under natural conditions, ground-water levels in the Havana lowlands recede in the late spring, summer, and early fall, when discharge by evapotranspiration, ground-water runoff, and possibly irrigation exceeds recharge from precipitation. Well water levels begin to recover in late fall when ground-water discharges are small and conditions are favorable for rainfall to replenish depleted soil moisture and later to percolate to the water table. The rise of water levels is especially pronounced in the wet, spring months when the ground-water reservoir receives most of its annual recharge. The high and low points of the annual cycle of water levels occur at different times from year to year, depending in large part on the seasonal and areal distribution and intensity of rainfall.

Superimposed on the annual cycle are changes in water levels caused by pumping. Pumping lowers water levels in the vicinity of the well until 1) a hydraulic gradient is established from a source of recharge to the pumped well sufficient to bring from the recharge area the amount of water being pumped, 2) sufficient water is diverted from an area of discharge to balance pumpage, or 3) a combination of increased recharge and diverted discharge balances the pumpage.

The magnitude of these water-level changes in the southwestern part of the Havana Lowlands has been monitored since March 1958 in an inactive domestic well near Snicarte (Section 11.8b, T.19N., R.10W., Mason County). Figure III-9 shows the hydrograph for the period 1958 to mid-1997.

Aquifer Hydraulic Properties

The yields of wells, quantity of water moving through an aquifer, and the magnitude of water-level fluctuations due to recharge and discharge of ground water are largely dependent on the hydraulic properties of an aquifer. The principal hydraulic properties of an aquifer are the transmissivity, *T,* or hydraulic conductivity, *K,* and storage coefficient, *S.*

The capacity of a formation to transmit ground water is expressed by the *transmissivity,* which is defined as the rate of flow of water in gpd through a vertical strip of the aquifer 1 ft wide and extending the full saturated thickness under a hydraulic gradient of 100 percent (1 ft per ft) at the prevailing temperature of the water. The transmissivity is the product of the saturated thickness of the aquifer, *m,* and the hydraulic conductivity, which is defined as the rate of flow of water in gallons per day through a cross-sectional area of 1 sq ft of the aquifer under a hydraulic gradient of 100 percent at the prevailing temperature of the water.

The storage properties of an aquifer are expressed by the *storage coefficient,* which is defined as the volume of water released from or taken into storage per unit surface area of the aquifer per unit change in the water level.

The hydraulic properties of an aquifer may be determined by means of aquifer tests, wherein the effect of pumping a well at a known constant rate is measured in the pumped well and in observation wells penetrating the aquifer. Graphs of drawdown versus time after pumping started, and/or of drawdown versus distance from the pumped well, are used to solve equations that express the relation between the transmissivity and storage coefficient of an aquifer and the lowering of water levels in the vicinity of a pumped well.

Hydraulic Conductivity

Walker et al. (1965) used the results of approximately 30 aquifer and well-production tests and available geohydrologic data to delineate areas of higher and lower (relatively) hydraulic conductivities in the Havana Lowlands area. These areas are delineated and labelled as ***"AREA 1"*** and ***"AREA*** 2", respectively, in figure III-10. Walker et al. (1965) summarized the regional hydraulic conductivity as follows:

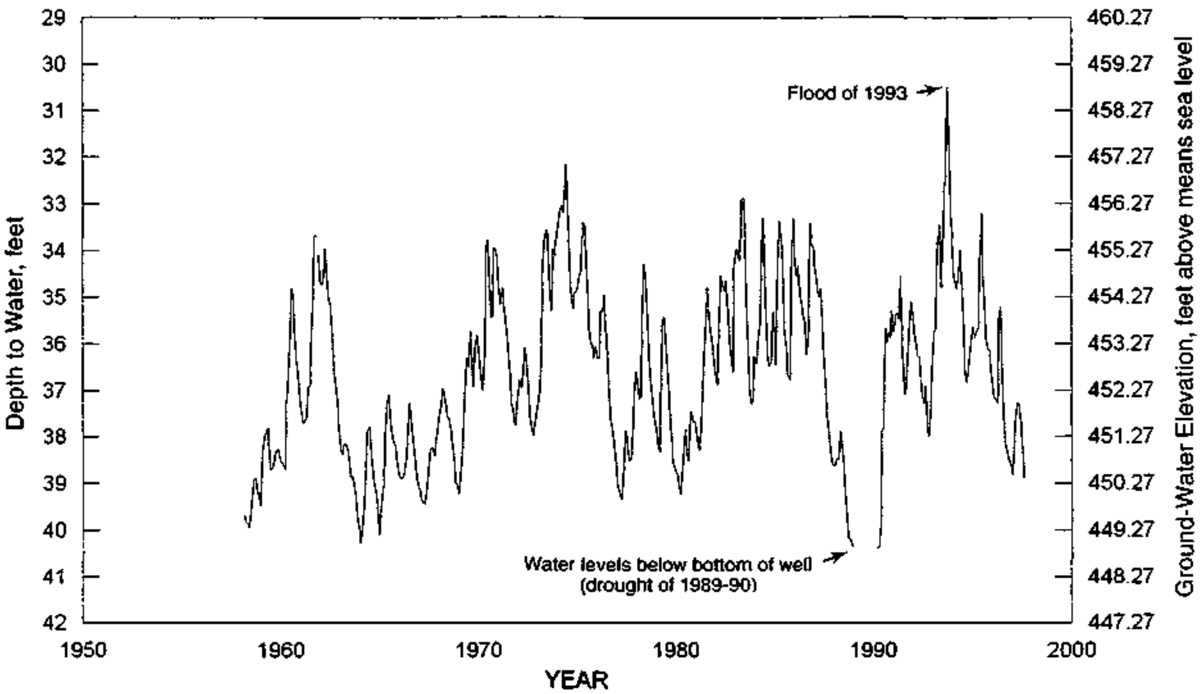


Figure III-9. Long-term hydrograph of ground-water levels in the Snicarte observation well

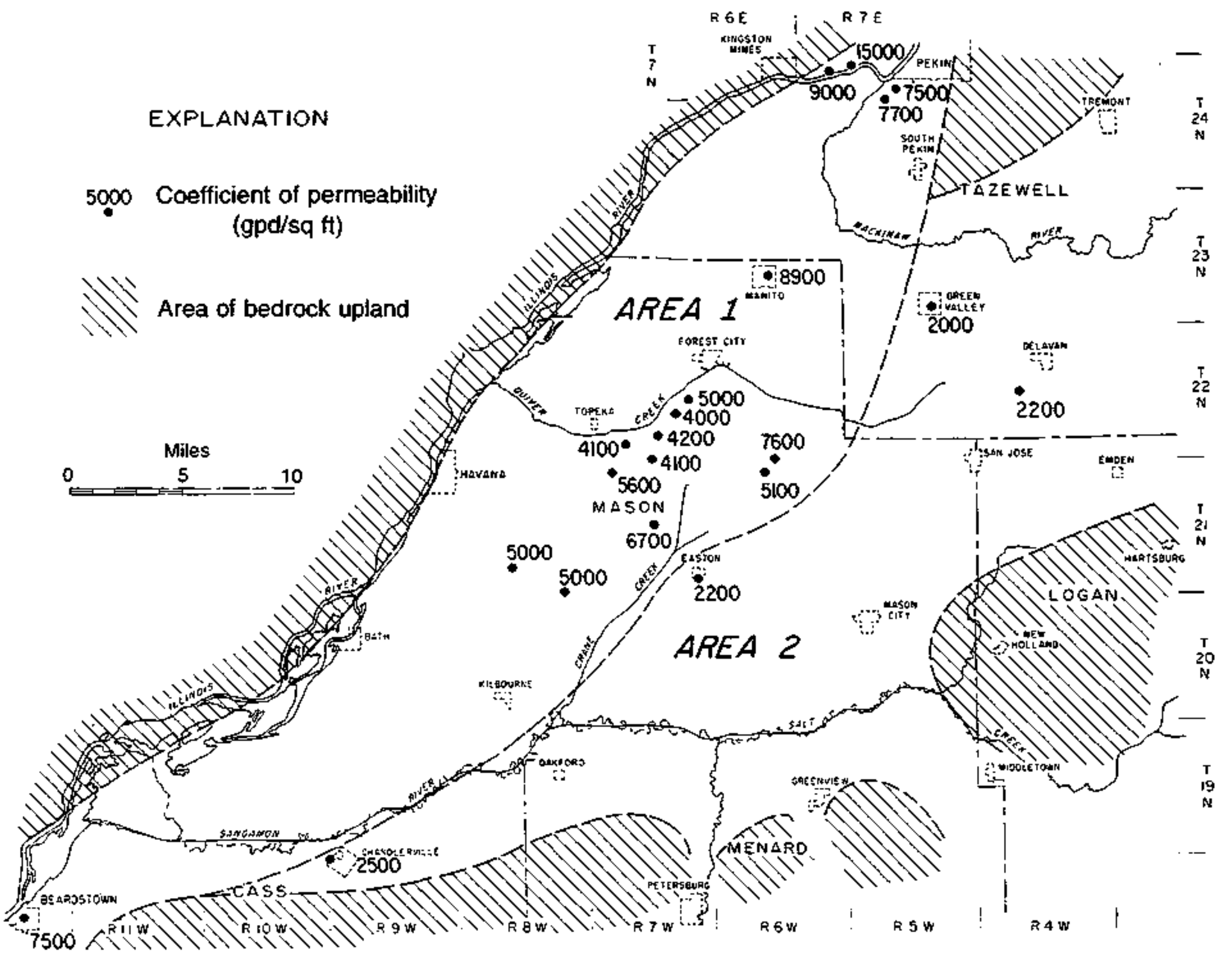


Figure III-10. Areas of high (area 1) and relatively lower (area 2) permeabilities of unconsolidated deposits (from Walker et al., 1965)

"Within area 1 the average [hydraulic conductivity] of the sand and gravel deposits ranges from 15,000 gpd/sq ft [2000 ft/day] in the northern part of the region, where very coarse deposits were laid down in the narrow gorge, to about 4,000 gpd/sq ft [530 ft/day] in the wide central part. In area 2, the eastern part of the region, the average [hydraulic conductivity] ranges from 2000 to 2500 gpd/sq ft [i.e., approx. 270 to 330 ft/day]."

Clark (1994) created a contour plot of regional hydraulic conductivity values and used it as input for the numerical ground-water model he created for the Havana Lowlands area. A total of 148 values of hydraulic conductivity were obtained from the records of the Illinois State Water Survey and used to create the map shown in figure III-11.

Storage Coefficient

Clark (1994) provided a discussion of the range of values for storage coefficients estimated in previous work by Walker et al. (1965) and Visocky and Sievers (1992). Clark's modeling efforts then used values of 0.1 and 0.05 for those areas west and east, respectively, of Route 29, which runs generally north-south in the eastern portion of Mason County. The values for storage coefficient used in the analysis later in this report will generally follow those used in Clark's (1994) ground-water modeling efforts.

FEASIBILITY OF ADDITIONAL GROUND-WATER DEVELOPMENT IN MASON COUNTY

The Havana Lowlands area in Mason County encompasses a relatively large area where thick (up to 200 ft) water-yielding sand-and-gravel deposits are present. These deposits and the presence of a large number of irrigation supply wells in the area suggest good to excellent hydrogeologic conditions for the development of the desired 12-mgd supplemental water supply for Springfield.

Using data from Water Survey files and available reports for the Mason County area allows reasonable assumptions to be made regarding the thickness, texture, and hydraulic properties of the aquifer. This then allows calculation of well field yields under several aquifer development strategies at several locations across the study area.

This section reviews past studies that indicate the potential for additional ground-water development in the study area. An analytical methodology was followed to develop a set of conceptual well field designs for procuring 12 mgd within the study area during drought conditions.

Prior Studies

A study by Smith and Stall (1975) enumerated 17 areas in Illinois where large-scale ground-water development was estimated to be possible. The impetus for that study was the need to summarize the availability of ground water for coal conversion, which was deemed to

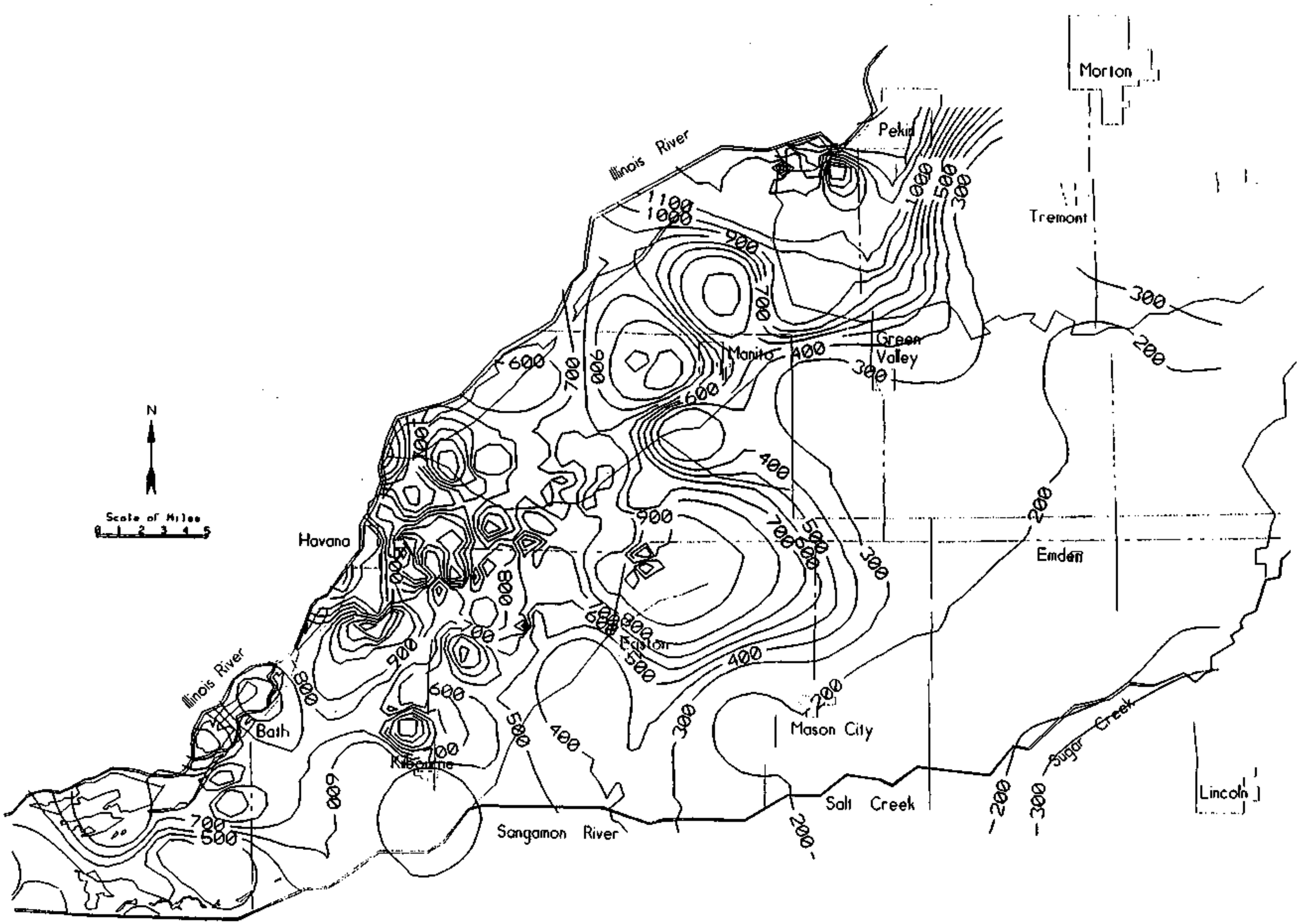


Figure III-11. Contour plot of regional hydraulic conductivity values
(from Clark, 1994)

require between 6 and 72 mgd to make a conversion facility feasible. In this earlier study, the Havana Lowlands area was identified as a viable area for the development of large ground-water supplies (see figure II-5, p. 34). Smith and Stall estimated that the maximum design rate (for coal conversion purposes) of 72 mgd could be developed within the Havana Lowlands area.

The extensive ground-water resource in the region furnishes the water supply for the Jake Wolf Fish Hatchery owned and operated by the Division of Fisheries, Illinois Department of Natural Resources in the Sand Ridge State Forest, located between Manito and the Illinois River in northern Mason County. Visocky and Sievers (1992) discussed the impacts, condition, and capability of the aquifer and well field supplying the hatchery. This facility has been in operation since 1982, and the estimated daily water use at the hatchery ranges from about 4 to 10 mgd and averages about 8.5 mgd.

As of 1992, the well field for this facility was located in Section 27, T.23N., R.7E., although expansion plans for additional wells or an additional well field located remote from the primary well field were being considered. Wells for the primary well field are located along forest roadways at approximately 500-ft spacings, and all wells except Well 1 (which is equipped with a Goulds pump) are equipped with an Allis-Chalmers vertical turbine pump with two to four stages. Well depths range from 98 to 110 ft, the screen diameters are either 12 or 16 in., and well screens are 40 ft in length, except for Well 4 with a 30-ft screen length. Rated pump capacities range from 400 to 1,200 gpm.

One of the main conclusions from Visocky and Sievers (1992) was that the existing well field (constructed in about 1982) was not capable of producing significant quantities of water beyond the average rate of 8.5 mgd. The potential for increased withdrawals at the primary well field was not limited so much by the regional yield capability of the aquifer, but more so by limitations in available drawdown at each well, the designs of the individual wells, and the mutual interference (or cumulative water-level drawdowns) inherent in the multi-well well field.

Ground-Water Recharge and Potential Yield

Potential yield is defined as the amount of ground water that can be continuously withdrawn from a reasonable number of wells without creating critically low water levels or exceeding the recharge rate. The water transmitting capability and the water storage capacity of the sand-and-gravel aquifer in the Mason County region are great enough that more ground water could be pumped from the aquifer system than can be recharged by precipitation (Walker et al., 1965). Thus, the potential yield of the sand-and-gravel aquifer depends on recharge rates rather than on the water-yielding character of the aquifer.

Walker et al. (1965) estimated precipitation recharge within the Havana Lowlands region to be about 300 mgd on an average annual basis. Clark (1994) arrived at similar numbers during the development of a steady-state computer model. Clark's study obtained an average annual recharge rate, based on precipitation, of 377 mgd for the Havana Lowlands region and 292 mgd for the Mason County area alone. Comparing the estimated recharge for Mason County to the estimates for total ground-water withdrawal (table III-4) indicates that significant additional withdrawals can occur without regional withdrawals exceeding estimated regional recharge on an annual basis.

Conceptual Well Field Designs

Overview of Approach

The following assumptions were made to arrive at conceptual well field designs to analyze the feasibility of developing a 12-mgd ground-water supply system during drought conditions in the study area using vertical, drilled wells:

1. The aquifer within the Havana Lowlands can be characterized as a water-table (i.e., unconfined) aquifer. (Saturated thickness of the aquifer will be discussed below.)

2. When justified, aquifer boundaries can be analytically modeled using (discharging) image well theory.

3. Induced infiltration from the Illinois River is not incorporated in the analytical approach. The decision to do this is based upon the relatively thin saturated thickness of the aquifer along the river and the existing relatively steep hydraulic gradient towards the river. Although collector or "Ranney" wells may be feasible at locations directly adjacent to the Illinois River, the magnitude of the ground-water resources available in the remainder of the Havana lowlands minimizes the impetus for induced infiltration (via collector wells) to be analyzed.

4. Water-level drawdowns in production wells can be described with the Theis nonleaky artesian formula while incorporating the correction factor derived by Jacob (1944), which accounts for decreases in aquifer saturated thickness under water table conditions. This correction factor, as described in Walton (1962), is:

$$s' = s - (s^2/2m)$$

where:

m = initial saturated thickness of aquifer, in feet.
s = observed drawdown under water-table conditions, in feet.
s' = drawdown that would occur in an equivalent nonleaky artesian aquifer, in feet.
= $(114.6Q/T)W(u)$.

and

Q = discharge, in gpm.
T — transmissivity, in gpd/ft.
$W(u)$ = the "well function" for the nonleaky artesian formula.

The primary constraint for the conceptual well field designs is that observed drawdowns, *s*, in the pumped wells not exceed one-half the initial saturated thickness of the aquifer, m, for the specified pumping duration. This translates to limiting *s*' to 0.375m, using Jacob's correction factor. Thus, in conceptual designs for a well field to yield 12 mgd under drought conditions, the theoretical drawdowns calculated using the nonleaky artesian formula are limited to 0.375m so that *observed* drawdowns do not exceed 0.5*m*. This constraint is applied to the critical (i.e., center) well(s) of the well field. A pumping duration of one year with no recharge (i.e., precipitation) occurring is analytically modeled and is considered conservative in simulating drawdowns due to pumpage. The effects of well field placement upon the conceptual well field design are analytically modeled, as described above for each township in the southern three tiers of townships of Mason County, or simply southern Mason County.

Aquifer Saturated Thickness

To apply the nonleaky artesian formula in the analytical approach described above, appropriate values for the hydrologic parameters and the *drought-condition* saturated thickness of the sand-and-gravel aquifer, m, are needed for each township within the study area.

The nondrought saturated thickness of the aquifer in each township is estimated via an examination of figure III-6. These values for saturated thickness are shown in column B of table III-5 and represent an approximate average thickness within each township. Where the non-drought saturated thickness has been decreased (as indicated by the subtractions), information from page 54 of Walker et al. (1965) has been incorporated. This was done to reflect changes in the understanding of bedrock topography that resulted from test drilling in the vicinity of the area between Easton and Kilbourne after the production of figure III-3.

To arrive at a drought-condition saturated thickness for each township, estimates of drawdown in the water table due to drought conditions were obtained from computer modeling efforts conducted by Clark (1994). Clark presents a contour map displaying water-table drawdowns due to impacts of two consecutive 1988 drought years (see figure III-12). In his report, Clark states the following:

> "The drought year of 1988 was modeled for two consecutive identical 12 month periods to simulate an assumed worst case consecutive drought year scenario. The drought year of 1988 was selected because reasonable estimates of increased irrigation use were available...and precipitation during the crop growing season was less than half of the precipitation that fell during the growing season in the drought year of 1989."

For each township in southern Mason County, the approximate nondrought aquifer saturated thickness (column B) was decreased by the approximate drawdown due to drought for that township as reflected in figure III-12. This calculation (subtraction) is shown in column C of table III-5. The drawdowns range from 5 to 14 ft. For comparison purposes, one can observe the long-term hydrograph shown previously (figure III-9) for an observation well located in Section 11.8b, Township 19 North, Range 10 West, Mason County. During the drought of 1988-89, water levels in this well dropped approximately 5 ft. Therefore, for the purposes of arriving at

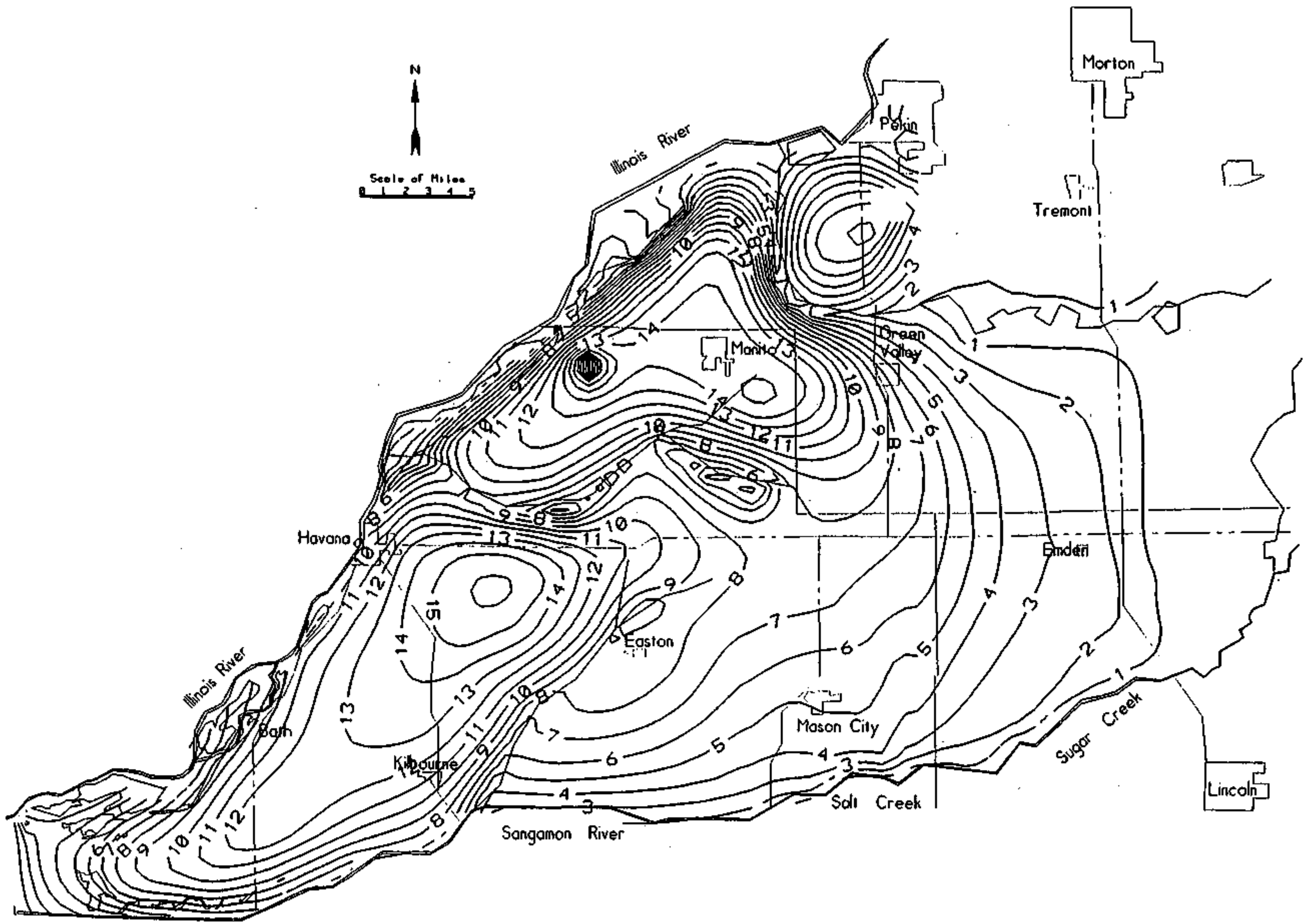


Figure III-12. Water-level drawdowns due to simulated drought conditions (from Clark, 1994)

Table III-5. Aquifer Hydraulic Properties

(A)	(B)	(C)	(D)	(E)	(F)
Mason County township (or portion thereof)	*Nondrought condition saturated thickness (ft)*	*Drought condition saturated thickness (ft)*	*Hydraulic conduc-tivity (gpd/ft^2)*	*Transmis-sivity (gpd/ft)*	*Storage coefficient (dimensionless)*
T21N R9W	100	100-12=88	4,000	352,000	0.10
T21N R8W	140-40=100	100-14=86	4,000	344,000	0.10
T21N R7W	140-20=120	120-11=109	4,000	436,000	0.10
T21N R6W	150	150-8=142	2,000	284,000	0.10
T21N R5W	170	170-6=164	2,000	328,000	0.05
T20N R10W	120	120-11=109	4,000	436,000	0.10
T20N R9W	140-40=100	100-12=88	4,000	352,000	0.10
T20N R8W	150-40=110	110-11=99	4,000	396,000	0.10
T20N R7W	150-30=120	120-7=113	2,000	226,000	0.10
T20N R6W	150-20=130	130-5=125	2,000	250,000	0.05
T20N R5W (NW ¼)	120	120-5=115	2,000	230,000	0.05
T19N R11W	120	120-7=113	4,000	452,000	0.10
T19N R10W	120-20=100	100-9=91	4,000	364,000	0.10
T19N R9W	100	100-11=89	4,000	356,000	0.10
T19N R8W	80	80-9=71	2,000	142,000	0.10

conceptual well field designs, the drawdowns due to drought conditions and the resulting drought-condition saturated thicknesses (column C, table III-5) appear reasonable and conservative.

Aquifer Hydraulic Conductivity and Storage Coefficient

As was mentioned earlier, both Walker et al. (1965) and Clark (1994) presented maps that indicate hydraulic conductivity values across the Havana Lowlands region. These were shown in figures III-10 and III-11. The hydraulic conductivity values that are used to calculate transmissivities and subsequent minimum well spacings in this report are those indicated by Walker et al. (1965). These values are listed in column D, table III-5.

Following the approach used by Clark (1994), which was discussed above, a storage coefficient of 0.1 was used in the western portion of the Havana Lowlands region, and a lower storage coefficient (0.05) was used in the southeastern portion of the area, or more specifically, in townships T21N R5W, T20N R6W, and T20N R5W.

Results

Recalling the constraint (described above) that the calculated drawdowns in the production wells not exceed 37.5 percent of the aquifer saturated thickness, or 0.375m, and allowing that additional contributing losses (i.e., well losses, partial penetration effects, etc.) could increase observed drawdowns at the well an additional 10 percent, a series of conceptual well field designs was generated using the analytical approach, the aquifer geometry, and the aquifer hydraulic properties described above. This approach suggested that individual well yields of 2 mgd and a 500-ft spacing between wells are feasible in all but one of the townships (T19N, R8W) in the southern portion of Mason County. The relatively smaller transmissivity in this township resulted in much larger nominal well spacings being indicated. Also, as reflected in figure III-13, only the northwestern ¼ of township T20N R5W was considered for possible ground-water development. Available mapping of bedrock topography (figure III-3) indicates significant aquifer boundaries are likely in the remainder of this township. Significant aquifer boundary effects are also possible in the region along the Illinois River in western Mason County. In the remainder of the southern portion of Mason County, hydrogeologic conditions and the analytical approach followed above suggest good to excellent potential for the development of a 12-mgd ground-water supply.

Table III-6 summarizes a listing of the aquifer hydraulic properties and geometry used in the analytical approach. (Note: The analytical approach used to arrive at the indicated well yields and spacings suggested that well spacings less than 500 ft would be feasible for 2 mgd wells. However, "real world" experience at the Jake Wolf Fish Hatchery indicates that a 500-ft minimum well spacing is likely more practical as a recommended minimum for this preliminary feasibility study.)

Considerations for Potential Ground-Water Development

Theoretical Effects of Pumping

A detailed analysis of the potential impacts to existing wells as a result of additional ground-water development at a particular site is beyond the scope of this report. However, it would be expected that pumpage from a 12-mgd well field in the Havana lowlands would have observable effects on surrounding water levels (Walker et al., 1965). The Theis nonleaky artesian formula and the hydraulic properties listed in table III-6 can be used to estimate the magnitude of water-level drawdowns that could occur in existing wells due to a nearby 12-mgd well field. Figure III-14 shows the theoretical drawdown that would occur at distances of 0.5 to 5 miles from a single hypothetical well pumping continuously at 12 mgd (8333 gpm) for a period of one year. Although calculated drawdowns from a single 12-mgd well will not match drawdowns from a six-well, 12-mgd well field in the immediate vicinity of the well field, the example will provide reasonable estimates for drawdowns at larger distances, i.e., greater than about a mile. Two curves shown in figure III-14 correspond to transmissivities of 225,000 and 500,000 gpd/ft, which "bracket" all the transmissivity values listed in table III-6, except that for T19N R8W. The graphs in figure III-14 assume that all water pumped is withdrawn from

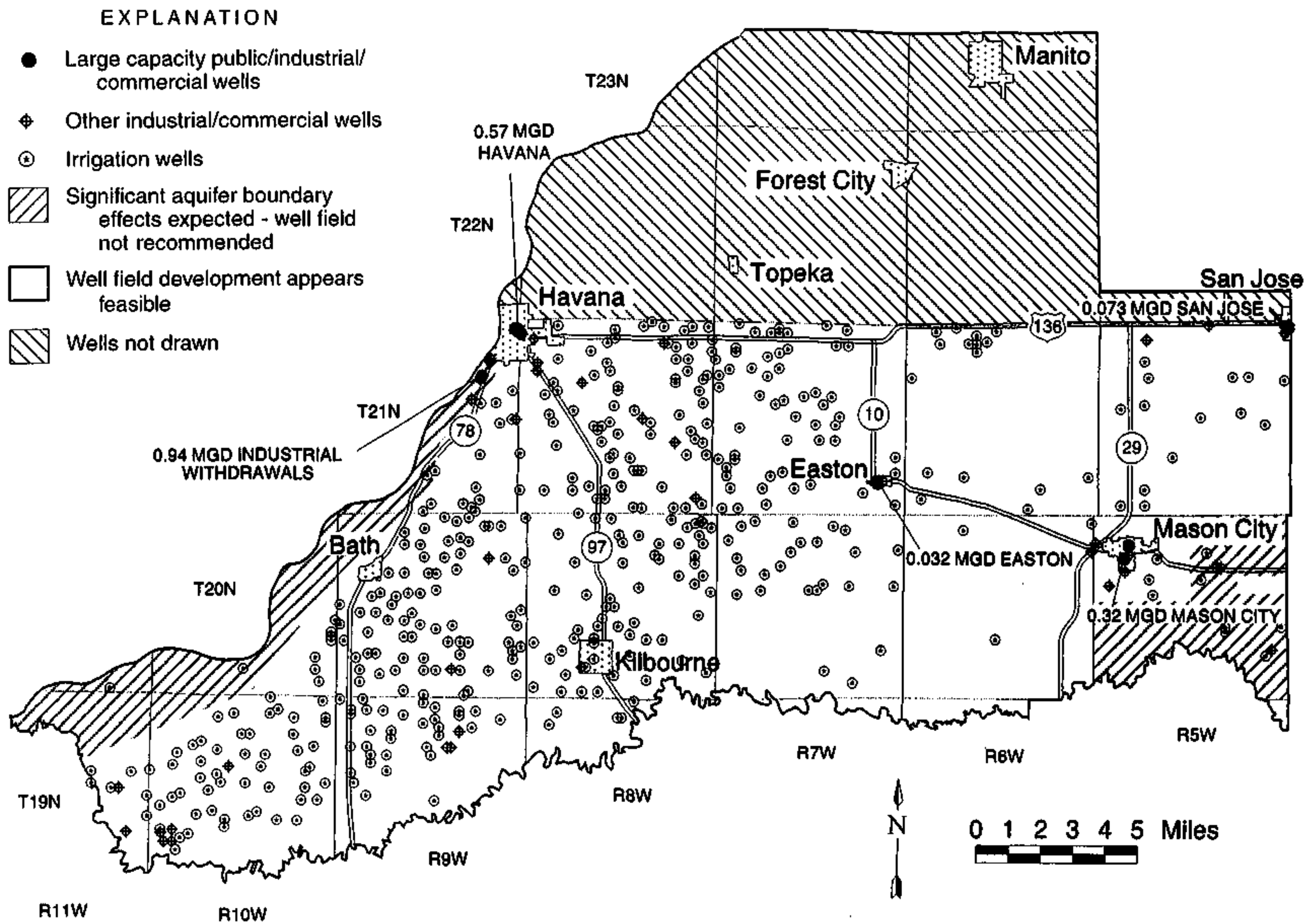


Figure III-13. Public, industrial, commercial, and irrigation wells
and areas where ground-water development appears feasible
in southern Mason County

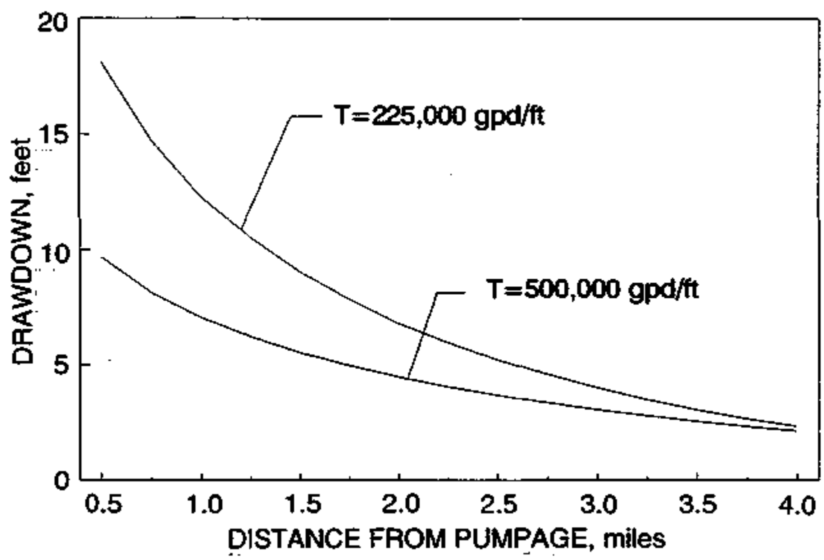


Figure III-14. Theoretical effects of pumping

Table III-6. Conceptual Well Field Designs

(A)	(B)	(C)	(D)	(E)	Nominal Spacing Between Wells, ft (Total length of well field in parenthesis, mi)		
Mason County township (or portion thereof)	*Saturated thickness (drought)*	*Transmis-sivity (Spd/ft)*	*Storage coefficient (dimension-less)*	*Assumed minimum distance (mi) and direction from well field to aquifer boundaries*	*6 wells @ 2.00 mgd (1,390 gpm) each*	*9 wells @ 1.33 mgd (925 gpm) each*	*12 wells @ 1.00 mgd (695 gpm) each*
T21N R9W	88	352,000	0.10	2 mi NW	500 ft (½ mi)	—	—
T21N R8W	86	344,000	0.10	—	500 ft (½ mi)	—	—
T21N R7W	109	436,000	0.10	—	500 ft (Vimi)	—	—
T21N R6W	142	284,000	0.10	—	500 ft (Vi mi)	—	—
T21N R5W	164	328,000	0.05	2 mi SE	500 ft (Vi mi)	—	—
T20N R10W	109	436,000	0.10	2 mi NW	500 ft (½ mi)	—	—
T20N R9W	88	352,000	0.10	2 mi NW	500 ft (½ mi)	—	—
T20N R8W	119	476,000	0.10	—	500 ft (½ mi)	—	—
T20N R7W	113	226,000	0.10	—	500 ft (½ mi)	—	—
T20N R6W	125	250,000	0.05	2 mi S	500 ft (½ mi)	—	—
T20N R5W (NW ¼)	115	230,000	0.05	3 mi S 3 mi E	500 ft (½ mi)	—	—
T19NR11W	113	452,000	0.10	2 mi S 3 mi N	500 ft (½ mi)	—	—
T19N R10W	91	364,000	0.10	2 mi S	500 ft (½ mi)	—	—
T19N R9W	89	356,000	0.10	2 mi S	500 ft (½ mi)	—	—
T19N R8W	71	142,000	0.10	2 mi S	—	—	1,550 ft (3¼ mi)

storage, and that the aquifer is infinite in areal extent. The effects of hydrogeologic boundaries would cause additional drawdowns.

As indicated in this hypothetical example illustrated with figure III-14, drawdowns in wells surrounding a (hypothetical) 12-mgd well field are significant. For example, at a distance of 1 mi, drawdowns range between approximately 7 to 12 ft, corresponding to relatively high and low transmissivities, respectively. However, these drawdowns decrease quite rapidly with increasing distances from the well field. For instance, at a distance of 2 mi these drawdowns decrease to about 4 to 7 ft, respectively.

It is very likely that the construction and operation of a new 12-mgd well field would result in water supply interruptions in some existing nearby wells. However, these water supply interruptions likely would not be caused by a catastrophic dewatering of the aquifer, but rather by local ground-water levels being lowered below the screens of shallower wells or below the pumps in wells with relatively shallow pump settings. These potential water supply interruptions could likely be remedied, or mitigated, by deepening the subject well or lowering the well pump or both.

The degree to which mitigative efforts would be necessary is difficult to predict. Looking at a hypothetical case may be instructive, however. Consider, for example, a 12-mgd well field in an area where irrigation is extensively practiced (i.e., western Mason County). Assume that the well field is a half mile in length with no irrigation wells in the immediate vicinity. Also assume that the surrounding sections of land are extensively irrigated with center-pivot systems irrigating the corresponding ¼-section plots. In this case, the minimum distance between one of the wells in the hypothetical 12-mgd well field and a surrounding irrigation well is approximately ½ mi. At this distance, the theoretical drawdown in the irrigation well due to pumpage at a 12-mgd well field could be about 10 to 18 ft, corresponding to the range of transmissivities shown in figure III-14. Although an additional increase in drawdown of 10 to 18 ft in an existing irrigation (or other) well is significant, the situation most likely could be mitigated, if necessary, as described above. The relatively large thickness of the saturated deposits in the Mason County area (column B, table III-6) render the increased drawdowns likely resolvable in most cases, even during drought conditions. Whether a water supply interruption would be experienced in a given well (irrigation, private, or otherwise) would depend on local hydrogeologic conditions and well construction features (i.e., depth, pump setting, etc.).

Additional Well Field Location Considerations

The higher hydraulic conductivities documented in the western portion of Mason County (figures III-10 and III-11) result in somewhat larger transmissivities in that area. Also, a higher recharge value of 490,000gpd/sq mi was reported (Walker et al., 1965) for the western portion of Mason County, as opposed to 270,000 gpd/sq mi for the eastern portion. From a strictly hydrologic perspective, these conditions would suggest an enhanced potential for the development and operation of a well field in the western portion. However, the theoretical approach followed above and the results summarized in table III-6 do indicate that a well field with six 2-mgd wells and 500-ft well spacings could be located in the eastern region as well.

Because the hydrogeology appears to allow well field development across the vast majority of southern Mason County, a secondary consideration might be the apparent level of ground-water development across the region. Examination of figures III-7 and III-8 indicates a lower density of irrigation wells in the eastern portion of southern Mason County. It is possible, therefore, that drawdowns caused by a new well field might affect a fewer number of wells in that area.

SUMMARY

The southern portion of Mason County, an area lying approximately 40 mi north-northwest of Springfield, encompasses a relatively large area where thick (approximately 50 to 200 ft) saturated sand-and-gravel deposits are present. This study has examined available data for the study area and estimated hydrologic parameters to describe the aquifer for each township in this area. An analytical approach was used to evaluate a set of conceptual well field designs for each township in the southern three tiers of townships in Mason County. The analytical approach indicated that a yield of 12 mgd is possible from six wells with 500-ft well spacings in all the subject townships except T19N R8W, where relatively thin saturated deposits are indicated and a required nominal well spacing of 1,550 ft is indicated. Significant aquifer boundary effects would be anticipated in portions of township T20N R5W, as well as in the westernmost portions of those townships along the Illinois River. For this reason a well field is not recommended in these areas (see figure III-13).

Should ground-water development at a particular site be pursued, further studies would be recommended. Primarily, the collection of background data in the vicinity of the proposed well field site is suggested. This could be done via an inventory of wells in the vicinity of the proposed well field to measure as many well depths and water levels as possible and to collect a water sample from as many wells as possible.

To help assure successful development of the desired quantity of ground water in the portion of Mason County indicated above, it appears that at least three project phases would be suggested. The essence of each phase would be as outlined below.

Phase 1: Construction of a high-capacity test well with three observation wells. Observation wells would likely be spaced in a line at distances of about 200, 500, and 800 ft from the pumped well.

A detailed pumping test (perhaps seven days) would then be conducted to obtain data necessary to determine the aquifer characteristics at the selected site. Providing the results of the test are favorable, more firm recommendations could then be made with regard to the number of wells, pumping rates, and well spacing for a well field.

Phase 2: Construction of a test hole at each proposed well site to collect samples of the aquifer material. Sieve analysis to determine the grain size of the material would be used to select the proper gravel-pack grain size and well screen length and slot opening size.

Phase 3: Construction of production wells and conduct of a pumping test (8-24 hours) and step test (to determine well loss coefficients) on each.

CONCLUSION

The three ground-water supply alternatives examined above represent supply options examined previously by the city of Springfield and others while searching for water to fulfill municipal and potential industrial demands. The three alternatives are in areas approximately 5 mi (Sangamon River valley), 40 mi (southern Mason County), and 50 mi (Illinois River valley in Scott County) from the approximate center of Springfield. The number of wells and the total well field length necessary to procure the desired 12 mgd during drought conditions range from 18-36 wells spanning a distance of 18-36 mi for development along the Sangamon River, to 6-12 wells spanning a distance of ½. to 3¼ mi for development either along the Illinois River (Scott County) or in southern Mason County. The relatively large number (18-36) of small capacity wells and the large well field lengths that are estimated to be required for the Sangamon River valley alternative result from the limited extent, thickness, and estimated recharge potential for the aquifer deposits along the Sangamon River. From a strictly hydrologic perspective, this alternative appears to be the least feasible of the three options.

From a hydrogeologic perspective, the feasibility of successful ground-water development in the two remaining areas (Illinois River valley in Scott County, and southern Mason County) appears very favorable. In both areas, the chances of procurring a 12-mgd ground-water supply during drought conditions using a reasonable number of production wells and reasonably short well spacing appear very favorable to excellent. Tables II-4 and III-6 show conceptual well field designs for these two general areas for the Illinois River valley in Scott County and the southern portion of Mason County, respectively. As is evident in figures II-6 and III-13, however, the area within Mason County where well field development appears feasible is much larger than the corresponding area in Scott County. Hence, the number of locations for consideration for siting a potential well field is much larger.

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Appendix I-1. Public Ground-Water Supplies along the Sangamon River Valley in Sangamon County

Curran-Gardner Township Water District

The Curran-Gardner Township Water District uses four wells (1, 2, 3, and 4) located within the lowlands of the Sangamon River as a source of public water supply. One of the wells (Well 3) is used only in emergency situations.

Well 1 (1,750 ft south and 1,320 ft east of the northwest corner of Sec. 12, T16N, R6W, Sangamon County) was drilled to a depth of 50 ft by E. C. Baker & Sons, Sigel, in 1968. Sand and gravel was reported between depths of 10 and 50 ft, and the well was screened with a 10.5-ft length of 12-inch (in.) diameter 125 slot well screen. When the well was installed, the static water level was lowered from 7.20 ft to 24.03 ft after pumping at 300 gallons per minute (gpm) for 3 hours (hr).

The Water Survey conducted a well production test on this well on December 12, 1968, which was reported to Mr. Nathan Wilcoxon, CM&T, Consulting Engineers, Springfield, in a letter from Thomas A. Prickett, Engineer. The specific capacity (yield per foot of drawdown) of the well for a pumping period of 3 hrs and a pumping rate of 300 gpm was 17.8 gpm/ft. The long-term specific capacity at this discharge rate was estimated to be 10.1 gpm/ft. Based on information available at that time, the long-term yield was estimated to be 300 gpm.

Well 2 (3950 ft north and 3150 ft west of the southeast corner of Sec. 12, T16N, R6W, Sangamon County) was drilled to a depth of 56 ft also by E. C. Baker & Sons, Sigel, in 1968. Sand and gravel was reported between depths of 25 and 55 ft, and the well was screened with a 12.5-ft length of 12-in. diameter 60 slot well screen in the interval 42.5 to 55 ft. When the well was installed, the static water level was lowered from 11.80 ft to 36.02 ft after pumping at rates of 240 to 250 gpm for 3 hr.

The Water Survey conducted a well production test on this well on November 22, 1968, which was reported to Mr. Nathan Wilcoxon, CM&T, Consulting Engineers, Springfield, in a letter from A. P. Visocky, Assistant Hydrologist. The specific capacity of the well for a pumping period of 180 minutes and pumping rate of 250 gpm was 10.3 gpm/ft. The long-term specific capacity at this discharge rate was estimated to be 8.3 gpm/ft. Based on information available at that time, the long-term yield was estimated to be 250 gpm.

Well 3 (2,180 ft south and 250 ft east of the northwest corner of Sec. 12, T16N, R6W, Sangamon County) was drilled to a depth of 50 ft by Diehl Pump & Supply Co., Louisville, Kentucky, in 1977. Sand and gravel ws reported between depths of 10 and 50 ft, and the well was screened with a 15-ft length of 12-in. diameter 60 slot well screen set between the depths of 30 to 35 ft and from 40 to 50 ft. Gravel pack was used between the depths of approximately 3 ft to 50 ft below land surface. When the well was installed, the static water level was lowered from 6.9 ft to 29.8 ft after pumping at 305 gpm for 6.5 hr.

Diehl Pump & Supply Co. conducted a well production test on this well on July 27, 1977, which was reported to CM&T Consulting Engineers, Springfield, in a letter from Richard J. Schicht, Engineer, Water Survey. The specific capacity of the well for a pumping period of 6.5 hr and a pumping rate of 305 gpm was 13.3 gpm/ft. Based on information available at that time, the long-term yield was estimated to be 300 gpm. It was indicated at that time that if the upper screen became partly or completely dewatered, the bottom 10 ft of screen would be sufficient to sustain the 300-gpm rate.

In 1987, in an attempt to stop sand pumpage in this well, an inner screen consisting of 7.2 ft of 6-in. diameter 100 slot screen was installed at the bottom of the well. After the additional screen was installed in 1987, the Water Survey conducted a production test on this well on April 2, 1987, which was reported to Mr. Nathan Wilcoxon, CM&T Consulting Engineers, Springfield, in a letter from Robert C. Kohlhase, Assistant Hydrologist. The water level was lowered from a static level of 22.14 to 42.61 ft below land surface after pumping at a rate of 252 gpm for 3 hr. The specific capacity of the well for a pumping period of 3 hr at a rate of 252 gpm was 12.3 gpm/ft. A 7 percent decrease in specific capacity since the well was completed in 1977 was determined not to be excessive considering the age of the well and inner screen. Based on information available at that time, the long-term yield was estimated to be 300 gpm (with partial dewatering of the upper screen). It was stated that the lower screen could safely transmit 300 gpm, but that a lower pumping rate may be necessary if the well yield deteriorated with age. It was further stated that it would be advisable to pump at 250 gpm to keep water levels above the upper screen. This well was abandoned in late 1987 due to continued sand pumpage.

Well 4 (2,270 ft south and 190 ft east of the northwest corner of Sec. 12, T16N, R6W, Sangamon County) was located approximately 135 ft SW of Well 3, was drilled to a depth of 54.5 ft by Brotcke Engineering, Fenton, Missouri, in 1988. Sand was reported between depths of 7 and 54.5 ft, and the well was screened with a 15-ft length of 12-in. diameter 55 slot well screen. When the well was installed, the water level was lowered from a static level of 16.1 ft to 25.66 ft after pumping at 300 gpm for 3 hr.

The Water Survey conducted a well production test on this well on October 20, 1988, which was reported to Mr. Paul Brotcke, Brotcke Engineering, Fenton, Missouri, in a letter from Paul C. Jahn, Assistant Hydrologist. The specific capacity of the well for a pumping period of 3 hr and pumping rate of 300 gpm was 31.4 gpm/ft. The long-term specific capacity at this discharge rate was estimated to be 10 gpm/ft. Based on information available at that time, the long-term yield was estimated to be 250 gpm.

Average daily pumpage was reported to be 419,000 gpd for 1995.

Analysis of a water sample taken from Well 4 in 1991 showed the water to have a hardness of 271 milligrams per liter (mg/l), total dissolved minerals of 360 mg/l, and an iron content of 2.18 mg/l.

The water is lime softened, chlorinated, and fluoridated before being pumped to the distribution system.

Dawson

Water is obtained from three drilled drift wells in the Sangamon River valley.

Well 1 (90 ft north and 1,530 ft east of the southwest corner of Sec. 25, T16N, R4W, Sangamon County) was drilled to a depth of 35.5 ft by E.C. Baker & Sons, Sigel, in 1967, and is approximately 250 ft east of the Sangamon River. Sand and gravel was reported between depths of 13 and 35 ft, and the well was screened with a 6-ft length of 8-in. diameter 100 slot well screen. When the well was installed, the water level was lowered from a static level of 6.24 ft to 13.01 ft after pumping at 105 gpm for 3 hr.

The Water Survey conducted a well production test on this well on January 24, 1967, which was reported to Emil L. Tiona, Engineer, in a letter from William H. Baker, Jr., Hydrology Assistant. The specific capacity (yield per foot of drawdown) of the well for a pumping period of 3 hr and a pumping rate of 105 gpm was 15.5 gpm/ft. Based on information available at the time, the long-term specific capacity was estimated to be 13.9 gpm/ft, and the long-term yield was estimated to be 100 gpm, with the constraint of the water level at the well not being lowered below the top of the well screen.

Well 2 (65 ft north and 1,680 ft east of the southwest corner of Sec. 25, T16N, R4W, Sangamon County) was drilled by to a depth of 54 ft E.C. Baker & Sons, Sigel, in 1967, and is approximately 150 ft east of Well 1. Sand and gravel was reported between depths of 10 and 54 ft, and the well was screened with a 12-ft length of 8-in. diameter 25 slot well screen. When the well was installed, the water level was lowered from a static level of 5.05 ft to 9.70 ft below grade after pumping at 125 gpm for 1½ hr.

The Water Survey conducted a well production test on this well on February 21, 1967, which was reported to Mr. Emil Tiona, Engineer, in a letter from M.A. Marino, Assistant Hydrologist. The specific capacity of the well for a pumping period of 1½ hr and a pumping rate of 125 gpm was 26.9 gpm/ft. Based on information available at the time, the long-term yield was estimated to be 100 gpm, with the constraint that the water level in the well not be lowered below the top of the well screen.

Well 3 (700 ft north and 3,850 ft west of the southeast corner of Sec. 25, T16N, R4W, Sangamon County) was drilled to a depth of 41 ft by Albrecht Well Drilling of Havana in 1985. Sand and gravel was reported between depths of 15 and 42 ft, and the well was screened with a 15-ft length of 8-in. diameter 80 slot well screen. When the well was installed, the water level was lowered from a static level of 8.23 ft to 11.50 ft after pumping at 125 gpm for 3 hr.

The Water Survey conducted a well production test on this well on September 11, 1985, which was reported to Mr. Charles Abbott, village of Dawson, in a letter from John Stephen Nealon, Assistant Hydrologist. The specific capacity of the well for a pumping period of 3 hr and a pumping rate of 125 gpm was 38.2 gpm/ft. The long-term specific capacity at this discharge rate was estimated to be 17.71 gpm/ft. Based on information available at that time, the long-term yield was estimated to be 125 gpm. It was further stated that it appeared as though pumping at this rate could cause additional drawdowns in Well 1 and Well 2.

Prior to approximately 1967, the village of Dawson conducted two well production tests on a test hole located 500 ft north and 2,500 ft west of the southeast corner of Sec. 15, T16N, R4W, Sangamon County (see table I-I-1). The production well tested January 31, 1962, differs from the one tested in 1958 in that a 12-in. diameter casing and commercial well screen were used in the new well, whereas the 1958 test was conducted on a test well consisting of 6-in. diameter casing slotted (perforated) opposite the water-bearing zone. In a letter from the Water Survey dated February 6, 1962, it was concluded that the higher efficiencies of the "new" well resulted in drawdowns approximately 20 percent less than those observed in the "original" test well, and the long-term safe yield, thus, was estimated to be about 120 gpm. The following data were reported for these tests (excerpt from Water Survey letter dated February 22, 1966, to Mr. Emil L. Tiona, Engineer):

Table I-I-1. Pump Test Data - Dawson Test Hole No. 4

Owner	*Location*	*Depth (ft)*	*Date of test*	*Nonpumping water level (ft)*	*Drawdown (ft)*	*Pumping rate (gpm)*	*Specific capacity (gpm/ft)*	*Estimated long-term yield (gpm)*
Village of Dawson, test hole No. 4	500' N and 2500' W of SE/c,Sec. 15, 16N,4W	26.5	11/21/58	6.94	12.4	120	9.7	100
Village of Dawson, test hole No. 4	2500' W and 500' N of SE/c, Sec. 15, 16N,4W	27	1/31/62	2.19	9.4	110	11.8	120

For the production test conducted in 1958, a study of hydrographs for observation wells showed that for the drought of 1953 and 1954, water was taken from storage within the aquifer for as many as 180 days in dry periods. It was further noted that at the end of a dry period, it was possible that the water table would decline below its (then) present level of 5.44 ft below land surface to 8 ft below land surface. With the top of the perforated casing at about 20 ft below land surface, and an assumed minimum pumping water level 1 ft above the top of the perforated casing, available drawdown would be 11 ft. Hence, the long-term yield was computed to be 100 gpm. Additional concluding remarks were that if interference effects between wells were considered, the long-term yield of a two-well system with a 250-ft spacing would be about 160 gpm.

Average daily pumpage was reported to be 193,900 gpd for 1994.

Analysis of a water sample taken from Well 3 in 1986 showed the water to have a hardness of 373 mg/l, total dissolved minerals of 453 mg/l, and an iron content of 0.648 mg/l.

The water is chlorinated, fluoridated, aerated, filtered, and zeolite softened before being pumped to the distribution system.

Fancy Creek Township Public Water District (P.W.D.)

Fancy Creek Township P.W.D. never became an operational public water supply, but fairly extensive exploratory drilling was conducted in the Sangamon River floodplain around 1966-1967 and in 1978 in anticipation of its formation.

In 1966-67 several test holes were drilled in Sections 32 and 33, T17N, R5W, near the north edge of the bottomlands of the Sangamon River. These test holes ranged in depth from 27 to 32 ft and reported a maximum thickness of 17 ft of sand and gravel. A pumping test conducted on December 30, 1966, indicated that a properly designed and constructed well at one of the test holes (Auger Test Well 2) should have yielded about 60 gpm. A water sample collected during this pumping test resulted in the partial chemical analysis shown in table I-I-2.

Table I-I-2. Partial Chemical Analysis
Fancy Creek Township Public Water District
(Laboratory No. 170519)

Parameter		*mg/l*	*meq/l*	*Parameter*		*mg/l*	*meq/l*
Iron (total)	Fe	1.4		Fluoride	F	0.2	
Manganese	Mn		0.36	Chloride	CI	9.	.25
				Nitrate	NO_3	0.9	.02
				Alkalinity	(as $CaCO_3$)	256.	5.12
Turbidity	8			Hardness	(as $CaCO_3$)	324.	6.48
Color	0						
Odor	0			Total Dissolved Minerals		386	
Temp. (reported)	56.5°F						

Notes:
mg/l = milligrams per liter
meq/l = milliequivalents per liter

Suggested water treatment for the planned water district supply included the removal of iron and the reduction of hardness.

In 1978 seven test holes were drilled. Five of the seven test holes (Nos. 3-78, 4-78, 5-78, 6-78, and 7-78) were drilled in the NW¼ of Sec. 5, T16N, R5W. Sand thicknesses listed on drilling logs were 15 ft, 30 ft, 42 ft, 0 ft, and 30 ft, respectively.

The remaining two test holes (I-78 and 2-78) were drilled in the *EV2* NE¼ SW¼ of Sec. 6, T16N, R5W. Reported sand thicknesses were 20 ft and 41 ft, respectively.

Mechanicsburg-Buffalo Water Commission

The Mechanicsburg-Buffalo Water Commission uses two wells (Nos. 1 and 2) located within the lowlands of the Sangamon River as a source of municipal water supply.

Well 1 (600 ft north and 2,000 ft west of the southeast corner of Sec. 11, T15N, R3W, Sangamon County) was drilled to a depth of 44.5 ft by E. C. Baker & Son, Sigel, Illinois, in 1961. Gravel was reported between depths of 15 and 44 ft, and starting at a depth of 30.5 ft, the well was screened with a 4-ft length of 10-in. diameter 40 slot well screen, a 6-ft length of 10-in. diameter 20 slot well screen, and a 4 ft length of 10-in. diameter 40 slot well screen. When the well was installed, the water level was lowered from a static level of 3.48 ft to 15.01 ft (below top of casing 1.4 ft above land surface) after pumping at 275 gpm for 22 hr.

The Water Survey conducted a well production test on this well on January 23-24, 1961, which was reported to Mr. Frederick D. Berry, Austin Engineering Company, Peoria, in a letter from Mr. Robert R. Russell, Engineering Assistant. The specific capacity of the well for a pumping period of 22 hr and pumping rate of 285 gpm was 24.6 gpm/ft. The long-term specific capacity at this discharge rate was estimated to be 20 gpm/ft. Based on information available at that time, the long-term yield was estimated to be 200 gpm.

Well 2 (565 ft north and 1,965 ft west of the southeast corner of Sec. 11, T15N, R3W, Sangamon County) was drilled to a depth of 48 ft by E. C. Baker & Sons, Sigel, Illinois, in 1971. Sand and gravel was reported between depths of 18 and 48 ft, and the well was screened with a 14-ft length of 10-in. diameter 40 slot well screen. When the well was installed, the water level was lowered from a static level of 6.30 ft to 17.25 ft below the top of the casing (1.8 ft above land surface) after pumping at 250 gpm for 3 hr.

The Water Survey conducted a well production test on this well on September 9, 1971, which was reported to Mr. Don Houser, Casler and Associates Consulting Engineers, Jacksonville, in a letter from Mr. Richard J. Schicht, Engineer. The specific capacity of the well for a pumping period of 180 minutes and pumping rate of 250 gpm was 22.8 gpm/ft. The long-term specific capacity at this discharge rate was estimated to be 15 gpm/ft. Based on information available at that time, the long-term yield was estimated to be 300 gpm with a pumping level of 25 ft below ground surface.

Average daily pumpage for the Mechanicsburg-Buffalo Water Commission was reported to be 126,800 gpd for 1994.

Analysis of a raw water sample taken from Well 2 in 1986 showed the water to have a hardness of 381 ppm, total dissolved minerals of 449 ppm, and an iron content of 1.6 ppm.

The water obtained from the two drilled drift wells is aerated, discharged to a 8,720 gallon detention tank, and then pumped, chlorinated, filtered (pressure), fluoridated, and discharged to the distribution system and elevated storage tank.

Pleasant Plains

Pleasant Plains uses three drilled, drift wells (Nos. 2, 3, and 4) located in the Sangamon River valley as a source of municipal water supply. All of the wells are located within approximately 900 ft of the Sangamon River. One of the wells (No. 2) is only used in case of an emergency.

Well 2 (1,150 ft south & 1,350 ft west of the northeast corner of Sec. 22, T17N, R.6W, Sangamon County) was drilled to a depth of 60 ft by Layne-Western of St. Louis, Missouri, in 1975. Sand and gravel was reported between the depths of 7 and 61 ft, and the well was screened with a 15-ft length of 10-in. diameter No. 6 Layne stainless steel shutter well screen. When the well was installed, the water level was lowered from a static level of 12.2 ft to 19.04 ft after pumping at an average rate of 210 gpm for 3 hr.

The Water Survey conducted a well production test on this well on December 12, 1975, which was reported to Casler, Houser & Hutchison, Consulting Engineers, in a letter from Adrian P. Visocky, Associate Hydrologist. The specific capacity (yield per foot of drawdown) of the well for a pumping period of 3 hr and an average pumping rate of 210 gpm was 30.7 gpm/ft. Based on information available at the time, the long-term specific capacity at this discharge rate was estimated to be 17.9 gpm/ft, and the long-term yield was estimated to be 290 gpm.

The Water Survey conducted a second well production test on this well on December 6, 1978, which was reported to Casler, Houser & Hutchison, Consulting Engineers, in a letter from Charles B. Burris, Assistant Hydrologist. The water level was lowered from a static level of 15.27 ft to 21.77 ft below land surface after pumping at rates ranging from 210 to 195 gpm for 1.7 hr. The specific capacity (yield per foot of drawdown) of the well for a pumping period of 1.7 hr at an average rate of 202 gpm was 31.1 gpm/ft. This compared favorably with the observed specific capacity of 30.7 gpm/ft in 1975, and apparently little or no well deterioration had occurred in the well.

Well 3 (1,100 ft south & 1,150 ft west of the northeast corner of Sec. 22, T17N, R6W, Sangamon County) was drilled to a depth of 61 ft by Layne-Western of St. Louis, Missouri, in 1975. Sand and gravel was reported between the depths of 8 and 61 ft, and the well was screened with a 15-ft length of 10-in. diameter No. 4 Layne stainless steel shutter well screen. When the well was installed, the water level was lowered from a static level of 16.5 ft to 25.0 ft after pumping at 200 gpm for 3 hr.

Layne-Western conducted a well production test on this well on December 6, 1976, which was reported to Casler, Houser & Hutchinson, Consulting Engineers, in a letter from Adrian P. Visocky, Associate Hydrologist. The specific capacity (yield per foot of drawdown) of the well for a pumping period of 3 hr at a rate of 200 gpm was 23.5 gpm/ft. Based on information available at the time, the long-term specific capacity at a rate of 200 gpm was estimated to be 15.6 gpm/ft, and the long-term yield was estimated to be 300 gpm on a sustained basis.

Well 4 (1,125 ft south and 1,250 ft west of the northeast corner of Sec. 22, T17N, R6W, Sangamon County) was drilled to a depth of 61 ft by Layne-Western of St. Louis, Missouri, in 1981. Sand and gravel was reported between the depths of 7 and 61 ft, and the well was screened with a 15-ft length of 10-in. diameter Layne shutter well screen. When the well was installed, the water level was lowered from a static level of 16.15 ft to 25.00 ft after pumping at rates ranging from 201 to 221 gpm for 3.5 hr.

Layne-Western conducted a well production test on this well on January 27, 1981, which was reported to the Dlinois Environmental Protection Agency in a transmittal letter from Robert D. Olson, Assistant Hydrologist. The specific capacity of the well for a pumping period of 3.5 hr at an average rate of 211 gpm was 23.8 gpm/ft.

Average daily pumpage for Pleasant Plains was reported to be 112,100 gpd for 1995.

Analysis of a water sample taken from Well 4 in 1991, showed the water to have a hardness of 332 mg/l, total dissolved minerals of 356 mg/l, and an iron content of 1.861 mg/l.

The water is chlorinated, aerated, sand filtered, and fluoridated before being pumped to the distribution system.

<u>Riverton</u>

The village of Riverton uses four drilled, drift wells (Nos. 3, 4, 5, and 6), located within the lowlands of the Sangamon River, as a source of municipal water supply. Well 3 is used only in emergency situations.

Well 3 (2,880 ft north and 130 ft east of the southwest corner of Sec. 22, T16N, R4W, Sangamon County) was drilled to a depth of 53 ft by E.C. Baker & Sons, Sigel, in 1972. Sand and gravel was reported between depths of 5 and 53 ft, and the well was screened with a 10-ft length of 12-in. diameter 40 slot well screen. When the well was installed, the water level was lowered from a static level of 8.86 ft to 26.02 ft below grade after pumping at 303 gpm for 3 hr.

The Water Survey conducted a well production test on this well on September 11, 1972, which was reported to Auby & Associates, Springfield, in a letter from J. M. Jess, Assistant Hydrologist. The specific capacity of the well for a pumping period of 3 hr and a pumping rate of 303 gpm was 17.66 gpm/ft. Based on available information at that time, the long-term yield was estimated to be 200 gpm.

Well 4 (2,100 ft south and 650 ft east of the northwest corner of Sec. 22, T16N, R4W, Sangamon County) was drilled to a depth of 56 ft by Layne Western, St. Louis, Missouri, in 1981. Sand and gravel was reported between depths of 13 and 57 ft, and the well was screened with a 15-ft length of 12-in. diameter No. 6 Layne shutter well screen. When the well was installed, the water level was lowered from a static level of 8.19 ft to 20.38 ft after pumping at 294 to 304 gpm for 3 hr.

The Water Survey conducted a well production test on this well on October 14, 1981, which was reported to Martin and Vasconcelles, Inc, in a letter from Adrian Visocky, Hydrologist. The specific capacity of the well for a pumping period of 3 hr and a pumping rate of 304 gpm was 24.9 gpm/ft. Based on information available at that time, the long-term yield was estimated to be 300 gpm, provided the well did not deteriorate with time.

Well 5 (2,107 ft south and 1,150 ft east of the northwest corner of Sec. 22, T16N, R4W, Sangamon County) was drilled to a depth of 54.5 ft by Layne-Western of St. Louis, Missouri, in 1989. Sand and gravel was reported between depths of 5 and 54.5 ft, and the well was screened with a 15-ft length of 12-in. diameter 55 slot well screen. In 1989, the water level was lowered from a static level of 12.95 ft to 26.20 ft below grade when pumping at 204 gpm for 3 hr.

The Water Survey conducted a well production test on this well on January 10, 1989, which was reported to Mr. James Vasconcelles, Vasconcelles Engineering, in a letter from John Stephen Nealon, Assistant Hydrologist. The specific capacity of the well for a pumping period of 3 hr and a pumping rate of 204 gpm was 15.4 gpm/ft. The long-term (I-year) specific capacity at this discharge rate was estimated to be 13.1 gpm/ft. Based on information available at that time, the long-term yield was estimated to be 250 gpm. It was further stated that based on available data, it appeared that this well could produce 250 gpm with simultaneous pumpage from the other Riverton wells.

Well 6 (2,440 ft south and 1,335 ft east of the northwest corner of Sec. 22, T16N, R4W, Sangamon County) was drilled to a depth of 55 ft by Layne-Western, St. Louis, Missouri, in 1989. Sand and gravel was reported between depths of 5 and 55 ft, and the well was screened with a 15-ft length of 12-in. diameter 55 slot well screen. When the well was installed, the water level was lowered from a static level of 12.68 ft to 28.12 ft below ground after pumping at rates ranging from 211 to 226 gpm for 1.7 hr.

The Water Survey conducted a well production test on this well on January 19, 1989, which was reported to Mr. James Vasconcelles of Vasconcelles Engineering, in a letter from Mr. John Stephen Nealon, Assistant Hydrologist. The specific capacity of the well for a pumping period of 100 minutes and a pumping rate of 221 gpm was 14.3 gpm/ft. The long-term specific capacity at this discharge rate was estimated to be 12.0 gpm/ft. Based on information available at that time, the long-term yield was estimated to be 250 gpm with simultaneous pumpage from the other Riverton wells.

Average daily pumpage for Riverton in 1995 was reported to be 304,000 gpd.

Analysis of a sample from Well 4 in 1989 showed the water to have a hardness of 229 mg/l, total dissolved minerals of 336 mg/l, and an iron content of 1.2 mg/l.

The water treatment process in 1995 was aeration, filtering, zeolite softening, feeding of caustic soda, chlorination, and fluoridation.

Sherman

Although the village of Sherman does not own and operate wells as part of a public water supply, ground-water exploration activities were conducted during the early and mid-1960s.

Two reconnaissance electrical earth resistivity surveys were conducted during July and October of 1966 in Sections 2 and 3, T16N, R5W.

Also in 1966, Charles Hayes of Champaign drilled six test holes in Sections 1 and 2, T16N, R5W. Both of the two test holes drilled in Sec. 1 were drilled in the NW¼ of the section and revealed sand-and-gravel deposits between depths of 13-52 ft. At 52 ft, bedrock was encountered. The four test holes drilled in Sec. 2 were drilled in the W¼ of the section. Of these test holes, the one located nearest the Sangamon River revealed sand-and-gravel deposits between the depths of 14 to 55 ft. The remaining three test wells drilled in Sec. 2 extended toward the north (away from the Sangamon River) and revealed thinner (less than approximately 20 ft thick) deposits of sand and gravel with intervening layers of clay, driftwood, and mud.

There is no record of any well production tests being conducted on these test holes.

Analysis of a ground-water sample collected during the drilling of these test holes showed the water to have a hardness of 488 mg/l, total dissolved minerals of 592 mg/l, and an iron content of 0.8 mg/l.

Appendix I-2. Available Records of Wells within 1 Mile of the Sangamon River in Sangamon County

Well location	Well owner	Well: Year constructed	Well: Depth (ft)	Well: Diameter (in)	Screen: Length (ft)	Screen: Diameter (in)	Screen: Slot Size (in)	Test data: Date (mmyy)	Test data: Static level (ft)	Test data: Drawdown (ft)	Test data: Pumping rate (gpm)	Test data: Length of test (hr)	Test data: Specific capacity (gpm/ft)	Water-bearing formation and depth Interval (ft)	Driller
16715N02W058E	MIKE DOWNING	1994	53	6-36										SAND & GRAVEL, 30-31	REYNOLDS
16715N02W058B	JACK NAPIER	1993	48	6-36										SAND, 25-27	REYNOLDS
16715N02W061D	WILLIAM CROUTCHER	1993	19	6-36										GRAVELLY CLAY, 4-19	WALTERS
16715N02W061C	DON KOTHER	1977	23	6-36										SANDY CLAY, 16-18	REYNOLDS
16715N02W061E	HARRY COOK	1989	26	6-36										SAND & GRAVEL, 15-26	REYNOLDS
16715N02W065E	J D WATERS	1993	41	6-36										SAND & GRAVEL, 35-36	WALTERS
16715N02W067C	MECHANICSBURG-BUFFALO WATER COMM TH4	1960	32	--										--	BAKER
16715N02W068C	MECHANICSBURG-BUFFALO WATER COMM TH1	1960	22	--										SAND, 7-10,	BAKER
16715N02W068C	MECHANICSBURG-BUFFALO WATER COMM TH2	1960	27	--										SAND, 7-12;jSAND & CLAY, 12-17	BAKER
16715N02W06BC	MECHANICSBURG-BUFFALO WATER COMM TH3	1960	22	--										SAND, 7-17	BAKER
16715N03W045D	NAZARENE ACRE	1990	37	6-36										SAND & GRAVEL, 28-37	REYNOLDS
16715N03W046C	ROGER FREEMAN	1986	50	6-36										SAND, 19-27; SAND & GRAVEL, 39-41	REYNOLDS
16715N03W047A	JACK LEAR	1987	50	6-36										SAND, 26-36	REYNOLDS
16715N03W047C	DALE BARNSTABLE	1987	54	6-36										SAND, 35-39	REYNOLDS
16715N03W047H	LUDORA SHARP	1979	28	6-36				1179	7.00					SAND, 18-23; SAND & GRAVEL, 23-28	ERWIN
16715N03W051D	CARREL COE	1978	40	6-36										SAND 81 GRAVEL, 26-32	REYNOLDS
16715N03W052C	JAMES BRAMBALL	1977	45	6-36											ERWIN
16715N03W053E	VIOLET TOWNSEND	1992	50	6-36	21									SAND, 26-32	REYNOLDS
16715N03W055E	HAROLD WERNER	1985	30	6-36										SAND, 10-15	REYNOLDS
16715N03W058H	TOM SPANGLER	1991	50	6-36	18									SAND, 14-15; SAND & GRAVEL, 25-26; SAND, 33-34	REYNOLDS
16715N03W061D	DAN WILLIAMS	1985	35	6-36										SAND & GRAVEL, 25-28	REYNOLDS
16715N03W062H	GENE PATRICK	1986	4B	6-36										SAND, 17-18, 44-48	REYNOLDS
16715N03W063F	MARK WEST	1987	40	6-36										SAND, 12-19; SAND & GRAVEL, 32-33	REYNOLDS
16715N03W063F	HAROLD KAHLERT	1985	32	6-36										SAND, 3-17; SILT SAND, 26-32	ERWIN
16715N03W063G	CARL AAROP	1978	47	10-36										CAVING SAND, 6-15	REYNOLDS
16715N03W063G	THOMAS REXROAD	1986	40	6-36										SAND, 8-15	REYNOLDS
16715N03W063G	BUTCH RUNKEL	1986	40	6-36										SAND, 12-17	REYNOLDS
16715N03W064B	HAROLD KAEHLERT	1976	40	6-36				0176	21.00					SANDY CLAY, 30-31	ERWIN
16715N03W064F	JACK GOLDSBERRY	1986	32	6-36-24										SAND, 19-23, 29-32	REYNOLDS
16715N03W064F	MICHAEL DYAS	1987	36	6-?										SAND, 5-14; SAND & GRAVEL, 27-30	REYNOLDS
16715N03W064F	SCOFFLAW FARMS	1981	35	6-36				1181	9.00					SANDY CLAY, 12-22	ERWIN
16715N03W064G	HAROLD KAEHLERT	1975	16	6-36										SAND TO BLUE CLAY, 10-16	LINK
16715N03W064G	GREGORY FANALE	1992	70	6-36	36									SAND, 23-24, 36-37; SAND & GRAVEL, 55-57	REYNOLDS
16715N03W064H	CARL AAROP	1981	28	6-36				1181	9.00					SAND, 6-18	ERWIN
16715N03W065F	GARY MOORE	1987	40	6-36										SAND, 12-18; SAND & GRAVEL, 18-21	REYNOLDS
16715N03W065F	ROD VILLAINS	1986	38	6-36										SANDY CLAY, 1-15	ERWIN
16715N03W065F	JAMES BUNZENDAHL	1989	40	6-36										SAND, 14-18; SAND & GRAVEL, 27-29	REYNOLDS
16715N03W065F	JAMES BUNZENDAHL	1989	40	6-36										SAND, 14-18; SAND & GRAVEL, 27-29	REYNOLDS
16715N03W065G	BRUCE HAMILTON	1980	30	6-36				0380	9.00					SANDY CLAY, 18-23	ERWIN
16715N03W065G	GEORGE KAUFFOLD	1988	39	6-36-24										SAND & GRAVEL, 10-15, 31-32	REYNOLDS
16715N03W065G	RONALD PRITCHARD	1988	31	6-36										SAND, 12-18; SAND & GRAVEL, 22-24	REYNOLDS
16715N03W065H	GEORGE MELTON CONSTRUCTION	1979	46	10-36										SAND, 6-16	REYNOLDS
16716N03W066D	ROGER HEILD	1977	50	6-36										SAND, 35-44	REYNOLDS
16715N03W066F	RONALD HANNEL	1991	52	6-36	17									SAND, 15-17, 28-29; SAND 8i GRAVEL, 47-52	REYNOLDS
16715N03W066F	JACK GOLDSBERRY	1988	36	6-36										SAND, 12-17	REYNOLDS
16715N03W066G	MICHAEL J.CUTLER	1992	31	6-36	14									SAND, 12-13; SAND & GRAVEL, 28-30	REYNOLDS
16715N03W066G	GARY DEIRKES	1990	40	6-36										SAND, 12-25, 30-32	REYNOLDS
16715N03W067F	DAVE ERWIN	1992	45	6-36										SAND, 14-17; SAND & GRAVEL, 30-31	REYNOLDS
16715N03W067G	ROGER HEILD	1982	30	6-36										SAND, 10-12	REYNOLDS
16715N03W068E	ROGER HEILD	1976	40	6-36										SAND (WATER), 17-21; SHALE (WATER),	BERGSCHNEIDER

Appendix 1-2. (Continued)

Well location	Well owner	Well: Year constructed	Well: Depth (ft)	Well: Diameter (in)	Screen: Length (ft)	Screen: Diameter (i)	Screen: Slot Size (i)	Test data: Date (mmyy)	Test data: Static level (ft)	Test data: Drawdown (ft)	Test data: Pumping rate (gpm)	Test data: Length of test (hr)	Test data: Specific capacity (gpm/ft)	Water-bearing formation and depth Interval (ft)	Driller
														21-27	
16715N03W068G	JUDY BONZENDAHL	1986	37	6-36										SAND & WATER, 1-3; SAND CLAY, 3-16	ERWIN
16715N03W068H	GARY DEIRKES	1992	32	6-36	13									SAND, 12-20, 30-31	REYNOLDS
16715N03W073A	ROCHESTER	1988	59											SANDY CLAY, 10-59	BAKER
16715N03W075A	WILSON J PARK	1979	69	10-36										SILTY SAND, 62-68	REYNOLDS
16715N03W075C	ROCHESTER (slotted pipe)	1988	55.5	2	20	2	080	0488	3.00		10			SAND & GRAVEL, 10-55	BAKER
16715N03W075D	ROCHESTER	1988	51	--										SAND & GRAVEL, 10-30; DIRTY SAND, 30-49	BAKER
16715N03W105E	NORTH ROSS	1990	70	6-36										SANDY CLAY, 12-19	REYNOLDS
16715N03W107G	JAMES A BLAKEMAN	1980	50	10-36										SAND & GRAVEL. 30-31	REYNOLDS
16715N03W114A	MECHANICSBURG-BUFFALO WTR CO	1961	44.5	10.8	14	10	40-20-40	0161	2.08	11.53	275	22	23.9	SAND & GRAVEL, 15-44	BAKER
16715N03W114A	MECHANICSBURG-BUFFALO WTR CO	1961	27	6											
16715N03W114A	MECHANICSBURG-BUFFALO WTR CO	1961	38.1	2	5										
16715N03W114A	MECHANICSBURG-BUFFALO WTR CO	1961	43.1	2	5										
16715N03W113A	MECHANICSBURG-BUFFALO WTR CO	1971	48	10	14	10	.040	0971	4.50	10.95	250	3	22.8	DIRTY SAND, 18-25; SAND & GRAVEL, 25-48	BAKER
16715N03W114A	MECHANICSBURG-BUFFALO WTR CO	1956	44	6.2	11	5	SLOTTED PIPE	1156	5.30	7.20	105	5.6	14.6	SAND & GRAVEL, 15-44	BAKER
16715N03W115B	GRACE HALL		45											--	--
16715N03W115B	GRACE HALL	1976	29	6-36										SAND, 26-29	COOK
16715N03W117A	BILLY BROOKS	1976	46	6-36										SAND & GRAVEL, 38-39	COOK
16715N03W121E	JOHN CAREY OIL CO	1979	41	10-36										SAND, 26-35; SAND & GRAVEL, 39-41	REYNOLDS
16715N03W122H	CURT NAVE	1993	35	6-36										SAND, 11-12	REYNOLDS
16715N03W123H	JOHN LESKO	1977	31	6-36										SAND & GRAVEL, 18-18.5, 30-31	REYNOLDS
16715N03W123H	LESTER BROOKS	1986	34	6-36										SAND, 17-21	REYNOLDS
16715N03W124E	JOHN CAREY	1983	31	6-36										SAND & GRAVEL, 26-31	REYNOLDS
16715N03W143D	GLEN MATTHEWS	1983	25	6-36										SAND, 8-15	REYNOLDS
16715N03W144A	JAMES FORD	1988	25	6-36										SAND, 14-18; ROCK AT 25	REYNOLDS
16715N03W145A	ALBERT JACOBS	1975	37	6-36										SAND, 18-19	REYNOLDS
16715N03W145C	JACK NAPIER	1987	51	6-36										SAND & GRAVEL, 25-27	REYNOLDS
16715N03W146C	EDWARD BUCKLES	1985	41	6-36										SAND & GRAVEL, 31-32	REYNOLDS
16715N03W146E	ROBERT BEATTY	1979	50	10-36										SAND, 24-25; SAND & GRAVEL, 44-45; ROCK AT 50	REYNOLDS
1671SN03W147E	WES MATTHEWS	1994	37	6-36										SAND, 11-13	REYNOLDS
16715N03W148D	KEN PATRICK	1989	52	6-36										SAND & GRAVEL, 28-32	REYNOLDS
16715N03W148E	GARY MATTHEWS	1986	34	6-36										SAND & GRAVEL, 32-34	REYNOLDS
16715N03W151E	JOHN W TAFT	1973	32	6-36										SAND, 2-4; SANDY CLAY, 16-19	REYNOLDS
16715N03W153D	TERRY FISHBURN	1987	38	6-36										SAND, 8-12, 18-23; ROCK AT 38	REYNOLDS
16715N03W153F	KIRK PATTON	1993	58	6-24	1									SAND, 12-40	REYNOLDS
16715N03W154E	THOMAS FAHRENBACHER	1974	17											SAND	COOK
16715N03W156E	KEN TAFT	1978	48	10-36										SAND, 33-34	REYNOLDS
16715N03W16	RONALD W & BRONWEN E LEE	1974	40	6-36										SAND 4 GRAVEL, 24-25	COOK
16715N03W16	RICK QUACKENBUSH	1978	41	6-36										SAND, 12-22; SAND & GRAVEL, 36-37	REYNOLDS
16715N03W168A	JOHN HENKELMANN	1993	38	6-36-24										SAND & GRAVEL, 19-20	REYNOLDS
16715N03W161A	RICK MATHIAS	1993	40	6-36										SAND, 5-12; SAND & GRAVEL, 32-33	REYNOLDS
16715N03W161A	CHARLES G REITH	1979	48	10-36										SAND, 28-29	REYNOLDS
16715N03W161H	G D WEATHERS	1973	41	--										--	--
16715N03W164E	LOUIS E EALEY	1991	36	6-36	14									SAND, 12-16	REYNOLDS
16715N03W165B	CURT DAVIS	1992	47	6-36										SAND, 13-15	REYNOLDS
16715N03W165D	DAVE JOHNSON	1983	48	6-36										SAND, 12-14; SHALE AT 48	REYNOLDS
16715N03W166B	DAVE VANSELOW	1992	41	6-36										SAND, 15-21	REYNOLDS
16715N03W166D	GARY BLIEFNICK	1992	41	6-36										SAND, 11-18; SAND & GRAVEL, 35-41	REYNOLDS
16715N03W166F	RONALD HICKMAN	1974	41	6-36										SANDY CLAY, 16-19	COOK
16715N03W168D	WILLIAM E ABNEY	1979	35	6-36										SAND, 6-15; SAND & GRAVEL, 27-28	REYNOLDS
16715N03W171E	DENNIS KIEFFER	1978	49	10-36										SAND, 21-49	REYNOLDS
16715N03W171E	MRS FOLEY	1985	50	6-36										SANDY CLAY, 14-21	REYNOLDS
16715N03W171E	MARY RAMSEY	1990	23	6-36										SAND & GRAVEL, 18-23	REYNOLDS
16715N03W173E	BYRON SKINNER	1977	40	6-36										SAND & GRAVEL & DRIFT, 28-33;	REYNOLDS

Appendix I-2. (Continued)

Well location	Well owner	Well: Year constructed	Well: Depth (ft)	Well: Diameter (in)	Screen: Length (ft)	Screen: Diameter (in)	Screen: Slot Size (in)	Test data: Date (mmyy)	Test data: Static level (ft)	Test data: Drawdown (ft)	Test data: Pumping rate (gpm)	Test data: Length of test (hr)	Test data: Specific capacity (gpm/ft)	Water-bearing formation and depth interval (ft)	Driller
														SHALE, 33-40	
16715N03W175G	BUCKHART SAND & GRAVEL	1990	25	6-36										SAND, 12-17; SAND & GRAVEL, 17-25	REYNOLDS
16715N03W21	TIMOTHY MABE	1976	40	6-36										CLAY SAND, 20-26	COOK
16715N03W21	LEE SPURGEON	1977	39	6-36										--	ERWIN
16715N03W211E	CLIFFORD RILEY	1981	30	6-36										SAND & GRAVEL, 17-20	REYNOLDS
16715N03W211E	JAMES LEKA	1989	41	6-36										SANDY CLAY, 17-23; SHALE, 33-41; LIMESTONE AT 41	REYNOLDS
16715N03W211H	GEORGE D WEATHER	1973	41	6-36										SAND, 11-15,37-38	COOK
16715N03W212G	GLEN MATTHEWS	1984	45	6-36	2									SAND & GRAVEL, 17-19; ROCK, 43-45	REYNOLDS
16715N04W011C	RICHARD T NEAL	1970	30	36	1			0670	17.00					SAND, 24-27	MILES
16715N04W021E	DANIEL A LAWS	1993	31	6-36										SAND & GRAVEL, 28-31	WALTERS
16715N04W021G	SPRINGFIELD SAND & GRAVEL CO	1979	48	10-36										SAND & GRAVEL, 35-35.3; SHALE, 40-48	REYNOLDS
16715N04W022G	SPRINGFIELD SAND & GRAVEL CO	1979	51	10-36										SANDY CLAY, 14-20; LIMESTONE AT 51	REYNOLDS
16715N04W024F	THOMAS EDEN	1988	45	6-36										SAND & GRAVEL, 21-22	REYNOLDS
16715N04W127G	JOHN DAY	1977	50	6-36										SAND, 31-31.5	REYNOLDS
16716N01W208H	BORDEN CHEMICAL & PLASTICS CO	1942	33.5	38-26	10	26	.055	0542	2.20	18.70	350	24	18.7	SAND & GRAVEL AT 33.5	LAYNE-WESTERN
16716N02W241A	JACK STENGEL	1977	27	6-36										SAND, 27-31	COOK
16716N02W242B	KEVIN KAYLOR	1983	60	6-36										SANDY CLAY, 14-20	REYNOLDS
16716N02W242B	STEVEN SHEARS	1974	37	6-36	10									SAND, 34-37	COOK
16716N02W242G	MICHAEL DOMBRINSKI	1991	55	6-36	19									SAND, 35-36	REYNOLDS
16716N02W256A	BORDEN CHEMICAL & PLASTICS CO	1980	65	--										SAND, 5-10; DIRTY SAND & GRAVEL. 10-15; SAND & GRAVEL, 15-25; SILTY SAND, 25-65	BAKER
16716N02W252D	BORDEN CHEMICAL CO	1980	65	--										SAND, 10-15; SAND, DIRTY, 15-20; SAND & GRAVEL, 20-35, 60-63	BAKER
16716N02W252H	WILLIAM WHITESIDE	1979	59	10-36										SAND, 32-38; DRIFT & SAND, 52-59	REYNOLDS
16716N02W254B	BORDEN CHEMICAL & PLASTICS CO	1981	60	--										SAND, DIRTY, 10-15; SAND, 15-20; SAND & GRAVEL, 20-25; DIRTY SAND & GRAVEL, 25-30; SAND, 30-55	BAKER
16716N02W254E	BORDEN CHEMICAL & PLASTICS CO	1980	40	--										SAND, 2-20	BAKER
16716N02W255A	BORDEN CHEMICAL & PLASTICS CO	1981	56	--										SAND, 5-15; SAND & GRAVEL, 15-20; SILTY SAND, 20-35; SAND, 35-55	BAKER
16716N02W255B	BORDEN CHEMICAL & PLASTICS CO	1981	60	--										DIRTY SAND, 10-20; SAND, 20-57	BAKER
16716N02W255B	BORDEN CHEMICAL & PLASTICS CO	1981	56	--										SAND, 5-15; SAND & GRAVEL, 15-56	BAKER
16716N02W255C	BORDEN CHEMICAL & PLASTICS CO	1980	60	--										SAND, 5-20; SAND & GRAVEL, 20-58	BAKER
16716N02W255E	BORDEN CHEMICAL & PLASTICS CO	1980	40	--										SAND, 10-20	BAKER
16716N02W256E	BORDEN CHEMICAL & PLASTICS CO	1980	50	--										SAND, 20-30	BAKER
16716N02W257A	BORDEN CHEMICAL S PLASTICS CO	1980	44	--										SAND, 10-15; SAND & GRAVEL, 10-35	BAKER
16716N02W257B	BORDEN CHEMICAL & PLASTICS CO (well sealed)	1942	48	38-26	15	26	.055	0742	7.30	23.30	461	24	19.8	DIRTY SAND, 4-13; SAND & GRAVEL, 13-22; SAND, 22-47	LAYNE-WESTERN
16716N02W257B	BORDEN CHEMICAL & PLASTICS CO	1977	47	16	15	16	.060	0677	10.00	11.67	300	2	25.7	SAND, 3-15; SAND & GRAVEL WITH CLAY, 15-20; SAND & GRAVEL, 20-47	J P MILLER
16716N02W257D	BORDEN CHEMICAL & PLASTICS CO	1980	59	--										SAND, 8-37; SAND & GRAVEL, 40-57	BAKER
16716N02W268A	BORDEN CHEMICAL & PLASTICS CO	1980	70	--										SAND, 10-20; SAND & GRAVEL, 20-30, 60-60	BAKER
16716N02W258A	BORDEN CHEMICAL & PLASTICS CO	1981	48	16				--						SAND & GRAVEL AT 48	ALBRECHT
16716N02W258A	BORDEN CHEMICAL & PLASTICS CO	1981	48	12	17	12	.040	0782 0683	20.82					SAND, 3-5; SAND & GRAVEL, 5-30; SAND, 30-35; SAND & GRAVEL, 35-37; SAND, 40-42; SAND & GRAVEL, 42-47	ALBRECHT
16716N02W258A	BORDEN CHEMICAL & PLASTICS CO	1981		2				0782	9.45						--
16716N02W258G	JOE HAVENER	1983	48	6-36										SAND, 24-27, 46-48	REYNOLDS
16716N02W26	FRED HARME	1992	37	6-36	3									SAND & GRAVEL, 18-37	LUTTRELL
16716N02W261C	BORDEN CHEMICAL & PLASTICS CO	1942	56	38-26	15	26	.055	0742	5.85	25.10	540	23	21.5	DIRTY SAND & GRAVEL, 10-15; SAND, 15-30; SAND & GRAVEL, 30-35; SAND, 35-45; SAND & GRAVEL, 45-55.5	LAYNE-WESTERN
16716N02W261C	BORDEN CHEMICAL & PLASTICS CO	1969	56.5	16	15	16	.110	0169	15.00	10.50	304	3	28.9	DIRTY SAND & GRAVEL, 14-24; SAND & GRAVEL, 24-57.5, SHALE, 57.5-60	LAYNE-WESTERN

Appendix I-2. (Continued)

Well location	Well owner	Well: Year con-structed	Well: Depth (ft)	Well: Dia-meter (in)	Screen: Length (ft)	Screen: Dia-meter (in)	Screen: Slot Size (in)	Test data: Date (mmyy)	Test data: Static level (ft)	Test data: Draw-down (ft)	Test data: Pumping rate (gpm)	Test data: Length of test (hr)	Test data: Specific capacity (gpm/ft)	Water-bearing formation and depth interval (ft)	Driller
16716N02W261E	SAM SMITH	1985	40	6-36										SAND & GRAVEL, 21-23	REYNOLDS
16716N02W261H	LEE UNGRUND	1992	53	36-24										SAND, 16-35	LUTTRELL
16716N02W262B	BORDEN CHEMICAL & PLASTICS CO	1942	55	38-26	15	26	.055	0742	1.30	24.20	555	24	22.9	SAND & GRAVEL AT 55	LAYNE-WESTERN
16716N02W262S	BORDEN CHEMICAL & PLASTICS CO	1992	55	30-16	15	16	.040	0392	27.80			1.7		SILTY SAND, 6-12; SAND, 12-30; SAND & GRAVEL, 30-55; BEDROCK AT 62	BROTCKE
16716N02W263A	SANGAMON ORDNANCE PLANT	1942	65	--										--	--
16716N02W263B	BORDEN CHEMICAL & PLASTICS CO	1969	58	34-16	15	16	.105	0369	7.30					DIRTY SAND & GRAVEL, 7-14; SAND, 14-29; SAND & GRAVEL, 29-58; SHALE, 58-59.6	LAYNE-WESTERN
16716N02W264F	ROY CAREY	1991	91	6-36	22									SAND, 18-19; SAND & GRAVEL, 23-24; SAND, 81-89	REYNOLDS
16716N02W264G	ED SHAADT	1969	30	36				1269	14.00					SAND, 18-21	MILES
16716N02W265A	BORDEN CHEMICAL & PLASTICS CO	1972	60	38-16	15	16	105	0572	6.50	14.75	402	3	27.3	SAND, 11-44; SAND & GRAVEL, 44-59	LAYNE-WESTERN
16716N02W272A	JOHN MOORE	1985	35	6-36										SAND, 22-35	REYNOLDS
16716N02W347C	SANGAMON ORDNANCE PLANT	1942	70	--										--	--
16716N02W348A	SANGAMON ORDNANCE PLANT	1942		--										--	--
16716N02W354H	SANGAMON ORDNANCE PLANT	1942	53	26-8	16	8	.025	0642	6.00	15.20	357	72	19.4	SAND & GRAVEL AT 53	LAYNE-WESTERN
16716N02W354H	BORDEN CHEMICAL & PLASTICS CO	1942	53	38-26	15	26	.055	0742	5.70	18.40	475	12	25.8	SAND & CLAY, 12-15; SAND & GRAVEL, 15-53	LAYNE-WESTERN
16716N02W356F	BORDEN CHEMICAL & PLASTICS CO	1972	60	38-16	15	16	105	0572	9.41	10.91	402	3	22.2	SAND, 14-46; SAND & GRAVEL, 46-59	LAYNE-WESTERN
16716N02W356F	BORDEN CHEMICAL & PLASTICS CO	1942	47	38-26	15	26	.055	0642	6.00	18.80	417	16	22.2	SAND & GRAVEL AT 47	LAYNE-WESTERN
16716N02W356F	BORDEN CHEMICAL & PLASTICS CO	1989	62	12	15	12	.080	0389	10.00					CLAY&SAND, 11-13; SAND & GRAVEL, 13-25; SAND, 25-32; SAND & GRAVEL, 32-43; SAND, 43-58; SHALE, 58-62	LAYNE-WESTERN
16716N02W356F	BORDEN CHEMICAL & PLASTICS CO	1989	57	--										SAND, 11-47; SAND & GRAVEL, 82-57	LAYNE-WESTERN
16716N02W356F	BORDEN CHEMICAL & PLASTICS CO	1989	56	30-12	15	16	.040	0789	11.50					SAND, 6-42.5; SAND & GRAVEL, 42.5-57.5	BROTCKE
16716N02W356F	SANGAMON ORDNANCE PLANT	1942	40	26-8	16	8	.025	0642	7.83	11.17	320	37	28.6	SAND & GRAVEL AT 40	LAYNE-WESTERN
16716N02W357G	SANGAMON ORDNANCE PLANT	1942	65	--										--	--
16716N02W358H	BILL WHITESIDE	1977	50	6-36										SAND, 12-14; SAND & GRAVEL, 36-37	REYNOLDS
02116N02W367E	BORDEN CHEMICAL CO 7-80	1980	39												BAKER
02116N02W367G	BORDEN CHEMICAL CO 9-80	1980	53												BAKER
16716N02W367G	BORDEN CHEMICAL CO 11-80	1980	59												BAKER
02116N02W367G	BORDEN CHEMICAL CO 6-80	1980	52												BAKER
02116N02W367H	BORDEN CHEMICAL CO (TEST HOLE	1980	57												BAKER
02116N02W367H	BORDEN CHEMICAL CO 15-80	1980	55												BAKER
02116N02W367H	BORDEN CHEMICAL CO 5-80	1980	39												BAKER
16716N03W317A	CANOE BARBER	1990	50	6-36										SAND & GRAVEL, 32-33	REYNOLDS
16716N03W317H	STEVE CARTWRIGHT	1977	40	6-36										--	ERWIN
16716N03W318H	ROBT BAILEY	1976	40	6-36										--	ERWIN
16716N03W31BH	BALA SATOR SR	1974	30	6-36										SAND, 9-12	REYNOLDS
16716N04W038A	WILLIAM EVERETT	1977	35	10-36										SAND & GRAVEL, 27-28	REYNOLDS
16716N04W04	AL UNVERSAW	1959	102	6.6-6	23.5			59	22.00	58.00	0.25	1	0	DIRTY SAND, 12-24; SAND, 24-25; DIRTY SANDSTONE, 79-102	BAKER
16716N04W04	FRANK GRAVES	1974	24	6-36										SAND, 3-18	COOK
16716N04W04	MARVIN GRAVES	1974	24	6-36										SAND, 11-17	COOK
16716N04W04	MARVIN GRAVES	1975	23	6-36										SAND, 9-23	COOK
16716N04W04	FRED GRAVES	1975	24	6-36										SAND, 7-19	REYNOLDS
16716N04W04	JERRY VAN METER	1975	37	6-36										CLAY & GRAVEL, 26-27	COOK
16716N04W04	RAND TODD	1976	20	6-36										SAND, 11-12; SHALE, 17-19; LIMESTONE, 19-20	COOK
16716N04W04	MRS RON PHILIPP	1976	23	6-36										SAND, 11-12; SHALE, 18-23; LIMESTONE, 22-23	REYNOLDS
16716N04W04	WARREN HOWIE	1976	32	6-36										SAND, 22-24; SHALE, 24-32; ROCK AT 32	BERGSCHNEIDER
16716N04W04	J & L BUILDERS	1976	28	6-36										SANDY CLAY, 12-14; LIMESTONE, 27-28	REYNOLDS
16716N04W04	RAY GUSTIN BLDRS	1976	40	6-36										SAND & GRAVEL, 27-27.5	REYNOLDS
16716N04W04	MARVIN GRAVES	1976	31	6-36										--	ERWIN

Appendix 1-2. (Continued)

Well location	Well owner	Well: Year constructed	Well: Depth (ft)	Well: Diameter (in)	Screen: Length (ft)	Screen: Diameter (in)	Screen: Slot Size (in)	Test data: Date (mmyy)	Test data: Static level (ft)	Test data: Drawdown (ft)	Test data: Pumping rate (gpm)	Test data: Length of test (hr)	Test data: Specific capacity (gpm/ft)	Water-bearing formation and depth interval (ft)	Driller
16716N04W04	MARVIN GRAVES	1976	31	6-36										--	ERWIN
16716N04W04	J & L BUILDERS	1976	37	6-36										--	ERWIN
16716N04W04	J & L BUILDERS	1976	30	6-36										--	ERWIN
16716N04W04	THOMAS SQUIRES	1976	40	6-36				1076	14.00					SAND, 18-20	ERWIN
16716N04W04	J & L BUILDERS	1976	40	6-36				1176	19.00					SANDY CLAY. 21-22	ERWIN
16716N04W04	JAMES CORMENY	1977	26	6-36										SAND, 10-23	COOK
16716N04W04	WILLIAM WIEBKING	1977	32	6-36				0477	9.00					SAND, 18-20	ERWIN
16716N04W04	LARRY DAUGHERTY	1977	34	6-36										--	ERWIN
16716N04W04	STACY VALEV	1977	40	6-36										--	ERWIN
16716N04W04	MARVIN GRAVES	1978	30	6-36										SAND, 8-10	REYNOLDS
16716N04W04	STACY VALEV	1978	23	6-30	1			0778	5.00					SAND, 5-23	ERWIN
16716N04W041A	DAVID LYONS	1976	50	6-36				1276	14.00					SANDY CLAY, 18-20	ERWIN
16716N04W042B	ALBERTINE DENE	1965	25	36				??65	9.00		6			SAND, 3-17	MILES
16716N04W042G	HOLIDAY ESTATES SUBD	--	42	6-72-54	20			0676	24.19					ROCK, 22-42	--
16716N04W043B	THOMAS WEISS	1976	40	6-36										--	ERWIN
16716N04W044D	ROBERT GRAVES	1976	37	6-36				1176	14.00					SANDY CLAY, 20-21	ERWIN
16716N04W044D	GEM CORP	1977	30	6-36										SAND, 11-17	COOK
16716N04W045D	PAUL WALKER	1979	30	6-36				0879	7.00					SAND, 6-13, 20-21	ERWIN
16716N04W045D	J & L BUILDERS	1979	37	10-36										SAND, 8-12; SAND 8, GRAVEL, 32-32.5	REYNOLDS
16716N04W045D	J & L BUILDERS	1980	45	6-36										SAND & GRAVEL, 38-38.5	REYNOLDS
16716N04W045D	RICHARD HALL	1978	34	10-36										SAND, 10-14, 28-29	REYNOLDS
16716N04W045D	FRED YAZELL JR	1979	28	10-36											REYNOLDS
16716N04W046E	HARVEY WELLS	1977	36	6-36										SAND & GRAVEL, 16-17	REYNOLDS
16716N04W045E	JAMES LEKA	1983	27	6-36										SAND, 3-10; LIMESTONE AT 27	REYNOLDS
16716N04W045E	MIKE AYRE	1983	26	6-36										SAND, 10-26	REYNOLDS
16716N04W045F	JAMES LEKA	1981	25	6-36										SAND, 7-12; SANDSTONE, 23-25	REYNOLDS
16716N04W045G	FRAN GRAVES	1977	29	6-36										SAND, 10-20	REYNOLDS
16716N04W046A	HARRY GRIFFITHS	1977	35	6-36										SAND, 21-26	COOK
16716N04W046A	JACK HART	1977	26	6-36										SAND, 7-15	COOK
16716N04W046D	HARVEY WELLS	1978	20	6-36										SAND, 3-20	REYNOLDS
16716N04W046E	J & L BUILDERS	1979	36	10-36										SAND, 12-16; DRIFT & SHALE, 16-36	REYNOLDS
16716N04W046G	ROBERT GRAVES	1976	20	6-36	2									SAND, 12-19	COOK
16716N04W046G	HORACE H GRIFFITTS	1979	28	10-24-36										SAND, 4-25; LIMESTONE AT 28	REYNOLDS
16716N04W046H	RAY ELLIS	1977	25	6-36										SAND, 7-16	COOK
16716N04W047C	RUSSELL & JANE YOCOM	1974	22	6-36										SAND, 17-21	REYNOLDS
16716N04W047G	JAMES LEKA	1983	27	6-36										SAND. 8-21	REYNOLDS
16716N04W047G	JAMES LEKA	1984	21	6-36										SAND, 8-20	REYNOLDS
16716N04W047H	HAROLD GRAVES	1974	24	6-36										SAND, 7-12	COOK
16716N04W047H	FRANK GRAVES SR	1979	30	6-36										SAND, 9-30	REYNOLDS
16716N04W056A	ADELLA KLASINZ	1992	33	6-36-24										SAND & GRAVEL, 11-13; SHALE, 15-33	REYNOLDS
16716N04W061B	RAY WAGNER	1979	37	6-36				0579	11.00					SAND, 4-16	ERWIN
16716N04W062D	GLEN T BECKMAN	1980	28	36										SAND & GRAVEL, 19-28	REYNOLDS
16716N04W065E	STATE HIGHWAY DEPT	196S	54.5	8-6	10	8	.080	0565	4.38					SAND, 7-18; SAND WITH CLAY, 18-35; SAND, 35-55; ROCK AT 62	LAYNE-WESTERN
16716N04W068A	JERRY CARSON	1976	46	6-36										SAND & GRAVEL, 36-37	COOK
16716N04W068H	JERRY CARSON	1989	42	6-36										SANDY CLAY, 17-21; SHALE, 37-42	REYNOLDS
16716N04W071A	CARLYNE MEYERS	1985	26	6-36										SANDY CLAY, 12-17; SHALE, 21-26; LIMESTONE AT 26	REYNOLDS
16716N04W071F	HAROLD GRAVES	1976	40	6-36										--	ERWIN
16716N04W071F	HAROLD GRAVES	1976	40	6-36										--	ERWIN
16716N04W071G	HAROLD GRAVES	1976	37	6-36										--	ERWIN
16716N04W071H	BOB BECKER	1976	31	6-36				0376	11.00					SAND & CLAY, 17-18	ERWIN
16716N04W071H	ROSCOE BRICKLER	1975	31	6-36				0775	9.00					SAND W/WATER, 20-22	ERWIN
16716N04W073H	ROGER BRICKLER	1986	28	6-36										SAND, 1-10	ERWIN
16716N04W074H	MARY HARRIS	1983	37	6-36										SAND & CLAY, 12-19; SAND & GRAVEL, 31-32	REYNOLDS
16716N04W074H	WILLIAM J SMITH	1992	30	6-36										SAND, 20-22	WHITE
16716N04W077H	JOHN KIRCHGNER	1986	32	6-36										SAND, 2-12	ERWIN

Appendix I-2. (Continued)

Well location	Well owner	Well: Year con-structed	Well: Depth (ft)	Well: Dia-meter (in)	Screen: Length (ft)	Screen: Dia-meter (in)	Screen: Slot Size (in)	Test data: Date (mmyy)	Test data: Static level (ft)	Test data: Draw-down (ft)	Test data: Pumping rate (gpm)	Test data: Length of test (hr)	Test data: Specific capacity (gpm/ft)	Water-bearing formation and depth Interval (ft)	Driller
16716N04W084C	WILLIAM KWILLHEIT SR	1976	39	6-36										SAND & GRAVEL, 27-27.5	REYNOLDS
16716N04W086C	KEVIN FIELDS	1985	26	6-36										COAL, 14-20; SHALE, 21-26	ERWIN
16716N04W086F	FRED ANTONACCI	1978	40	6-36										SANDY CLAY. 22-23	COOK
16716N04W087A	JAMES BARMEISTER	1977	29	6-36										SANDY CLAY, 11-15	REYNOLDS
16716N04W087B	JESSE DYER	1979	46	6-?				1079	23.00					SAND, 5-9; SHALE, 31-36; COAL, 36-37; SHALE, 37-46	ERWIN
16716N04W087B	JESSE & BETTY JEAN DYER JR	1977	40	6-36										SANDY CLAY, 31-33	COOK
16716N04W087D	LAWRENCE MATTHYS	1976	37	6-36										SAND, 31-32	COOK
16716N04W087E	HAROLD GRAVES	1976	34	6-36										SAND, 22-23	COOK
16716N04W087E	HAROLD GRAVES	1976	34	6-36										SAND, 22-23	COOK
16716N04W087E	RAYMOND LANGLEY	1968	35	36				0968	17.00					SAND 8, GRAVEL, 21-24	MILES
16716N04W087F	HAROLD GRAVES	1976	37	6-36										--	ERWIN
16716N04W087F	JOHN SVETLIK	1976	40	6-36				0276	14.00					SAND & GRAVEL, 20-21	ERWIN
16716N04W088A	STEPHEN STEPP	1977	42	6-36										--	ERWIN
16716N04W088A	THOMAS HAMPSON	1974	26	6-36										SANDY CLAY, 13-15	COOK
16716N04W088A	KENNETH RUNKLES	1977	29	6-36						1.00				SANDY CLAY, 5-14	REYNOLDS
16716N04W088A	JIM WELLIFORD	1977	40	6-36										GRAVELLY CLAY, 16-20	BEASLEY
16716N04W088A	STERLING & CAROLYN JOHNSON	1977	23	6-36				0477	2.30					SANDSTONE. 22-23	COOK
16716N04W088D	RUSSELL MARCUSSEN	1973	23	6-36										SANDY CLAY. 16-19	REYNOLDS
16716N04W088D	RUSSELL MARCUSSEN	1973	28	6-36										SAND & GRAVEL. 25-26	REYNOLDS
16716N04W088D	MIKE WEYENT	1987	44	6-36										SHALE, 32-44	ERWIN
16716N04W088E	STEPHEN STEPP	1977	50	6-36										--	ERWIN
16716N04W088E	HAROLD GRAVES	1976	34	6-36										SAND, 22-23	COOK
16716N04W088A	STERLING JOHNSON	1971	30	36				1271	17.00					SANDY CLAY, 16-30	MILES
16716N04W088E	HAROLD GRAVES	1976	34	6-36										SAND, 22-23	COOK
16716N04W088E	HAROLD GRAVES	1976	34	6-36										SAND, 22-23	COOK
16716N04W088F	HAROLD GRAVES	1977	30	6-36										SANDY CLAY, 12-15	COOK
16716N04W088F	CHARLES PATTERSON	1980	50	6-36										SANDY CLAY. 32-34	ERWIN
16716N04W088G	HAROLD GRAVES	1977	28	6-36										SAND & GRAVEL, 20-22	COOK
16716N04W088G	RUSSELL J FLEMING	1979	45	10-36										SAND & GRAVEL, 23-24, 31-32. 38-39	REYNOLDS
16716N04W09	SCOTT MORLEDGE LUMBER CO	--	14	--										--	--
16716N04W09	ILL TRACTION CO	1918	50	4	8									SAND & GRAVEL, 8-10; SAND, 30-50	--
16716N04W09	ILL TRACTION CO	--	20											SAND AT 20	--
16716N04W09	ILL TRACTION CO	--	17											SAND AT 17	--
16716N04W09	ILL TRACTION CO	--	12											SAND AT 12	--
16716N04W092F	MIKE SMITH	1978	34	6-36										SAND-DRY, 4-9; SANDY CLAY. 20-21; CREVICE ROCK, 30-34	ERWIN
16716N04W094H	MICHAEL SMITH	1977	31	6-36										--	ERWIN
16716N04W095D	NICK ANTONACCI	1983	34	6-36										SAND, 10-14; SHALE, 29-34; LIMESTONE AT 34	REYNOLDS
16716N04W095D	NICK FANALE	1973	24	36										SAND, 12-24 .	BEASLEY
16716N04W097D	CARL STOTT	1985	40	6-36										SAND WITH CLAY, 39-40	ERWIN
16716N04W097G	BOB BAKER	1989												--	JACOBS
16716N04W097H	BILL GILL	1977	24	6-36										SAND, 12-14	BEASLEY
16716N04W154A	DAWSON	1958	57	--										DIRTY SAND, 2-9; SAND, 9-20; SAND & GRAVEL, 20-27; SAND, 46-54; SHALE, 54-57	BAKER
16716N04W154A	DAWSON	1958	57	--							85			DIRTY SAND, 8-14; SAND, 14-16; SAND 8, GRAVEL, 16-22; DIRTY SAND, 37-42; SAND, 42-56; SHALE, 56-57	BAKER
16716N04W154A	DAWSON	1958	57	--										SAND, 3-24; DIRTY SAND & GRAVEL, 26-32; SAND, 42-55; SHALE, 55-57	BAKER
16716N04W154A	DAWSON	1958	56	6.2	6			1158	6.94	11.96	120	24	10	DIRTY SAND, 5-11.5; SAND & GRAVEL, 11.5-26; SAND, 28-47; SAND 8, GRAVEL, 47-54; SHALE, 54-56	BAKER
16716N04W154A	DAWSON (PAUL WANLESS)	1962	27.1	12	4.8	12	.060	0162	2.19	9.55	110	3.5	11.51	DIRTY SAND, 5-11.5; SAND & GRAVEL, 11.5-26; SAND, 28-47; SAND & GRAVEL, 47-54; SHALE, 54-56	BAKER

Appendix I-2. (Continued)

Well location	Well owner	Well: Year constructed	Well: Depth (ft)	Well: Diameter (in)	Screen: Length (ft)	Screen: Diameter (in)	Screen: Slot Size (in)	Test data: Date (mmyy)	Test data: Static level (ft)	Test data: Drawdown (ft)	Test data: Pumping rate (gpm)	Test data: Length of test (hr)	Test data: Specific capacity (gpm/ft)	Water-bearing formation and depth interval (ft)	Driller
16716N04W155E	ROBERTA ANTONOCCI	1976	41	6-36										SANDY CLAY, WATER, 8-18	BERGSCHNEIDER
16716N04W155F	RICHARD RHODES	1989	35	6-36										SHALE, 29-35; LIMESTONE AT 35	REYNOLDS
16716N04W156E	GARY LYONS	1992	63	6-36										SAND, 24-25; SHALE, 45-63; LIMESTONE AT 63	REYNOLDS
16716N04W157E	ED MOTICKA	1981	40	6-36				1281	9.00					SAND, 0-12; SHALE, 34-40	ERWIN
16716N04W158E	MIKE & MARYLN SHANEGBREY	1972	24	36				0172	11.00					SAND, 12-24	MILES
16716N04W163A	RIVER OAKS VILLAGE MHP	1976	50	--										SAND, 10-20; SILTY SAND, 20-35; SAND, 35-50	BAKER
16716N04W165A	MERLE NORMAN	1976	30	6-36										SAND, 22-23, 28-30	BERGSCHNEIDER
16716N04W165E	JACK CESSNA	1988	37	6-36										SAND & GRAVEL, 21-37	REYNOLDS
16716N04W166A	THE HIDEAWAY	1978	26	6-36										SAND, 3-26	REYNOLDS
16716N04W166C	CAMP BUTLER CEMETERY	1975	50.5	2	7	2	.020	??75	8.40	16.60	5	3	0.3	DIRTY SAND, 29-50.5	BAKER
16716N04W166C	CAMP BUTLER CEMETERY	1975	51	2	5	2	.030	??75			1	0.5		SAND AND CLAY, 7-30	BAKER
16716N04W166C	CAMP BUTLER CEMETERY	1975	50.5	2	7	2	.020	0975	6.20					DIRTY SAND, 29-50.5	BAKER
16716N04W166C	CAMP BUTLER CEMETERY	1975	47	12	5	12	.040	??75	9.50	15.50	2		0.1	MUDDY SAND, 10-20; SAND, 40-45	BAKER
16716N04W166D	WALTER GROESCH	1983	40	6-36										SAND, 25-28; SHALE, 31-40	REYNOLDS
16716N04W166E	TOM MACK	1986	39	6-36										SANDSTONE, 29-39	REYNOLDS
16716N04W167B	CAMP BUTLER CEMETERY	1978	43	10-36				0978	16.19	6.33	15	3	27	SAND, 8-17, 21-26.5; SAND & GRAVEL, 34-35; SHALE, 35-43	COOK & REYNOLDS
16716N04W167C	HAROLD I SLOE	1973	81	--				0173	22.10	5.50	0.5	48	0.1	SANDSTONE, 31-54; SHALE, 54-81	BAKER
16716N04W167C	MYRON VIGASSA	1977	25	6-36										SAND, 5-21	COOK
16716N04W167D	MYRON & NANCY VIGESSA	1975	41	6-36										SANDSTONE, 33-41	COOK
16716N04W167F	WILLIAM MUELLER	1993	47	6-36										SANDSTONE, 17-47; LIMESTONE AT 47	REYNOLDS
16716N04W168A	JERRY JOHNSON	1975	35	6-36										SANDY CLAY, 15-19	REYNOLDS
16716N04W17	JAMES CHURCHILL	1975	24	6-36										SANDY CLAY, 11-14	COOK
16716N04W17	DONALD OLESEN	1976	25	6-36										SANDY CLAY, 10-14	REYNOLDS
16716N04W17	MICHAEL C LASCODY JR	1957	116	6-3				??57	8.20	107.80	3	2	0.03	SANDSTONE. 36.5-42; SHALE, 42-49; LIMESTONE, 49-73; SHALE, 73-116	SPAULDING & CLARK
16716N04W17	WILLIAM J HOOD	1968	27	36				1168	11.00					CLAY, 16-18	MILES
16716N04W17	WILLIAM KIMSEY	1976	28	6-36										SANDY CLAY, 11-14	COOK
16716N04W17	JESSIE J MAZRUM	1977	30	6-36										CLAY, 3-21	COOK
16716N04W173G	RICK HEINS	1978	30	6-36										SANDY CLAY, 12-14	COOK
16716N04W174D	LOUIS EDMONSTON	1972	27	36				0172	11.00					CLAY, 2-27	MILES
16716N04W174D	DAVID YOGGERST	1971	30	36				1171	13.00					CLAY, 2-20	MILES
16716N04W175E	LEE B SHRYOCK	1968	24	36				0668	13.00					CLAY, 2-24	MILES
16716N04W175E	CHRIS DINARDO	1985	32	6-36										SANDY CLAY, 12-17; SHALE, 28-32; LIMESTONE AT 32	REYNOLDS
16716N04W175F	JAMES DRISCOLL	1969	26	36				0369	11.00					CLAY, 4-16	MILES
16716N04W175G	DAVID POINTER	1977	24	6-36											ERWIN
16716N04W176E	JAMES CHURCHILL	1983	26	6-36										SANDY CLAY, 10-19; SANDSTONE, 22-26	REYNOLDS
16716N04W176E	WILLARD CHURCHILL	1978	26	6-36										SILTY CLAY, 10-14; SHALE, 22-26	REYNOLDS
16716N04W176E	DAVE POINTER	1977	28	6-36										CLAY - CAVING, 2-21	COOK
16716N04W176F	WILLIAM PAUL	1966	21	36				??66	9.00					SANDY LOAM, 8-21	MILES
16716N04W176G	RICHARD PETERS	1976	23	6-36										SAND, 18-20	BERGSCHNEIDER
16716N04W176H	RON BEECHLER	1981	28	6-36										SANDY CLAY, 12-16; SANDSTONE, 27-28	REYNOLDS
16716N04W177G	CHARLES COURTRIGHT	1966	27	36				??66	8.00					SAND ROCK, 21-27	MILES
16716N04W177G	ERNEST J ANTONACCI	1965	24	36				??65	12.00					HARDPAN, 15-24	MILES
16716N04W177H	LLOYD REHWOLDT	1967	24	6-36				0767	9.00					SANDY LOAM, 10-24	MILES
16716N04W177H	RICHARD HOPPER	1975	25	6-36										SANDY CLAY, 11-13	REYNOLDS
16716N04W178H	WAYNE TRUAX	1978	22	10-36										SHALE, 19-20; LIMESTONE, 20-22	REYNOLDS
16716N04W178H	PAUL CARPENTER	1980	23	6-36										SANDY CLAY, 10-14; SANDSTONE, 19-23	REYNOLDS
16716N04W20	WILLIAM E WERNER	1957	87	5-4				??57	18.00	69.00	1	0.3	0.01	SANDSTONE, 20-53; SHALE, 53-55, 59-87	SPAULDING & CLARK
16716N04W21	OSCAR F BARNES	1955	50	5	19.4			??55	9.50	20.50	3	3	0.1	SANDSTONE, 19-20.5; 26.5-50	SPAULDING & CLARK
16716N04W211A	RIVER OAKS VILLAGE MHP	1971	37	--										DIRTY SAND & GRAVEL, 12-25	BAKER
16716N04W212A	RIVER OAKS VILLAGE MHP	1971	32	--										DIRTY SAND & GRAVEL, 18-21; SHALE, 21-32	BAKER
16716N04W212A	RIVER OAKS VILLAGE MHP	1971	42	--										SAND & GRAVEL, 12-41; SHALE, 41-42	BAKER

Appendix I-2. (Continued)

Well location	Well owner	Well: Year constructed	Well: Depth (ft)	Well: Diameter (in)	Screen: Length (ft)	Screen: Diameter (in)	Screen: Slot Size (in)	Test data: Date (mmyy)	Test data: Static level (ft)	Test data: Drawdown (ft)	Test data: Pumping rate (gpm)	Test data: Length of test (hr)	Test data: Specific capacity (gpm/ft)	Water-bearing formation and depth Interval (ft)	Driller
16716N04W212A	RIVER OAKS VILLAGE MHP	1971	55	--										SAND, 12-32; DIRTY SAND & GRAVEL, 44-55; SHALE BELOW	BAKER
16716N04W212A	RIVER OAKS VILLAGE MHP	1971	27	--										SAND & GRAVEL, 15-25	BAKER
16716N04W212A	RIVER OAKS VILLAGE MHP	1971	32	--										SAND & GRAVEL, 15-26	BAKER
16716N04W212A	RIVER OAKS VILLAGE MHP	1973	50	--										SAND & CLAY, 2-17; SAND S GRAVEL, 17-35; DIRTY SAND & GRAVEL, 45-49; SHALE, 49-50	BAKER
16716N04W212A	RIVER OAKS VILLAGE MHP	1973	47	--										SAND & GRAVEL, 11-35; DIRTY SAND. 35-47	BAKER
16716N04W212B	RIVER OAKS VILLAGE MHP	1971	25	--										SAND, 6-14; SHALE, 23-25	BAKER
16716N04W212B	RIVER OAKS VILLAGE MHP	1971	27	--										SAND, 5-12	BAKER
16716N04W212B	RIVER OAKS VILLAGE MHP	1971	10	--										SHALE, 5-10	BAKER
16716N04W212B	RIVER OAKS VILLAGE MHP	1971	25	--										SAND, 0-16; SHALE, 21-25	BAKER
16716N04W212B	RIVER OAKS VILLAGE MHP	1971	20	--										SANDY CLAY, 12-20	BAKER
16716N04W212B	RIVER OAKS VILLAGE MHP	1971	20	--										SANDY CLAY, SOME GRAVEL, 11-18; SHALE, 18-20	BAKER
16716N04W212B	RIVER OAKS VILLAGE MHP	1971	43	6	10	6	.020	0671	8 14	7.13	101	3	14.2	SAND, 17-35; SAND & GRAVEL, 35-43; SHALE BELOW	BAKER
16716N04W212B	RIVER OAKS VILLAGE MHP	1978	40.5	6	10	6	.015	0978	8.84	6.30	100	0.5	15.9	SAND & CLAY, 4-22; SAND & GRAVEL, 22-30; SAND, 30-40.5	BAKER
16716N04W213B	RIVER OAKS VILLAGE MHP	1971	17	--										MUD, 6-12; SHALE, 12-17	BAKER
16716N04W213B	RIVER OAKS VILLAGE MHP	1971	11.5	--										--	BAKER
16716N04W213H	RIVER OAKS VILLAGE MHP	1976	50	--										SAND & GRAVEL, 15-50	BAKER
16716N04W214E	RIVER OAKS VILLAGE MHP	1976	55	--										DRY SAND, 10-15; SHALE AT 55	BAKER
16716N04W214E	RIVER OAKS VILLAGE MHP	1976	55	--										DRY SAND, 5-10; SAND, 10-28; SHALE, 54-55	BAKER
16716N04W214F	RIVER OAKS VILLAGE MHP	1976	18	--										LIMESTONE AT 18	BAKER
16716N04W214F	RIVER OAKS VILLAGE MHP	1976	35	--										SAND & GRAVEL, 20-25	BAKER
16716N04W214F	RIVER OAKS VILLAGE MHP	1976	40	--										SAND MUCK, 20-30; SHALE, 30-40	BAKER
16716N04W215F	RIVER OAKS VILLAGE MHP	1976	20	--										SAND, 0-20	BAKER
16716N04W216F	RIVER OAKS VILLAGE MHP	1976	31	--										SAND, 10-15; SAND & GRAVEL, 15-21, SILTY SHALE, 21-31	BAKER
16716N04W215G	RIVER OAKS VILLAGE MHP	1976	30	--										DRY SAND, 10-15; SAND & GRAVEL, 15-25	BAKER
16716N04W215G	RIVER OAKS VILLAGE MHP	1976	35	--										SAND, 15-20; SAND & GRAVEL, 20-25	BAKER
16716N04W223F	RICHARD WIELAND	1990	77	6-36-24										SAND & GRAVEL, 52-54	REYNOLDS
16716N04W224E	RICHARD WIELAND	1983	50	6-36										SANDY CLAY, 16-19	REYNOLDS
16716N04W225D	CLEAR LAKE SAND & GRAVEL	1986	22	6-36	3									SAND. 4-18; SAND & GRAVEL, 18-22	REYNOLDS
16716N04W225D	MICHAEL BURK	1992	30	6-36	10									SAND, 7-30	REYNOLDS
16716N04W225G	ALLEN LORTON	1991	29	6-36	12									SAND, 11-29	REYNOLDS
16716N04W225G	BRAD LORTON	1988	26	6-36										SAND AT 26	REYNOLDS
16716N04W226E	RIVERTON	1989	55	30-12	15		.055	0189	1268					SAND & GRAVEL, 5-15; SAND, 15-45; SAND & GRAVEL, 45-55; SHALE, 55-56	LAYNE-WESTERN
16716N04W227E	RIVERTON	1961	47	8	20			1161	5.00	7.00	130	2	18.6	SAND & GRAVEL, 5-50	J P MILLER
16716N04W227E	RIVERTON	1989	64.5	30-12	15	12	.055	0189	12.95		204	3		SAND, 5-40; SAND & GRAVEL, 40-54.5	LAYNE-WESTERN
16716N04W228E	RIVERTON	1972	53	12	10	12	.040	0972	8.86	17.16	302	3	16.7	SAND, 5-16; SAND & GRAVEL, 16-35; SAND, 35-40; SAND & GRAVEL, 40-53	BAKER
16716N04W228E	RIVERTON	1981	56	12	15	12	.080	8.19						SAND & GRAVEL, 13-30; SAND, 30-40; SAND & GRAVEL, 40-57	LAYNE-WESTERN
16716N04W228E	RIVERTON	1961	52	8	10			1261	5.00	18.00	300	2	16.7	SAND & GRAVEL, 6-52	J P MILLER
16716N04W228E	RIVERTON	1972	54	--										SAND, 5-12; SAND & GRAVEL, 12-53; SHALE, 53-54	BAKER
16716N04W228E	RIVERTON	1972	54	--										SAND & GRAVEL, 6-54	BAKER
16716N04W228E	RIVERTON	1972	50	--										SAND, 9-50	BAKER
16716N04W228E	RIVERTON	1972	49	--										SAND, 10-44; SHALE AT 49	BAKER
16716N04W233A	KEN KIRBY	1976	25	6-36										SANDY CLAY, 8-16	BERGSCHNEIDER
16716N04W251B	JOSEPH A HOHIMER	1970	30	36				0370	14.00					SAND, 17-25	MILES
16716N04W251C	DARRELL JOSEPH HOHIMER	1977	28	6-36										SHALE, 25-28	COOK

Appendix I-2. (Continued)

Well location	Well owner	Well: Year constructed	Well: Depth (ft)	Well: Diameter (in)	Screen: Length (ft)	Screen: Diameter (in)	Screen: Slot Size (in)	Test data: Date (mmyy)	Test data: Static level (ft)	Test data: Drawdown (ft)	Test data: Pumping rate (gpm)	Test data: Length of test (hr)	Test data: Specific capacity (gpm/ft)	Water-bearing formation and depth Interval (ft)	Driller
16716N04W252B	RICHIE HARMS	1976	30	6-36										SANDY CLAY, 3-17; SHALE, 20-24, 25-30	COOK
16716N04W253C	KARL GOWIN	1985	40	6-36										SAND, 8-14, 23-24; SHALE, 38-40	REYNOLDS
16716N04W253E	JOHN MILLER	1991	32	6-36	12									SAND,, 13-14; SAND & GRAVEL, 16-17; ROCK AT 32	REYNOLDS
16716N04W254E	KENNETH MILLER	1992	45	6-36										SAND & GRAVEL, 26-27, 37-38	REYNOLDS
16716N04W256A	DAWSON	1966	60	..										DIRTY SAND & GRAVEL, 17-19; SHALE, 58-60	BAKER
16716N04W256A	DAWSON	1967	34	3.5	7.7		.040							SAND, 10-20; SAND & GRAVEL, 20-53	BAKER
16716N04W256A	DAWSON	1967	37	12	3	12	.020							SAND & GRAVEL, 12-37	BAKER
16716N04W256A	DAWSON	1966	27	12	3	1 2	.025							SAND & GRAVEL, 18-27	BAKER
16716N04W256A	DAWSON	1966	27.6	12	4	12	MESH							SAND & GRAVEL, 18-27	BAKER
16716N04W256A	DAWSON	1966	37	2	11.5	2	.100	0266						SAND & GRAVEL, 18-34	BAKER
16716N04W256A	DAWSON	1967	54	8	12	8	.025	0267	5.05	4.65	125	1.5	26.9	SAND, 10-20; SAND & GRAVEL, 20-54	BAKER
16716N04W256A	DAWSON	1967	35.5	18-8	6	8	100	0167	6.24	6.77	105	3	15.5	SAND & GRAVEL, 13-35	BAKER
16716N04W256B	DAWSON	1985	41	8	15		.080	0985	8.23					SAND, 15-26; SAND & GRAVEL, 26-36; SAND, 36-42	ALBRECHT
16716N04W264A	WAYNE SOWERS	1977	106											CLAY & GRAVEL, 5-21, 25-32; SHALE, 32-35; SANDSTONE, 35-43; SHALE, 43-53; SANDSTONE, 53-56; SHALE, 56-106	BAKER
16716N04W264A	FRANK TONKO	1977	127											SHALE, 11-43; SANDSTONE, 43-46; SHALE, 46-59, 61-65; LIMESTONE, 65-70; SHALE. 70-127	BAKER
16716N04W264A	ROGER CULLERS	1980	35	6-36				1080	13.00					SANDY CLAY, 2-12; SHALE, 16-35	ERWIN
16716N04W264B	WAYNE SOWERS	1976	33	6-36										SHALE, 30-33	COOK
16716N04W264G	DOROTHY BECK	1989	25	6-36										SAND, 12-14	REYNOLDS
16716N04W265F	LARRY WILLIAMS	1975	33	6-36										SAND, 12-16	REYNOLDS
16716N04W266A	LARRY BUNDZELAUSKAS	1982	40	6-36				0482	9.00					SAND & GRAVEL, 18-20	ERWIN
16716N04W27	F W STEPHENSON	1955	122	5-4				?755	60.00	60.00	0.2	24	0	LIMESTONE, 37-42, 85-105; SHALE, 105-115	SPAULDING & CLARK
16716N04W278A	LAWRENCE PISANI	1975	25	6-36										SAND, 15-17	COOK
16716N04W28	ALBERT KORNACK	1956	65	5.5-4.5				?756	25.00	20.00	25	1	1.3	SAND AT 45; SANDSTONE, 48-64; SHALE & COAL, 64-65	SPAULDING & CLARK
16716N04W285G	OAKCREST COUNTRY CLUB														
16716N04W33	WAYNE MORGAN	1957	100	3	20			7757	20.00		2			SANDSTONE, 20-48; SHALE, 51-61; SANDSTONE, 61-62; SHALE, 62-63; LIMESTONE, 63-76; SHALE, 76-100	SPAULDING & CLARK
16716N04W331H	CARL GREENWOOD	1978	34												ERWIN
16716N04W332H	JAMES ORLANDINI	1979	24											SHALE, 14-24	REYNOLDS
16716N04W343H	JOHN J RABBIT	1966	30	36										SAND, 5-10	MILES
16716N04W345D	BOB RHODES	1980	22	6										SANDY CLAY	ERWIN
16716N04W347E	ROBERT TURNER	1978	32	10-36										SHALE, 21-32	REYNOLDS
16716N04W347F	DAN COKER	1992	49	6-36										SAND, 19-20; SHALE, 40-49	REYNOLDS
16716N04W347H	W B CONSTRUCTION	1978	34	6-36										SHALE, 18-34	REYNOLDS
16716N04W347H	DONALD BOWERS	1976	29	6-36										SANDY CLAY, 12-14	REYNOLDS
16716N04W348H	FRANK TOMKO	1976	37	6-36										SANDY CLAY, 12-17; SHALE, 34-37	COOK
16716N04W351A	VIOLA SEXTON	1986	55	6-36										SAND, 20-21; SHALE, 45-55	REYNOLDS
16716N04W354A	WM RUDOLPH	1970	42					0970	19.00					SAND & GRAVEL, 20-22	MILES
16716N04W354C	LEE ESTROP	1969	30	36				0669	19.00					SAND & GRAVEL, 22-24	MILES
16716N04W354D	THOMAS & MARTHA WRIGHT	1976	47	36										SAND & GRAVEL, 26-27	COOK
16716N04W357C	LEE ESTROP	1966	25	36										BOULDER CLAY WITH BOULDERS, 15-25	MILES
16716N04W36	CHARLES BROWN	1983	32	6-36										SANDSTONE, 14-21; SHALE, 27-32	REYNOLDS
16716N04W361A	JERRY SZKUTNIK	1981	41	6-36										SAND, 8-15; SAND & GRAVEL, 24-25; LIMESTONE AT 41	REYNOLDS
16716N04W361A	DON EALEY	1982	37	6-36										SAND. 8-10; SAND & GRAVEL, 10-15, 31-32; CLAY & LIMESTONE, 32-37	REYNOLDS
16716N04W361A	JOHN R CLEMENT JR	1991	28.5	6-36										SAND & GRAVEL, 27-28.5	WHITE

Appendix I-2. (Continued)

Well location	Well owner	Well: Year constructed	Well: Depth (ft)	Well: Diameter (in)	Screen: Length (ft)	Screen: Diameter (in)	Screen: Slot Size (in)	Test data: Date (mmyy)	Test data: Static level (ft)	Test data: Drawdown (ft)	Test data: Pumping rate (gpm)	Test data: Length of test (hr)	Test data: Specific capacity (gpm/ft)	Water-bearing formation and depth Interval (ft)	Driller
16716N04W361D	JAMES BIRKETT	1983	45	6-36										SAND, 10-13	REYNOLDS
16716N04W361D	CLIFF FELTON	1987	45	6-36										SAND, 10-15	REYNOLDS
16716N04W362C	STEVEN J POE	1993	34	6-36										SAND, 10-11	REYNOLDS
16716N04W362D	BOB DAMBACHER	1993	35	6-24										SANDSTONE, 18-30; SHALE. 30-33. 34-35; LIMESTONE AT 35	REYNOLDS
16716N04W362D	DAVID TROUT	1992	40	6-36										SAND, 13-14; SANDSTONE, 25-26; SHALE, 26-40; LIMESTONE AT 40	REYNOLDS
16716N04W362D	DAN PITTMAN	1983	34	6-36										SAND, 8-12; SANDSTONE, 18-21; SHALE, 21-34	REYNOLDS
16716N04W362D	TOM LISTER	1987	55	6-36-24										SAND, 12-22; SHALE, 43-55	REYNOLDS
16716N04W362D	RICHARD ROHRIG	1984	34	6-36										SAND, 4-17; SAND & GRAVEL, 19-21; ROCK AT 34	REYNOLDS
16716N04W362E	J & L BUILDERS	1984	45	6-36										SAND & GRAVEL, 26-27	REYNOLDS
16716N04W363D	MIKE ANDERSON	1985	60	6-36-24										SAND, 8-21; SHALE, 45-60; LIMESTONE BELOW	REYNOLDS
16716N04W363F	ROBERT VAN BEHREN	1978	24	10-36										SAND, 8-9; SHALE, 15-24; LIMESTONE BELOW	REYNOLDS
16716N04W363G	ROBERT ETHERTON	1977	26	6-36										SANDY CLAY, 10-14; SHALE, 14-26; LIMESTONE BELOW	REYNOLDS
16716N04W363G	DWANE JONES	1977	24	6-36										SANDY CLAY, 10-14; SHALE, 19-24; LIMESTONE BELOW	REYNOLDS
16716N04W364D	ROBERT DERBER	1987	50	6-36-24										SAND, 10-14; SHALE, 27-50	REYNOLDS
16716N04W364F	CARL ADRUP	1977	28	6-36										SAND & GRAVEL, 10-18	REYNOLDS
16716N04W366A	EARL SIDENER	1969	29	36				0969	17.00					SAND, 18-22	MILES
16716N04W367F	SPRINGFIELD SAND & GRAVEL	1966	24	36				7766	9.00					BOULDER CLAY, 14-24	MILES
16716N04W367F	SPRINGFIELD SAND & GRAVEL	1968	39	36				0368	20.00					SAND, 21-24; SAND & GRAVEL, 24-30	MILES
16716N04W368A	STEVE BILEK	1989	34	6-36										SAND, 12-16; SANDSTONE, 24-34	REYNOLDS
16716N05W01	WILLIAM SANDNER	1972	42	6-36										SAND, 29-40; SAND & GRAVEL, 40-42	COOK
16716N05W011A	HAROLD GRAVES	1978	45	6-36										SANDY CLAY, 23-24	COOK
16716N05W011A	MARVIN ZARN	1980	50	6-36										SANDY CLAY, 26-30	ERWIN
16716N05W012A	HAROLD GRAVES	1979	36	6-36										SANDY CLAY, 24-26; SHALE, 26-36	COOK
16716N05W012F	JOHN & MARTHA MCDANIEL	1975	30	6-36										SAND, 2-14; SHALE, 21-30	COOK
16716N05W012H	WILLIAMSVILLE	1957	71	6	10		.030		21.00					SAND, 21-27; SAND & GRAVEL, 27-64; SAND, 64-69	J P MILLER
16716N05W012H	WILLIAMSVILLE	1957	64	6	10		.030	0357	21.00	9.00	150	4.8	16.7	SAND, 21-27; SAND & GRAVEL, 27-64; SAND, 64-69	J P MILLER
16716N05W013A	HAROLD GRAVES	1974	35	6-36										SANDY CLAY, 20-21; SHALE, 21-35	COOK
16716N05W013A	HAROLD GRAVES	1979	35	6-36										SANDY CLAY, 20-21; SHALE, 21-35	COOK
16716N05W013D	DAN FELTZ	1971	30	36				1171	13.00					SAND, 10-21	MILES
16716N05W014A	HAROLD GRAVES	1979	33	6-36										SHALE, 26-33	COOK
16716N05W014A	SANGAMON VALLEY LANDFILL	1983	40	6-36										SAND & GRAVEL, 20-22; SHALE, 34-40	REYNOLDS
16716N05W015A	ROBERT RATSCH	1986	38	6-36										SAND, 16-18; SHALE, 28-38; LIMESTONE BELOW	REYNOLDS
16716N05W016B	ROGER FILE	1975	19	--										CAVING SAND	REYNOLDS
16716N05W016C	DAVE SMITH	1980	27	6-36-30										SANDY DRIFT; 17-20; SAND ROCK, 20-27	ERWIN
16716N05W016C	LAWRENCE FOWLER	1968	29	36				1068	17.00					SAND, 18-24	MILES
16716N05W016E	LUKE CARTER	1966	54	4.5				0966	8.00					DIRTY SAND, 12-17; SAND, 17-20; SAND & GRAVEL, 20-53; SANDSTONE & SHALE, 53-54	HAYES
16716N05W016E	RAIL GOLF CLUB	1975	53	10	18	10	.025	1175	10.59	10.52	305	3	29	SAND, 30-53	BAKER
16716N05W016F	SHERMAN	1966	51	--										SAND, 14-25; SAND & GRAVEL, 25-30; SAND, 30-45; SAND & GRAVEL, 45-50; ROCK, 50-51	HAYES
16716N05W016G	"THE RAIL" BROOKDALE DEVLPMT	1994	18	--										SHALE, 15-18	BAKER
16716N05W017A	EARNEST LUKES	1976	31	6-36-30				0576	9.00					SAND, 10-12	ERWIN
16716N05W017H	JOE CARTER	1985	23	6-36										SAND, 6-8; SAND ROCK, 8-23; LIMESTONE BELOW	ERWIN

Appendix I-2. (Continued)

Well location	Well owner	Well: Year constructed	Well: Depth (ft)	Well: Diameter (in)	Screen: Length (ft)	Screen: Diameter (in)	Screen: Slot Size (in)	Test data: Date (mmyy)	Test data: Static level (ft)	Test data: Drawdown (ft)	Test data: Pumping rate (gpm)	Test data: Length of test (hr)	Test data: Specific capacity (gpm/ft)	Water-bearing formation and depth interval (ft)	Driller
16716N05W022A		1965	30	36				??65	15.00					SHALE, 27-30	MILES
16716N05W027C	SHERMAN	1966	56	--										SAND, 14-15; SAND & GRAVEL, 15-20; SAND, 20-55; SHALE, 55-56	HAYES
16716N05W027D	SHERMAN	1966	57	--										SAND & GRAVEL, 12-15; SAND & CLAY, 15-20; SAND & GRAVEL, 20-24.7; SAND, 45-55; SHALE, 55-57	HAYES
16716N05W027E	SHERMAN	1966	72.5	--										DIRTY SAND, 5-10; SAND, 10-30, 51-72; SHALE BELOW	HAYES
16716N05W027H	SHERMAN	1966	57	--										SAND, 13-19, 32-52; SAND & GRAVEL, 52-56; SHALE, 56-57	HAYES
16716N05W031A	CHESTER LANCE	1973	26	6-36										SAND, 3-7; SANDY CLAY, 13-16	REYNOLDS
16716N05W034A	DAVENPORT BUILDERS	1978	40	6-36				0878	12.00					SAND, 8-15; SANDY CLAY. 15-16; SHALE, 28-40	ERWIN
16716N05W034A	HAROLD CLINE	1976	30	6-36										SAND, 13-15	ERWIN
16716N05W034A	RICK SCHOFINER	1989	50	6-36										SANDY CLAY, 19-21; SHALE, 27-50	REYNOLDS
16716N05W034D	SANDRA & DAVID DODSON SR	1973	31	6-36										SANDY CLAY, 14-17	COOK
16716N05W035A	ROBERT HAYES	1987	35	6-36										SAND, 12-14; SANDY CLAY, 14-19; SHALE, 29-35; LIMESTONE BELOW	REYNOLDS
16716N05W035A	KATHY KRUSZ	1991	35	6-36	10									SAND, 13-16, 20-21; LIMESTONE AT 35	REYNOLDS
16716N05W035B	HOWARD CROWDER	1988	41	6-36-24										SANDY CLAY, 19-23; SANDSTONE, 39-41; LIMESTONE BELOW	REYNOLDS
16716N05W035D	JON CIOTTI	1988	51	6-36-24										SAND, 12-18; SANDSTONE, 36-51	REYNOLDS
16716N05W043B	JOHN GATSCHENBERGER	1977	34	6-36											ERWIN
16716N05W044A	JOHN GATSCHENBERGER	1992	41	6-36										SAND, 12-19; SANDSTONE, 33-41; LIMESTONE BELOW	REYNOLDS
16716N05W044E	D ANDERSON	1977	32	6-36										SAND, 14-21	BEASLEY
16716N05W044E	D ANDERSON	1977	25	6-36										SAND & SILT, 14-21	BEASLEY
16716N05W044E	DWIGHT ANDERSON	1977	30	6-36										SAND & SILT, 14-24	BEASLEY
16716N05W044F	JOHN GATSCHENBERGER	1972	63	5	4	6	.020	0172	4.70	18.30	30	6.5	1.6	SAND, 16-18; SAND & GRAVEL, 18-22, 52-53.5; SHALE, 57-62 & BELOW 63	GIBBS
16716N05W045A	MILLARD KADYK	1968	24	36				0568	11.00					SAND, 14-24	MILES
16716N05W045A	GEORGE STREMSTERFER	1968	27	36				??68	800					SAND, 6-10, 18-24	MILES
16716N05W045A	GEORGE STREMSTERFER	1968	27	36				0468	8.00					SAND, 6-10, 18-24	MILES
16716N05W045A	M D ROGERS	1968	24	36				0668	13.00					SANDY LOAM, 14-24	MILES
16716N05W045C	GEORGE BOCKSTINE	1987	30	6-36										SAND, 2-8; SAND ROCK, 26-30	ERWIN
16716N05W045C	GERALD FOSTER	1989	34	6-36										SAND, 12-17; LIMESTONE AT 34	REYNOLDS
16716N05W045D	CHARLES ROLLY	1983	32	6-36										SANDY CLAY, 14-19	REYNOLDS
16716N05W045E	GENE BRIMM	1988	44	6-36-24										SAND, 3-18; SANDSTONE, 35-44	REYNOLDS
16716N05W045H	MIKE SHELTON	1979	42	6-36				0779	23.00					SHALE, 19-42	ERWIN
16716N05W046D	BERNICE FOFI	1989	38	6-36										SAND, 1-6	JACOBS
16716N05W046E	DWIGHT ANDERSON	1976	31	6-36										SAND, 6-14; GRAVELLY CLAY, 14-15	BEASLEY
16716N05W047A	JACK RODERICK	1978	34	10-36										SAND, 6-20	REYNOLDS
16716N05W048A	BERTHA LOGUE	1987	30	6-36										SAND, 8-14; LIMESTONE AT 30	REYNOLDS
16716N05W057F	FANCY CREEK TWP PWD	1978	52	--										DIRTY SAND, 35-50	BAKER
16716N05W057G	FANCY CREEK TWP PWD	1978	52	--										DIRTY SAND, 10-20; SAND, 20-40	BAKER
16716N05W057H	FANCY CREEK TWP PWD	1978	52	--										DIRTY SAND 81 GRAVEL, 10-20; SAND, 20-52	BAKER
16716N05W058F	FANCY CREEK TWP PWD	1978	47	--										SAND, 17-47; SHALE BELOW	BAKER
16716N05W058G	FANCY CREEK TWP PWD	1978	30											SHALE, 25-30	BAKER
	ROBERT MC KEMIE	1989	55	6-36										SAND & GRAVEL, 23-27; SHALE, 27-55; LIMESTONE BELOW	REYNOLDS
16716N05W061D	FANCY CREEK TWP PWD	1978	55	--										SAND, 20-35; SILTY SAND, 35-40; SHALE, 54-55	BAKER
16716N05W061E	FANCY CREEK TWP PWD	1978	56	--										SAND, 15-50; SAND & GRAVEL, 50-56	BAKER
16716N05W062H	MARTY USHMAN	1988	30	6-36											JACOBS
16716N05W062H	GREG MUELLER	1989	40	6-36	19									SAND & GRAVEL, 21-25	MUELLER
16716N05W064H	FRANK LIVINGSTONE	1993	48	6-36										SHALE, 17-48	REYNOLDS
16716N05W065H	MIKE CARILE	1985	45	6-36										SAND & GRAVEL, 25-45	REYNOLDS

Appendix I-2. (Continued)

Well location	Well owner	Well: Year constructed	Well: Depth (ft)	Well: Diameter (in)	Screen: Length (ft)	Screen: Diameter (in)	Screen: Slot Size (in)	Test data: Date (mmyy)	Test data: Static level (ft)	Test data: Drawdown (ft)	Test data: Pumping rate (gpm)	Test data: Length of test (hr)	Test data: Specific capacity (gpm/ft)	Water-bearing formation and depth Interval (ft)	Driller
16716N05W067B	LESLIE WOODRUM	1976	30	6-36										SAND & GRAVEL, 16-17	REYNOLDS
I6716N05W068H	JOHN PROFITT	1978	33	6-36										SANDY CLAY, 17-18	COOK
16716N05W068H	STEVE YEAKUM	1989	39	6-36										SAND & GRAVEL, 12-14; SHALE, 32-39	REYNOLDS
16716N05W07	JOHN BLAKLEY	1991	30	6-36										SAND & GRAVEL, 27-30	WHITE
16716N05W071C	ERNEST BLIESNER	1974	46	6-36										SAND, 38-39	REYNOLDS
16716N05W072B	ROBERT MORROW	1987	50	6-36										SANDY CLAY, 28-30	REYNOLDS
16716N05W073C	SHERMAN SMITH	1993	41	6-36										SAND, 10-15	REYNOLDS
16716N05W074A	HAROLD L OSBORNE	1975	30	6-36										CLAY, 16-18	ERWIN
16716N05W074B	ROSS KELLEY	1977	43	6-36										--	ERWIN
16716N05W074B	DOUGLAS & MARJORIE NORRIS	1974	22	--										--	COOK
16716N05W074B	ROSS KELLEY	1977	40	6-36										--	ERWIN
16716N05W074D	MIKE ROCKFORD	1993	48	6-36										SAND, 11-15; SAND & GRAVEL, 26-27	REYNOLDS
16716N05W074E	JERRY SANDERFIELD	1990	45	6-36										SAND, 12-18	REYNOLDS
16716N05W075A	JERALD L MCCASKEY	1970	30	36				1270	14.00					SAND & GRAVEL, 15-18	MILES
16716N05W075A	LAWRENCE METZROTH	1975	40	6-36				1175	9.00					SANDY CLAY, 18-20	ERWIN
16716N05W075B	LARRY METZROTH	1978	45	6-30				1078	15.00					SAND, 6-11; SHALE, 31-45	ERWIN
16716N05W075C	FREDRICK BROWN	1973	18	36										SAND, 5-11	REYNOLDS
16716N05W075C	FRED UHLIG	1983	31	6-36										SAND & GRAVEL, 12-16	REYNOLDS
16716N05W076B	JOHN STIEVEN	1987	37	6-36										SANDY CLAY, 14-17	REYNOLDS
16716N05W076B	KATHY SGRO	1986	40	6-36										SAND (WATER AT 12), 0-18	ERWIN
16716N05W076B	CHARLES W SEVERNS	1980	38	6-36										SAND, 8-13; SANDY CLAY, 18-23	REYNOLDS
16716N05W076B	STEVE CLARK	1985	36	6-36										SAND, 8-15; SAND & GRAVEL, 34-36	REYNOLDS
16716N05W076B	LEROY COHNEN	1989	45	6-36										SAND, 21-23	REYNOLDS
16716N05W077A	GEORGE HOEMAN	1986	30	6-30				0486	6.00					SAND, 5-12; TILL, 12-30	ERWIN
16716N05W077A	SAM SULLIVAN	1978	55	10-36										SAND, GRAVEL & CLAY, 48-55	REYNOLDS
16716N05W077B	DICK STOVE	1986	40	6-?										SANDY CLAY, 17-19; SAND & GRAVEL, 35-36	REYNOLDS
16716N05W077B	STEVE CLARK	1984	32	6-36										SAND, 10-14	REYNOLDS
16716N05W078A	SAM SULLIVAN	1974	40	6-36										SANDY CLAY, 11-13	REYNOLDS
16716N05W078A	MYRA MORROW	1970	29	36				0770	17.00					SAND, 18-21	MILES
16716N05W078C	AL YOUNG	1980	60	10-36										SAND, 23-24	REYNOLDS
16716N05W078F	DAN SAUSAMAN	1993	40	6-36										SAND, 10-12, 35-40	REYNOLDS
16716N05W081F	ROBERT G MENILLE	1965	32	36-24				??65	9.00					SAND, 5-20; SAND ROCK, 30-32	MILES
16716N05W082H	MERLE BUERKETT	1992	46	6-36										SANDSTONE, 25-46	REYNOLDS
16716N05W083G	ROBERT CARY	1965	32	36				?765	12.00					CLAY & SAND, 10-32	MILES
16716N05W084E	STEVE LISTER	1978	34	6-30				1078	7.00					SAND, 8-17; SILTY SANO, 25-28; SANDSTONE, 28-34	ERWIN
16716N05W084F	RAYMOND COX	1977	40	6-36										--	ERWIN
16716N05W085E	JOHN CISSNA	1977	42	6-36										SANDY CLAY, 12-17; SAND & GRAVEL, 27-28; ROCK, 28-42	REYNOLDS
16716N05W09	HAROLD & CATHERENE CLINE	1968	29	30				1168	9.00					SAND, 12-16	MILES
16716N05W09	BACON & VAN BUSKIRK GLASS INC	1975	21	6-36										SAND, 9-21	REYNOLDS
16716N05W093F	MARGARET E TAYLOR	1975	22	6-36				0875	9.00					SAND, 10-22	ERWIN
16716N05W094E	PLEASANT NURSERY INC	1980	37	10-36										SAND, 5-12; SANDY CLAY, 22-26; LIMESTONE AT 37	REYNOLDS
16716N05W094G	FRANK MOSCARDELLI NURSERY	1977	39	6-36										SANDY CLAY, 4-9; SAND & MUD, 9-22; SHALE, 32-39	REYNOLDS
16716N05W094G	FRANK MOSCARDELLI	1977	36	6-36										SANDY CLAY, 8-10; SAND & GRAVEL, 10-20; SILT & SAND, 20-30; SHALE, 30-36	REYNOLDS
16716N05W094H	THOMAS MARKEY	1975	31	6-36										--	ERWIN
16716N05W095H	HENRY KRUGER	1965	30	36				?765	9.00					SAND, 10-20	MILES
16716N05W094H	GENE BRIMM	1975	25	6-36										SANDY CLAY, 11-15	REYNOLDS
16716N05W095H	EARL HORN	1981	30	6-36										SAND, 8-17; SAND & GRAVEL, 26-28	REYNOLDS
16716N05W095H	TOM BRADENBURG	1982	29	6-36										SAND, 20-21; ROCK AT 29	REYNOLDS
16716N05W096H	HERBERT DORSCH	1964	75	4	36			0664	14.00	39.00	2	0.2	0.1	SAND ROCK, 39-54; SHALE, 54-75	HANKS
16716N05W096H	HERBERT DORSCH	1964	75	4	35			0464	10.00		10	0.5		SANDSTONE, 39-54; SHALE, 54-75	HANKS
16716N05W096H	HERBERT DORSCH	1964	58	--				0764	15.00		0.5			SANDSTONE, 40-54; SHALE, 54-58	HANKS

Appendix I-2. (Continued)

Well location	Well owner	Well: Year constructed	Well: Depth (ft)	Well: Diameter (in)	Screen: Length (ft)	Screen: Diameter (in)	Screen: Slot Size (in)	Test data: Date (mmyy)	Test data: Static level (ft)	Test data: Drawdown (ft)	Test data: Pumping rate (gpm)	Test data: Length of test (hr)	Test data: Specific capacity (gpm/ft)	Water-bearing formation and depth interval (ft)	Driller
16716N05W096H	FRED A LAVIGNE	1980	30	6-36										SAND, 8-14; CLAY & SAND, 19-22	REYNOLDS
16716N05W096H	RONALD SMITH	1982	34	6-36										SAND, 8-16; SANDSTONE, 32-34	REYNOLDS
16716N05W097H	HARRY PAULL JR	1980	30	6-36										SAND, 2-12; SANDSTONE, 29-30	REYNOLDS
16716N05W10	SPRINGFIELO	1921	52	24	27									SAND, 4-8; SAND WITH CLAY, 8-12; SAND, 12-45, 46-52	KELLY
16716N05W10															
16716N05W105F	GLENN STOUTENBOROUGH	1966	30	36										SAND, 0-11; CLAY & SAND, 11-30	MILES
16716N05W105F	DAVENPORT BUILDERS	1968	40	36	1			1068	19.00					SAND, 20-26	MILES
16716N05W105G	EDITH M LANGFIELD	1966	24	36				?766	10.00					SAND, 18-24	MILES
16716N05W105G	LARRY DAILY	1981	40	6-36				0681	14.00					SANDY CLAY, 16-24	ERWIN
16716N05W105H	GARY UNDERFANGER	1989	41	6-36										SAND, 18-21	JACOBS
16716N05W106D	ALLIS CHALMERS MFG	1966	27	36										SAND ROCK, 25-27	MILES
16716N05W106H	JAMES MILLER	1978	40	6-36											ERWIN
16716N05W106H	MIKE EMMONS	1991	30	6-36										SAND, 6-10	WHITE
16716N05W108A	CHARLES LEIGH	1985	35	6-36										SANDY CLAY, 14-21; SHALE, 31-35	REYNOLDS
16716N05W108E	DONALD FITZGERALD	1978	40	6-36											ERWIN
16716N05W11	FRANK SICILIANO	1968	30	36				1068	17.00					SAND, 21-23	MILES
16716N05W11	FRANK SICILIANO	1968	30	36				1068	17.00					SAND & GRAVEL, 21-23	MILES
16716N05W11	FRANK SICILIANO	1968	30	36				1068	17.00					SAND & GRAVEL, 21-23	MILES
16716N05W11	V RAY TELEPHONE BLDG		0												
16716N05W111G	JOHN & JOYCE STUPER	1973	37	6-30										SAND, 3-13	REYNOLDS
16716N05W114D	LOU MESSERY	1985	35	6-36				0285	17.00					SAND, 18-26	ERWIN
16716N05W117C	EDWARD PROCTOR	1978	75											SAND, 10-75	REYNOLDS
16716N05W117E	KEN POTTS	1979	30	6-36										SANDY CLAY, 17-18	COOK
16716N05W12	MR & MRS GEORGE SPONSLER	1955	155	5-4				??55	20.00	130.00	1	3.3	0.01	SANDSTONE, 17-18; GRAVEL WITH TILL; 18-34; SHALE, 34-36; LIMESTONE, 43-47; SANDSTONE, 50-66; SHALE, 66-116, 120-129, 12-144, 146-155	SPAULDING & CLARK
16716N05W12	STEVE BAJA	1959	80	6-4	21		3/4	0559	12.00	52.00	6	2	0.1	SHALE, 20-27; SANDSTONE, 27-80	SPAULDING
16716N05W12	JAMES RAINS	1965	30	36				7765	15.00		0.5			SAND, 3-20	COOK
16716N05W12	RICHARD LOPINTO	1976	34	6-36				1176	8.00					COAL - WATER, 20-24	ERWIN
16716N05W12	ROBERT OWENS	1976	32	6-36											ERWIN
16716N05W12	EMIL MALENSKY	1977	34	6-36											ERWIN
16716N05W12	BILL SHURES	1992	34	6-36				0992	12.00					SAND & GRAVEL, 13-16; SHALE, 21-34	DAVIS
16716N05W121G	BRIAN LOTT	1991	22												BRERGSCHNIEDER
16716N05W121H	RALPH MCCORD	1993	35	6-36										SAND & GRAVEL, 32-35	WHITE
16716N05W121H	GARY HUFFMAN	1992	40	6-36	11									SAND & GRAVEL, 20-21	REYNOLDS
16716N05W121H	LILLIAN KUNZ	1969	30	36				0869	14.00					SAND, 15-24	MILES
16716N05W121H	GINNY PIERCEALL	1986	51	6-36										SANDY STREAK, 30-31; COAL, 48-51	ERWIN
16716N05W121H	BOZ STEIN	1984	48	6-36										SANDY CLAY, 17-21; SAND & GRAVEL, 29-30	REYNOLDS
16716N05W122G	STEVE SMITH	1992	46	6-36										SAND & GRAVEL, 30-32	REYNOLDS
16716N05W122H	HOWARD NATION	1990	40	6-36										SAND, 23-24, 35-36; SHALE, 38-40	REYNOLDS
16716N05W122H	GEORGE PETROPOOLOS	1979	40	6-36				0779	21.00					SANDY CLAY, 26-27	ERWIN
16716N05W123D	WOODLAND ACRES MHP	1969	30	6-36				0469	5.29	4.71	10.5	1	2.2	SAND & GRAVEL, 22-25	MILES
16716N05W123G	WILLIAM ROSE	1993	28	6-36										CLAY, 7-28	WHITE
16716N05W123H	LARRY CRAEG	1971	30	36				1171	15.00					SANDY CLAY, 16-30	MILES
16716N05W124C	WOODLAND ACRES MHP	1971	31.5	6-36				0971	16.58	5.80	14	1	2.4	DRIFT	MILES
								1078	16.65						
16716N05W124C	WOODLAND ACRES MHP	1971	35.5	6-36				1171	16.25					DRIFT	MILES
16716N05W124D	WOODLAND ACRES MHP	1971	26.5	6-36				0971	17.16	3.78	23.2	0.2	6.1	DRIFT	MILES
16716N05W124D	WOODLAND ACRES MHP	1971	26	6-36				1171	19.10	3.09	10	0.4	3.2	DRIFT	MILES
16716N05W124D	WOODLAND ACRES MHP	1971	33	6-36				0971	17.60	7.81	14.8	0.6	1.9	DRIFT	MILES
16716N05W124D	WOODLAND ACRES MHP	1971	48	6-36				0971	20.94	15.23	14.7	1	1	DRIFT	MILES
								1078	17.10						
16716N05W124H	DARRLY LARGE	1976	40	6-36										SAND, 18-30	ERWIN
16716N05W124H	ROBERT TAYLOR	1991	58	6-36	13									SAND, 14-16; SAND & GRAVEL, 33-34	REYNOLDS
16716N05W125E	JACK FINLEY CO	1975	34	6-36										SANDY CLAY, 15-19	COOK

Appendix I-2. (Continued)

Well location	Well owner	Well: Year con- structed	Well: Depth (ft)	Well: Dia- meter (in)	Screen: Length (ft)	Screen: Dia- meter (in)	Screen: Slot Size (in)	Test data: Date (mmyy)	Test data: Static level (ft)	Test data: Draw- down (ft)	Test data: Pumping rate (gpm)	Test data: Length of test (hr)	Test data: Specific capacity (gpm/ft)	Water-bearing formation and depth Interval (ft)	Driller
16716N05W127F	JACK FINDLEY	1968	54	36				0968	34 00					SAND, 40-44	MILES
16716N05W127G	GEORGE SOLTYS	1970	36	36				1070	17.00					SAND, 18-21	MILES
16716N05W128H	ROBERT MCAFEE	1977	42	6-30										--	ERWIN
16716N05W184H	TOM BERBERET	1984	30	6-36										SANDY CLAY, 10-16; SAND & GRAVEL, 27-30	REYNOLDS
16716N05W184H	TOM BERBERET	1984	32	6-36										SANDY CLAY, 10-17; SAND & GRAVEL, 27-30	REYNOLDS
16716N05W185H	RANDY BROWN	1986	43	6-36										SANDY CLAY, 17-23	REYNOLDS
16716N05W185H	TED MAUPIN	1971	30	36				0271	14.00					SAND & GRAVEL. 15-18	MILES
16716N05W187H	SHIRLEY J KATZ	1976	30	6-36										SANDY CLAY, 11-15	REYNOLDS
16716N05W188H	RANDY BROWN	1981	41	6-36										SANDY CLAY, 10-16; SAND & GRAVEL; 31-36	REYNOLDS
16716N06W01	STEPHAN RITCHIE	1977	32	6-36										--	ERWIN
16716N06W021H	MIKE SULLIVAN	1984	37	6-36										SAND, 12-16; SAND & GRAVEL, 21-22; ROCK BELOW	REYNOLDS
16716N06W022H	DOYLE FARMS	1982	55	5	3	5	.015	0482	23 00					SAND, 10-55	ERWIN
16716N06W033G	LEE WELLS	1976	80	6-36										--	ERWIN
16716N06W033G	HARRY SHULL	1976	41	6-36										SAND & GRAVEL, 25-26	BERGSCHNEIDER
16716N06W034H	DICK LUTLE	1974	44	6-36										SAND, 22-24	BERGSCHNEIDER
16716N06W035C	JOHN CONSTANTINIDES	1990	45	6-36										SAND & GRAVEL, 20-23; SHALE, 30-45	REYNOLDS
16716N06W10	MILLER MCDONALD	1977	31	6-36										--	ERWIN
16716N06W10	HAROLD KOERNER	1976	37	6-36				0776	9.00					SANDY CLAY, 27-29	ERWIN
16716N06W10	MILLER MCDONALD	1977	35	6-36				0477	4.00					SANDY CLAY, 14-18	ERWIN
16716N06W10	MILLER MCDONALD	1977	40	6-36				0477	6.00					SANDY CLAY, 16-20	ERWIN
16716N06W10	WILLIAM ANGELL	1977	40	6-36										--	ERWIN
16716N06W10	PAUL & NANCY L BAYER	1976	40	6-36										HARDPAN, 20-25	COOK
16716N06W101D	MIKE BOURLAND	1986	40	6-36										CLAY, 31-40	ERWIN
16716N06W101H	JAMES E KERN	1975	29	36										--	ERWIN
16716N06W102G	JERRY A HYMAN	1977	40	6-36										SANDY CLAY, 20-30	COOK
16716N06W111C	TOM YOAKUM	1966	24	36				??66	12.00					SANDY LOAM, 10-24	MILES
16716N06W112F	CURRAN-GARDNER PWD	1976	57	--										SAND, 25-57; SHALE AT 57	BAKER
16716N06W113G	CURRAN-GARDNER PWD	1976	53	--										SAND, 25-53; ROCK BELOW	BAKER
16716N06W12	CURRAN-GARDNER PWD	1988	60.5	--										SILTY SAND, 13-32; SAND 81 GRAVEL, 32-43; SAND, 43-58; SAND & GRAVEL, 58-60.5; BEDROCK AT 60.5	BROTCKE
16716N06W12	CURRAN-GARDNER PWD	1988	60.3	--										SAND, 22-29; SAND & GRAVEL, 29-47; SAND, 47-60.2; BEDROCK AT 60.2	BROTCKE
16716N06W12	CURRAN-GARDNER PWD	1988	56	--										SAND & GRAVEL, 17-31; SAND, 31-40; SAND & GRAVEL, 40-56	BROTCKE
16716N06W121C	GLENN E MORRIS	1970	29	36				0770	17.00					SAND, 18-21	MILES
16716N06W121C	STEVE CLARK	1981	47	6-36										SANDY CLAY, 12-19; SAND & GRAVEL, 27-28	REYNOLDS
16716N06W121C	STEVE CLARK	1983	25	6-36										SANDY CLAY, 10-14; ROCK AT 25	REYNOLDS
16716N06W121E	EDWARD & HELEN BONNETT	1966	27	36				??66	18.00					SAND & GRAVEL, 20-21.5	MILES
16716N06W121F	BILL & LINDY SELTZER	1992	42											SAND, 13-15; SAND & GRAVEL, 32-33	REYNOLDS
16716N06W121G	HOWARD TUTTLE	1987	36	6-36										SAND, 2-6; SANDY CLAY, 14-19; ROCK AT 36	REYNOLDS
16716N06W125D	CURRAN-GARDNER PWD	1967	47	--										DIRTY SAND & GRAVEL, 15-22; SHALE, 41-47	BAKER
16716N06W125D	CURRAN-GARDNER PWD	1967	47	--										DIRTY SAND, 10-22; SHALE, 43-47	BAKER
16716N06W125F	CURRAN-GARDNER PWD	1968	55	26-12	12.5	12	060	1168	11.80	24.22	250	3	10.3	SAND, 25-47; SAND & GRAVEL, 51-55	BAKER
16716N06W125G	CURRAN-GARDNER PWD	1968	55	2	5	2	.040	1168	11.07					SAND, 5-45, 50-55	BAKER
16716N06W125G	CURRAN-GARDNER PWD	1968	56	--										SAND, 17-35; SAND 81 GRAVEL, 35-55	BAKER
16716N06W125G	CURRAN-GARDNER PWD	1968	56	6										SAND, 6-14; DIRTY SAND, 14-24; SAND, 24-40; SAND & GRAVEL, 40-47; SILTY SAND, 47-51; SAND, 51-56; SHALE BELOW	BAKER
16716N06W125G	CURRAN-GARDNER PWD	1968	57	--										SAND & GRAVEL, 10-30; SAND, 30-44	BAKER

Appendix I-2. (Continued)

Well location	Well owner	Well: Year constructed	Well: Depth (ft)	Well: Diameter (in)	Screen: Length (ft)	Screen: Diameter (in)	Screen: Slot Size (in)	Test data: Date (mmyy)	Test data: Static level (ft)	Test data: Drawdown (ft)	Test data: Pumping rate (gpm)	Test data: Length of test (hr)	Test data: Specific capacity (gpm/ft)	Water-bearing formation and depth interval (ft)	Driller
16716N06W125G	CURRAN-GARDNER PWD	1968	55	12	4	12	.040							SAND & GRAVEL, 4-47; DIRTY SAND & GRAVEL, 47-55; SHALE BELOW	BAKER
16716N06W126F	CURRAN-GARDNER PWD	1967	52	3.5	9	3	.080	2.21	12.42	130.00	2	10.5		SAND & GRAVEL, 10-51; SHALE, 51-52	BAKER
16716N06W126F	CURRAN-GARDNER PWD	1967	52	12	3	12	.060							SAND & GRAVEL, 6-51; SHALE, 51-52	BAKER
16716N06W126F	CURRAN-GARDNER PWD	1967	54	12	4	12	.060							SAND, 10-52; SHALE, 52-54	BAKER
16716N06W126G	CURRAN-GARDNER PWD	1968	37											SAND, 8-25; SHALE, 25-37	BAKER
16716N06W126G	CURRAN-GARDNER PWD	1967	52	12	2	12	.060							SAND & GRAVEL, 10-51; SHALE, 51-52	BAKER
16716N06W126H	CURRAN-GARDNER PWD	1968	32	--										SAND, 10-12	BAKER
16716N06W127F	CURRAN-GARDNER PWD	1968	50	2	5	2	.040	6.2						SAND, 8-50	BAKER
16716N06W127F	CURRAN-GARDNER PWD	1968	50	26-12	10.5	12	125	1268	7.20	16.83	300	3	17.8	DIRTY SAND, 10-25; SAND, 25-37; SAND & GRAVEL, 37-50	BAKER
16716N06W128E	CURRAN-GARDNER PWD	1988	54.5	28-12	15	12	.055	1088	16.10					SILTY SAND, 7-17; SAND & GRAVEL, 17-35; SAND, 35-40; SAND & GRAVEL, 40-54.5	BROTCKE
16716N06W128E	CURRAN-GARDNER PWD	1977	50	26-12	15 7.2	12 6	.060 .100	0777 0487	6.90 22.14	22.90	305	6.5	13 3	MUDDY SAND, 10-28; SAND, 28-36; SAND. 36.5-45; SAND & GRAVEL, 45-50	DIEHL PUMP
16716N06W128E	CURRAN-GARDNER PWS	--	65.5	2	3		SANDPOINT	0487	20.36						--
16716N06W128E	CURRAN-GARDNER PWD	1976	64	--										SAND, 25-60; SAND & GRAVEL, 60-64	BAKER
16716N06W128E	CURRAN-GARDNER PWD	1986	65	--										SILTY SAND, 20-37.5; SAND & GRAVEL, 37.5-48.5; SILTY SAND, 50-53; SAND & GRAVEL, 53-56; SILTY SAND, 56-57.5; SAND & GRAVEL, 57.5-65	PROFESSIONAL SERVICE
16716N06W128E	CURRAN-GARDNER PWD	1986	65	--										SILTY SAND, 20-37.5; SAND, 37.5-48.5; SILTY SAND, 48.5-53; SAND, 53-62.5; ROCK BELOW	PROFESSIONAL SERVICE
I6716N06W13	JOHN PIPER	1940	94	—				7740	62.00		60			MUD & GRAVEL, 20-56; LIME BOULDERS & DRIFT, 56-60; SANDY MUD; 60-81; SHALE, 81-94	ROWDEN
16717N04W31	WAYFIELD FARMS	1959	55.5	6.6	3	5.5	100	?759	4.60	20.40	50	2	2.5	SAND & GRAVEL. 17-27; SAND, 27-40; MUD SAND, 48-51; SAND & GRAVEL, 51-55; SHALE, 55-55.5	BAKER
16717M04W31	WILLIAMSVILLE	1955	58.5	--										SAND, 5-16.5; SAND & GRAVEL, 16.5-53.5; SHALE, 56-58	J P MILLER
16717N04W31	WILLIAMSVILLE	1955	60	--										SAND, 5-16.5; SAND & GRAVEL, 16.5-22; 43-53.6; SHALE, 57-60	J P MILLER
16717N04W31	WILUAMSVILLE	1955	58.5	--										SAND, 5-16.6; SAND & GRAVEL, 16.5-32.5, 43-48	
16717N04W311H	SPRINGFIELD MARINE BANK	1932	18	72				0334	10.00	8.00	8	3	1	SAND ROCK AT 18	WEIBKING
16717N04W316E	WILLIAMSVILLE	1955	55	6	10		.050-.030	0955	10.20					SAND, 5-16.5; SAND & GRAVEL, 16.5-53.5	J P MILLER
16717N04W316E	WILLIAMSVILLE	1964	56	--										SAND & GRAVEL, 22-26; SAND, 26-37; SAND & GRAVEL, 48-56; SHALE BELOW	BAKER
16717N04W316E	WILLIAMSVILLE	1964	55	8				0364	8.40	28.56	33	2.9	1.2	SAND	BAKER
16717N04W316E	WILUAMSVILLE	1964	55	8	5	8	.060	8.40						DIRTY SAND, 52-55	BAKER
16717N04W317C	PRATHER FARM		27	72				0334	10.00					SAND & GRAVEL AT 27	
16717N04W317E	WILLIAMSVILLE	1964	56	20-8	8	8	.100	0564 0766 1066	5.51 6.80 10.00	17.27 22.40	175 175	4.5 2	10.1 7.8	SAND & GRAVEL, 22-26; SAND, 26-37; SAND & GRAVEL, 48-56; SHALE BELOW	BAKER
16717N04W317E	WILLIAMSVILLE	1955	55	6	10	6	.050-.030	1263	13.94					SAND, 6-16.5, SAND & GRAVEL, 16.5-53.5	J P MILLER
16717N04W32	DENNIS BROWN	1992	30	6-36										SAND, 25-27	WHITE
16717N04W321C	ROGER BRANSON	1992	43	6-36										SAND, 19-20; SAND & GRAVEL, 25-26 SHALE, 40-43; LIMESTONE AT 43	REYNOLDS
16717N04W321D	ROGER BRANSON	1990	42	6-36										SANDY CLAY, 16-19; SHALE, 27-42	REYNOLDS
16717N04W321D	ROGER BRANSON	1987	28	6-36										SANDY CLAY, 14-19; SHALE, 27-28; LIMESTONE AT 28	REYNOLDS
16717N04W321G	JESSE REID	1976	31	6-36				0676	9.00					SAND, 18-20	ERWIN

Appendix I-2. (Continued)

Well location	Well owner	Well: Year constructed	Well: Depth (ft)	Well: Diameter (in)	Screen: Length (ft)	Screen: Diameter (in)	Screen: Slot Size (in)	Test data: Date (mmyy)	Test data: Static level (ft)	Test data: Drawdown (ft)	Test data: Pumping rate (gpm)	Test data: Length of test (hr)	Test data: Specific capacity (gpm/ft)	Water-bearing formation and depth interval (ft)	Driller
16717N04W322C	JOE BURGE	1979	40	6-36				0979	14.00					SAND & GRAVEL, 26-27	ERWIN
16717N04W322D	GLEN MATTHEWS	1988	36	6-36										SANDY CLAY, 14-21; SAND & GRAVEL, 21-22; ROCK AT 36	REYNOLDS
16717N04W322E	RICH COLEMAN	1990	54	6-36										SAND & GRAVEL, 24-26; SHALE. 39-54	REYNOLDS
16717N04W322F	LAURA SANER	1970	30	36				1170	15.00					SAND, 20-22	MILES
16717N04W322F	ROBERT MOORE	1974	35	6-36										SAND & GRAVEL, 18-20	COOK
16717N04W323D	JERRY VAN METER	1978	40	6-36-30				1278	14.00					SAND, 13-17, 26-30	ERWIN
16717N04W323D	LYNDA MUSSELLMAN	1991	40	6-36	16									SAND & GRAVEL, 25-27	REYNOLDS
16717N04W323D	WM SCHNEIDER	1992	28	6-36										SAND, 12-13; SHALE, 20-28; LIMESTONE AT 28	REYNOLDS
16717N04W323E	GEORGE T WALTERS	1915	17	36				0334	11.00					CLAY AT 17	--
16717N04W323F	MIKE CORBETT	1976	28	6-36										SANDY CLAY, 12-17	REYNOLDS
16717N04W323F	LARRY SAPP	1976	26	6-36										SANDY CLAY. 12-17; SAND & GRAVEL, 24-25	REYNOLDS
16717N04W323H	STEVE BUCKMAN	1990	40	6-36										SAND & GRAVEL, 31-33	REYNOLDS
16717N04W324D	ROBERT HEWITT	1993	34	6-36										SAND & GRAVEL, 20-22	REYNOLDS
16717N04W324D	NORM DAVIS	1979	40	6-36				0579	8.00					CLAY WITH SANDY STREAKS, 14-21	ERWIN
16717N04W324E	JAY ZMATIS	1978	29	6-36										SANDY CLAY, 18-24	BERGSCHNEIDER
16717N04W324E	LYND L RAGGINS	1976	35	6-36				0676	5.00					SAND, 20-21	ERWIN
16717N04W324E	ROBERT MOORE JR	1976	33	6-36										SANDY CLAY, 15-17	COOK
16717N04W324E	MERL AUSMUS	1989	43	6-36										SAND & GRAVEL, 27-29	REYNOLDS
16717N04W325D	RONNIE SANER	1974	40	6-36										SAND, 7-10; SAND & GRAVEL, 17-18	REYNOLDS
16717N04W325G	JACK HOSKINS	1987	40	6-36										SAND & GRAVEL, 27-31	REYNOLDS
16717N04W331A	ROBERT CALHOUN	1978	49	6-36										SANDY CLAY, 12-20; SAND, 21-22	REYNOLDS
16717N04W333C	RICHARD HOLLIS	1980	58	6-36										SHALE, 42-58	REYNOLDS
16717N04W334D	JAMES LEKA	1988	30	6-36										SANDY CLAY, 14-19	REYNOLDS
16717N04W335C	W J HOKE	--	49	42				0334	35.00					--	--
16717N04W335E	D F YOCUM	--	25	48				0334	22.00					CLAY AT 25	--
16717N04W337E	JOHN WILSON	1994	45	6-36										SHALE, 22-45	REYNOLDS
16717N04W338A	WM L COOKER	1990	30	6-36										SAND, 12-15	LINK
16717N04W338A	ROLLA J WOMACK	1992	47	6-36										SAND & GRAVEL, 19-20; SHALE, 26-47; LIMESTONE AT 47	REYNOLDS
16717N04W338D	J W SMITH	1924	21	60				0334	12.00					SAND AT 21	--
16717N04W338D	ROGER BRANSON	1988	40	6-36										SANDY CLAY, 14-21; SHALE, 27-40	REYNOLDS
16717N04W338E	CHUCK DONNELLE	1989	64	6-36-24										SHALE, 19-64	REYNOLDS
16717N04W338E	JAY OSHESKY	1989	53	6-36										SANDY CLAY, 19-25	REYNOLDS
16717N05W31	FRANKLIN JOHNSON	1993	38	6-36										SAND & GRAVEL, 20-22	WHITE
16717N05W315A	D GREIMER	1900	22	48				0334	12.00					SAND, GRAVEL & CLAY AT 22	--
16717N05W321E	FANCY CREEK TWP PWD	1966	32	3.5	5	3.6	.040	??66	3.20	14.80	150	3	10.1	SAND, 14-17; SAND & GRAVEL, 17-31; SHALE, 31-32	BAKER
16717N05W321E	FANCY CREEK TWP PWD	1966	32	1.2	3	1.2	.020	?766	3.39		8	0.2		SAND & GRAVEL, 14-31; SHALE, 31-32	BAKER
16717N05W321E	FANCY CREEK TWP PWD	1966	32	1.2	4	1.2	1/8	??66	3.58		3	0.2		SAND & GRAVEL, 14-20; SHALE, 29-32	BAKER
16717N05W321E	FANCY CREEK TWP PWD	1966	32	1.2	3	1.2	.012	??66	3.96		8	0.2		SAND & GRAVEL, 15-31; SHALE, 31-32	BAKER
16717N05W321E	FANCY CREEK TWP PWD	1966	27	--										SHALE, 19-27	BAKER
16717N05W321E	FANCY CREEK TOWNSHIP PWD	1966	29.5	3.5	5	3.6	.040	1266	3.45	9.15	115	3.3	12.6	SAND, 14-17; SAND & GRAVEL, 17-31; SHALE, 31-32	BAKER
16717N05W325A	LILLIAN FAIRCHILD	1982	44	6-36										SANDY CLAY, 16-22; SHALE, 39-44	REYNOLDS
16717N05W326A	ROGER WALSH	1979	43	10-36										SANDY CLAY, 10-15; SHALE, 28-43	REYNOLDS
16717N05W328A	MICHAEL BARRY	--	20	48				0334	12.00					--	--
16717N05W335A	SCHMIDGALL BROS	1964	36	18		18	3/16	??64	4.00	4.00	150	8	37.5	SAND & GRAVEL, 16-36	BROWN IRRIGATION
16717N05W336F	DAVID L BROWN	1980	35	6-36										SAND, 14-15	REYNOLDS
16717N05W337E	FANCY CREEK TWP PWD	1967	32	--										SAND, 15-20; SAND & GRAVEL, 20-28; SHALE, 28-32	BAKER
16717N05W338E	FANCY CREEK TWP PWD	1967	32	--										SAND & GRAVEL, 25-30; SHALE, 30-32	BAKER
16717N05W338E	FANCY CREEK TWP PWD	1967	31	--										SAND & GRAVEL, 24-28	BAKER
16717N05W352D	DUANE L GALLUP	1976	30	6-36										SANDY CLAY, 14-19; LIMESTONE AT 30	REYNOLDS
16717N05W356B	LENA L PETEFISH	--	50	48-10				0334	40.00	8.00	6	1.5	0.8	COAL, 20-25; SAND, AT 50	--
16717N05W36	J J HART	--	25	--										SAND W/CLAY, 5-13; SAND & GRAVEL,	--

Appendix I-2. (Concluded)

Well location	Well owner	Well: Year constructed	Well: Depth (ft)	Well: Diameter (in)	Screen: Length (ft)	Screen: Diameter (in)	Screen: Slot Size (in)	Test data: Date (mmyy)	Test data: Static level (ft)	Test data: Drawdown (ft)	Test data: Pumping rate (gpm)	Test data: Length of test (hr)	Test data: Specific capacity (gpm/ft)	Water-bearing formation and depth interval (ft)	Driller
														13-25	
16717N05W366C	ARNOLD VANCE	1978	12	--										SHALE, NO WATER, 4-12	REYNOLDS
16717N05W366C	ARNOLD VANCE	1978	30											SHALE, 25-30	REYNOLDS
16717N05W368E	WM CARPENTER	1933	22	72-60				0334	18.00	4.00	5	3	1.3	SAND AT 22	--
16717N06W22	PLEASANT PLAINS	1975	45.5	--										SILTY SAND, 3-6; SAND, 6-43	LAYNE-WESTERN
16717N06W22	PLEASANT PLAINS	1975	51.5	--										SAND. 7-28, 32-47.6; SAND & GRAVEL, 47.6-50	LAYNE-WESTERN
16717N06W22	PLEASANT PLAINS	1975	65.5	--										SAND, 7-61	LAYNE-WESTERN
16717N06W22	PLEASANT PLAINS	1975	36.5	--										SILTY SAND, 12.5-18; SAND, 18-29	LAYNE-WESTERN
16717N06W22	PLEASANT PLAINS	1975	51	--										SAND, 6-48	LAYNE-WESTERN
16717N06W22	PLEASANT PLAINS	1975	50.5	--										SILTY SAND, 3.5-7; SAND, 7-31.5; SILTY SAND, 31.5-50	LAYNE-WESTERN
16717N06W22	PLEASANT PLAINS	1975	61.5	--										SILTY SAND, 7.5-12.5; SAND, 12.5-25; SILTY SAND, 25-27; SAND, 27-61	LAYNE-WESTERN
16717N06W221A	DAVE RUDOLPH	1965	40	--										SAND, 2-14	MILES
16717N06W222G	PLEASANT PLAINS	1981	61	10	15	10	--	0181	16.15					SAND, 7-30; SAND & GRAVEL, 30-61	LAYNE-WESTERN
16717N06W222G	PLEASANT PLAINS	1975	61	10	15	10	.130	1276	16.50	8.50	200	3	23.5	SAND & GRAVEL, 8-30; SAND, 30-45; SAND & GRAVEL, 45-61	LAYNE-WESTERN
16717N06W223G	PLEASANT PLAINS	1975	60	10	15	10	.080	1275	12.19	6.85	210	3	30.7	SAND, 7-22; SAND & GRAVEL, 22-61	LAYNE-WESTERN
								1278	15.27	6.52	200	1.7	30.7		
16717N06W224E	PLEASANT PLAINS	1975	56.5	--										SAND & GRAVEL, 11-20; SAND, 37-52; SHALE, 52-56.5	LAYNE-WESTERN
16717N06W232E	R A SANDOVAL	1974	30	36										SANDY CLAY, 13-15	COOK
16717N06W232F	JOSEPH SANDOVAL	1981	42	6-36										SAND, 18-22	ERWIN
16717N06W234D	JAMES CARY	1983	40	6-36										SAND & GRAVEL, 31-32	REYNOLDS
16717N06W234D	MARSHA CARRINO	1985	41	6-36										SAND, 8-15; SANDY CLAY, 19-22	REYNOLDS
16717N06W235B	RICK CRONISTER	1985	61	6-36										TILL, 21-53; SAND & GRAVEL, 53-53.5; CAP ROCK, 53.5-54; TILL, 54-61	ERWIN
16717N06W235E	GERROLD NATION	1990	60	6-36										SAND, 5-20; SAND & GRAVEL, 30-31, 45-46	REYNOLDS
16717N06W238C	PLEASANT PLAINS	1975	46.5	--										SAND & GRAVEL, 9-28	LAYNE-WESTERN
16717N06W254D	HOWARD NATION	1972	30	36				0372	17.00					SANDY CLAY, 19-30	MILES
16717N06W255E	RANDY ATKINSON	1993	52	6-36										SANDY CLAY, 18-19	REYNOLDS
16717N06W255F	HAROLD BARBEE	1975	40	6-36										SAND, 3-6; SANDY CLAY, 15-17	REYNOLDS
16717N06W255F	HOWARD GOODMAN	1977	37	6-36										SANDY CLAY, 14-19	REYNOLDS
16717N06W256G	DAVE GILPIN	1977	28	6-36										SANDY CLAY, 12-17; SAND, 24-28	REYNOLDS
16717N06W258B	ROBERT EGIZII	1989	43	6-36										SAND & GRAVEL, 10-14; LIMESTONE, 21-43	REYNOLDS
16717N06W258G	FRANKIE COOPER	1977	42	6-36										--	ERWIN
16717N06W258H	JESSE WAKE	1985	51	6-36-24										SAND, 14-18	REYNOLDS
16717N06W261H	CARL E STANSBURY	1973	22	6-36										SAND, 11-17	COOK
16717N06W261H	DONALD WAKE	1977	28	6-36										SAND, 11-20	COOK
16717N06W262G	CAMP CILICA	1985	55	6-36										SAND, 12-14; SAND & GRAVEL, 35-37	REYNOLDS
16717N06W264D	CAMP CILICA	1966	42	8	10	8	.080	0966	15.83					SAND & GRAVEL	LAYNE-WESTERN
16717N06W27	STEPHEN L ZAUBI	1991	30	6-36										SAND & GRAVEL, 28-30	WHITE
16717N06W274E	CHARLES LORD	1974	94	--										--	REYNOLDS
16717N06W275E	JOHN D LEE	1976	40	6-36				0776	11.00					CLAY, 20-24	ERWIN
16717N06W341F	ANNA BELL ROURKE	1975	41	6-36				0575	15.30					SANDY CLAY, 25-29	COOK
16717N06W341H	JIMMIE KERN	1975	50	6-36										SANDY CLAY, 14-21	REYNOLDS
16717N06W343E	MRS JAMES ROURKE	1978	90	10-36										SAND, 65-75	REYNOLDS
16717N06W343E	JOHN R POWELL	1985	68	6-36										CLAY & SAND, 41-47; SAND, 47-53	ERWIN
16717N06W35	WILLIAM G STRATTON	--	35	6	6	5.6	.025	1157	8.00		35			--	SIMS
16717N06W366F	ROBERT PATTON	1978	30	10-36										SAND, 21-30	REYNOLDS

Appendix I-3. Chemical Analyses of Water Samples Taken within 1 Mile of the Sangamon River in Sangamon County

Well location	Well owner	Sample date	Lab. analysi number	Well depth (ft)	Iron (mg/l)	Manganese (mg/l)	Ammonium (mg/l)	Sodium (mg/l)	Calcium (mg/l)	Magnesium (mg/l)	Silica (mg/l)	Fluoride (mg/l)	Nitrate (mg/l)	Chloride (mg/l)	Sulfate (mg/l)	Alkalinity (mg/l as CaC03)	Hardness (mg/l as CaC03)	TDM (mg/l)	Temp (F)
16715N03W075C	ROCHESTER TH 2-88	04/28/88	5-0222528	55.5	0.07	0.06	--	9.2	80.8	40.3	--	0,3	32.7	29.0	88.1	262	368	444	
16715N03W113A	MECHANICSBURG-BUFFALO WATER COMM #2	09/09/71	5-0186604	48	2.6	0.16	--	--	--	--	--	0.3	0.4	8	--	322	368	418	54.9
16715N03W113A	MECHANICSBURG-BUFFALO WATER COMM #2	05/17/73	7-B110530	48	2.0	0.21	0.1	10	78	36	15	0.2	0	8	55	294	342	379	--
16715N03W113A	MECHANICSBURG-BUFFALO WATER COMM #2	03/12/76	7-A015622	48	1.0	0.2	0.1	9.2	75	33	13	0.4	0.4	9	50	295	325	410	--
16715N03W113A	MECHANICSBURG-BUFFALO WATER COMM #2	07/01/80	7-B000454	48	1.5	0.25	--	10	88	38	14	0.21	3.5	17	60	300	328	453	--
16715N03W113A	MECHANICSBURG-BUFFALO WATER COMM #2	07/06/82	7-B000527	48	1.86	0.300	<0.1	11	90	39.2	14	0.20	<0.4	35	53	294	366	616	--
16715N03W113A	MECHANICSBURG-BUFFALO WATER COMM #2	02/20/86	7-Z000796	48	1.576	0.26	--	--	--	--	--	--	--	49	55	291	--	449	47.3
16715N03W114A	MECHANICSBURG-BUFFALO WATER COMM TH #24	11/30/56	5-0142012	44	1.8	0.2	--	--	--	--	--	0.1	0.2	10	--	284	316	343	--
16715N03W114A	MECHANICSBURG-BUFFALO WATER COMM #1	01/24/61	5-0154071	45	1.9	0.1	--	--	--	--	--	0.2	0.9	6	--	288	330	341	56
16715N03W114A	MECHANICSBURG-BUFFALO WATER COMM #1	01/00/74	7-B107643	45	0.02	0.00	0.1	9	76	36	16	0.3	0.0	8	54	292	342	623	--
16715N03W114A	MECHANICSBURG-BUFFALO WATER COMM #1	04/12/77	7-A020339	45	1.40	0.23	0.06	9.2	92.5	35.4	14	0.2	0.0	10	63	300	378	380	--
16715N03W114A	MECHANICSBURG-BUFFALO WATER COMM #1	03/19/79	7-B037745	45	0.92	0.17	<0.1	9	82	38	16	0.6	<0.4	23	57	274	361	383	--
16715N03W114A	MECHANICSBURG-BUFFALO WATER COMM #1	04/30/81	7-B052844	45	2.80	0.207	<0.1	11	90	38.5	14	0.23	<0.4	35	55	298	370	469	--
16715N03W114A	MECHANICSBURG-BUFFALO WATER COMM #1	10/12/83	7-B015207	45	1.6	0.290	<0.1	13	94	41.6	14	0.19	<0.4	40	58	305	406	444	--
16715N03W115B	GRACE HALL	10/00/76	1-0203286	45	0.2	0.70	--	--	--	--	--	--	12.5	37	--	412	546	646	--
16715N03W161H	G D WEATHERS	01/25/74	1-0194677	41	0.1	--	--	--	--	--	--	--	48.6	20	--	444	576	663	--
16715N03W168G	C BRYANT FLATT	10/23/73	1-0193846	0	trace	0.03	0.1	3.6	64.4	24.2	15.0	0.2	0.0	3	45.9	216	260	317	--
16716N01W208H	BORDEN CHEMICAL & PLASTICS CO #3	04/00/42	5-0092703	33.5	1.2	--	--	--	--	--	--	--	--	5	--	192	212	282	--
16716N01W208H	BORDEN CHEMICAL & PLASTICS CO #3	05/09/42	5-0092950	33.5	1.4	0.4	trace	17.9	62.5	17.4	12.0	--	2.1	3.0	41.3	218	227	289	52.4
16716N01W208H	BORDEN CHEMICAL & PLASTICS CO #3	07/25/42	5-0093517	33.5	3.6	0.5	0.4	11.7	83.3	31.2	15.0	--	1.6	9	64.2	282	336.5	415	54.5
16716N02W257B	BORDEN CHEMICAL & PLASTICS CO #13	05/05/81	7-B053974	47	4.77	0.467	0.8	54	111	34.4	14	0.20	<0.4	98	108	284	398	671	--
16716N02W257B	BORDEN CHEMICAL & PLASTICS CO #13	10/13/83	7-B015303	47	2.0	0.322	0.1	12	128	48	14	0.10	4.2	37	127	347	510	660	--
16716N02W257B	BORDEN CHEMICAL & PLASTICS CO #13	02/14/84	7-B031147	47	4.2	0.458	1.7	32	99	33.6	12	0.10	<0.4	45	70	317	402	514	--
16716N02W257B	BORDEN CHEMICAL & PLASTICS CO #13	03/06/84	7-B033771	47	4.400	0.479	0.8	26	108	35.8	12	0.22	2.9	38	70	336	429	502	--
16716N02W257B	BORDEN CHEMICAL & PLASTICS CO #13	09/29/86	7-Z000880	47	3.395	0.423	0.5	17	112	35	16	0.16	<0.4	38	62	362	424	593	57.6
16716N02W257B	BORDEN CHEMICAL & PLASTICS CO #13	03/31/92	7-B204418	47	4.8	0.447	1.1	43.2	105	34.6	13.2	0.13	<0.04	79	78	335	294	568	--
16716N02W258A	BORDEN CHEMICAL & PLASTICS CO #14	04/20/82	5-0217025	48	3.74	0.43	2.96	64.2	82.8	31.2	--	0.3	<0.5	80	84.3	277	335	526	--
16716N02W258A	BORDEN CHEMICAL & PLASTICS CO #14	04/28/82	7-B043249	48	3.700	0.430	3.2	76	86	30.6	10	0.20	<0.4	97	88	282	337	434	--
16716N02W258A	BORDEN CHEMICAL & PLASTICS CO #14	07/13/82	5-0217407	48	3.7	0.44	--	48.9	82.6	30.4	--	0.2	<0.5	58	--	288	332	497	--
16716N02W258A	BORDEN CHEMICAL & PLASTICS CO #14	06/10/83	5-0218625	48	4.68	0.55	--	43.7	99.5	35.8	--	0.3	<0.6	63	96	296	396	543	54.5
16716N02W258A	BORDEN CHEMICAL & PLASTICS CO #14	09/29/86	7-Z000869	48	3.909	0.759	1.8	108	104	36	7	0.26	<0.4	1S8	101	289	408	734	60.8
16716N02W258A	BORDEN CHEMICAL &	03/31/92	7-B204413	48	2.0	0.684	--	--	--	--	--	--	--	92	31	237	296	651	--

Appendix I-3. (Continued)

Well location	Well owner	Sample date	Lab. analysl number	Well depth (ft)	Iron (mg/l)	Manganese (mg/l)	Ammonium (mg/l)	Sodium (mg/l)	Calcium (mg/l)	Magnesium (mg/l)	Silica (mg/l)	Fluoride (mg/l)	Nitrate (mg/l)	Chloride (mg/l)	Sulfate (mg/l)	Alkalinity (mg/l as CaC03)	Hardness (mg/l as CaC03)	TDM (mg/l)	Temp (F)
	PLASTICS CO #14																		
16716N02W261C	BORDEN CHEMICAL & PLASTICS CO #5	07/22/42	5-0093449	56.2	2.3	0.0	0.1	11.5	78.0	33.6	15.0	--	2.3	12.0	62.9	274	333.5	407	54.5
16716N02W261C	BORDEN CHEMICAL & PLASTICS CO #9	01/17/69	5-0177567	56.5	1.6	0.37	--	--	--	--	--	0.2	7.0	12	--	366	582	705	--
16716N02W261C	BORDEN CHEMICAL & PLASTICS CO #9	12/26/73	7-B106677	56.5	2.1	0.25	0.0	9	100	40	15	0.2	8.6	16	100	300	417	407	--
16716N02W261C	BORDEN CHEMICAL & PLASTICS CO #9	03/05/75	7-A015179	56.5	5.2	0.3	0.0	6.2	92	30	10	0.3	3.1	12	65	270	360	385	--
16716N02W261C	BORDEN CHEMICAL & PLASTICS CO #9	04/11/77	7-A020174	56.5	1.20	0.2	0.26	8.1	101.5	41.5	13	0.2	0.88	17	87	340	425	460	--
16716N02W261C	BORDEN CHEMICAL & PLASTICS CO #9	03/20/79	7-B037994	56.5	1.3	0.25	0.1	8	107	44	14	0.3	3.5	20	98	322	454	472	--
16716N02W261C	BORDEN CHEMICAL & PLASTICS CO #9	05/05/81	7-B053969	56.5	1.62	0.301	0.1	10	124	47	14	0.19	0.4	23	136	358	498	607	--
16716N02W261C	BORDEN CHEMICAL & PLASTICS CO #9	01/31/86	7-Z000882	56.5	1.956	0.292	0.2	26	122	48	14	0.13	7.97	106	93	--	502	689	56.3
16716N02W261C	BORDEN CHEMICAL & PLASTICS CO #9	03/31/92	7-B204415	56.5	2.9	0.378	0.2	77	130	49.1	12.3	0.18	1.7	182	85	334	418	796	--
16716N02W262B	BORDEN CHEMICAL & PLASTICS CO #6	07/17/42	5-0093437	55	2.1	0.3	0.2	17.0	73.5	33.3	13.5	--	0.4	11	46.3	294	320.5	368	54.8
16716N02W262B	BORDEN CHEMICAL & PLASTICS CO #17	03/31/92	7-B204417	55	1.1	0.609	0.10	--	87.7	37.0	11.8	0.20	<0.04	--	86	285	385	597	--
16716N02W263A	SANGAMON ORDNANCE PLANT TH3	03/00/42	1-0092609	65	0.7	--	--	--	--	--	--	--	--	10	--	286	318	370	--
16716N02W263B	BORDEN CHEMICAL & PLASTICS CO #10	03/05/69	5-0177572	58	1.0	0.41	--	--	--	--	--	0.3	0.2	10	--	254	328	388	53
16716N02W263B	BORDEN CHEMICAL & PLASTICS CO #10	12/26/73	7-B106674	58	1.9	0.47	0.0	7	75	33	12	0.4	0.4	13	75	256	326	364	--
16716N02W263B	BORDEN CHEMICAL & PLASTICS CO #10	03/05/75	7-A015178	58	2.2	0.4	0.2	6.2	92	33	11	0.2	0.8	8	75	290	370	400	--
16716N02W263B	BORDEN CHEMICAL & PLASTICS CO #10	03/20/79	7-B037991	58	2.2	0.60	0.1	13	103	43	12	0.3	0.9	34	93	305	429	474	--
16716N02W263B	BORDEN CHEMICAL & PLASTICS CO #10	05/05/81	7-B053981	58	2.82	0.642	<0.1	19	110	45.3	12	0.22	<0.4	44	124	306	430	639	--
16716N02W263B	BORDEN CHEMICAL & PLASTICS CO #10	10/13/83	7-B015310	58	2.500	0.621	<0.1	20	105	39	11	0.20	1.5	43	100	300	449	502	--
16716N02W263B	BORDEN CHEMICAL & PLASTICS CO #10	01/31/86	7-Z000876	58	2.075	0.511	<0.1	16	92	38	11	0.22	2.3	44	84	--	386	504	56.3
16716N02W265A	BORDEN CHEMICAL & PLASTICS CO #11	05/02/72	5-0188437	60	4.3	0.42	--	--	--	--	--	0.2	0.4	13	--	292	392	466	54
16716N02W265A	BORDEN CHEMICAL & PLASTICS CO #11	12/26/73	7-B106675	60	2.6	0.48	0.1	8	83	37	13	0.3	0.0	10	105	276	363	393	--
16716N02W265A	BORDEN CHEMICAL & PLASTICS CO #11	03/05/75	7-A015182	60	2.2	0.4	0.2	8.0	92	33	10	0.2	2.2	11	80	270	370	405	--
16716N02W265A	BORDEN CHEMICAL & PLASTICS CO #11	04/11/77	7-A020178	60	2.58	0.48	0.32	12.5	97.5	41.5	11	0.2	0.0	35	130	285	418	500	--
16716N02W265A	BORDEN CHEMICAL & PLASTICS CO #11	03/20/79	7-B037997	60	2.7	0.62	0.3	25	117	45	12	0.2	2.2	62	127	305	474	570	--
16716N02W265A	BORDEN CHEMICAL & PLASTICS CO #11	05/05/81	7-B053977	60	2.95	0.531	0.1	17	107	41.1	12	0.19	5.3	40	114	286	414	592	--
16716N02W265A	BORDEN CHEMICAL & PLASTICS CO #11	10/13/83	7-B015304	60	3.100	0.718	0.1	22	113	44.7	12	0.20	<0.4	36	129	302	466	529	--
16716N02W265A	BORDEN CHEMICAL & PLASTICS CO #11	01/31/86	7-Z000871	60	2.646	0.595	0.2	15	96	39	11	0.22	2.0	33	101	298	400	515	55.4
16716N02W265A	BORDEN CHEMICAL & PLASTICS CO #11	03/31/92	7-B204416	60	2.800	0.728	0.2	14.7	116	45.2	12.0	0.16	0.8	59	109	309	473	540	--
16716N02W347C	SANGAMON ORDNANCE PLANT TH1	03/19/42	1-0092607	70	1.0	--	--	--	--	--	--	--	--	9	--	234	296	332	--

Appendix I-3. (Continued)

Well location	Well owner	Sample date	Lab. analyst number	Well depth (ft)	Iron (mg/l)	Manganese (mg/l)	Ammonium (mg/l)	Sodium (mg/l)	Calcium (mg/l)	Magnesium (mg/l)	Silica (mg/l)	Fluoride (mg/l)	Nitrate (mg/l)	Chloride (mg/l)	Sulfate (mg/l)	Alkalinity (mg/l as CaC03)	Hardness (mg/l as CaC03)	TDM (mg/l)	Temp (F)
16716N02W348A	SANGAMON ORDNANCE PLANT TW	04/00/42	1-0092794		3.0	--	--	--	--	--	--	--	--	8.0	--	202	264	346	--
16716N02W354H	SANGAMON ORDNANCE PLANT TH69	06/04/42	1-0093115	53	2.4	--	--	--	74.7	27.1	--	--	1.1	8	59.2	236	298	321	53.8
16716N02W354H	BORDEN CHEMICAL & PLASTICS CO #7	07/07/42	5-0093360	53	3.9	0.7	0.4	10.4	67.1	28.0	13.0	--	1.7	8.0	53.1	238	282.5	344	54
16716N02W356F	SANGAMON ORDNANCE PLANT TH81	06/04/42	1-0093116	40	14	--	--	--	69.8	27.1	--	--	1.1	7	43.4	240	287	308	54
16716N02W356F	BORDEN CHEMICAL & PLASTICS CO #8	06/29/42	5-0093269	47	2.1	0.5	0.5	15.9	65.0	26.5	11.5	--	1.8	7.0	39.9	254	272	312	58
16716N02W356F	BORDEN CHEMICAL & PLASTICS CO #12	05/03/72	5-0188438	59.5	3.0	0.25	--	--	--	--	--	0.2	0.6	15	--	314	370	447	54
16716N02W356F	BORDEN CHEMICAL & PLASTICS CO #12	05/08/73	7-B110109	59.5	2.1	0.38	0.4	8	84	37	10	0.2	1.3	9	91	291	366	447	--
16716N02W356F	BORDEN CHEMICAL & PLASTICS CO #12	12/26/73	7-B106669	59.5	2.5	0.40	0.2	7	82	35	14	0.3	0.0	9	86	278	352	393	--
16716N02W356F	BORDEN CHEMICAL & PLASTICS CO #12	03/05/75	7-A015181	59.5	2.0	0.4	0.1	7.2	90	30	11	0.3	0.4	11	65	270	355	380	--
16716N02W356F	BORDEN CHEMICAL & PLASTICS CO #12	04/11/77	7-A020177	59.5	2.60	0.35	0.26	7.3	92.5	39.0	11	0.2	0.0	22	87	295	395	420	--
16716N02W356F	BORDEN CHEMICAL & PLASTICS CO #12	03/20/79	7-B037993	59.5	2.6	0.43	0.3	12	85	40	12	0.3	1.8	23	77	293	403	428	--
16716N02W356F	BORDEN CHEMICAL & PLASTICS CO #12	06/05/81	7-B053972	59.5	2.85	0.394	0.1	41	98	36.4	12	0.18	0.4	66	99	281	366	617	--
16716N02W356F	BORDEN CHEMICAL & PLASTICS CO #12	10/13/83	7-B015308	59.5	2.400	0.457	0.1	14	100	37	11	0.20	<0.4	20	87	320	400	438	--
16716N02W356F	BORDEN CHEMICAL & PLASTICS CO #12	01/31/86	7-Z000842	59.5	2.086	0.380	0.2	8.8	90	35	11	0.18	2.3	19	72	295	369	479	56.3
16716N02W356F	BORDEN CHEMICAL & PLASTICS CO #16	03/31/92	7-B204420	56	2.900	0.513	0.4	19.7	99.9	37.6	11.5	0.14	<0.04	66	94	297	289	539	--
16716N02W357G	SANGAMON ORDNANCE PLANT TH5	03/00/42	1-0092611	65	6.2	--	--	--	--	--	--	--	--	8	--	236	330	361	--
16716N04W042G	HOLIDAY ESTATES	09/17/74	7-B105214	42	0.0	0.0	0.3	11	92	34	22	0.2	18	16	66	278	369	436	--
16716N04W042G	HOLIDAY ESTATES	03/18/75	7-A015946	42	0.	0.00	0	12	95	32	21	0.2	12.8	20	60	275	370	430	--
16716N04W042G	HOLIDAY ESTATES	06/17/76	5-0202266	42	0.0	0.01	--	--	--	--	--	0.2	9.4	21	--	280	342	401	56
16716N04W042G	HOLIDAY ESTATES	05/02/77	7-A021747	42	0.00	0.00	0.13	11.0	87	32.6	22	0.2	6.16	22	65	260	351	510	--
16716N04W065E	STATE HIGHWAY DEPT #1	05/17/65	1-0165928	54.5	4.7	0.11	--	--	--	--	--	0.2	0.7	47	--	336	316	372	56.4
16716N04W154A	DAWSON TH4-58	11/21/58	5-0148231	56	trace	--	--	--	--	--	--	0.1	6.3	8	--	248	326	342	59.5
16716N04W154A	DAWSON TW1	01/31/62	5-0156586	27.1	trace	0.0	--	--	--	--	--	0.2	6.7	8	--	216	297	340	56
16716N04W166C	CAMP BUTLER CEMETERY #1	09/24/75	1-0199764	51	8.6	--	--	--	--	--	--	--	0.6	27	--	418	316	480	56
16716N04W167B	CAMP BUTLER CEMETERY #2	09/12/78	1-0209082	43	4.2	0.24	--	--	--	--	--	0.2	1.3	18	--	416	536	613	--
16716N04W212B	RIVER OAKS VILLAGE MHP#1	06/01/71	5-0185790	43	0.6	0.33	--	--	--	--	--	0.2	3.6	7	--	252	306	357	54.5
16716N04W212B	RIVER OAKS VILLAGE MHP#1	05/26/77	5-0205091	43	0.7	0.37	--	--	--	--	--	0.1	1.6	13	--	280	336	406	--
16716N04W212B	RIVER OAKS VILLAGE MHP#1	09/29/86	7-Z000896	43	0.528	0.342	<0.1	10	88	36	12	0.15	0.5	17	58	--	368	535	59
16716N04W212B	RIVER OAKS VILLAGE MHP#2	01/22/86	7-Z000889	40.5	0.772	0.414	<0.1	12	88	37	16	0.2	0.9	20	56	316	372	510	58.1
16716N04W226E	RIVERTON #6	01/19/89	5-0222859	55	0.26	0.23	--	9.8	68.8	27.6	--	0.1	4.0	20.4	96.0	211	285	366	--
16716N04W227E	RIVERTON #1	12/04/61	5-0156234	47	2.2	0.5	--	--	--	--	--	0.2	1.0	9	--	272	323	382	--
16716N04W227E	RIVERTON #1	12/04/61	5-0156235	47	1.8	0.5	--	--	--	--	--	0.2	2.6	10	--	264	313	370	--
16716N04W227E	RIVERTON #1	12/18/73	7-B106612	47	0.7	0.50	0.0	8	63	25	12	0.3	3.1	10	54	208	261	345	--
16716N04W227E	RIVERTON #1	03/05/75	7-A015175	47	1.0	0.5	0.2	8.0	75	27	10	0.2	9.7	15	60	215	300	340	--
16716N04W227E	RIVERTON #1	04/12/77	7-A020335	47	0.75	0.52	0.32	8.7	88.0	27.7	11	0.2	13.64	17	70	230	334	380	--
16716N04W227E	RIVERTON #1	03/21/79	7-B038167	47	0.90	0.61	0.1	9	84	34	11	0.3	10.6	21	67	255	334	380	--
16716N04W227E	RIVERTON #1	05/04/81	7-B053448	47	1.39	0.544	0.3	9	73	27.0	11	0.17	12.0	14	65	216	294	402	--
16716N04W227E	RIVERTON #1	10/11/83	7-B014883	47	0.820	0.539	0.3	10	74	29.0	11	0.15	12.4	17	62	221	306	368	--
16716N04W227E	RIVERTON #1	09/25/87	7-B715628	47	0.549	0.510	0.2	8.6	77	28	10	0.12	19.9	20	79	207	307	378	--

Appendix I-3. (Continued)

Well location	Well owner	Sample date	Lab. analysl number	Well depth (ft)	Iron (mg/l)	Manganese (mg/l)	Ammonium (mg/l)	Sodium (mg/l)	Calcium (mg/l)	Magnesium (mg/l)	Silica (mg/l)	Fluoride (mg/l)	Nitrate (mg/l)	Chloride (mg/l)	Sulfate (mg/l)	Alkalinity (mg/l as CaC03)	Hardness (mg/l as CaC03)	TDM (mg/l)	Temp (F)
16716N04W227E	RIVERTON #5	01/10/89	5-0222854	54.5	1.45	0.42	--	14.2	70.4	25.0		0.3	-0.1	25.9	--	232	278	387	--
16716N04W228E	RIVERTON #2	12/04/61	5-0156236	52	1.3	0.2						0.3	1.5	3	--	184	254	311	--
16716N04W228E	RIVERTON #2	05/16/73	7-B110486	52	1.5	0.44	0.4	9.3	84	30	10	0.3	5.7	18	63	244	333		--
16716N04W228E	RIVERTON #2	06/11/75	7-B113313	52	1.2	0.48	0.35	9	88	33	11	0.2	9.24	17	65	285	355	354	--
16716N04W228E	RIVERTON #2	06/08/77	7-A024220	52	1.2	0.38	0.13	10	80	28	12	0.9	7.0	31	70	230	317	405	--
16716N04W228E	RIVERTON #2	07/07/80	7-B001198	52	1.4	0.440	0.6	10	88	31	13	0.16	1.8	19	60	269	329	431	--
16716N04W228E	RIVERTON #2	07/12/82	7-B001296	52	1.50	0.475	0.3	11	90	32.9	10	0.16	8.9	21	51	280	331	338	--
16716N04W228E	RIVERTON #2	03/11/86	7-Z000898	52	1.111	0.530	0.6	12	99	31	10	0.18	4.4	27	60	315	375	459	54.5
16716N04W228E	RIVERTON #3	09/11/72	5-0189775	53	3.5	0.09						0.2	0.6	12		282	320	339	54.3
16716N04W228E	RIVERTON #3	07/07/80	7-B001192	53	3.200	0.500	0.4	10	78	30	13	0.15	<0.4	20	60	250	292	387	--
16716N04W228E	RIVERTON #3	07/12/82	7-B001300	53	2.8	0.590	0.2	10	77	29	13	0.16	<0.4	21	53	245	307	386	--
16716N04W228E	RIVERTON #3	07/23/87	7-B712110	53	3.102	0.627	0.3	12	82	30	13	0.17	<0.4	26	43	276	328	413	--
16716N04W228E	RIVERTON #4	10/14/81	5-0216280	56	0.9	0.3	--	12.9	57.7	23.8	--	0.2	1.0	6	--	244	242	265	54.5
16716N04W228E	RIVERTON #4	03/12/85	7-B033017	56	1.2	0.253	--	9	66	28.4	11	0.11	--	18	56	229	295	336	--
16716N04W228E	RIVERTON #4	03/11/86	7-Z000901	56	1.058	0.347	0.3	10	71	26	9.9	0.11	4.4	20	58	196	284	369	55.4
16716N04W256A	DAWSON #1	02/17/66	5-0168282	35.5	1.5	0.35	--	--	--	--	--	0.1	0.2	9	--	268	320	346	54.5
16716N04W256A	DAWSON #1	01/24/67	5-0170655	35.5	0.6	0.25	--	--	--	--	--	0.1	0.4	6	--	268	324	374	56.0
16716N04W256A	DAWSON #1	06/25/74	7-B100100	35.5	1.7	0.66	0.0	12	70	30	13	0.2	1.4	27	50	228	298	390	--
16716N04W256A	DAWSON #1	07/23/75	7-B063664	35.5	1.3	0.3	0.08	8.0	73	32	13	0.2	1.3	17	51	244	314	364	--
16716N04W256A	DAWSON #1	06/14/77	7-B050292	35.5	1.3	0.36	0.04	9	74	29	13	0.2	0.0	16	53	239	309	345	--
16716N04W256A	DAWSON #1	06/16/80	7-B056126	35.5	1.7	0.37	<0.1	7	80	33	12	0.18	4.0	11	58	273	336	385	--
16716N04W256A	DAWSON #1	07/19/82	7-B002242	35.5	1.17	0.632	<0.1	32	90	38	11	0.16	2.9	72	60	274	372	515	--
16716N04W256A	DAWSON #2	01/00/67	5-0170660	54	0.9	0.48	--	--	--	--	--	0.1	2.2	6	--	348	402	438	--
16716N04W256A	DAWSON #2	02/21/67	5-0170882	54	1.4	0.29	--	--	--	--	--	0.1	0.8	7	--	236	300	351	55.5
16716N04W256A	DAWSON #2	01/08/74	7-B107046	54	1.0	0.39	0.0	6	70	30	13	0.2	0.4	9	48	256	299	323	--
16716N04W256A	DAWSON #2	03/31/75	7-B132463	54	1.4	0.3	0.1	8	69	27	14	0.1	0.0	9	65	233	283	377	--
16716N04W256A	DAWSON #2	06/14/77	7-B050294	54	1.0	0.36	0.04	7	75	28	13	0.1	0.9	10	50	252	315	349	--
16716N04W256A	DAWSON #2	06/14/80	7-B056130	54	1.300	0.44	<0.1	10	82	34	12	0.16	1.3	23	60	283	344	395	--
16716N04W256A	DAWSON #2	07/19/82	7-B002532	54	1.0	0.404	<0.1	18	83	33.2	12	0.18	5.3	40	58	275	336	472	--
16716N04W256A	DAWSON #2	02/19/86	7-Z000872	54	<0.050	0.011	<0.1	18	82	36	12	0.95	5.3	44	65	262	353	450	55.4
16716N04W256B	DAWSON #3	02/19/86	7-Z000878	41	0.648	0.805	<0.1	11	87	38	12	0.11	<0.4	37	71	273	373	453	43.7
16716N04W285G	OAKCREST COUNTRY CLUB	08/00/57	1-0144253		--	--	--	--	--	--	--	--	--	9	--	106	168	202	--
16716N05W012H	WILLIAMSVILLE TW57-1	03/07/57	5-0142795	64	0.1	trace	--	--	--	--	--	0.0	23.7	38	--	308	2020	3125	59.3
16716N05W016E	LUKE CARTER TH1-66	09/28/66	1-0169953	54	0.8	0.49	--	--	--	--	--	0.2	1.3	14	--	332	488	592	--
16716N05W016E	RAIL GOLF CLUB #1	11/17/75	1-0200356	53	0.7	--	--	--	--	--	--	--	2.9	22	--	344	605	782	55
16716N05W016E	RAIL GOLF CLUB #1	02/02/82	7-B034395	53	0.181	0.007	<0.1	24	140	65.0	15	0.21	4.4	26	265	355	591	810	
16716N05W123D	WOODLAND ACRES MHP #1	04/23/69	5-0177972	30	7.6	0.27	--	--	--	--	--	0.3	3.0	9	--	164	192	249	51.5
16716N05W123D	WOODLAND ACRES MHP #1	11/26/90	7-B017427	30	0.130	0.015	0.1	14.2	39.6	24.7	9.3	0.64	6.2	50	53	130	200	335	--
16716N05W124C	WOODLAND ACRES MHP #5	09/17/71	5-0186683	31.5	1.1	0.00	--	--	--	--	--	0.2	11.1	150	--	276	556	623	57
16716N05W124C	WOODLAND ACRES MHP #5	11/26/90	7-B017424	31.5	<0.060	<0.016	<0.01	48.8	108	56	23	0.22	5.3	164	86	274	500	706	
16716N05W124C	WOODLAND ACRES MHP #7	11/12/71	5-0187070	35.5	0.5	0.52	--	--	--	--	--	0.3	1.9	54	--	372	456	574	56.5
16716N05W124C	WOODLAND ACRES MHP #7	11/26/90	7-B017430	35.5	<0.060	<0.015	0.09	20.2	49.2	26.4	13	0.58	3.7	56	49	142	231	346	--
16716N05W124D	WOODLAND ACRES MHP #2	09/17/71	5-0186693	26.5	0.6	0.00	--	--	--	--	--	0.3	15.8	7	--	268	260	427	--
16716N05W124D	WOODLAND ACRES MHP #3	11/12/71	5-0187071	26	0.3	0.00	--	--	--	--	--	0.4	14.6	4	--	332	394	478	57
16716N05W124D	WOODLAND ACRES MHP #4	09/16/71	5-0186658	33	0.4	0.00	--	--	--	--	--	0.3	3.4	3	--	244	210	325	56.9
16716N05W124D	WOODLAND ACRES MHP #6	09/16/71	5-0186656	48	5.7	0.27	--	--	--	--	--	0.3	16.9	5	--	276	362	480	57.0
16716N06W111E	CURRAN-GARDNER PWD #?	10/01/91	7-B113685	63	2.800	0.019	--	--	--	--	--	--	--	49	84	389	398	563	--
16716N06W125F	CURRAN-GARDNER PWD #2	11/22/68	5-0176854	55	0.1	0.00	--	--	--	--	--	0.2	14.2	12	--	184	252	287	52.4
16716N06W125F	CURRAN-GARDNER PWD #2	06/05/73	7-B111131	55	0.00	0.01	0.0	8	63	34	--	0.2	7.9	13	54	246	297	392	--
16716N06W125F	CURRAN-GARDNER PWD #2	07/23/75	7-A001586	55	0.00	0.00	0.0	7.0	75	32	15	0.2	3.5	16	52	260	320	380	--
16716N06W125F	CURRAN-GARDNER PWD #2	06/04/77	7-A023960	55	0.00	0.00	0.45	8.3	70.0	34.0	14	0.1	7.92	14	47	275	314	405	--
16716N06W125F	CURRAN-GARDNER PWD #2	10/17/83	7-B015684	55	<0.05	0.012	0.2	8	68	31	15	0.10	3.3	16	53	247	324	340	--
16716N06W125F	CURRAN-GARDNER PWD #2	07/31/87	7-B712603	55	<0.050	0.018	0.1	8.5	76	31	14	0.14	12.4	16	48	248	316	451	--
16716N06W125F	CURRAN-GARDNER PWD #2	06/05/91	7-B107753	55	<0.050	0.018	--	--	--	--	--	--	--	23	50	264	--	426	55.3
t6716N06W125F	CURRAN-GARDNER PWD #2	09/24/91	7-B113265	55	<0.050	0.025	<0.01	11	67	29	16.3	0.43	5.8	20	53	260	287	402	--
16716N06W126F	CURRAN-GARDNER PWD TH5	02/28/67	5-0170960	52	0.1	0.00	--	--	--	--	--	0.1	11.5	7	--	188	252	304	55.5
16716N06W127F	CURRAN-GARDNER PWD #1	12/12/68	5-0176994	50	0.0	0.02	--	--	--	--	--	0.1	9.9	13	--	166	232	298	54.5
16716N06W127F	CURRAN-GARDNER PWD #1	12/18/73	7-B106608	50	0.00	0.00	0.0	9	64	28	15	0.2	8.4	13	46	216	275	366	--
16716N06W127F	CURRAN-GARDNER PWD #1	03/11/75	7-A015542	50	0.00	0.00	0.0	8.0	64.0	27.0	12	0.1	10.6	14	50	216	271	346	--

Appendix I-3., (Concluded)

Well location	Well owner	Sample date	Lab. analysl number	Well depth (ft)	Iron (mg/l)	Manganese (mg/l)	Ammonium (mg/l)	Sodium (mg/l)	Calcium (mg/l)	Magnesium (mg/l)	Silica (mg/l)	Fluoride (mg/l)	Nitrate (mg/l)	Chloride (mg/l)	Sulfate (mg/l)	Alkalinity (mg/l as CaC03)	Hardness (mg/l as CaC03)	TDM (mg/l)	Temp (F)
16716N06W127F	CURRAN-GARDNER PWD #1	06/04/77	7-A023961	50	0.00	0.00	0.45	14.0	63.0	29.2	13	0.2	8.8	26	58	220	277	380	--
16716N06W127F	CURRAN-GARDNER PWD #1	10/17/83	7-B015677	50	0.06	0.018	<0.1	13	69	29.1	12	0.15	6.6	21	51	231	303	334	--
16716N06W127F	CURRAN-GARDNER PWD #1	01/22/86	7-Z000909	50	<0.050	0.019	<0.1	14	64	27	12	0.18	11.5	27	43	209	271	385	53.6
16716N06W127F	CURRAN-GARDNER PWD #1	09/24/91	7-B113264	50	<0.050	0.091	0.04	23	65	27	13.6	0.18	11.5	38	53	231	272	404	--
16716N06W128E	CURRAN-GARDNER PWD #3	07/27/77	5-0205720	50	0.6	0.35	--	--	--	--	--	0.2	0.8	18	--	262	308	367	55
16716N06W128E	CURRAN-GARDNER PWD #3	10/17/83	7-B015673	50	1.2	1.360	<0.1	14	76	29.4	15	0.10	0.9	21	46	248	309	353	--
16716N06W128E	CURRAN-GARDNER PWD #3	04/02/87	5-0222061	50	0.13	0.91	--	12.0	64.8	25.6		0.2	<0.2	27.8	45.1	240	267	346	53
16716N06W128E	CURRAN-GARDNER PWD #3	07/31/87	7-B712604	50	1.292	1.258	<0.1	10	74	27	14	0.17	<0.4	14	46	244	293	437	--
16716N06W128E	CURRAN-GARDNER PWD #4	10/20/BB	5-0222802	55	0.53	0.88	--	13.0	65.6	24.6	--	0.2	-0.1	30.4	40.7	233	265	338	--
16716N06W128E	CURRAN-GARDNER PWD #4	09/24/91	7-B113263	55	2.183	1.342	0.5	18	61	--	15.1	0.19	<0.04	29	47	238	242	360	--
16717N04W316E	WILLIAMSVILLE TW55-4	09/06/55	5-0138547	55	0.4	--	--	--	--	--	--	0.1	2.0	11	--	228	312	345	--
16717N04W316E	WILLIAMSVILLE TH4-64	03/31/64	6-0162522	55	0.3	0.20	--	--	--	--	--	0.3	32	6	--	128	248	306	57
16717N04W317E	WILLIAMSVILLE #3	10/06/61	7-0012880	55	0.2	0.1	0	12	62	32	19	0.5	9.7	12	85	200	288	330	--
16717N04W317E	WILLIAMSVILLE #4	05/19/64	5-0162963	56	0.4	0.22	--	--	--	--	--	0.3	14.0	11	--	194	288	341	56
16717N04W317E	WILLIAMSVILLE #4	07/01/66	5-0169208	56	0.1	0.13	--	--	--	--	--	0.3	12.6	12	--	200	276	352	57.5
16717N04W317E	WILLIAMSVILLE #4	10/26/66	5-0170116	56	0.3	0.06	--	--	--	--	--	0.2	9.7	10	--	188	274	327	56.4
16717N05W321E	FANCY CREEK TWP PWD #1	12/30/66	5-0170519	29.5	1.4	0.36	--	--	--	--	--	0.2	0.9	9	--	256	324	386	56.5
16717N06W222G	PLEASANT PLAINS #1	01/10/79	7-B040644	60	1.0	1.600	--	12	75	25	32	0.3	--	20	50	249	309	361	--
16717N06W222G	PLEASANT PLAINS #3	01/00/77	5-0204129	61	2.4	0.12	--	--	--	--	--	0.1	2.5	37	--	204	176	280	--
16717N06W222G	PLEASANT PLAINS #3	10/02/78	5-0209294	61	2.8	0.08	--	--	--	--	--	0.1	14.5	7	--	180	214	271	--
16717N06W222G	PLEASANT PLAINS #3	12/06/78	5-0209901	61	2.9	0.10	0.4	--	--	--	--	0.1	16.2	8	--	182	216	260	54
16717N06W222G	PLEASANT PLAINS #3	04/10/79	7-B040643	61	3.2	0.12	0.4	9	51	20	15	0.2	14.6	7.0	36	175	208	249	--
16717N06W222G	PLEASANT PLAINS #3	06/20/79	5-0211153	61	3.4	0.09	0.3	--	--	--	--	0.1	12	11	--	180	218	266	--
16717N06W222G	PLEASANT PLAINS #3	06/01/81	7-B058782	61	5.14	0.313	0.3	9	64	23	29	0.17	14.6	25	60	165	244	328	--
16717N06W222G	PLEASANT PLAINS #3	10/17/83	7-B015685	61	1.0	0.071	<0.1	8	52	21	14	0.10	35.4	14	39	159	232	268	--
16717N06W222G	PLEASANT PLAINS #3	02/03/86	7-Z000979	61	5.949	0.826	0.3	7.7	85	31	14	0.1	8.0	15	106	249	340	491	56.3
16717N06W222G	PLEASANT PLAINS S3	10/31/91	7-B115300	61	0.909	0.177	0.03	7.5	62	25	15.6	0.12	28.3	15	36	208	258	310	--
16717N06W222G	PLEASANT PLAINS #4	02/05/81	5-0215116	61	0.67	0.07	--	7.7	--	--	--	0.1	32.6	9	--	148	208	255	--
16717N06W222G	PLEASANT PLAINS #4	01/29/85	7-B028524	61	3.600	0.236	0.2	9	73	31.9	14	<0.1	10.6	9.4	33	268	313	471	--
16717N06W222G	PLEASANT PLAINS #4	02/03/86	7-Z000977	61	1.853	0.151	0.2	5.8	59	25	15	0.12	23.5	11	37	257	250	362	56.3
16717N06W222G	PLEASANT PLAINS #4	10/31/91	7-B115299	61	1.861	0.210	0.7	9.5	74	36	17.4	0.20	<0.04	10	27	331	332	356	--
16717N06W223G	PLEASANT PLAINS #2	12/12/75	5-0200575	60	4.7	0.46	--	--	--	--	--	0.2	0.6	7	--	266	302	370	55
16717N06W223G	PLEASANT PLAINS #2	10/02/78	5-0209293	60	13	0.57	--	--	--	--	--	0.2	1.5	7	--	276	284	304	--
16717N06W223G	PLEASANT PLAINS #2	12/06/78	5-0209900	60	5.0	0.31	0.6	--	--	--	--	0.2	1.1	6	--	302	318	338	54
16717N06W223G	PLEASANT PLAINS #2	04/06/79	5-0210632	60	3.9	--	--	--	--	--	--	--	--	7	--	228	260	305	--
16717N06W223G	PLEASANT PLAINS #2	04/06/79	5-0210633	60	3.8	--	--	--	--	--	--	--	--	7	--	228	260	312	--
16717N06W223G	PLEASANT PLAINS #2	04/10/79	7-B040637	60	3.4	0.25	0.6	7	58	25	16	0.2	5.3	6.8	33	216	260	277	--
16717N06W223G	PLEASANT PLAINS #2	06/01/81	7-B058780	60	2.26	0.220	0.1	7	57	22.0	15	0.15	28.3	10	33	170	226	295	--
16717N06W223G	PLEASANT PLAINS #2	10/17/83	7-B015680	60	1.900	0.154	<0.1	7	52	22	13	<0.1	34.1	8	38	167	231	266	--
16717N06W223G	PLEASANT PLAINS #2	07/13/87	7-B711422	60	2.112	0.074	1.4	11	--	--	17	0.18	0.5	7.2	24	340	506	411	59.7
16717N06W223G	PLEASANT PLAINS #2	10/31/91	7-B115303	60	9.267	0.334	1.3	8.3	77	37	17.9	0.25	<0.04	9.0	21	337	344	359.	--
16717N06W264D	CAMP CILICA #1	09/01/66	1-0169775	42	0.4	0.10	--	--	--	--	--	0.2	4.5	2	--	300	336	422	64

Appendix I-4. Correspondence Addressing Ground-Water Yields in the Sangamon River Valley

October 22, 1959

Mr. Donald Long
Plant Manager
Borden Chemlcal Company
Illiopolis, Illinois

Dear Mr. Long:

This letter; is prepared in response to your request for information concerning the sustained yield of the DeKalb Agrlcultural-Association well field along the Sangamon River in Sangamon County, Illinois. Studies described in this letter indicate that the sustained yield of the well field exceeds the total anticipated water demand (26 million gallons per month) in your area.

The Sangamon River valley, in which the well field is located, is underlain by alluvium and glacial outwash sand and gravel. The logs of production wells 4, 5, and 7 given in Table 1 show that sand and gravel occur to an average depth of about 50 feet. Studies made of logs of wells within a 7-mile radius of the well field indicate that the outwash deposits are fairly extensive in areal extent. The character of shallow deposits and the fact that the Sangamon River has been dredged in the well field area suggest that recharging conditions are favorable.

The hydraulic properties (coefficients of transmissibility, T, and storage, S,) of the sand and gravel aquifer were determined from the results of six pumping tests made during June and July 1942. Values of drawdown in pumped and observation wells were plotted on logarithmic paper against values of time after pumping started (time-drawdown graph) and against values of squares of distances from pumped wells to observation wells (distance-drawdown graph). These data and the nonequilibrium formula, described in Report of Investigation No, 25, published by the State Water Survey, were used to compute the hydraulic properties of the sand and gravel aquifer. The distance-drawdown graph for the pumping test made on production well Ho. 7 together with computations for T and S are given in figure 1 to illustrate the method of analysis used. Results of the pumping tests indicate that the coefficient of transmissibillty ranges from about 45,000 gpd/ft in the northeastern part of the well field to about 100,000 gpd/ft in the southwestern part of the well field. The average coefficient of transmissibillty is fairly high and is 60,000 gpd/ft. The coefficient of permeability, based on an average saturated thickness of 45 feet, is about 1300 gpd/sq ft. The average value of the storage coefficient Is O.04

indicating that water-table conditions exist in the well field area.

Computations made taking into consideration the results of pumping tests, data on well construction features, well yields, and pump capacities given in Table 2, and all available geologic and hydrologic information, indicate that 26 million gallons per month can be obtained by pumping the five existing production wells about 12 hours per day. If the wells are pumped at rates given in Table 2, long-term pumping levels will be several feet above the tops of the screens in the wells. Available data suggest that the sustained yield of the sand and gravel aquifer in the vicinity of the well field may exceed 40 million gallons per month under favorable pumping conditions.

If we can be of further help in this matter please call on us.

Very truly yours
STATE WATER SURVEY DIVISION

Richard J. Schicht
Assistant Engineer

RJS/CH

c.c. Water Plant Operator
DeKalb Agricultural Association
Illiopolis, Illinois

Illinois Institute of Natural Resources

Water Survey Division

605 East Springfield
Champaign. IL 61820
Mail: Box 232. Urbana. IL 61801
217/333-2210

October 3, 1979

Mr. Brian Whiston
Crawford, Murphy, & Tilly
2750 W. Washington
Springfield, Illinois 62702

Dear Mr. Whiston:

Please find enclosed a copy of a report dated October, 1959 which states the long-term yield of the aquifer supplying Borden "may exceed 40 million gallons per month (1.3 mgd) under favorable pumping conditions." Data collected since the time of the report seem to confirm that yield prediction. Proper pumping conditions may be construed to mean proper well spacing (1500-2000 feet:), reduced pumping rates from individual wells (200-300 gpm as opposed to 350-400 gpm), and adequate rest periods each day to allow the water levels to recover in the wells.

Previous failure of wells 4 through 8 located in the vicinity of the operating wells was felt to be due to overpumping. While individual wells may yield 350-400 gpm for several months or maybe even years, the sand and gravel material comprising the aquifer in that area is very fine and will migrate toward the well under the velocities generated by higher pumping rates (350-400 gpm) clogging the well screen and gravel pack.

Raw water supplies which have a high iron content, like the one supplying Borden, can create many problems when wells are overpumped. Oxygen entering the dewatered formation above the cone of depression can come into contact with dissolved ferrous iron to form ferric hydroxide. The iron hydroxide can slowly build on the surface of sand grains and well screens until the permeability of the formation in the vicinity of the "well has been greatly reduced.

Additionally, iron bacteria feed on ferrous iron and excrete solid hydrated ferric iron oxides which accumulate in not only the voids of the sand and gravel but in water mains and pump housings as well.

So, while the groundwater in this area is plentiful and should meet the anticipated requirements, care must be taken to avoid overpumping individual wells and reducing their useful life. If you have any more questions or need additional data, please feel free to call.

Sincerely,
ILLINOIS STATE WATER SURVEY

HAW

H. W. Allen Wehrman
Assistant Hydrologist
Phone (217) 333-6800

llAW:psm
Enclosure

State Water Survey Division

605 East Springfield
Champaign. IL 61820
Mail: Box 232. Urbana. IL 61801
217/333-2210

Illinois Institute of Natural Resources

April 20, 1982

Mr. L. K. Crawford
Crawford, Murphy, and Tilly,. Inc.
2750 W. Washington Street
Springfield, IL 62702

Dear Mr. Crawford:

In our letter of April 7th, we intended to convey our estimate of the groundwater flow toward either the gravel pits or a well field as being of the order of 1 mgd. Our estimate intentionally did not include any additional water from induced infiltration.

In a report prppared February 24, 1964, Mr. William H. Walker — then of our staff — estimated that in a year of normal precipitation, one might expect to develop as much as 3 mgd from a well field along the Sangamon River. Of that amount, approximately 1 mgd would be derived from the groundwater itself and the remaining 2 mgd would come from the river by induced infiltration. In. his report, Mr. Walker also concluded that the old infiltration gallery system used by Springfield procured the majority of its water supply either directly or indirectly from the river. The Bulletin 21 reference which you cited, incidentally, pointed out that in low flow periods this system was inadequate and that a direct connection to the river was necessary.

It was, therefore, our conclusion that in drought periods, at least, the amount of induced infiltration would be limited — probably no more than half of the amount obtained in a year of normal precipitation and quite possibly much less. Therefore, as stated above, we intentionally did not assume induced infiltration in our estimate of the yield of a groundwater supply during drought conditions.

Please call us if you wish to pursue the matter further.

Sincerely,
ILLINOIS STATE WATER SURVEY

Adrian P. Visocky
Hydrologist
Phone: (217) 333-1724

APV:lw

Illinois State Water Survey

Telephone (217) 333-4300
Ground-Water Section
2204 Griffith Drive
Champaign, Illinois 61820-7495

June 17, 1987

Mr. James Roth
Crawford, Murphy, and Tilly, Inc.
2750 W. Washington Street
Springfield, IL 62702

Dear Jim:

This letter is written in response to your request for further review of information relating to the well field yield for Borden Chemical Company/Illiopolis. In particular, you wanted to know what effect a new well (No. 16) would have on the rest of the wells presently being used by Borden Chemical. The proposed Well 16 would be located in the vicinity of Test Holes 3-81 and 4-81, along the south bank of the Sangamon River, in Section 25, T.16N., R.2W., Christian County. This location is approximately 2000 feet northeast of Borden's Well 15, and across the river and upstream from the rest of Borden's wells (Nos. 9, 10, 11, 12, 13, and 14).

I would not expect the new well to have an effect on the wells across the river. The river will act as a boundary to drawdowns created by withdrawals at the new well site and thereby eliminate interference effects with those wells. In that respect, the present yield of the well field north of the river should stay the same as previous estimates--according to my letter dated 5/10/82, this is approximately 1.3 mgd.

Estimates must be made, however, on the mutual interference effects between Well Nos. 15 and 16. This is quite difficult because of the lack of good aquifer hydraulic property data with which to make an estimate of distance-drawdown relationships. Aquifer properties derived for the sand and gravel on the north side of the river may not be the same as the properties of the sand and gravel on the south side of the river. Judging by the differences in particle size distribution from test holes drilled at the locations of Wells 14, 15, and 16, it appears that the hydraulic conductivity may vary considerably between locations. Using an admittedly conservative value of 30,000 gallons per day per foot (gpd/ft) for the transmissivity of the aquifer (a value of 60,000 gpd/ft was used for the north bank well field yield estimate), the drawdown at Well 15 caused by pumping Well 16 at 250 gpm is approximately 2.5 feet. Whether Well 16 will be able to produce that amount of water and whether an additional 2-3 feet of drawdown at Well 15 will materially affect its yield is uncertain.

Short of actually conducting another production test on Well 15, information that would be most useful includes pumping and nonpumping

A Division of the
Illinois Department of Energy and Natural Resources

water levels along with pumping rates for Well 15. According to our phone conversation, you understood that Well 15 was being pumped at 250 gpm. Knowing the history of well deterioration problems at the Borden well field, a sustained 250 gpm pumping rate may be optimistic. It is essential to know where the pumping water level is during operation of Well 15 because that information is crucial to determining whether Well 16 will materially affect the yield of Well 15. If water levels are near the screen during pumping, any additional drawdown will affect the yield of the well. If water levels are well above the well screen, the additional drawdown created by the use of Well 16 may have no effect at all.

To summarize, the yield of the well field at Borden should be enhanced by the addition of Well 16. By how much is difficult to estimate, and will depend on the long-term rate the well is able to sustain and the interference effects with Well 15. If Well 15 is presently producing 250 gpm, then the current total well field yield is approximately 1.66 mgd (1.3 mgd + 360,000 gpd). If Well 16 is able to sustain a 200 gpm rate with no effect on Well 15, then another 288,000 gpd is effectively added to the system, bringing the total yield to 1.95 mgd. However, given the history of well degradation problems and the uncertainty of the yield of the aquifer at the site of Well 16, it appears more prudent to assume Well 16 will have some effect on Well 15. Assuming both wells can operate at 200 gpm, which I feel is realistic, then 576,000 gpd can be added to the system yield to bring the total yield to 1.88 mgd. Adding Well 16, then, may effectively increase the system production by 0.22 mgd or about 153 gpm.

I hope this response is useful to you. Please appreciate the fact that these estimates are based on my experience with the Borden Chemical well field. Obviously, more information concerning current well operation and ground-water levels should improve this estimate. Should you have any questions or comments concerning this letter, please feel free to contact me.

Sincerely,

HAW

H. Allen Wehrmann
Associate Hydrologist
Phone: (217) 333-0493

Appendix II-1. Public Ground-Water Supplies along the Illinois River Valley in Morgan and Scott Counties

Bluffs

The village of Bluffs uses three drilled, drift wells (Wells 2, 3, and 4) as a source of municipal water supply. In addition to supplying Bluffs, this system provides water to the Exeter-Merritt Water Cooperative. The wells are located near the eastern edge of the Illinois River floodplain (see figure II-4).

Well 2 (located approximately 20 ft south and 900 ft west of the northeast corner of Section 16, Township 15 North, Range 13 West, Scott County) was drilled to a depth of 57 ft by R. R. Long, Jacksonville, in 1947. Sand and gravel was reported between depths of 35 and 57 ft, and the well was screened with a 12-ft length of 8-in. diameter, 16 slot well screen. When the well was installed, the water level was lowered from a static level of 17 ft below the top of the casing to 24 ft below the top of the casing after pumping at 90 gpm for 7 hours. Before being placed in service, the well was pumped at 220 gpm for 24 hours, and the water level was lowered from a static water level of 17.2 below the pump base to 33 ft.

Analysis of a raw water sample from Well 2 in 1988 showed the water to have a hardness of 494 mg/l, total dissolved minerals of 557 mg/l, and an iron content of 1.59 mg/l.

Well 3 (located approximately 5 ft south and 755 ft west of the northeast corner of Section 16, Township 15 North, Range 13 West, Scott County) was drilled to a depth of 59 ft by Layne-Western, St. Louis, Missouri, in 1958. Sand and gravel was reported between depths of 28 and 56 ft, and the well was screened with a 15-foot length of 12-in. diameter, No. 5 (0.105 in.) Layne stainless steel shutter screen.

Representatives of the driller, the village, and the State Water Survey conducted a well production test on this well on October 9, 1959. The water level was lowered from a static level of 18.83 ft to 31.05 ft below land surface after pumping at rates ranging from 154 to 252 gpm for 8 hours. During the test, water levels were noted in two observation wells, Observation Well (O.W.) No. 1 and O.W. No. 2, located 60 and 58 ft, respectively, from the pumped well (No. 3). When the pumping was stopped, the water level in O.W. No. 1 had lowered 5.1 ft from a static level of 24.2 ft. In O.W. No. 2 the water level lowered 6.3 ft from a static level of 22.4 ft.

Analysis of a raw water sample from Well 3 in 1983 showed the water to have a hardness of 534 mg/l, total dissolved minerals of 641 mg/l, and an iron content of 1.60 mg/l.

Well 4 (located approximately 125 ft south and 1,350 ft west of the northeast corner of Section 16, Township 15 North, Range 13 West, Scott County) was drilled to a depth of 60 ft by the Layne-Western Company of Kirkwood, Missouri, in 1979. Fine to medium sand was reported between the depths of 22 and 30 ft, and medium to coarse sand was reported between 30 and 60 ft. The well was screened with 15 ft of Layne stainless steel #5 shutter screen between depths of 45 and 60 ft. A well production test on 4/27/79 showed a specific capacity of 15.7 gpm per foot of drawdown after pumping at 250 gpm for 3 hr.

Analysis of a raw water sample from Well 4 in 1990 showed the water to have a hardness of 511 mg/l, total dissolved minerals of 597 mg/l, and an iron content of 1.43 mg/l.

The total average daily pumpage for Bluffs in 1995 was reported to be 0.11 mgd. As of 1994, water obtained from the three drilled drift wells was aerated to oxidize iron, passed into a 21,650 gallon reaction basin, and then to a 2,500 gallon pump suction well. The water was then pumped, chlorinated, fluoridated, filtered, and discharged to the distribution system.

<u>CIPS - Meredosia Station</u>

CIPS-Meredosia Station uses four drilled, drift wells (Wells 3, 5, 6, and 7) located within the lowlands of the Illinois River as a source of water supply. One of the wells (No. 3) is used for standby purposes. Water for this supply is supplemented with water from an intake in the Illinois River.

Well 3 (1,643 ft north and 473 ft west of the southeast corner of Section 21, Township 16 North, Range 13 West, Morgan County) was drilled to a depth of 109 ft with a 38-in. diameter bore hole by Layne-Western of St. Louis, Missouri, in 1957. An outer casing (30-in. diameter) extends from grade to 30 ft below grade. The inner casing (10-in. diameter) extends from 4 ft below land surface to a depth of 84 ft below land surface. This gravel-packed well is screened with a 25-ft length of 10-in. diameter Layne stainless steel shutter well screen from 84 to 109 ft below land surface. A partial driller's log indicates sand from land surface to 24 ft, sand and gravel from 24 to 55 ft, sand from 55 to 68 ft, and sand and gravel from 68 to 78 ft. When the well was installed, the drawdown was reported to be 3 ft after pumping at a rate of 165 gpm for 1 hr. No analysis of water quality is available for this well.

Well 5 (1,700 ft north and 300 ft west of the southeast corner of Section 21, Township 16 North, Range 13 West, Morgan County) was drilled to a depth of 106 ft with a 38-in. diameter bore hole by Layne-Western of St. Louis, Missouri, in 1974. An outer casing (20-in. diameter) extends from grade to 30 ft below grade. The inner casing (12-in. diameter) extends from 2 ft above land surface to a depth of 81 ft below land surface. This gravel-packed well is screened with a 25-ft length of 12-in. diameter No. 5 (0.105 inch) Layne stainless steel shutter screen from 81 to 106 ft below land surface. A driller's log indicates sand and gravel from 15 to 60 ft, sand from 60 to 67 ft, sand and gravel from 67 to 80 ft, sand from 80 to 85 ft, and sand and gravel from 85 to 106 ft.

When the well was installed, a well production test using one observation well was conducted by the driller on May 24, 1974. The water level was lowered from a static level of 25.34 ft to 30.65 ft below land surface after pumping at 503 gpm for 23.8 hr. During this test, the Illinois River was rising.

Analysis of a raw water sample collected from Well 5 during the well production test in 1974, showed the water to have a hardness of 222 mg/l, total dissolved minerals of 278 mg/l, and a trace of iron.

Well 6 (1,420 ft north and 1,270 ft west of the southeast corner of Section 21, Township 16 North, Range 13 West, Morgan County) was drilled to a depth of 104 ft with a 38-in. diameter bore hole by Layne-Western of St. Louis, Missouri, in 1977. An outer steel casing (30-in. diameter) extends from grade to 30 ft below grade. The inner steel casing (12-in. diameter) extends from 1 ft above land surface to a depth of 78 ft below land surface. This gravel-packed well is screened with a 25-ft length of 12-in. diameter No. 6 (0.080 inch) Layne stainless steel shutter well screen from 79 to 104 ft below land surface. A driller's log indicates sand from grade to 20 ft and sand and gravel from 30 to 104 ft.

The Illinois State Water (ISWS) conducted a production test on this well on April 25, 1978, which was reported to Mr. John Ruester, Layne-Western, St. Louis, Missouri, in a letter from Charles B. Burris, ISWS. The water level was lowered from a static level of 23.00 ft to 28.56 ft below land surface after pumping at rates of 525 to 500 gpm for 3 hr. Based on available information at that time, the long-term specific capacity of the well was estimated to be 89.9 gpm/ft, and the well was judged to yield about 500 gpm on a long-term basis with a pump setting of 80 ft below land surface.

Analysis of a raw water sample collected from Well 6 during the well production test in April 1978, showed the water to have a hardness of 280 mg/l, total dissolved minerals of 317 mg/l, and an iron content of 0.7 mg/l.

Well 7 (located in the SE¼ of the NE¼ of the SE¼ of Section 21, Township 16 North, Range 13 West, Morgan County) was drilled to a depth of 104 ft with a 42-in. diameter bore hole by Brotcke Engineering, Fenton, Missouri, in 1994. An outer steel casing (36-in. diameter) extends from 2 ft above grade to a depth of 30 ft below grade. The inner steel casing (16-in. diameter) extends from 2 ft above land surface to a depth of 79 ft below land surface. This gravel-packed well is screened with a 25-ft length of 16-in. diameter No. 50 slot well screen from 79 to 104 ft below land surface. A driller's log indicates sand from land surface to 85 ft and sand and gravel from 85 to 104 ft. When the well was installed, the static water level was 30 ft below land surface.

Analysis of a raw water sample from Well 7 in 1994 showed the water to have a hardness of 214 mg/l, total dissolved minerals of 311 mg/l, and an iron content of 1.02 mg/l.

Average daily ground-water pumpage for the CIPS-Meredosia Station in 1995 was reported to be 0.06 mgd.

<u>Jacksonville</u>

The city of Jacksonville uses three wells (Wells 1, 2, and 101), which are located about one-third of a mile north of Naples, approximately 23 miles west of the Jacksonville and within the floodplain of the Illinois River. Well 101 is a collector ("Ranney") well using seven horizontal runs of perforated pipe leading away from a large caisson that houses the well pumps. This well is the primary well used by Jacksonville. Wells 1 and 2 are conventionally constructed drilled wells and used for standby purposes.

Jacksonville supplies treated water to the towns of Franklin, Murrayville, and Woodson. Chapin obtains water from the raw water pipeline at a point approximately mid-way between Naples and Jacksonville.

Well 101 (1,100 ft south and 2,250 ft west of the northeast corner of Section 12, Township 15 North, Range 14 West, Scott County) was constructed by the Ranney Co, Westerville, Ohio, in 1955. A drillers log for this well reports sand and gravel between depths of 25 and 95 ft. The well consists of a large reinforced concrete caisson with seven horizontal laterals extending from near the base of the caisson radially outward towards the Illinois River. The reinforced concrete caisson [13 ft inner diameter (ID) by 16 ft outer diameter (OD)] was constructed from about 8 ft below land surface to depth of 93 ft, and a concrete plug was poured in the bottom. The seven 8-in. diameter, perforated (⅜- by 1¼-in. slot openings) steel horizontal laterals were hydraulically projected at a depth of 82.4 ft below the top of the caisson and radiate from the west side of the concrete caisson. Available drawings indicate that the laterals contain about 20 ft± of casing and 140 ft± of slotted screen. The total length of the seven laterals is approximately 1056 ft with individual lengths ranging from 136 to 176 ft. The collector well caisson houses three pumps with pumping rates of 1,500 gpm, 2,800 gpm, and 2,800 gpm.

According to an JEPA well site survey conducted in 1985, the original horizontal laterals constructed in 1955 were abandoned and replaced with seven new, similarly constructed 12-in. laterals in 1983. The new laterals were installed approximately 30 in. above the elevation of the original laterals.

Representatives of the Ranney Company conducted a production test on this well on September 1-11, 1955. After 240 hr of pumping at a rate of 5,000 gpm, the drawdown was 25.27 ft from a nonpumping water level of 19.81 ft below the top of the caisson. The Ranney Company states that this well has a design pumping rate of 8.0 mgd. Appendix II-4 includes the report from the Ranney Company summarizing this production test, as well as several well site diagrams copied from ISWS files.

Analysis of a raw water sample from Well 101 in 1991 showed the water to have a hardness of 416 mg/l, total dissolved minerals of 524 mg/l, and an iron content of 6.0 mg/l.

Well 1 (900 ft south and 1,540 ft west of the northeast corner of Section 12, Township 15 North, Range 14 West, Scott County) was drilled to a depth of 94 ft by J. P. Miller in 1982. Sand and gravel was reported between depths of 0 and 94 ft, and the gravel-packed well was screened with a 40-ft length of 18-in. diameter, 60-slot well screen. When the well was installed, the water level was lowered from a static level of 14 ft to 33 ft below the top of the casing after pumping at 2,000 gpm for 4 hr.

Analysis of a raw water sample from Well 1 in 1985 showed the water to have a hardness of 289 mg/l, total dissolved minerals of 340 mg/l, and an iron content of 1.8 mg/l.

Well 2 (650 ft south and 1,458 ft west of the corner of Section 12, Township 15 North, Range 14 West, Scott County) was drilled to a depth of 85 ft by the J. P. Miller Artesian Well Company, Brookfield, Illinois, in 1982. Sand and gravel is reported between depths of 0 and 85 ft, and the gravel-packed well is screened with a 40-ft length of 18-in. diameter, 60-slot well screen. When the well was installed, the water level was lowered from a static level of 9.3 ft to 24.3 ft below the top of the well casing after pumping at 2,000 gpm for 4 hr.

Analysis of a raw water sample from Well 2 in 1986 showed the water to have a hardness of 300 mg/l, total dissolved minerals of 377 mg/l, and an iron content of 3.504 mg/l.

Water for the Jacksonville public water system is obtained from Well 101 (Ranney well) or the standby drilled drift wells (Wells 1 and 2) at a constant rate. During periods of higher demand, ground-water pumpage is supplemented with flow from a 156.8 million gallon impounding reservoir (Lake Mauvaise Terre), which is supplemented with flow from yet another 2,055 million gallon impounding reservoir (Lake Jacksonville). During periods of lower demand, the ground water from Well 101 (or the standby wells) not required for treatment and subsequent distribution is discharged to Lake Mauvaise Terre. In 1995, the average daily pumpage for these three wells and the lake intake was reported as follows:

Well 101		2.02 mgd
Well 1		0.40 mgd
Well 2		0.74 mgd
Lake Mauvaise Terre		1.08 mgd
	Total:	4.24 mgd

Jacksonville's water treatment process includes prechlorination, mixing with alum, lime softening, potassium permanganate addition, carbon treatment (periodically), and flocculation. The water is then settled, recarbonated, fluoridated, filtered, discharged to the clear wells, postchlorinated, and discharged for distribution.

Meredosia

The village of Meredosia uses four drilled, drift wells (Wells 2, 3,4, and 5) located within the lowlands of the Illinois River as a source of municipal water supply. Wells 2-4 are tubular, and Well 5 is a gravel-packed well. Details of the construction and production testing of Wells 2-4 have been described in a prior report (Woller and Sanderson, 1979). Much text for the descriptions of these wells is excerpted from this earlier publication. Additional updated information is included where appropriate.

Well No. 2 (locally referred to as Well No. 3), finished in sand and gravel, was constructed in April 1950, to a depth of 40 ft by R. R. Long, Jacksonville, and deepened in 1961 to a reported depth of 60 ft by J. P. Johnson, Plymouth. The well is located about 112 ft northeast of Well No. 1, approximately 875 ft south and 2,900 ft west of the northeast corner of Sections 22, Township 16 North, Range 13 West, Morgan County. The land surface elevation at the well is approximately 450 ft.

A sample study summary log of Well No. 2 furnished by the State Geological Survey follows:

Strata	*Thickness (ft)*	*Depth (ft)*
PLEISTOCENE SERIES		
Sand, light brown, fine, rounded, well sorted	25	25
Sand, light brown, fine to medium, clean	10	35
Sand, light brown, fine to very coarse, clean	5	40
Interval not studied	20	60

Originally, the well was cased with 8-in. steel pipe from 1.5 ft above the pumphouse floor to a depth of 30 ft followed by 10 ft (11 ft overall length) of No. 16 slot Johnson Everdur screen. After deepening, the well was reported to be cased with 8-in. pipe from 0.1 ft above the pump station floor to a depth of 40 ft followed by 20 ft of screen. The screened section consists of 10 ft of No. 16 slot followed by 10 ft of No. 20 slot.

Representatives of the driller, the village, the ISWS and Casler & Stapleton, Consulting Engineers conducted a production test with one observation well on May 1, 1950. After 5.4 hr of pumping at rates ranging from 125 to 119 gpm, the drawdown was 10.1 ft from a nonpumping water level of 14.8 ft below land surface. Nine minutes after pumping was stopped, full recovery was observed.

The ISWS conducted a production test was on February 5, 1973. After 2 hours of pumping at a rate of 68 gpm, the final drawdown was 5.04 ft from a nonpumping water level of 18.38 ft below land surface. Ten minutes after pumping was stopped, the water level had recovered to 18.39 ft.

The pumping equipment installed [as of about 1979] is a Jacuzzi submersible pump rated at 70 gpm, and powered by a 5-horsepower (hp) Franklin electric motor.

A mineral analysis made by the Illinois Environmental Protection Agency (IEPA) (Lab. No. A18548) of a sample collected March 14, 1977, showed the water to have a hardness of 305 mg/l, total dissolved minerals of 380 mg/l, and an iron content of 0.65 mg/l.

Well No. 3 (locally referred to as Well No. 2), finished in sand and gravel, was completed in September 1973, to a depth of 84 ft by the Calhoun Well Drilling Co., Batchtown. The well is located about 120 ft north-northeast of the plant building, approximately 800 ft south and 2,950 ft west of the northeast corner of Section 22, Township 16 North, Range 13 West, Morgan County. The land surface elevation at the well is approximately 450 ft.

A drillers log of Well No. 3 follows:

Strata	*Thickness (ft)*	*Depth (ft)*
Fine sand	62	62
Fine sand with some coarse sand	2.5	64.5
Coarse sand with some fine sand	19.5	84

A 12-in. diameter hole was drilled to a depth of 20 ft and finished 8 in. in diameter from 20 to 84 ft. The well was equipped with a Merrill pitless adapter from 2 ft above land surface to a depth of 5 ft and cased with 8-in. steel pipe to a depth of 70 ft, followed by 14 ft of 8-in. No. 25 slot Johnson stainless steel screen. The annulus between the bore hole and casing was filled with cement grout from 5 ft below land surface to 20 ft.

The pumping equipment installed (as of about 1979) was a REDA submersible pump set at 68 ft, rated at 100 gpm, and powered by a 5-hp REDA electric motor.

A mineral analysis made by the JJEPA (Lab. No. B19066) of a sample collected October 31, 1977, after pumping for 24 hr at 85 gpm, showed the water to have a hardness of 394 mg/l, total dissolved minerals of 472 mg/l, and an iron content of 0.8 mg/l.

Well No. 4 (locally referred to as Well No. 1), finished in sand and gravel, was completed in July 1975, to a depth of 87.5 ft by the J. B. Bushnell Well Drilling Co., Plymouth. The well is located about 50 ft northeast of the plant building, approximately 850 ft south and 2,950 ft west of the northeast corner of Section 22, Township 16 North, Range 13 West, Morgan County. The land surface elevation at the well is approximately 450 ft.

A 12-in. diameter hole was drilled to a depth of 20 ft and finished 8 in. in diameter from 20 to 87.5 ft. The well is equipped with a Monitor pitless adapter from 2 ft above land surface to a depth of 73.5 ft followed by 14 ft of 8-in. No. 25 slot Johnson stainless steel screen. The annulus between the bore hole and casing was filled with cement grout from 5 ft below land surface to 20 ft.

The pumping equipment installed [as of about 1979] was a Jacuzzi submersible pump set at 68 ft, rated at 110 gpm, and powered by a 5-hp Franklin electric motor.

The IEPA (Lab. No. B212649) made the following mineral analysis for a water sample from the well collected August 19,1992:

Parameter		*mg/l*	*Parameter*		*mg/l*
Iron (total)	Fe	0.653	Fluoride	F	0.14
Manganese	Mn	0.259	Chloride	Cl	18
Calcium	Ca	74.4	Nitrate&NO_2-N total		1.86
Magnesium	Mg	30.4	Sulfate	SO_4	54
Sodium	Na	14.4			
Copper	Cu	<0.01			
			Alkalinity, total	266	
Turbidity	-		Hardness, EDTA total	337	
Color	-				
Odor	-		(ROE)TDS@ 180°C	389	
pH (in lab)	7.6				
Temp, (reported)					

Note: Measurements are in mg/l unless otherwise indicated

Well 5 (about 612 ft south and 2,425 ft east of the northwest corner of Section 22, Township 16 North, Range 13 West, Morgan County) was drilled to a depth of 92 ft with a 30-in. diameter bore hole by Albrecht Well Drilling in 1980. A 10-in. diameter casing extends from 1 ft above ground to 72 ft below ground. The well was screened with a 20-ft length of 10-in. diameter, 60-slot, stainless steel Johnson well screen from 72 to 92 ft below ground. The annulus between the casing and the bore hole was filled with cement grout from 6 to 26 ft below ground, and with No. 2 well pack from Northern Gravel Co. from 26 to 92 ft below ground. The drillers log reports sand and gravel between the depths of 5 and 92 ft.

The ISWS conducted a well production test on this well on September & 1980, which was reported to Mr. Robert H. Benton, Benton & Associates, Inc., Jacksonville, Illinois, in a letter from Ms. Susan S. Richards, ISWS. At the time of the well production test, the static water level was 26.85 ft below the base of the pump (measuring point), which was 1 ft above land surface. During the production test, another well 145 ft east-southeast of the test well pumped at 100 gpm continuously. The observed specific capacity of the well for a pumping period of 3 hr and a pumping rate of 300 gpm was 54.15 gpm/ft. Based on available information at that time, the long-term specific capacity was estimated to be 46.29 gpm/ft.

The IEPA (Lab. No. B212645) made the following mineral analysis for a water sample from the well collected August 19, 1992:

Parameter		*mg/l*	*Parameter*		*mg/l*
Iron (total)	Fe	0.285	Fluoride	F	0.16
Manganese	Mn	0.164	Chloride	Cl	12
Calcium	Ca	60.1	Nitrate&NO_2-N total		4.8
Magnesium	Mg	23.2	Sulfate	SO_4	57
Sodium	Na	7.1			
Copper	Cu	<0.01			
			Alkalinity, total	214	
Turbidity	-		Hardness, EDTA total	290	
Color	-				
Odor	-		(ROE) TDS @ 180°C	355	
pH (in lab)	7.6				
Temp, (reported)					

Note: Measurements are in mg/l unless otherwise indicated

Average daily pumpage for Meredosia in 1995 was reported to be 0.06 mgd. Water obtained from these four wells is chlorinated, fed potassium permanganate, filtered, fluoridated, and discharged to the distribution system and 50,000 gallon elevated storage tank.

South Jacksonville

The village of South Jacksonville, which is located in Morgan County, uses two drilled, drift wells (Wells 1 and 2) located about 20 mi west of the village and within the floodplain of the Illinois River in Scott County as a source of municipal water supply.

Well 1 (approximately 2,626 ft north and 1,280 ft west of the southeast corner of Section 31, Township 15 North, Range 13 West, Scott County) was drilled to a depth of 79.5 ft by the Layne-Western Co., Kirkwood, Missouri, in 1967. A 24-in. diameter bore hole was drilled, and the well was cased with a 10-in. pipe from 1 ft above land surface to a depth of 59.5 ft, followed by a 20-foot length of 10-in. diameter No. 5 (0.105 inch) Layne shutter screen. The annulus between the bore hole and casing-screen assembly was filled with concrete from 0 to 11 ft and with gravel from 11 to 79.5 ft. Sand and gravel was reported between depths of 22 and 82 ft. When the well was installed the static water level was 17.40 ft below the top of the well casing.

The ISWS conducted a well production test on this well on August 31-September 1, 1967, which was reported to representatives of Caldwell-Rhoads Co., Consulting Engineers, Jacksonville, in a letter from Adrian P. Visocky, ISWS. The specific capacity of the well for a pumping period of 9 hr 40 minutes and a pumping rate of 412 gpm was 30.5 gpm/ft. Based on available information at that time, the long-term specific capacity was estimated to be 27.3 gpm/ft.

A mineral analysis of a water sample (Lab. No. 172872) was collected from Well 1 on September 1, 1967, after the well had pumped for 9.7 hr at a rate of 412 gpm. The results were as follows:

Parameter		*ppm*	*epm*	*Parameter*		*ppm*	*epm*
Iron (total)	Fe	1.7		Fluoride	F	0.2	
Manganese	Mn	0.21		Chloride	Cl	5	0.14
				Nitrate	NO_3	11.7	0.19
				Alkalinity (as $CaCO_3$)		252	5.04
Turbidity	6			Hardness (as $CaCO_3$)		310	6.20
Color	5						
Odor	0			Total Dissolved Minerals		367	
Temp, (reported)	55.0°F						

Notes:
ppm = parts per million
epm = equivalents per million

Well 2 (approximately 2,626 ft north and 680 ft west of the southeast corner of Section 31, Township 15 North, Range 13 West, Scott County) was drilled approximately 600 ft east of Well 1 by the Layne-Western Co., Kirkwood, Missouri, on September 8, 1967. A 24-in. diameter bore hole was drilled to a depth of 76.5 ft. The well was cased with 10-in. pipe from 1.5 ft above land surface to a depth of 56.5 ft, and the well was screened with a 20-ft length of 10-in. diameter No. 7.5 (0.048 inch) Layne stainless steel shutter screen. The annulus between the bore hole and casing-screen assembly was filled with concrete from 0 to 10 ft and with gravel from 10 to 76.5 ft. The drillers log reports sand and gravel between the depths of 9 and 76.5 ft.

During a well production test conducted on September 11, 1967, the water level was lowered from a static level of 14.29 ft below the casing, which was 2 in. above ground, to 28.56 ft below the casing after pumping at 495 gpm for 3 hr and 20 minutes.

The ISWS conducted a well production test on this well on September 11, 1967, which was reported to Mr. Paul Rhoads, Caldwell-Rhoads Co., Consulting Engineers, Jacksonville, in a letter from Thomas Prickett, ISWS. The specific capacity of the well for a pumping period of 200 minutes and a pumping rate of 495 gpm was 34.7 gpm/ft. Based on available information at that time, the long-term specific capacity of the well was estimated to be 21.2 gpm/ft, and the well was judged to yield about 700 gpm on a long-term basis.

A mineral analysis of a water sample (Lab. No. 172934) was collected from Well 2 on September 11, 1967, after the well had pumped for 3.33 hr at a rate of 495 gpm. The results were as follows:

Parameter		*ppm*	*epm*	*Parameter*		*ppm*	*epm*
Iron (total)	Fe	0.7		Fluoride	F	0.3	
Manganese	Mn	0.07		Chloride	Cl	4	0.11
				Nitrate	NO_3	1.3	0.02
				Alkalinity (as $CaCO_3$)		216	4.32
Turbidity		5		Hardness (as $CaCO_3$)		266	5.32
Color		0					
Odor		0		Total Dissolved Minerals		313	
Temp, (reported)		56.0°F					

Notes:
ppm = parts per million
epm = equivalents per million

Average total daily pumpage for South Jacksonville's Wells 1 and 2 for 1995 was reported to be 0.31 mgd.

The water treatment process for South Jacksonville's ground water in 1996 involved aeration, prechlorination, pumping to the treatment plant at South Jacksonville (approximately 20 mi to the east), fluoridation, filtration, zeolite softening, postchlorination, and pumping to the distribution system.

Winchester

The village of Winchester uses two drilled, drift, gravel-packed wells (Wells 101 and 102) located within the floodplain of the Illinois River as a source of municipal water supply. These two wells are spaced approximately 500 ft apart, and they are approximately 4 mi west and 1 mi south of the village.

Well 101 (75 ft north and 2,440 ft west of the southeast corner of Section 34, Township 14 North, Range 13 West, Scott County) was drilled to a depth of 65 ft with a 29-in. diameter bore hole by McClelland Services, Inc., St. Louis, Missouri, in 1986. An outer casing (30-in. diameter) extends from 13 ft above ground to 15 ft below ground. The inner casing extends from 14.5 ft above ground to 53 ft below ground. The well was screened with a 12-ft length of 12-in. diameter, 100 slot, stainless steel Johnson well screen from 53 to 65 ft below ground. The annulus between the inner and outer casings was filled with concrete, and the annulus from 15 to 65 ft below ground was filled with gravel. Sand and gravel is reported between depths of 8 and 65 ft.

When the well was installed, the water level was lowered from a static level of 21.38 ft below top of casing (inner) to 26.75 ft below top of casing after pumping at 280 gpm for 4 hr.

The ISWS conducted a well production test on this well on November 20, 1986, which was reported to Mr. Ed Degroot, Benton and Associates, Jacksonville, Illinois, in a letter from Mr. Kenneth J. Hlinka, ISWS. The observed specific capacity of the well for a pumping period of 4 hr and a pumping rate of 280 gpm was 52.1 gpm/ft. Based on available information at that time, the long-term specific capacity was estimated to be 46.5 gpm.

A mineral analysis of a water sample (Lab. No. 221861) was collected from Well 101 at the time of the well production test, after the well had pumped for 215 minutes. The results were as follows:

Parameter		*mg/l*	*meq/l*	*Parameter*		*mg/l*	*meq/l*
Iron (total)	Fe	0.05		Fluoride	F	0.2	
Manganese	Mn	0.42		Chloride	Cl	6.9	0.19
Calcium	Ca	83	4.14	Nitrate	(as NO_3)	18.5	0.30
Magnesium	Mg	37.2	3.06	Sulfate	SO_4	47	0.98
Sodium	Na	5.8	0.25				
Copper	Cu	<0.01					
				Alkalinity (as $CaCO_3$)		308	6.17
Turbidity	<1			Hardness (as $CaCO_3$)		360	7.20
Color	<1						
Odor	None			Total Dissolved Minerals		398	
pH (in lab)	7.5						
Temp, (reported)	55°F						

Note:
meq/l - milli-equivalents per liter

Well 102 (75 ft north and 1,930 ft west of the southeast corner of Section 34, Township 14 North, Range 13 West, Scott County) was drilled to a depth of 58 ft with a 29-in. diameter bore hole by McClelland Services, Inc., St. Louis, Missouri, in 1986. An outer casing (30-in. diameter) extends from 13 ft above ground to 15 ft below ground. The inner casing (12-in. diameter) extends from approximately 14.5 ft above ground to 44 ft below ground. The well was screened with a 14-ft length of 12-in. diameter, 100 slot, stainless steel Johnson well screen from approximately 44 to 58 ft below ground. The annulus between the inner and outer casings was filled with concrete, and the annulus from approximately 44 to 58 ft below ground is filled with gravel. Sand and gravel was reported between depths of 0 and 58 ft.

When the well was installed, the water level was lowered from a static level of 20.95 ft below top of casing (inner) to 24.5 ft below top of casing after pumping at 290 gpm for 3 hr.

The ISWS conducted a well production test on this well on December 1, 1986, which was reported to Mr. Ed Degroot, Benton and Associates, Jacksonville, Illinois, in a letter from Mr. Kenneth J. Hlinka, ISWS. The observed specific capacity of the well for a pumping period of 2 hr and a pumping rate of 290 gpm was 60.7 gpm/ft. Based on available information at that time, the long-term specific capacity was estimated to be 49.3 gpm.

A mineral analysis of a water sample (Lab. No. 221872) was collected from Well 102 at the time of the well production test, after the well had pumped for 115 minutes. The results were as follows:

Parameter		*mg/l*	*meq/l*	*Parameter*		*mg/l*	*meq/l*
Iron (total)	Fe	0.31		Fluoride	F	0.3	
Manganese	Mn	0.32		Chloride	Cl	7.8	0.22
Calcium	Ca	78	3.89	Nitrate	(as NO_3)	23	0.37
Magnesium	Mg	33.6	2.76	Sulfate	SO_4	42	0.87
Sodium	Na	5.2	0.23				
Copper	Cu	<0.01					
				Alkalinity (as $CaCO_3$)		293	5.86
Turbidity	<1			Hardness (as $CaCO_3$)		333	6.66
Color	<1						
Odor	None			Total Dissolved Minerals		380	
pH (in lab)	7.6						
Temp. (reported)	55°F						

Average daily pumpage for the village of Winchester in 1995 was reported to be 0.19 mgd.

Water obtained from Wells 101 and 102 is chlorinated, fluoridated, aerated, and discharged to a solids contact unit, where it is chlorinated and fed alum and lime. It is then mixed, coagulated, lime-softened, and sulfuric acid is added. It is then filtered, passed into the clear well, and discharged to the distribution system.

Appendix II-2. Available Records of Wells within 4 Miles of the Illinois River in Morgan and Scott Counties

Well location	Well owner	Well: Year constructed	Well: Depth (ft)	Well: Diameter (in)	Screen: Length (ft)	Screen: Diameter (in)	Screen: Slot Size (in)	Test data: Date (mmyy)	Test data: Static level (ft)	Test data: Drawdown (ft)	Test data: Pumping rate (gpm)	Test data: Length of test (hr)	Test data: Specific capacity (gpm/ft)	Water-bearing formation and depth Interval (ft)	Driller
13716N12W188E	J E STEINBERG	--	24	36				0334	16.00	2.00				--	--
13716N12W194G	RUSSWINKLE ESTATE	--	30	60				0334	20.00	2.00				--	--
13716N13W136C	WM KLEINSCHMIDT (irrigation)	1988	76	14-12	20	12	.050	1188	16.00	23.00	1250		54.3	SAND, 2-32; SAND & GRAVEL, 32-76; SHALE BELOW	GROSCH
13716N13W211B	CIPS-MEREDOSIA STATION #0 (abandoned-casing pulled)	1973	104	30-12	25	12	.105	0873	30.67	6.97	517	22	74.2	SAND, 0-90; SAND 8, GRAVEL, 90-105; ROCK BELOW	LAYNE-WESTERN
13716N13W211C	CIPS-MEREDOSIA STATION #3	1957	109	30-10	25	10	--	1165			165	1		SAND, 0-24; SAND & GRAVEL, 24-55; SAND, 55-68; SAND & GRAVEL, 68-78	LAYNE-WESTERN
13716N13W211C	CIPS-MEREDOSIA STATION #5	1974	106	20-12	25	12	.105	0574	25.34	5.31	503	23.8	94.7	SAND & GRAVEL, 15-60; SAND, 60-67; SAND & GRAVEL, 67-80; SAND, 80-85; SAND U GRAVEL, 85-106; ROCK BELOW	LAYNE-WESTERN
13716N13W211C	CIPS-MEREDOSIA STATION #7	1994	104	36-16	25	16	.050	0694	30.00					SAND. 0-85; SAND & GRAVEL, 85-104; ROCK BELOW	BROTCKE
13716N13W211D	CIPS-MEREDOSIA STATION #4	1960	105	--			--	1165	38.00	2.00	503	8	251.5	SAND, 0-25; SAND U GRAVEL, 25-40; SAND, 40-48; SAND &. GRAVEL, 48-52; SAND, 52-81; SAND & GRAVEL, 81-105	LAYNE-WESTERN
13716N13W212C	CIPS-MEREDOSIA STATION #6	1977	104	30-12	25	12	.080	0478	23.00	5.56	500	3	89.9	SAND, 0-20; SAND & GRAVEL, 30-104; ROCK BELOW	LAYNE-WESTERN
13716N13W225G	MEREDOSIA #1 (before deepening-depth=40')	1950	76	8	10	8	.016	0557	19.40	6.80	70	4.1	10.3	SAND, 0-40; SAND 8, GRAVEL, 40-76	LONG/JOHNSON
									19.00	9.20	90	1	9.8		
13716N13W225Q	MEREDOSIA #2 (before deepenlng-depth=40')	1950	60	8	11	8	.016	0550	15.30	10.10	120	5.5	11.9	SAND, 0-40	LONG/JOHNSON
								0273	18.38	5.04	68	2	13.5		
13716N13W225G	MEREDOSIA #3	1973	84	8	14	8	.025							SAND, 0-84	CALHOUN
13716N13W225G	MEREDOSIA #4	1975	87.5	8	14	8	.025							SAND & GRAVEL AT 87.5	BUSHNELL
13716N13W225G	MEREDOSIA #5	1980	92	10	20	8	.060	0980	25.85	5.45	300	3	55	SAND, 5-20; SAND & CLAY, 20-25; SAND & GRAVEL, 25-92; LIMESTONE, 92-105	ALBRECHT
13716N13W24	TOM & TODD BURRUS	1990	68	5	4	5	.015							SAND, 34-68	GROSCH
13716N13W24	ROBERT BURRUS #1	1989	76	6.6	3.5	5	.015	1289	28.00	20.00				SAND, 0-75	HICKS
13716N13W242D	MARTIN & TODD BURRUS (well seated)	1989	52	--										--	--
13716N13W246C	BURRUS FARMS (irrigation)	1979	82	16	40	16	3/16							SAND & GRAVEL, 25-82	GROSCH
13716N13W251G	ROBERT LANSINK	1974	95	6-5				0974	23.50					SAND MUD DRIFT, 0-50; SHALE, 50-54; LIMESTONE BROKEN WITH SHALE, 54-95	CHADWICK
13716N13W252D	LELAND LITTIG	1990	58	5	4	5	.012	0890	18.00					SAND, 29-36; SAND & GRAVEL, 36-58; ROCK BELOW	GROSCH
13716N13W255D	BURRUS SEED FARMS (irrigation)	1988	60	16	20	16	.050	1188	22.00	26.00	1550		59.6	SAND & GRAVEL, 32-60; SHALE BELOW	GROSCH
13716N13W175C	RICHARD MURPHY	--	58	--										--	--
13716N13W27BE	T/A TERMINALS INC - AMMONIA STORAGE #4	1979	91	16	25	16	.080	0579	12.00	10.80	1000	8	92.6	SAND, 0-36; SAND 4 GRAVEL, 36-91	J P MILLER
13716N13W278F	NATL STARCH CHEM MFG INST DL-1 (well abandoned)	1966	95	12	13.1		.030	0367	28.00		761			SAND, 0-45; SAND & GRAVEL, 45-95	DIEHL
13716N13W278F	NATL STARCH CHEM MFG INST #5 (well abandoned)	1966	100	18	25		.040-030-025 .020-.018	0466	27.00	22.00	1546	9	70.3	SAND, 0-45; SAND & GRAVEL, 45-98	DIEHL
13716N13W28	NATL STARCH CHEM MFG INST #15 (P E plant)	1991	81	--										--	SKOUBY
13716N13W28	NATL STARCH CHEM MFG INST #17 (Plant 20 potable)	--	82	--										--	--
13716N13W281F	NATL STARCH CHEM MFG INST #8	1970	93	26-12	25	12	.040	1270	23.00	9.00		6		SAND, 18-45; SAND & GRAVEL, 45-55; SAND, 55-65; SAND & GRAVEL, 65-95; ROCK BELOW	DIEHL
13716N13W281F	NATL STARCH CHEM MFG	1976	90	16	25	16	.080	0276	23.50	13.00	1075	2	82.7	SAND, 0-40; SAND & GRAVEL, 40-90	J P MILLER

Appendix II-2. (Continued)

Well location	Well owner	Well: Year constructed	Well: Depth (ft)	Well: Diameter (in)	Screen: Length (ft)	Screen: Diameter (in)	Screen: Slot Size (in)	Test data: Date (mmyy)	Test data: Static level (ft)	Test data: Drawdown (ft)	Test data: Pumping rate (gpm)	Test data: Length of test (hr)	Test data: Specific capacity (gpm/ft)	Water-bearing formation and depth interval (ft)	Driller
	INST #10														
13716N13W281F	NATL STARCH CHEM MFG INST #8	1970	93	--										--	DIEHL
13716N13W281H	T/A TERMINALS INC - AMMONIA STORAGE #3	1969	90	24-12	26	12	.060	0969	12.50	18.00	1000	8	55.6	SAND, 0-20; SAND & GRAVEL, 20-90	DIEHL
13716N13W282E	NATL STARCH CHEM MFG INST #2A (well abandoned)	1971	60	16-8	10	8	.040	0271	18.00	5.00	120	2	24	SAND, 0-60	DIEHL
13716N13W282E	NATL STARCH CHEM MFG INST #12	1988	89	16	25	16	.080	1088	26.00	8.00	800	6	100	SAND, 0-55; SAND 8, GRAVEL, 55-90	LAYNE-WESTERN
13716N13W282E	NATL STARCH CHEM MFG INST #14	1989	95	16										--	LAYNE-WESTERN
13716N13W282F	NATL STARCH CHEM MFG INST #3 (well abandoned)	1968	96	8	16	8	.025	0868	26.00					SAND & GRAVEL, 24-96	DIEHL
13716N13W282F	NATL STARCH CHEM MFG INST #6A (well abandoned)	1977	89	16	25	16	.080	0677	24.80	6.80	600	8	88.2	SAND & GRAVEL, 0-89	J P MILLER
13716N13W282F	NATL STARCH CHEM MFG INST #11 (well abandoned)	1978	90	16	25	16	.080	1178	31.00	16.00	1150	6	71.9	SAND, 0-45; SAND & GRAVEL, 45-90	J P MILLER
13716N13W282F	NATL STARCH CHEM MFG INST #6 (well abandoned)	1968	90	18-12	25	10	.035	0268	27.00	20.00	780	3	39	SAND & GRAVEL, 21-90	DIEHL
13716N13W282H	NATL STARCH CHEM MFG INST OLD #3	1961	95	16	20	16		0761	21.00	16.00	1200	8	75	SAND & GRAVEL, 0-95	J P MILLER
13716N13W282H	NATL STARCH CHEM MFG INST #2 (well abandoned)	1958	92	12	20		.030	1058	25.00	7.50	500	24	66.7	SAND, 0-20; SAND & GRAVEL, 20-92	J P MILLER
13716N13W283D	NATL STARCH CHEM MFG INST #16 (Office potable)	1993	62	5	4	5	.012							SAND, 2-40; SAND & GRAVEL, 40-62; SAND BELOW	GROSCH
13716N13W283E	NATL STARCH CHEM MFG INST #7	1968	92	24-12	30	12	.050	0868	26.00	20.00	1001	8.3	50.1	SAND S GRAVEL, 20-92	DIEHL
13716N13W283E	NATL STARCH CHEM MFG INST #9	1973	96	16	25	16	.080	0573	17.00	7.00	800	8	114.3	SAND & GRAVEL, 0-96	J P MILLER
13716N13W283F	NATL STARCH CHEM MFG INST TH1	1955	97					0255	23.00					--	J P MILLER
13716N13W283F	NATL STARCH CHEM MFG INST #4 (well abandoned)	1964	98	12	20	12		0764	--	9.50	600	15	63.2	SAND, 0-70; SAND & GRAVEL, 70-98	J P MILLER
13716N13W284A	MOBIL CHEMICAL CO #2	--	77	14		14		1068	16.27					SAND & GRAVEL AT 77	LAYNE-WESTERN
13716N13W284A	MOBIL CHEMICAL CO #4-N	--	20				SANDPOINT							SAND & GRAVEL AT 20	--
13716N13W284A	MOBIL CHEMICAL CO #5-G	--	20				SANDPOINT							SAND & GRAVEL AT 20	--
13716N13W284A	MOBIL CHEMICAL CO #3-M (office)	1968	17	1.2	3	1.2	DRIVE POINT							SAND & GRAVEL AT 17	--
13716N13W284A	MOBIL CHEMICAL CO #2-W	--	20	--			SANDPOINT							SAND & GRAVEL AT 20	--
13716N13W284A	MOBIL CHEMICAL CO #1-B	--	20	--			SANDPOINT							SAND & GRAVEL AT 20	--
13716N13W284A	MOBIL CHEMICAL CO WELL H	--	20	--			SANDPOINT							SAND & GRAVEL AT 20	--
13716N13W284G	NATL STARCH CHEM MFG INST #1 (well abandoned)	1955	94	12				0165	20.00	33.00	750	1	22.7	--	J P MILLER
13716N13W347C	ILL ROAD CONTRACTORS (irrigation)	1981	84	18	20	16	.050	0581	12.00	36.00	1250		34.7	SAND, 2-48; SAND & GRAVEL, 48-84; ROCK BELOW	GROSCH
13716N13W364E	WARREN MC CULLOCK	1974	70	36										CLAY & DRIFT, 49-70	RIMBY
17113N13W026D	ROBERT A GOPEL	1976	146	4	16									SAND, 0-60; LIME SHELLS & SAND, 60-120; LIME, 120-146	CHADWICK

Appendix II-2. (Continued)

Well location	Well owner	Well: Year constructed	Well: Depth (ft)	Well: Diameter (in)	Screen: Length (ft)	Screen: Diameter (in)	Screen: Slot Size (in)	Test data: Date (mmyy)	Test data: Static level (ft)	Test data: Drawdown (ft)	Test data: Pumping rate (gpm)	Test data: Length of test (hr)	Test data: Specific capacity (gpm/ft)	Water-bearing formation and depth Interval (ft)	Driller
17113N13W028D	DONALD RANFT	1977	105	6.6	45	5.5	SLOTTED PIP	0977			20			SANDSTONE, 20-50; LIMESTONE & SANDSTONE, 50-60; LIMESTONE, 60-80, 85-105	ST CHARLES DRLG
17113N13W028E	B THORPE	--	90	1.5	3		SANDPOINT							SAND AT 90	--
17113N13W028H	KEITH ZENGE #1	1970	85	6	17			1170	39.00		20			SHALE, 60-65; LIMESTONE, 65-85	CHADWICK
17113N13W032A	J C SHEPPARD	--	25	1.5	3		SANDPOINT							SAND AT 25	--
17113N13W032D	ORVILLE SMITH	--	25	1.5	3		SANDPOINT							SAND AT 25	--
17113N13W032D	ED BERGSCHNEIDER (Irrigation)	1985	57	8	20	8	.050	0485	27.00	18.00	381		21.2	SAND, 2-35; SAND & GRAVEL, 35-57; BEDROCK BELOW	GROSCH
17113N13W033F	HARRY CLARK	--	35	1.5	3		SANDPOINT							SAND AT 35	--
17113N13W033F	MRS AVERY	--	30	1.5	3		SANDPOINT							SAND AT 30	--
17113N13W035E	ED BERGSCHNEIDER (irrigation)	1979	74	16	28	16	3/16	1279	12.00	32.00	1250		39.1	SAND, 5-32; SAND & GRAVEL, 32-74	GROSCH
17113N13W037G	DICK BERGSCHNIEDER (irrigation)	1988	67	14	20	12	.050							SAND, 2-14; SAND & GRAVEL, 14-67; BEDROCK BELOW	GROSCH
17113N13W042B	TRIEBEL FARM #1 (irrigation)	1977	70	14	30	12	.080	0777	4.00					SAND, 8-30; SAND & GRAVEL, 30-70	RUESTER
17113N13W042C	CARL TREBLE	--	40	1.5	3		SANDPOINT							SAND AT 40	--
17113N13W042E	C MATHEWS	--	40	1.5	3		SANDPOINT							SAND AT 40	--
17113N13W047B	ALBERT HOOTS	--	40	1.5	3		SANDPOINT							SAND AT 40	--
17113N13W048H	J W WILKINS	--	30	1.5	3		SANDPOINT							SAND AT 30	--
17113N13W051A	HARRY DIX	--	26	1.5	3		SANDPOINT							SAND AT 26	--
17113N13W055H	T K KEMPER	--	60	1.5	3		SANDPOINT							SAND AT 60	--
17113N13W056F	CHARLES TEMPLIN	--	27	1.5	3		SANDPOINT							SAND AT 27	--
17113N13W061B	CLEAVE OVERTON	--	65	1.5	3		SANDPOINT							SAND AT 65	--
17113N13W071A	C MALONE	1929	28	1.5	3		SANDPOINT	0334	10.00					SAND AT 28	--
17113N13W073F	JESSE TEMPLETON	--	44	1.5	3		SANDPOINT							SAND AT 44	--
17113N13W084H	OR FLETCHER	--	20	1.5	3		SANDPOINT							SAND AT 20	--
17113N13W087A	FRED KEIDLER	1930	30	1.5	3		SANDPOINT	0334	10.00					SAND AT 30	KEIDLER
17113N13W092G	TRIEBEL FARM #2 (Irrigation)	1977	76	14	30	12	.080	0777	9.00					SAND, 0-30; SAND AND GRAVEL, 30-76	RUESTER
17113N13W097B	HARRY DIX	--	18	1.5	3		SANDPOINT							SAND AT 18	--
17113N13W098E	HARRY DIX	--	20	1.5	3		SANDPOINT							SAND AT 20	--
17113N13W098F	HARRY DIX	--	20	1.5	3		SANDPOINT							SAND AT 20	--
17113N13W101C	JOHN BROWN	1977	127	6	92			1077	115.00	9.00	0.5	1	0.1	SAND, 0-26; SAND & MUD, 26-35; LIMESTONE, 35-127	SHOEMAKER
17113N13W102C	JOHN BROWN	1991	43	5	4	5	.012	1291	17.00					SAND, 2-37; SAND & GRAVEL, 37-43	GROSCH
17113N13W102G	C HARDY	--	28	1.5	3		SANDPOINT							SAND AT 28	--
17113N13W105A	CLAYTON RENNER	1932	25	1.5	3		SANDPOINT							SAND AT 25	--
17113N13W105A	ANDY BROWN	1991	49	5	4	5	.012	1291	8.00					SAND, 11-26; SAND & GRAVEL, 26-49	GROSCH
17113N13W108A	C A SARGENT	1933	25	1.5	3		SANDPOINT							SAND AT 25	SARGENT
17113N13W108H	CARL TREBLE	--	28	1.5	3		SANDPOINT							SAND AT 28	--
17113N13W111F	C L PATTERSON	1900	30	42				0334	26.00					LIMESTONE AT 30	--
17113N13W112G	MRS V C CUMBY	1860	22	48				0334	19.00					ROCK AT 22	--
17113N13W117G	VICTOR EVANS	1981	117	6	61									SHALE, 30-51; ROCK, 51-117	POHLMAN
17113N13W118A	ALFRED RHODES #1	1978	31	6-36										SANDY & CAVEY, 21-31	BERGSCHNEIDER
17113N13W118F	FRED SAVAGE	--	18	1.5	3		SANDPOINT							SAND AT 18	--
17113N13W145H	MRS REED	--	100	6	40			0334	20.00					CLAY & LIMESTONE AT 100	--
17113N13W148B	ALEX COWAN	1910	25	30					24.00					SAND, 10-25	COWAN
17113N13W148D	WM MCCARTHY	--	25.5	42				0334	23.80					SAND TO QUICKSAND AT 25.5	--
17113N13W148E	C GENE WEAR (methane gas present)	1977	325	6.6-5.5				0977			1			SAND, 0-25; LIMESTONE, 30-115; SHALE, 115-295; LIMESTONE, 295-325	ST CHARLES DRLG
17113N13W148G	ELLA J HOOTS	1915	25	48				0334	23.00					ROCK AT 25	HOOTS
17113N13W151A	A BENTON	1860	30	48				0334	18.00					SAND AT 20	--
17113N13W151D	ANDY SAUERS	--	30	42				0334	28.00					ROCK AT 30	--
17113N13W152D	CURTIS WEAR	1994	53	5	4	5	.012	0994	16.00					SAND, 0-10; SAND & GRAVEL, 16-53; ROCK BELOW	GROSCH
17113N13W152H	ELMER STICE	--	25	1.5	3		SANDPOINT							SAND AT 25	--

Appendix II-2. (Continued)

Well location	Well owner	Well: Year constructed	Well: Depth (ft)	Well: Diameter (in)	Screen: Length (ft)	Screen: Diameter (in)	Screen: Slot Size (in)	Test data: Date (mmyy)	Test data: Static level (ft)	Test data: Draw-down (ft)	Test data: Pumping rate (gpm)	Test data: Length of test (hr)	Test data: Specific capacity (gpm/ft)	Water-bearing formation and depth interval (ft)	Driller
17113N13W165D	FROST, BOZE & O'RIELY	1930	25	1.5	3		SANDPOINT							SAND AT 25	PIEPER
17113N13W167E	FROST, BOZE 8, O'RIELY	1927	38	1.5	3		SANDPOINT	0334	15.00					SAND AT 38	PIEPER
17113N13W173F	WILL BLACKBURN	1928	20	2	3		SANDPOINT	0334	8.00					SAND AT 20	PIEPER
17113N13W18	JACK ELMER	1979	127	8	44			0979	14.00	110.00	12	1	0.1	SHALE & SAND, 43-72; BROKEN LIME, 72-83; LIMESTONE, 83-127	SHOEMAKER
17113N13W181H	H L ALARD (dug to 18')	1930	96	48-1.5	3		SANDPOINT	0334	10.00					SAND AT 96	ALARD
17113N13W182G	BIG SWAN DRAINAGE & LEVEE DIST	1986	90	8	20	6	.040	0686	15.00					SAND 8. GRAVEL, 52-90	GROSCH
17113N13W202F	CLAUD THOMAS	1928	20	1.5	3		SANDPOINT							SAND AT 20	PIEPER
17113N13W206G	CLAUD THOMAS	--	100	1.5	3		SANDPOINT	0334	12.00					SAND AT 100	--
17113N13W211E	R EDWARD FROST #2 (Irrigation)	1977	70	14	30	12	.080	0777	6.00					SAND, 7-30; SAND & GRAVEL, 30-70	RUESTER
17113N13W211E	BIG SWAN FARMS INC (irrigation)	1995	95	14	30	14	.050							SAND, 2-23; SAND & GRAVEL, 23-95	GROSCH
17113N13W213G	CLAUD THOMAS	<1931	48	1.5	3		SANDPOINT	0334	8.00					SAND AT 48	PIEPER
17113N13W214E	R EDWARD FROST #1 (irrigation)	1977	76	14	30	12	.080	0777	6.00					SAND, 7-25; SAND & GRAVEL, 25-76	RUESTER
17113N13W215D	BIG SWAN FARMS INC (irrigation)	1988	90	14	20	12	.060	0688			1250			SAND, 8-32; SAND & GRAVEL, 32-90	GROSCH
17113N13W215F	CLAUD THOMAS	1930	35	1.5	3		SANDPOINT							SAND AT 35	PIEPER
17113N13W215F	CLAUD THOMAS	1928	40	1.5	3		SANDPOINT							SAND AT 40	PIEPER
17113N13W215G	MRS E HARDER	1932	40	1.5	3		SANDPOINT	0334	6.00					SAND AT 40	PIEPER
17113N13W225E	JOHN C PETERSON	1932	30	1.5			SANDPOINT							SAND AT 30	PETERSON
17113N13W225H	ANDY SAUERS (dug to 14'-sandpoint below)	--		48-1.5			SANDPOINT	0334	9.70					SAND AT 14+	PIEPER
17113N13W227E	A W MEYERS	1930	35	1.5			SANDPOINT							SAND AT 35	PIEPER
17113N13W236A	C DRAKE	1925	34	1.5	3		SANDPOINT							SAND AT 34	PIEPER
17113N13W237B	ALEX YOUNG	--	30	48				0334	28.00					SAND AT 30	--
17113N13W25	JAMES FITCH (dug well)	--	33	--										--	--
17113N13W258H	C J WRIGHT	1886	40	42				0334	30.00					CLAY AT 40	--
17113N13W266F	CHARLES CRAVER	1995	15	6-36										SAND & GRAVEL, 12-15	WALTERS
17113N13W267A	E C ADAMS SONS (spring)	--		--										--	--
17113N13W273F	CLAIR & WARREN WILSON	1985	92	16	32	16	.050	0785			1000			SAND, 8-22; SAND & GRAVEL, 22-53, 59-91; CLAY BELOW	GROSCH
17113N13W276B	E C ADAMS #1	1941	1050	--										KINDERHOOK-NEW ALBANY, 115-202; SILURIAN SYSTEM, 202-340; MAQUOKETA FORMATION, 340-515; KIMMSWICK FORMATION, 515-685; GALENA-PLATTEVILLE, 685-865; ST PETER SANDSTONE, 865-1050	BEDELL
17113N13W281D	ARCHIE HESTER	--	35	1.5			SANDPOINT	0334	8.00					SAND AT 35	--
17113N13W283G	J H BENTON	1926	15	1.5	3		SANDPOINT	0334	6.00					SAND AT 15	PIEPER
17113N13W292D	CHARLES SHAVER	--	60	1.5	3		SANDPOINT							SAND AT 60	--
17113N13W292D	CORBIT EST	1931	60	1.5	3		SANDPOINT							SAND AT 60	SIPES
17113N13W321F	CORBIT EST	1928	20	1.5	3		SANDPOINT							SAND AT 20	NEWLIN
17113N13W322H	CORBIT EST	1929	30	2	3		SANDPOINT							SAND AT 30	PIEPER
17113N13W336A	CHARLES DANIELS	1927	40	1.5	3		SANDPOINT	0334	20.00					SAND AT 40	PIEPER
17113N13W336E	JOHN GRAHAM	1929	40	1.5	3		SANDPOINT							SAND AT 40	PIEPER
17113N13W344H	CLAIR WILSON	1980	94	16	40	16	3/16	0480	10.00	41.00	2000		48.8	SAND, 12-48; SAND & GRAVEL, 48-90; ROCK, 90-94	GROSCH
17113N13W348G	E C ADAMS SONS	1900	40	42				0334	15.00					SAND AT 40	--
17113N13W35	W D MCEVERS	1920	322	--	222									LIMESTONE, 200-322	--
17113N13W356A	ROY MCEVERS	<1932	20	42				0334	17.00					CLAY AT 20	--
17113N13W356B	W D MCEVERS	1922	313	8	213			0334	50.00					SHALE, 100-200; LIMESTONE, 200-313	HUBBARD
17113N13W356B	W D MCEVERS	1910	28	48				0334	23.00					CLAY, 20-28	MCEVERS
17113N13W357E	E C ADAMS SONS	1927	40	1.5			SANDPOINT	0334						SAND AT 40	PIEPER
17113N13W357H	E C ADAMS SONS	--	40	48				0334	34.00					SAND & CLAY AT 40	--

Appendix II-2. (Continued)

Well location	Well owner	Well: Year constructed	Well: Depth (ft)	Well: Diameter (in)	Screen: Length (ft)	Screen: Diameter (in)	Screen: Slot Size (in)	Test data: Date (mmyy)	Test data: Static level (ft)	Test data: Drawdown (ft)	Test data: Pumping rate (gpm)	Test data: Length of test (hr)	Test data: Specific capacity (gpm/ft)	Water-bearing formation and depth Interval (ft)	Driller
17113N13W36	CLAUD ADAMS	<1907	23	--										CLAY AT 23	--
17114N13W055E	WILLIAM KUHNS #1	1996	255	6	215			0696	38.00	210.00				SHALE, 27-38; LIME, 38-255	SHOEMAKER
17114N13W056H	JULES RACHKUS #1	1996	270	6	229			0496	48.00	218.00		1		SHALE, 16-35; LIME, 35-270	SHOEMAKER
17114N13W083A	GEORGE GREEN	1927	30	1.5	3		SANDPOINT							SAND AT 30	GREEN
17114N13W083E	HATTIE GIVENS	1925	25	1.2	3		SANDPOINT							SAND AT 25	COX
17114N13W085F	JERRY MILLER #1	1994	370	6	230			0994	188.50	175.00		1		SHALE, 85-121; SANDSTONE, 121-159; LIME, 159-367; SHALE, 367-370	SHOEMAKER
17114N13W086B	S B ATCHISON	1926	30	1.2	3		SANDPOINT							SAND AT 30	PIEPER
17114N13W087C	FANNY LELAND	1930	35	1.2	3		SANDPOINT							SAND AT 35	PIEPER
17114N13W087D	FANNY LELAND	1933	30	1.2	3		SANDPOINT							SAND AT 30	PIEPER
17114N13W087E	HERMAN FREEZEN	1927	35	1.2	3		SANDPOINT							SAND AT 35	FREEZEN
17114N13W164D	KENNETH BOESTER	1992	50	6-36										SAND 8, GRAVEL, 17-18, 28-30	REYNOLDS
17114N13W166E	WALLACE HOOTS	--	50	48										ROCK AT 60	--
17114N13W166H	C J CAMPBELL	1928	35	1.2			SANDPOINT							SAND AT 35	CAMPBELL
17114N13W167F	JOSEPH HOOTS	1925	45	1.5			SANDPOINT							SAND AT 45	HOOTS
17114N13W167H	BEN RUETER	1926	35	1.5			SANDPOINT							SAND AT 35	PIEPER
17114N13W172G	WILLIAM DUBBEL	1930	25	1.2	3		SANDPOINT							SAND AT 25	DUBBEL
17114N13W177A	FRED RUETER	1928	25	1.2	3		SANDPOINT							SAND AT 25	RUETER
17114N13W177G	WILLIAM CLAYTON	1930	25	1.2	3		SANDPOINT							SAND AT 25	CLAYTON
17114N13W177H	WILLIAM CLAYTON	1927	30	1.5	3		SANDPOINT							SAND AT 30	CLAYTON
17114N13W186G	PAUL & RICK POLLOCK (Irrigation)	1981	90	18	20	16	.050	0581	6.00	52.00	1250		24	SAND, 2-39; SAND & GRAVEL, 39-90; BEDROCK BELOW	GROSCH
17114N13W187C	LUEDIMAN HEIRS	1930	35	1.2	3		SANDPOINT							SAND AT 35	LUEDIMAN
17114N13W188A	NEAT, CONDIT & GRANT BANK	1931	40	1.5	3		SANDPOINT							SAND AT 40	PIEPER
17114N13W191H	SAM SMITH	<1932	25	1.5			SANDPOINT							SAND AT 25	--
17114N13W193D	C J WALTERS	<1928	28	1.5			SANDPOINT							SAND AT 28	--
17114N13W197H	JAMES A SMOTHERS	1925	25	1.2	3.5		SANDPOINT							SAND AT 25	PIEPER
17114N13W205F	J L WILSON	1930	23	1.2			SANDPOINT							SAND AT 23	HOOTS
17114N13W206E	DELFA DUNHAM	--	23	1.5										SAND & GRAVEL AT 23	--
17114N13W207F	C R MCLAUGHLIN	1931	28	1.2			SANDPOINT							SAND AT 28	--
17114N13W207H	J L WILSON	1926	21	1.2			SANDPOINT							SAND AT 21	HOOTS
17114N13W214C	LEO SMITH	1926	54	1.5			SANDPOINT							SAND AT 54	PIEPER
17114N13W214D	EATHEL MCEVERS (dug 40'-driven to ?}	--	40	48-1.2			STRAINER							SAND AT 40+	--
17114N13W212A	GEORGE MCCAIN	1929	30	1.2			SANDPOINT							SAND AT 30	MCCAIN
17114N13W215D	WESLEY SHAFER	1926	50	1.2			SANDPOINT							SAND AT 50	SHAFER
17114N13W215F	DAVID MCDADE	1920	50	1.2			SANDPOINT							SAND AT 50	--
17114N13W228H	W SAXER #1	1977	52	6-36										SAND, 37-38	BERGSCHNEIDER
17114N13W272D	CLARENCE WILSON	1991	49	5	4	5	.012	1291	24.00					SAND & GRAVEL, 17-49; SHALE BELOW	GROSCH
17114N13W273E	W C SIMMONS	--	30	1.5			SANDPOINT	0334	15.00					SAND AT 30	--
17114N13W276E	J W PRICE	1925	32	1.5			SANDPOINT							SAND AT 32	PRICE
17114N13W277C	ALLEN SMITH	--	28	1.2			SANDPOINT							SAND AT 28	--
17114N13W281C	TOM EDMONSON	1933	40	1.5	3		SANDPOINT	0334	20.00					SAND AT 40	EDMONDSON
17114N13W281C	DICK WILSON	1929	35	1.5			SANDPOINT							SAND AT 35	WILSON
17114N13W282H	WILLIAM KESINGER	1932	40	1.5			SANDPOINT							SAND AT 40	KESINGER
17114N13W292C	MRS D C SMITH	--	20	1.5			SANDPOINT							SAND AT 20	--
17114N13W296D	RAY HOOTS	1929	30	1.5			SANDPOINT							SAND AT 30	PIEPER
17114N13W297A	ILL VALLEY ASPHALT #1	1977	120	6	8	5.5	.050	0677	12.50	0.00	40	1		SAND, 10-120	CALLIHAN
17114N13W297E	ALVIN GREGORY	1927	35	1.5			SANDPOINT							SAND AT 35	GREGORY
17114N13W301A	E A CALWELL	1927	30	1.5	3		SANDPOINT							SAND AT 30	PIEPER
17114N13W301B	JAMES BROWN	1994	60	5	20	5	.012	0894	7.00					SAND, 5-40; SAND 8, GRAVEL, 40-60	GROSCH
17114N13W302D	E A CALWELL	1928	35	1.5	3		SANDPOINT							SAND AT 35	PIEPER
17114N13W304A	E SANDERSON	--	25	1.5			SANDPOINT	0334	6.00					SAND AT 25	--
17114N13W313F	CHARLES ELLIS ESTATE	1928	40	1.5	3		SANDPOINT	0334	6.00					SAND AT 40	PIEPER
17114N13W314D	CHARLES ELLIS ESTATE	1927	40	1.5	3		SANDPOINT	0334	6.00					SAND AT 40	KELLY
17114N13W323F	HOLIMAN NORTON FARM	1994	62	5	4	5	.012	0894	15.00					SAND & GRAVEL, 34-62	GROSCH
17114N13W323F	MRS H HARGETT	1933	40	1.5	3		SANDPOINT	0334	8.00					SAND AT 40	PIEPER

Appendix II-2. (Continued)

Well location	Well owner	Well: Year constructed	Well: Depth (ft)	Well: Diameter (in)	Screen: Length (ft)	Screen: Diameter (in)	Screen: Slot Size (in)	Test data: Date (mmyy)	Test data: Static level (ft)	Test data: Drawdown (ft)	Test data: Pumping rate (gpm)	Test data: Length of test (hr)	Test data: Specific capacity (gpm/ft)	Water-bearing formation and depth Interval (ft)	Driller
17114N13W324E	MRS H HARGETT	1930	15	1.5	3		SANDPOINT	0334	10.00					SAND AT 15	COONS
17114N13W325H	EDGAR SMITH	1933	35	1.5			SANDPOINT							SAND AT 35	SMITH
17114N13W327E	MRS H HARGETT	1929	20	1.5	3		SANDPOINT	0334	8.00					SAND AT 20	WILKINS
17114N13W331D	RAND KASINGER	1925	25	1.5			SANDPOINT							SAND AT 25	PIEPER
17114N13W331H	DICK WILSON	1928	35	1.5	3		SANDPOINT	0334	10.00					SAND AT 35	WILSON
17114N13W332H	DICK WILSON	1926	35	1.5			SANDPOINT							SAND AT 35	WILSON
17114N13W333H	DICK WILSON	1926	32	1.5			SANDPOINT							SAND AT 32	WILSON
17114N13W335D	MERLE BROWN (irrigation)	1989	75	16	20	16	.050	0389	14.00	28.00	1250		44.6	SAND, 2-32; SAND & GRAVEL. 32-75	GROSCH
17114N13W34	WINCHESTER TH3	1981	54	--										SAND, 6-18; SAND & GRAVEL, 18-54; ROCK BELOW	LAYNE-WESTERN
17114N13W341C	E W WOODALL	--	18	1.5			SANDPOINT							SAND AT 18	--
17114N13W343A	WINCHESTER TB2	1986	58.5	--				0786	5.00					SAND, 0-3, 7.5-12.5; SAND & GRAVEL, 12.5-27.5; SAND, TRACE SILT, 27.5-42.5; SAND & GRAVEL, 42.5-58.5	MCCLELLAND
17114N13W343A	WINCHESTER #102	1986	58	12.8	14	12.8	.100	1186	6.45	4.78	290	2	60.7	SAND, 0-3, 7.5-12.5; SAND & GRAVEL, 12.5-32.5; SAND, TRACE SILT, 32.5-42.5; SAND S GRAVEL, 42.5-68.5	MCCLELLAND
17114N13W344A	WINCHESTER TH1	1981	61	--										SAND, 5-50; SAND & GRAVEL, 50-61; ROCK BELOW	LAYNE-WESTERN
17114N13W344A	WINCHESTER TH2 (OB1 for #102)	1981	58	6				1286	3.80					SAND, 5-25; SAND & GRAVEL, 25-58; ROCK BELOW	LAYNE-WESTERN
17114N13W344A	WINCHESTER TB1	1986	64.9	--				0786	5.00					SAND, 0-4; SAND, TRACE CLAY, 8-12.5; SAND, 12.5-18; SAND, TRACE CLAY, 18-24; SAND & GRAVEL, 24-29; SAND & GRAVEL WITH SILT, 29-33.5; SAND, 33.5-38; SAND & GRAVEL, 38-57.5; SAND 8. GRAVEL WITH SILT, 57.5-64.9	MCCLELLAND
17114N13W344A	WINCHESTER #101	1986	65	12.8	12	12.8	.100	1186	6.88	5.37	280	4	52.1	SAND, 0-4, 8-29; SAND & GRAVEL, 29-33.5; SAND, 33.5-38; SAND & GRAVEL, 38-65.6	MCCLELLAND
17114N13W348E	ED WILSON	--	25	1.5			SANDPOINT							SAND AT 25	--
17114N14W122C	PAUL & RICK POLLOCK	1981	89	18	20	16	.050	0581	6.00	43.00	1250		29 1	SAND, 6-27; SAND & GRAVEL, 27-62; SAND, 62-71; SAND & GRAVEL, 71-89; BEDROCK BELOW	GROSCH
17114N14W131C	LUEDIMAN HEIRS	1927	40	1.5			SANDPOINT							SAND AT 40	--
17114N14W136A	ALBERT HESS	1926	35	1.5			SANDPOINT							SAND AT 35	PIEPER
17114N14W141D	ALBERT HESS	1929	35	1.5			SANDPOINT							SAND AT 35	PIEPER
17115N13W	B F ROCKWOOD-SPRING	<1909												SANDSTONE	--
17115N13W032H	LEROY CASTLE	1992	36	5	4	5	.012	0992	15.00	10.00	18		1.8	SAND, 2-23, 30-36; SHALE BELOW	GROSCH
17115N13W038C	LOUIS PESSINA (irrigation)	1978	81	15	20	12	.060	0578	3.00		1000	1		SAND, 5-60; SAND & GRAVEL, 60-81	ALBRECHT
17115N13W038G	LOUIS PESSINA (irrigation)	1978	84	15	20	12	.060	0578	4.00		1000	1		SAND, 5-60; SAND & GRAVEL, 60-84	ALBRECHT
17115N13W046C	LOUIS PESSINA (Irrigation)	1978	81	15	20	12	.060	0578	3.00		1000	1		SAND, 5-60; SAND & GRAVEL, 60-81	ALBRECHT
17115N13W047F	LOUIS PESSINA (irrigation)	1978	75	15	20	12	.100	0678	3.00		1000	1		SAND, 5-60; SAND & GRAVEL, 60-75	ALBRECHT
17115N13W061E	VERA BARROW	1995	54	5	8	5	.015-.030	0395	7.50					SAND, 0-17; SAND & GRAVEL, 17-39; SAND, 39-45; SAND & GRAVEL, 45-54	ALBRECHT
17115N13W071G	BURRIS SEED FARMS #1 (irrigation)	1995	77	14	30	14	.050	0395	7.00	13.00	1250 .		96.2	SAND, 2-35; SAND & GRAVEL, 35-77; SHALE BELOW	GROSCH
17115N13W082E	JACKSONVILLE TH6	--	43	--				0454			5	5		--	--
17115N13W10	ROYAL OAKES	<1924	30	--										STONE, 25-30	--
17115N13W108A	SCOTT-MORGAN C.U.D. MW-3 (monitoring)	1992	34	2	10	2	.010	0492	24.50					SAND, 11-12; SILT TO SAND, 27-33	WESTERN ASPHALT
17115N13W108B	SCOTT-MORGAN C.U.D.	1992	34	2	10	2	.010	0492	25.50					SAND, 17-20	WESTERN ASPHALT

Appendix II-2. (Continued)

Well location	Well owner	Well: Year constructed	Well: Depth (ft)	Well: Diameter (in)	Screen: Length (ft)	Screen: Diameter (in)	Screen: Slot Size (in)	Test data: Date (mmyy)	Test data: Static level (ft)	Test data: Draw-down (ft)	Test data: Pumping rate (gpm)	Test data: Length of test (hr)	Test data: Specific capacity (gpmm)	Water-bearing formation and depth Interval (ft)	Driller
	MW-1 (monitoring)														
17115N13W108B	SCOTT-MORGAN C.U.D.	1992	33.5	2	10	2	.010	0492	24.50					SAND, 11-12; SILT TO SAND, 23-28	WESTERN ASPHALT
	MW-2 (monitoring)														
17115N13W108B	SCOTT-MORGAN C.U.D.	1992	33.5	2	10	2	.010	0492	24.50					SAND, 11-13; SILTY SAND, 28-30	WESTERN ASPHALT
	MW-4 (monitoring)														
17115N13W162H	WABASH RAILWAY CO - WEST WELL	--	58	12	10	8		0234			100			--	--
								0348		13.00	60		4.6		
17115N13W162H	WABASH RAILWAY CO - EAST WELL	<1916	62	12	10	8		0234			100			SAND & GRAVEL, 25-45; SAND, 45-62	--
								0348		21.00	60		2.9		
17115N13W162H	BLUFFS #3	1958	59.4	26-12	15	12	.105	1058	18.83	12.22	252	8	20.6	SAND, 28-56	LAYNE-WESTERN
17115N13W162H	BLUFFS TH2- OB1 FOR #3	1958	59.5	--				1058	21.17			8		SAND, 28-56, 56.3-59.5; BEDROCK BELOW	LAYNE-WESTERN
17115N13W162H	BLUFFS #1 (well tilled in)	1936	58	54-36-26	44	36-26	orous concret	0136	14.10	7.20	173	4.3	24	DIRTY SAND, 28-35; SAND, 35-58	THORPE
								0136	15.50	7.10	168	3.8	23.7		
								0236	11.90	9.80	178	8	18.2		
								0240	21.00	17.50	60	0.3	3.4		
								0246	18.00	40.00	62		1.6		
17115N13W163B	W BETTY RILEY	1974	120	6				??74			4			LIME & SHALE, 30-50; LIME, 50-55; LIME, SHALE STREAKS, 55-120	CHADWICK
17115N13W163H	BLUFFS TH1 - OB2 FOR #3	1958	58.5	..				1058	20.03			8		SAND, CLAY SHOWING, 28-56; SAND, 56.3-58.5; BEDROCK BELOW	LAYNE-WESTERN
17115N13W163H	BLUFFS #2	1947	57	8	12	8	.016	0947	17.00	7.20	90	7	12.5	SAND & GRAVEL AT 57	LONG
								0348	17.20	16.00	220	24	13.8		
17115N13W163H	BLUFFS #4	1979	60	12	15	12	.105	0479	13.77	15.90	250	3	15.7	SAND, 22-60	LAYNE-WESTERN
17115N13W174H	JACKSONVILLE-OLD #1	<1905	69	10	20									SAND & GRAVEL, 18-69	--
17115N13W174H	JACKSONVILLE-OLD #2	<1907	68	10	20									SAND & GRAVEL AT 68	--
17115N13W174H	JACKSONVILLE-OLD #3	<1907	68-70	10	20									--	--
17115N13W174H	JACKSONVILLE-OLD #4	<1907	68-70	10	20									--	--
17115N13W174H	JACKSONVILLE-OLD #5	<1907	68-70	10	20									--	--
17115N13W174H	JACKSONVILLE-OLD #6	<1907	68-70	10	20									--	--
17115N13W174H	JACKSONVILLE-OLD #7	<1907	68-70	10	20									--	--
17115N13W174H	JACKSONVILLE-OLD #8	<1907	60	10	20									SAND & GRAVEL, 8-60	--
17115N13W174H	JACKSONVILLE-OLD #9	<1907	58	11	20									SAND & GRAVEL AT 58	--
17116N13W174H	JACKSONVILLE-OLD #10	<1907	60	10	20									SAND & GRAVEL AT 60	--
17115N13W174H	JACKSONVILLE-OLD #11	<1907	68-70	10	20									--	--
17115N13W174H	JACKSONVILLE-OLD #12	<1907	68-70	10	20									--	--
17115N13W174H	JACKSONVILLE-OLD #13	<1907	68-70	10	20									--	--
17115N13W174H	JACKSONVILLE-OLD #14	<1907	68-70	10	20									--	--
17115N13W175E	G O HEAD FARMS (irrigation)	1989	79	14	20	12	.050	0389	18.00	26.00	1200		46.2	SAND, 2-31; SAND & GRAVEL, 31-79; SHALE BELOW	GROSCH
17115N13W202C	TOM POOLE	1980	93	6				0380	17.00	48.00	10	1	0.2	BROKEN LIME & FLINT, 56-93	SHOEMAKER
17115N13W203C	CARL KRUSA (Irrigation)	1983	75	16	20	16	.050	1083	14.00	15.00	1160		77.3	SAND, 5-32; SAND & GRAVEL, 32-75; BEDROCK BELOW	GROSCH
17115N13W205G	EUGENE NIENHISER (Irrigation)	1989	78	14	20	12	.050							SAND, 2-27; SAND & GRAVEL, 27-78; ROCK BELOW	GROSCH
17115N13W21	RAYMOND MORRIS	1949	102	6	4	6	.025							SAND, 65-95; SAND & GRAVEL, 95-100; SHALE BELOW	BUSHNELL
17115N13W218G	VIVIAN BENTLEY	1995	29	6-36										SHALE, 19-29; LIMESTONE BELOW	REYNOLDS
17115N13W293C	GEORGE KRUSA	1991	200	6.6-4.5	40		PERFORATED P	0891	56.00					SAND, 0-12; SHALE, 12-36; LIME, 36-48; SHALE, 48-52; LIME, 52-200	HICKS
17115N13W294A	GEORGE KRUSA	1988	19	6-36										SAND & GRAVEL, 15-16; ROCK AT 19	LINK
17115N13W294A	CARL KRUSA	1994	29	5	4	5		0394	11.00					SAND & GRAVEL, 20-29	GROSCH
17115N13W296C	NORRIS E MERRIMAN	1976	200	6	120	5	SLOTTED PIP	0976	68.50		1			SHALE SANDY, 30-80; SHALE, 80-120; LIMESTONE, 120-200	CHADWICK
17115N13W305A	CARL KRUSA	1994	80	5	4	5	.012	0294	25.00					SAND, 2-20, 24-50; SAND & GRAVEL, 50-80	GROSCH
17115N13W312D	SOUTH JACKSONVILLE #2	1967	77	10	20	10	.048	0967	14.12	14.27	495	3.3	34.7	DIRTY SAND, 0-4; SAND WITH CLAY; 9-15; SAND, 15-54; SAND & GRAVEL,	LAYNE-WESTERN

Appendix II-2. (Concluded)

Well location	Well owner	Well: Year con-structed	Well: Depth (ft)	Well: Dia-meter (in)	Screen: Length (ft)	Screen: Dia-meter (in)	Screen: Slot Size (in)	Test data: Date (mmyy)	Test data: Static level (ft)	Test data: Draw-down (ft)	Test data: Pumping rate (gpm)	Test data: Length of test (hr)	Test data: Specific capacity (gpm/ft)	Water-bearing formation and depth Interval (ft)	Driller
														54-76.5; BEDROCK BELOW	
17115N13W312D	SOUTH JACKSONVILLE #1	1967	79.5	10	20	10	.105	0967	16.40	13.51	412	9.7	30.5	DIRTY SAND, 0-11; SAND WITH CLAY, 22-35; SAND, 35-40; SAND & GRAVEL, 40-62; SAND WITH CLAY, 62-70; SAND & GRAVEL, 70-82; LIMESTONE BELOW	LAYNE-WESTERN
17115N13W313G	HEAD FARMS INC (irrigation)	1989	61	14	20	12	.050							SAND, 2-35; SAND & GRAVEL, 35-61	GROSCH
17115N13W323H	IVAN RUSSWINCK	1982	80	6				0682	38.00	40.00	8	4	0.2	SHALE, 25-55; LIMESTONE, 55-80	CHADWICK
17115N13W324E	STEVE MERRIMAN	1993	30	5	4	5	.012	0793	....					BEDROCK, 29-30	GROSCH
17115N14W123G	JACKSONVILLE TH1	1982	94	2				0382	12.00					SILTY SAND, 0-5, 10-20; SAND, 20-94	LAYNE-WESTERN
17115N14W123G	JACKSONVILLE #1	1982	94	18	40	18	.060	0682	13.00	19.00	2000	4	133.3	SAND 8. GRAVEL, 0-94	J P MILLER
17115N14W123H	JACKSONVILLE #2	1982	84	18	40	18	.060	0682	3.00	15.00	2000	4	133.3	SAND & GRAVEL, 0-85	J P MILLER
17115N14W124G	JACKSONVILLE AN2- OB FOR #101	1955	104	--										SILTY SAND, 3-31; SAND 8, GRAVEL, 31-102; BEDROCK, 102-104	RANNEY
17115N14W124G	JACKSONVILLE AN1- OB FOR #101	1955	105	--										SILTY SAND, 3-32; SAND & GRAVEL, 32-63; SAND, 63-70; SAND & GRAVEL, 70-104; BEDROCK, 104-105	RANNEY
17115N14W124G	JACKSONVILLE AS1 - OB FOR #101	1955	98	--										SILTY SAND, 4-32; SAND & GRAVEL WITH SILT, 32-49; SAND & GRAVEL, 49-97; BEDROCK, 97-98	RANNEY
17115N14W124G	JACKSONVILLE AE1 - OB FOR #101	1955	97.5	--										SILTY SAND, 0-25; SAND & GRAVEL, 25-50; SAND & GRAVEL WITH CLAY, 50-51; SAND & GRAVEL, 51-97; BEDROCK, 97-97.5	RANNEY
17115N14W124G	JACKSONVILLE AW3 - OB FOR #101	1955	75	--										SAND & GRAVEL WITH SILT, 0-25; SAND & GRAVEL, 25-72; BEDROCK, 72-75	RANNEY
17115N14W124G	JACKSONVILLE AW2 - OB FOR #101	1954	82	6	10		SLOTTED PIP	1054	7.00	8.00	6	2	0.8	SAND & GRAVEL, 10-32; SAND & GRAVEL WITH SILT, 32-60; SAND & GRAVEL, 60-80; BEDROCK, 80-82	RANNEY
17115N14W124G	JACKSONVILLE AW1 - OB FOR #101	1955	94	--										SAND, 1-10; SAND & SILT, 10-21; SAND & GRAVEL WITH SILT, 21-34; SAND & GRAVEL, 34-93; BEDROCK, 93-94	RANNEY
17115N14W124G	JACKSONVILLE TW (site of Ranney collector)	1954	95	12.6-12	13	10	SLOTTED PIP	1054	24.76	44.34	820	50.2	18.5	SAND & GRAVEL, 25-50; SAND & GRAVEL WITH CLAY, 50-52; SAND & GRAVEL, 52-95	RANNEY
17115N14W124G	JACKSONVILLE #101 - RANNEY COLLECTOR (7 laterals 136-176'long, total=1056')	1955	93	192-156				0155 0955	22.00 19.81	25.27	5000	240	197.9	SAND & GRAVEL, 25-50; SAND & GRAVEL WITH CLAY, 50-52; SAND & GRAVEL, 52-95	RANNEY
17115N14W124H	JACKSONVILLE TH2	1982	99	--				0382	13.00					SILTY SAND, 0-8, 10-23; SAND, 23-53; SAND & GRAVEL, 53-73; SAND, 73-85; SAND & GRAVEL, 85-99	LAYNE-WESTERN
17115N14W125G	M ABBOT	--	85	--				0454			5	1		--	--
17115N14W127G	JACKSONVILLE TW5	1954	99	--										--	--
17115N14W135E	CONSOLIDATED GRAIN BARGE	1989	87	6	8	6	.018							SAND, 5-46; SAND & GRAVEL, 46-87; ROCK BELOW	GROSCH
17115N14W138E	CONSOLIDATED GRAIN BARGE	1990	92	5	8	5	.012	1190	28.00					SAND, 2-53; SAND & GRAVEL, 53-69; SAND, 69-82; SAND & GRAVEL, 82-92	GROSCH

Appendix II-3. Chemical Analyses of Water Samples Taken within 4 Miles of the Illinois River in Morgan and Scott Counties

Well location	Well owner	Sample date	Lab. analysi number	Well depth (ft)	Iron (mg/l)	Manganese (mg/l)	Ammonium (mg/l)	Sodium (mg/l)	Calcium (mg/l)	Magnesium (mg/l)	Silica (mg/l)	Fluoride (mg/l)	Nitrate (mg/l)	Chloride (mg/l)	Sulfate (mg/l)	Alkalinity (mg/l as CaC03)	Hardness (mg/l as CaC03)	TDM (mg/l)	Temp (F)
13716N13W211B	CIPS-MEREDOSIA STATION #0	08/30/73	1-0193551	104	2.6	0.33	--	--	--	--	--	--	--	7	258.2	262	488	657	58
13716N13W211C	CIPS-MEREDOSIA STATION #5	05/23/74	1-0196770	106	Trace	0.06	--	--	--	--	--	0.2	0.1	0	--	188	222	278	--
13716N13W211C	CIPS-MEREDOSIA STATION #7	07/15/94	1-0227857	104	1.02	0.38	--	1.6	71.4	8.7	--	0.1	1.7	10.3	52.0	231	214	311	--
13716N13W212C	CIPS-MEREDOSIA STATION #6	04/25/78	1-0207953	104	0.7	0.22	--	--	66.0	28.1	--	0.2	1.0	4	--	242	280	317	57
13716N13W225G	MEREDOSIA #1 (before deepening)	04/26/50	5-0121503	40	0.4	0.0	--	--	--	--	--	0.0	22.2	3.0	27.4	156	206	236	56.7
13716N13W225G	MEREDOSIA #1	09/26/57	5-0144578	76	1.6	0.2	Trace	1	75.0	35.2	13.8	0.2	0.9	4	23.9	304	332	349	57.5
13716N13W225G	MEREDOSIA #1	02/05/73	5-0191363	76	12	0.54	--	--	--	--	--	0.2	12.0	11	--	280	318	418	58.0
13716N13W225G	MEREDOSIA #1	12/13/73	7-B106607	76	0.72	0.19	0.0	12	71	30	16	0.2	22	25	48	224	300	412	--
13716N13W225G	MEREDOSIA #1	04/23/75	7-B136292	76	0.2	0.2	0.0	10	66	31	13	0.3	15	20	42	244	292	382	--
13716N13W225G	MEREDOSIA #2 (Local 3) - before deepening	05/01/50	5-0121561	40	0.1	--	--	--	--	--	--	--	22.9	3.0	27.0	152	201	223	56.1
13716N13W225G	MEREDOSIA #2 (Local 3) - before deepening	05/01/50	5-0121562	40	0.2	0.0	Trace	3.7	51.6	17.6	24.4	0.2	25.2	6.0	26.9	152	202	246	56.7
13716N13W225G	MEREDOSIA #2 (Local 3) - after deepening	01/29/73	5-B106640	60	0.55	0.23	0.0	9	67	33	15	0.2	12	18	45	222	302	358	--
13716N13W225G	MEREDOSIA #2 (Local 3) after deepening	02/05/73	5-0191362	60	0.6	0.18	--	--	--	--	--	0.2	20.8	19	--	242	300	364	57.5
13716N13W225G	MEREDOSIA #2 (Local 3) after deepening	04/23/75	7-B136294	60	0.4	0.2	0.0	12	65	29	15	0.2	22	26	49	216	281	358	--
13716N13W225G	MEREDOSIA #2 (Local 3) - after deepening)	03/14/77	7-A018548	60	0.65	0.28	0.13	8.2	69	32	13	0.2	14.1	22	50	240	305	380	--
13716N13W225G	MEREDOSIA #2 (Local 3) - after deepening	02/14/79	7-B033395	60	0.90	0.33	<0.1	7	78	36	16	0.3	0.4	8.5	33	301	342	330	--
13716N13W225G	MEREDOSIA #2 (Local 3) - after deepening	03/08/88	7-B803545	60	0.544	0.245	<0.1	15	72	31	14	0.15	12.0	21	59.5	257	304	405	60.1
13716N13W225G	MEREDOSIA #2 (Local 3) - after deepening	08/19/92	7-B212646	60	0.209	0.189	<0.01	17.9	69.1	27.8	14.9	0.13	19.0	23	50	230	308	388	--
13716N13W225G	MEREDOSIA #3 (Local 2)	10/31/77	7-B019066	84	0.8	0.42	0.0	10	89	38	14	0.3	22	34	85	264	394	472	--
13716N13W225G	MEREDOSIA #3 (Local 2)	12/28/79	7-B028489	84	0.384	0.196	<0.1	12	68	31	15	0.18	15.9	26	53	238	304	330	--
13716N13W225G	MEREDOSIA #3 (Local 2)	04/21/81	7-B051097	84	0.37	0.200	<0.1	16	76	33.2	14	0.22	14.6	29	59	251	322	422	--
13716N13W225G	MEREDOSIA #3 (Local 2)	01/18/82	7-B032898	84	0.370	0.193	<0.1	16	72	31.6	15	0.18	18.6	25	61	241	301	376	--
13716N13W225G	MEREDOSIA #3 (Local 2)	09/26/83	7-B012834	84	0.350	0.187	<0.1	17	68	32.1	14	<0.1	23.0	30	55	234	312	322	--
13716N13W225G	MEREDOSIA #3 (Local 2)	03/08/88	7-B803550	84	1.730	0.396	<0.1	14	76	33	14	0.22	3.6	22	60	282	326	413	58.6
13716N13W225G	MEREDOSIA #3 (Local 2)	05/08/91	7-B106251	87.5	0.586	0.307	--	--	--	--	--	--	--	16	53	210	--	349	58.5
13716N13W225G	MEREDOSIA #3 (Local 2)	08/19/92	7-B212635	84	0.682	0.363	<0.01	12.9	72.4	30.3	14.6	0.17	5.6	19	58	243	328	380	--
13716N13W225G	MEREDOSIA #3 (Local 2)	03/14/94	7-B403526	84	0.790	0.400	--	--	--	--	--	--	--	14.3	63	271	--	146	63.2
13716N13W225G	MEREDOSIA #4 (Local 1)	03/14/77	7-A018545	87.5	0.74	0.18	0.06	10	66	28	13	0.12	14.1	22	60	240	299	380	--
13716N13W225G	MEREDOSIA #4 (Local 1)	02/14/79	7-B033392	87.5	0.32	0.22	<0.1	13	73	32	15	0.2	17	25	45	240	312	351	--
13716N13W225G	MEREDOSIA #4 (Local 1)	04/21/81	7-B051127	87.5	1.15	0.337	<0.1	7	79	35.1	16	0.17	<0.4	6.6	29	325	326	368	--
13716N13W225G	MEREDOSIA #4 (Local 1)	09/26/83	7-B012836	87.5	1.000	0.285	<0.1	8	77	36.8	15	0.15	0.5	13	44	310	342	373	--
13716N13W225G	MEREDOSIA #4 (Local 1)	05/24/84	7-Z000902	87.6	0.411	0.269	<0.1	14	68	29	14	0.16	13.3	18	59	224	--	375	58.1
13716N13W225G	MEREDOSIA #4 (Local 1)	08/22/84	7-Z000903	87.5	0.439	0.291	0.1	14	67	29	14	0.13	16.8	19	53	228	--	443	57.2
13716N13W225G	MEREDOSIA #4 (Local 1)	12/05/84	7-Z000904	87.5	0.421	0.295	0.5	14	73	31	15	0.11	14.2	24	53	246	--	439	57.2
13716N13W225G	MEREDOSIA #4 (Local 1)	04/03/85	7-Z000906	87.5	0.356	0.246	0.2	15	70	29	13	0.17	15.5	18	59	230	--	366	59
13716N13W225G	MEREDOSIA #4 (Local 1)	03/08/88	7-B803544	87.5	0.244	0.168	<0.1	15	68	29	15	<0.1	18.2	20	58	248	288	393	59
13716N13W225G	MEREDOSIA #4 (Local 1)	08/19/92	7-B212649	87.5	0.653	0.259	<0.01	14.4	74.4	30.4	15.6	0.14	8.2	18	54	266	337	389	--
13716N13W225G	MEREDOSIA #5 (Local 4)	09/08/80	5-0214402	92	0.1	0.6	--	16.1	--	--	--	0.2	17.9	37	--	240	352	451	58
13716N13W225G	MEREDOSIA #5 (Local 4)	09/26/83	7-B012831	92	0.41	0.305	<0.1	15	75	34	15	0.10	10.6	24	61	285	320	375	--
13716N13W225G	MEREDOSIA #5 (Local 4)	03/02/84	7-B032947	92	0.380	0.272	<0.1	15	67	27.6	14	0.18	13.3	20	54	231	302	369	--
13716N13W225G	MEREDOSIA #5 (Local 4)	08/19/92	7-B212645	92	0.285	0.164	<0.01	7.1	60.1	23.2	15.2	0.16	21.2	12	57	214	290	355	--
13716N13W275C	RICHARD MURPHY	11/00/94	1-0228189	58	0.02	<0.01	--	8.6	46.9	19.1	--	<0.1	17.31	9.8	31.2	110	195	243	--
13716N13W278F	T/A TERMINALS INC - AMMONIA STORAGE #4	05/15/79	1-0210950	91	1.0	0.14	--	--	--	--	--	0.1	75.0	18	--	348	488	559	--
13716N13W281F	NATL STARCH CHEM	11/17/88	1-0222794	93	1.30	0.66	--	7.3	80.0	27.2	--	0.2	17.2	27.4	74.9	214	311	414	--

Appendix II-3. (Continued)

Well location	Well owner	Sample date	Lab. analysl number	Well depth (ft)	Iron (mg/l)	Manganese (mg/l)	Ammonium (mg/l)	Sodium (mg/l)	Calcium (mg/l)	Magnesium (mg/l)	Silica (mg/l)	Fluoride (mg/l)	Nitrate (mg/l)	Chloride (mg/l)	Sulfate (mg/l)	Alkalinity (mg/l as CaC03)	Hardness (mg/l as CaC03)	TDM (mg/l)	Temp (F)
	MFG INST #8																		
13716N13W281F	NATL STARCH CHEM MFG INST #10	03/00/76	1-0201125	90	0.6	0.24	--	--	--	--	--	--	0.6	0	--	232	276	322	--
13716N13W281F	NATL STARCH CHEM MFG INST #10	03/01/79	1-0210395	90	0.9	0.07	--	--	--	--	15.2	<0.1	10.6	0.0	61.7	210	268	338	--
13716N13W281F	NATL STARCH CHEM MFG INST #10	11/17/88	1-0222796	90	0.86	0.20	--	4.6	62.2	25.3	--	0.2	13.0	5.5	56.8	225	259	259	--
13716N13W281F	NATL STARCH CHEM MFG INST TW	05/05/93	1-0226757	80	2.40	0.33	--	17.1	90.4	35.8	--	0.3	0.4	4.1	60.3	344	373	419	--
13716N13W282E	NATL STARCH CHEM MFG INST #2A	03/01/79	1-0210391	60	0.3	0.52	--	--	--	--	--	<0.1	92.8	4	97.9	292	440	532	--
13716N13W282E	NATL STARCH CHEM MFG INST #12	11/17/88	1-0222798	89	0.88	0.16	--	68.2	86.2	28.5	--	0.4	5.1	78.7	150.0	237	332	604	--
13716N13W282E	NATL STARCH CHEM MFG INST #12	01/25/95	1-0228333	89	1.19	0.26	--	59.2	83.2	26.4	--	0.1	4.3	39.7	141	259	316	454	--
13716N13W282E	NATL STARCH CHEM MFG INST #12	07/19/95	1-0228838	89	1.72	0.26	--	143	82.8	25.4	--	0.3	-0.02	55.2	142	373	311	714	--
13716N13W282E	NATL STARCH CHEM MFG INST #14	09/01/89	1-0223169	95	-0.06	0.81	--	44.6	141.0	43.2	--	0.5	0.7	38.8	306.0	275	529	798	--
13716N13W282E	NATL STARCH CHEM MFG INST #14	01/25/95	1-0228332	95	1.70	0.81	--	61.1	138	33.7	--	0.2	0.60	39.6	292	288	483	797	--
13716N13W282F	NATL STARCH CHEM MFG INST OLD #3	07/24/61	1-0155306	95	0.1	0.1	--	--	--	--	--	0.2	1.8	3	52	228	262	295	--
13716N13W282F	NATL STARCH CHEM MFG INST #11	11/22/78	1-0209861	90	0.4	0.98	--	--	--	--	12.3	0.2	0.8	36	412.2	158	556	833	--
13716N13W282F	NATL STARCH CHEM MFG INST #11	03/01/79	1-0210396	90	2.0	0.69	--	--	--	--	--	<0.1	4.3	30	337.3	166	472	720	--
13716N13W282F	NATL STARCH CHEM MFG INST #11	11/17/88	1-0222797	90	0.62	0.58	--	40.4	149.0	38.1	--	0.5	6.0	20.0	360.0	259	528	800	--
13716N13W282F	NATL STARCH CHEM MFG INST #6A	03/01/79	1-0210393	89	7.0	0.02	--	--	--	--	--	<0.1	40.1	16	170.3	408	542	728	--
13716N13W282F	NATL STARCH CHEM MFG INST #6	11/17/88	1-0222792	92	1.31	0.37	--	52.6	78.2	24.1	--	0.3	18.0	46.3	93.5	237	332	604	--
13716N13W282H	NATL STARCH CHEM MFG INST #2	10/17/58	1-0148012	92	1.3	--	--	--	--	--	--	0.2	1.8	5	27	204	220	241	--
13716N13W282H	NATL STARCH CHEM MFG INST #2	06/26/89	1-0223079	92	0.29	1.62	--	433.0	435.0	71.0	--	1.8	-0.1	14.8	2269.0	89	1377	3363	--
13716N13W283E	NATL STARCH CHEM MFG INST #7	11/17/88	1-0222793	92	2.55	0.35	--	51.6	99.7	33.6	--	0.4	26.0	56.8	134.0	286	387	608	--
13716N13W283E	NATL STARCH CHEM MFG INST #7	07/19/95	1-0228839	92	2.38	0.56	--	56.7	118	35.6	--	0.1	2.06	36.0	135	373	441	651	--
13716N13W283E	NATL STARCH CHEM MFG INST #9	07/10/73	1-0192602	96	1.1	0.22	--	--	--	--	--	0.3	9.9	6	--	262	298	348	--
13716N13W283E	NATL STARCH CHEM MFG INST #9	03/01/79	1-0210394	96	1.5	0.15	--	--	--	--	17.0	<0.1	37.8	6	62.5	216	302	402	--
13716N13W283E	NATL STARCH CHEM MFG INST #9	11/17/88	1-0222795	96	1.17	0.17	--	7.2	70.6	22.9	--	0.2	54.3	11.2	68.5	188	270	352	--
13716N13W283F	NATL STARCH CHEM MFG INST TH1	02/12/55	1-0137026	97	0.6	--	--	--	24	11	--	--	--	9	65	176	104	288	--
13716N13W283F	NATL STARCH CHEM MFG INST #4	07/08/64	1-0163450	98	1.4	0.21	--	--	--	--	--	--	0.8	10	110	238	260	307	--
13716N13W283F	NATL STARCH CHEM MFG INST #4	03/01/79	1-0210392	98	0.9	0.50	--	--	--	--	--	0.2	3.8	32	242.7	228	416	620	--
13716N13W284A	MOBIL CHEMICAL CO #?	12/00/68	1-0176923	20	--	--	0.1	--	--	--	--	--	91	0	--	164	304	349	--
13716N13W284A	MOBIL CHEMICAL CO #1-B	12/00/68	1-0176918	20	--	--	1.0	--	--	--	--	--	147	0	--	148	296	371	--
13716N13W284A	MOBIL CHEMICAL CO #1-B	12/26/68	1-0177130	20	--	--	57.5	--	--	--	--	--	224	--	--	--	--	--	--
13716N13W284A	MOBIL CHEMICAL CO #2	10/07/68	1-0176502	77	4.3	--	3.9	--	--	--	--	--	188	6	--	372	552	617	--
13716N13W284A	MOBIL CHEMICAL CO #2-W	12/00/68	1-0176921	20	--	--	1.0	--	--	--	--	--	217	1	--	200	400	493	--
13716N13W284A	MOBIL CHEMICAL CO #2-W	12/26/68	1-0177131	20	--	--	162	--	--	--	--	--	107	--	--	--	--	--	--

Appendix II-3. (Continued)

Well location	Well owner	Sample date	Lab. analysis number	Well depth (ft)	Iron (mg/l)	Manganese (mg/l)	Ammonium (mg/l)	Sodium (mg/l)	Calcium (mg/l)	Magnesium (mg/l)	Silica (mg/l)	Fluoride (mg/l)	Nitrate (mg/l)	Chloride (mg/l)	Sulfate (mg/l)	Alkalinity (mg/l as CaC03)	Hardness (mg/l as CaC03)	TDM (mg/l)	Temp (F)
13716N13W284A	MOBIL CHEMICAL CO #3-M	10/07/68	1-0176501	17	1.0	--	0.8	--	--	--	--	--	107	6	--	136	244	268	--
13716N13W284A	MOBIL CHEMICAL CO #3-M	12/00/68	1-0176919	17	--	--	0.1	--	--	--	--	--	83	12	--	180	352	389	--
13716N13W284A	MOBIL CHEMICAL CO #3-M	12/26/68	1-0177132	20	0.1	--	0.1	--	--	--	--	--	15.5	9	--	220	288	353	--
13716N13W284A	MOBIL CHEMICAL CO #4-N	12/00/68	1-0176920	20	--	--	0.1	--	--	--	--	--	102	2	--	76	220	276	--
13716N13W284A	MOBIL CHEMICAL CO #4-N	12/26/68	1-0177133	20	0.1	--	0.2	--	--	--	--	--	5.8	8	--	242	296	354	--
13716N13W284A	MOBIL CHEMICAL CO #5-G	12/00/68	1-0176922	20	--	--	0,1	--	--	--	--	--	61	0	--	156	244	274	--
13716N13W284A	MOBIL CHEMICAL CO #5-G	12/26/68	1-0177134	20	0.1	--	0.2	--	--	--	--	--	19.0	15	--	222	306	383	--
13716N13W284G	NATL STARCH CHEM MFG INST #1	06/26/89	1-0223078	94	0.30	0.17	--	7.3	91.4	41.4	--	0.2	-0.1	3.1	46.1	377	398	432	--
17113N13W048H	J W WILKINS	03/24/34	1-0081089	30	--	--	0.02	9.9	59.5	25.0	7.0	--	15.9	12.0	60.6	180	252	305	--
17113N13W148E	C GENE WEAR	06/20/78	1-0208568	325	0.1	--	4.5	--	--	--	--	1.3	--	5200	--	300	362	8872	--
17113N13W236A	C DRAKE	03/24/37	1-0081087	34	--	--	--	4.6	99.2	38.4	10.0	--	2.4	12.0	25.9	370	406	418	--
17114N13W273E	GALEN ROTHERING	09/10/92	1-0226178	20	<0.5	--	--	5.2	116	50.8	--	0.3	33.3	26.8	83.4	365	498	530	--
17114N13W343A	WINCHESTER #102	12/01/86	5-0221872	58	0.31	0.32	--	5.2	78	33.6	--	0.3	23	7.8	42	293	333	380	55
17114N13W343A	WINCHESTER #102	03/07/88	7-B803564	58	<0.050	0.035	<0.1	4.5	86	34	18.2	0.13	48.7	10.3	41	278	352	348	58,3
17114N13W343A	WINCHESTER #102	02/06/90	7-B001809	58	<0.050	0.031	<0.1	4.6	89	35	19	<0.1	44.3	11	46	294	348	427	--
17114N13W344A	WINCHESTER #101	11/20/86	5-0221861	65	0.05	0.42	--	5.8	83	37.2	--	0.2	18.5	6.9	47	308	360	398	55
17114N13W344A	WINCHESTER #101	03/07/88	7-B803566	65	0.078	0.328	<0.1	6	81	34	15	<0.1	32.3	10	45	291	342	424	58.3
17114N13W344A	WINCHESTER #101	02/05/90	7-B001818	65	<0.050	0.327	<0.1	5.6	84	35	16	0.12	19.0	14	55	288	335	432	--
17115N13W082E	JACKSONVILLE TH6	04/17/64	5-0134667	43	0.8	--	--	--	--	--	--	0.3	21.1	3	--	124	152	176	58.1
17115N13W162H	WABASH RAILWAY CO - EAST WELL	02/14/36	1-0077433	62	1.4	0.4		1,6	105.0	48.0	9.0	--	1.5	19.0	127.4	288	460	526	--
17115N13W162H	WABASH RAILWAY CO - WEST WELL	02/12/36	1-0077434	58	1.6	0.4	--	10.4	109.6	50.0	10.0	--	1.9	28.0	133.5	322	479.5	558	--
17115N13W162H	BLUFFS #1	02/13/36	5-0077435	58	1.4	0.6	0.1	13.8	139.2	63.4	12.0	--	1.9	33.0	263.0	318	609	775	--
17115N13W162H	BLUFFS #1	12/09/37	5-0082588	58	1.2	--	--	--	--	--	--	--	--	29	210.0	326	508	696	--
17115N13W162H	BLUFFS #1	03/12/48	5-0113729	58	1.8	0.2	0.2	47.2	136.7	57.4	19.6	0.3	1.1	34.0	288.2	332	578	788	--
17115N13W162H	BLUFFS #3	10/09/58	5-0147875	59.4	1.0	--	--	--	--	--	--	0.2	2.8	19	--	368	600	780	55.2
17115N13W162H	BLUFFS #3	06/29/60	5-0152613	59.4	2.7	0.2	Trace	26	128.0	55.9	13.9	0.2	1.0	16	197.9	376	550	679	--
17115N13W162H	BLUFFS #3	05/16/73	7-B110484	59.4	1.6	0.26	0.1	23	120	55	15	0.3	0.9	13	175	368	525	658	--
17115N13W162H	BLUFFS #3	03/11/75	7-A015538	59.4	1.9	0.2	0.2	21	120	50	14	0.2	0.9	15	160	370	510	670	--
17115N13W162H	BLUFFS #3	09/08/76	7-A005626	59.4	1.6	0.2	0.2	19	112.5	52.5	15	0.2	0.44	10	170	360	500	670	--
17115N13W162H	BLUFFS #3	08/23/78	7-B010122	59.4	1.7	0.28	0.1	20	114	56	16	0.3	0.4	15	169	373	536	635	--
17115N13W162H	BLUFFS #3	10/02/78	7-B015522	59.4	1.66	0.27	0.3	21	119	57	15	0,3	0.4	14	165	375	524	611	--
17115N13W162H	BLUFFS #3	01/12/81	7-B033448	59.4	1.575	0.273	0.1	24	127	58	14	0,25	<0.4	17	200	365	540	669	--
17115N13W162H	BLUFFS #3	10/18/83	7-B016033	59.4	1.600	0.251	0.3	31	117	55	14	0.20	<0.4	21	214	347	534	641	--
17115N13W162H	BLUFFS #3	03/07/86	7-Z000793	59.4	1.492	0.324	0.1	28	121	51	13	0.2	1.0	26	170	375	--	679	56.3
17115N13W162H	BLUFFS #3	01/31/90	7-B001577	59.4	1.863	0.270	<0.1	24	121	56	15	0.20	<0.4	27	173	373	509	651	--
17115N13W183H	BLUFFS #2	09/25/47	5-0111993	57	2.0	--	--	--	--	--	--	--	--	32.0	--	320	581	697	--
17115N13W163H	BLUFFS #2	03/05/48	5-0113692	57	1.8	0.2	0.2	19.1	127.9	53.8	18.6	0.3	0.1	24.0	224.0	316	542	662	55
17115N13W163H	BLUFFS #2	12/31/74	7-B119202	57	1.4	0.3	0.1	7.5	105	48	18	0.2	2.3	8	110	368	459	531	--
17115N13W163H	BLUFFS #2	03/11/75	7-A015540	57	2.0	0.3	0.2	8.3	110	50	14	0.2	5.3	9	100	380	480	530	--
17115N13W163H	BLUFFS #2	12/07/76	7-A012289	57	3.70	0.18	0.1	7.0	98.0	50.0	16	0.2	0.0	7	85	380	457	490	--
17115N13W163H	BLUFFS #2	03/12/79	7-B036705	57	1.77	0.21	0.2	8	96	49	16	0.3	<0.4	7.8	85	356	455	457	--
17115N13W163H	BLUFFS #2	03/08/88	7-B803547	57	1.590	0.219	0.2	8	115	50	15	0.21	12.4	13	93	404	494	557	--
17115N13W163H	BLUFFS #4	04/27/79	5-0210770	60	0.9	0.11	--	--	--	--	--	0.2	4.2	12	129.2	414	544	591	--
17115N13W163H	BLUFFS #4	01/12/81	7-B033455	60	1.187	0.236	<0.1	11	117	55	15	0.19	0.4	11	120	390	528	585	--
17115N13W163H	BLUFFS #4	10/18/83	7-B016024	60	1.2	0.263	0.2	15	114	54	15	0.20	<0.4	15	142	386	538	590	--
17115N13W163H	BLUFFS #4	03/07/86	7-Z000791	60	0.971	0.211	<0.1	13	119	51	14	0.18	3.5	15	132	403	--	623	55.4
17115N13W163H	BLUFFS #4	01/31/90	7-B001575	60	1.432	0.219	0.2	9.9	118	55	16	0.21	<0.4	18	117	410	511	597	--
17115N13W174H	JACKSONVILLE OLD #1	09/19/05	5-0013570	69	2.9	--	--	7.7	82.4	35.2	18.7	--	0.3	2.4	16.8	--	349	--	--
17115N13W312D	SOUTH JACKSONVILLE #1	09/01/67	5-0172872	79.5	1.7	0.21	--	--	--	--	--	0.2	11.7	5	--	252	310	367	55.0
17115N13W312D	SOUTH JACKSONVILLE #1	12/04/73	5-B105898	79.5	0.85	0.27	0.1	7	63	22	18	0.3	38	5	36	184	249	283	--
17115N13W312D	SOUTH JACKSONVILLE #1	01/07/75	7-A011695	79.5	0.1	0.00	0.0	6.0	67	25.8	13	0.1	17.6	5	45	212	273	358	--
17115N13W312D	SOUTH JACKSONVILLE #1	02/28/77	7-A017402	79.5	0.00	0.10	0.06	5.0	58	20	15	0.2	4.4	2	40	192	231	290	--
17115N13W312D	SOUTH JACKSONVILLE #1	04/23/81	7-B051733	79.5	0.75	0.243	<0.1	6	65	22.9	16	0.17	28.3	7.4	36	207	257	306	--
17115N13W312D	SOUTH JACKSONVILLE #1	10/17/83	7-B015682	79.5	0.55	0.235	<0.1	7	67	24.9	16	0.10	15.9	11	44	213	300	303	--
17115N13W312D	SOUTH JACKSONVILLE #1	05/24/84	7-B044903	79.5	1.300	0.036	<0.1	5	75	29.5	15	0.14	28.8	12	46	248	299	373	--
17115N13W312D	SOUTH JACKSONVILLE #1	03/25/86	7-Z000755	79.5	<0.005	<0.005	<0.1	6.5	75	27	16	0.14	11.1	10	38	--	--	377	54.5

Appendix II-3. (Concluded)

Well location	Well owner	Sample date	Lab. analysl number	Well depth (ft)	Iron (mg/l)	Manganese (mg/l)	Ammonium (mg/l)	Sodium (mg/l)	Calcium (mg/l)	Magnesium (mg/l)	Silica (mg/l)	Fluoride (mg/l)	Nitrate (mg/l)	Chloride (mg/l)	Sulfate (mg/l)	Alkalinity (mg/l as CaC03)	Hardness (mg/l as CaC03)	TDM (mg/l)	Temp (F)
17115N13W312D	SOUTH JACKSONVILLE #2	09/11/67	5-0172934	76.5	0.7	0.07	--	--	--	--	--	0.3	1.3	4	--	216	266	313	56
17115N13W312D	SOUTH JACKSONVILLE #2	09/18/73	7-B102917	76.5	0.73	0.20	0.1	7.5	69	22	16	0.1	20	8	48	224	292	370	--
17115N13W312D	SOUTH JACKSONVILLE #2	12/04/73	7-B105908	76.5	0.85	0.20	1.9	7	65	28	20	0.3	18	7	49	224	278	309	--
17115N13W312D	SOUTH JACKSONVILLE #2	01/07/75	7-A011694	76.5	0.8	0.18	0.0	6.5	61.5	30.4	14	0.1	19.3	5	50	228	280	348	--
17115N13W312D	SOUTH JACKSONVILLE #2	02/28/77	7-A017401	76.5	0.77	0.22	0.06	7.5	64	26	15	0.2	23.8	8	50	208	270	350	--
17115N13W312D	SOUTH JACKSONVILLE #2	02/20/79	7-B034111	76.5	0.83	0.18	<0.1	7	68	31	15	0.3	11	8.6	60	225	290	344	--
17115N13W312D	SOUTH JACKSONVILLE #2	04/23/81	7-B051734	76.5	0.84	0.204	<0.1	7	74	28.8	15	0.14	23.0	10	49	238	293	368	--
17115N13W312D	SOUTH JACKSONVILLE #2	10/17/83	7-B015675	76.5	0.960	0.167	<0.1	9	81	35.2	14	0.10	1.9	18	60	274	360	403	--
17115N13W312D	SOUTH JACKSONVILLE #2	08/29/84	7-B008893	76.5	1.1	0.230	--	8	74	31.9	14	0.14	--	13	50	255	324	418	--
17115N13W3120	SOUTH JACKSONVILLE #2	03/25/86	7-Z000752	76.5	0.825	0.212	<0.1	7.5	79	29	16	0.13	27.4	14	50	--	--	409	57.2
17115N13W312D	SOUTH JACKSONVILLE #2	03/29/94	7-B404466	76.5	0.920	0.260	--	--	--	--	--	--	--	21.3	54	253	--	340	57.1
17115N14W123G	JACKSONVILLE TH1	03/01/82	5-0216842	94	<0.06	0.16	--	15.5	70.8	26.6	20.9	0.3	0.7	9	--	261	286	364	--
17115N14W123G	JACKSONVILLE #1	06/21/82	5-0217356	94	0.66	0.23	--	10.7	64.4	23.4	17.7	0.2	<0.5	21	--	192	257	322	--
17115N14W123G	JACKSONVILLE #1	06/19/85	7-B545393	94	1.8	0.131	0.4	10	71	27.3	16	0.17	10.6	20	46	217	289	340	--
17115N14W123G	JACKSONVILLE #1	01/11/94	7-B400602	94	1.500	0.123	--	--	--	--	--	--	--	13.6	42	193	--	135	57.7
17115N14W123G	JACKSONVILLE #2	06/29/82	5-0217369	84	2.7	0.44	--	10.0	96.6	36.0	19.4	0.2	<0.5	14	--	310	389	470	--
17115N14W123H	JACKSONVILLE #2	05/24/84	7-Z000812	85	3.539	0.352	0.1	14	81	30	17	0.18	1.5	22	47	288	--	401	54.5
17115N14W123H	JACKSONVILLE #2	08/22/84	7-Z000813	85	3.659	0.364	0.3	15	81	30	17	0.17	4.0	27	54	268	--	577	58.1
17115N14W123H	JACKSONVILLE #2	12/05/84	7-Z000814	85	3.500	0.336	<0.1	14	79	28	17	0.17	2.1	28	55	248	--	421	56.3
17115N14W123H	JACKSONVILLE #2	02/26/85	7-Z000816	85	2.845	0.281	0.17	15	72	26	15	0.22	5.3	25	48	253	--	363	56.3
17115N14W123H	JACKSONVILLE #2	06/19/85	7-B545394	84	7.5	0.701	0.5	13	105	38.3	18	0.22	<0.4	18	64	346	400	567	--
17115N14W123H	JACKSONVILLE #2	12/03/86	7-Z000819	85	3.504	0.321	0.3	13	75	28	16	0.22	3.5	22	49	--	--	377	55.4
17115N14W124G	JACKSONVILLE TW	10/09/54	5-0135932	95	4.9	--	--	--	--	--	--	0.0	0.7	4	--	348	352	358	56.3
17115N14W124G	JACKSONVILLE AW2	10/13/54	5-0135953	82	4.4	--	--	--	--	--	--	0.0	0.3	7	--	404	392	443	56
17115N14W124G	JACKSONVILLE AW2	10/13/54	5-0135954	82	2.9	--	--	--	--	--	--	0.0	0.7	8	--	256	280	300	56.3
17115N14W124G	JACKSONVILLE #101 RANNEY COLLECTOR	01/26/55	1-0136877	93	3.6	--	--	--	88	19	--	0.0	0.5	7	--	280	300	314	57
17115N14W124G	JACKSONVILLE #101 - RANNEY COLLECTOR	06/00/57	1-0143708	93	3.7	0.2	--	--	--	--	--	--	--	20	--	268	328	377	--
17115N14W124G	JACKSONVILLE #101 - RANNEY COLLECTOR	01/28/73	7-B106645	93	2.3	0.32	0.8	13.5	76	30	18	0.3	4.8	20	60	248	313	331	--
17115N14W124G	JACKSONVILLE #101 - RANNEY COLLECTOR	12/09/74	7-A110015	93	2.8	0.3	0.4	12	68	28	16	0.3	7	23	50	220	290	360	--
17115N14W124G	JACKSONVILLE #101 - RANNEY COLLECTOR	02/23/77	7-A017169	93	2.98	0.35	0.51	21	78	26	16	0.2	3.96	30	65	240	304	420	--
17115N14W124G	JACKSONVILLE #101 - RANNEY COLLECTOR	05/05/83	5-0218521	93	4.36	0.34	--	20.4	85.6	30.4	10.4	0.3	<1.0	36	59	268	339	446	55
17115N14W124G	JACKSONVILLE #101 RANNEY COLLECTOR	05/07/87	7-Z000820	85	3.398	0.328	0.3	12	81	29	14	0.18	4.9	20	46	--	--	368	54.5
17115N14W124G	JACKSONVILLE #101 RANNEY COLLECTOR	01/23/91	7-B101154	93	6.0	0.472	0.5	13.4	103	38.6	--	0.2	0.4	--	74	326	416	524	57.1
17115N14W124H	JACKSONVILLE TH2	03/02/82	5-0216843	99	0.09	0.42	--		80.1	30.1	19.4	0.2	3.2	22	--	317	324	472	--
17115N14W125G	M ABBOT	04/00/54	1-0134666	85	0.1	--	--	--	--	--	--	0.2	10.1	5	--	144	204	226	--
17115N14W127G	JACKSONVILLE TW5	04/00/54	5-0134511	99	5.7	--	--	--	94	34	--	0.1	0.0	4	--	376	376	410	--

Appendix II-4. Selected Documents from Water Survey Files Regarding Jacksonville's Ranney Well

REPORT ON
FINAL PUMPING TEST
RANNEY HORIZONTAL WATER COLLECTOR
CITY OF JACKSONVILLE
ILLINOIS

I. PURPOSE OF TEST:

This report presents the results of a pumping test conducted to determine the yield of the Ronney horizontal water collector constructed for the City of Jacksonville, Illinois. The results of the hydrogeoioglcol survey, run prior to construction, were given in our report doted November 3rd, 1954,

II. DESCRIPTION OF TEST:

The pumping test was conducted in accordance with Sec. 9.30, Final Pumping Test, Specification for Sub-Surface Water Supply Exploration and Horizontal Collector, except for o modification of the pumping rate. Owe to the Inability of the pumping equipment to perform continuously at a test rate in excess of the required 5700 galiorn per minute, the test was conducted of a constant rate of 5,000 golions per minute. This specification change was approved by the Engineers prior to the start of the test.

The pumping fest was started at 2107 p.m. on September 1 end continued until 2*4° p.m. on September 11, 1955. Continuous records of river stage and water level fluctuations in the collector, Weil AN-1 and Well AW-1 were recorded by means.of automatic water level recorders. Tape measurements were made in Wells AW-2, AN-2, AS-1 and AE-1. Hydrographs of water level fluctuations are not included in this raport since oil basic data collected, Including recorder charts and tape measurements, has been submitted to the Engineers

The temperature of the discharge water varied from 57*F. to 59*F. during the test and the temperature of the Illinois River varied from 71 to 80*F.

III. ANALYSIS OF TEST DATA:

During the original hydrogeoioglcol survey, an apparent confined or "artesian" condition, caused by the lower permeability of the overlying fine sand, existed throughout the pumping test and therefore water levels stabilized within the 72-hour pumping test period. Although initial static conditions were similar during the present test, the drawdowns were sufficiently large to create a free surface or a "water table" condition as pumping progressed. The presence of a water table condition explains why the water levels were still not completely stabilized after 10 days of pumping.

The existence of this condition complicates considerably the analysis af the test data.

Since complete stabilization did not occur during the test period, analysis of the data by equilibrium methods is not possible. Also, since e free surface or water table condition exists, the use of the modified non-equilibrium formula is not possible because the effects of recharge on the image well become noticeable before time is sufficiently large to permit the modifying assumptions to become valid. Therefore the following analysis is based upon utilization of the non-equilibrium type curve.

Although the river stoge dropped about 3.5 feet during the test period, the data are presented without any river correction, since it is not possible to establish a river-aquifer relationship under the existing free surface conditions. The test data are shown graphically on the time-drawdown graph in Figure 0-74-1. In considering matching of the test data with the type curve (the solution for Wet) AE-1 is given on the graph) weight is given to transmissibility as determined from the original hydrogeologicai survey.

Averaging the results from oll observation wells, the fransmissibility is determined as 140,000 gallons per day per foot, the storage coefficient as 0.24, and the effective distance to the line of infiltration, as measured from the collector, as 650 feet. It is pointed out that since the effect of river changes and dewatering has not been considered, the effective distance, as determined above, is somewhat larger than actual and therefore these results are conservative.

Using the aquifer constants as determined above, a theoretical curve for the collector drawdown for the test pumping rote of 5,000 gallons per minute is given in Figure O-74-2. The observed data are also shown on the graph. For the test pumping rate of 5,000 gallons per minute, a stabilized drawdown of 27.3 feet is indicated.

IV. <u>COLLECTOR YIELD:</u>

From the above test data, the collector drawdown can be predicted for any given natural condition by the following expression:

$$\frac{Q_1}{Q_2} = \frac{m_1 s_1 V_2}{m_2 s_2 V_1}$$

where,

Q_1 = test pumping rate, In g. p. m.

Q_2 = pumping rate for which the drawdown is being computed, In g.p.m.

m_1 = average saturated thickness for pumping rate Q_1, in feet

m_2 = average saturated thickness for pumping rote Q_2, in feet

s_1 = stabilized drawdown for pumping rate Q_1, in feet

s_2 = stabilized drawdown for pumping rate Q_2, in feet

V_t = viscosity correction factor for the test temperefure

V_9 = viscosity correction factor for the temperefure for which the drowdown It being computed.

For the design pumping rote of 8.0 million gollors o day (5,550 g.p.m.), the overage drowown will oet

$$\frac{5000}{5550} = \frac{(56.3)(27.3)(1.17)}{\frac{(140-s)}{2}(s)(1.17)}$$

$$s_{ave.} = 31.4 \text{ feet}$$

Using a lowest expected river-aquifer temperature of 45*F. (V = 1.42), the maximum drawdown for the design rote of 8.0 million gallons a day will be:

$$\frac{5000}{5550} = \frac{(56.3)(27.3)(1.42)}{\frac{(140-s)}{s}(s)(1.17)}$$

$$s_{max.} = 42.2 \text{ feet}$$

Although these drawdowns are somewhat higher than the original survey computations, the results clearly show that the collector can produce the design quantity of 8 million gallors with a large factor of safety—more than 20 feet of water remaining above the horizontal laterals even during a?verse conditions of river and temperature.

The differences between water elevations in observation wells located within the lateral projection pattern and the water elevation in the caisson during pumping conditions represents a measure of the mechanical efficiency of the collector. For the test rote of 5,000 gallors per minute the differences ore:

Well	Head differential in feet
AS-1	3.48
AW-1	1.56
*N-1	2.63

These differences are small, representing 6 to 14 percent of the total collector drawdown, and indicate the high degree of horizontal lateral design and development.

V. QUALITY:

Water samples were collected at the start and at the end of the 10-day test period.

The chemical analyse* of these samples, however, are not yet oveilable for Inclusion in this report.

However, the water samples taken during the original survey showed a rather high iron content in the normal ground water. Although the primary source of recharge is the Illinois River, and therefore considerable reduction in iron content eon bo expected once continuous operation of the collecter is started, the Improvement in quality will be rather slow becouse of the large amount of ground water storage available. insofar as water quality is concerned, the importance of high rate continuous pumpage cannot be over-emphasized. it is pointed out that continuous pumpage, even at low rates, should produce a better quality water than intermittent pumpage at high rates.

VI. SUMMARY:

The results of the pumping test conducted on the Konney horizontal collector eon-structed for the City of Jacksonville, Illinois, have shown that the collector is capable of producing the required 8.0 million gallons a day with a large factor of safety. Although the actual drawdowns will be somewhat larger than the original computations based on the hydro-geological survey, the minimum pumping elevations under minimum conditions of river stage and temperature will be about elevation 376, leaving over 20 feet of water above the horizontal laterals at all times.

It is suggested that, in order to assure the best possible water quality, pumping schedules be arranged so that the pumpage is continuous from the collector. Continuous at low rotes, is preferable to intermittent pumpage at higher rates.

Respectfully submitted,

RANNEY METHOD WATER SUPPLIES, INC.

By
Frederick C. Mikels, Chief
Hydrogeoiogical Division

September 29th, 1955

December 14, 1977

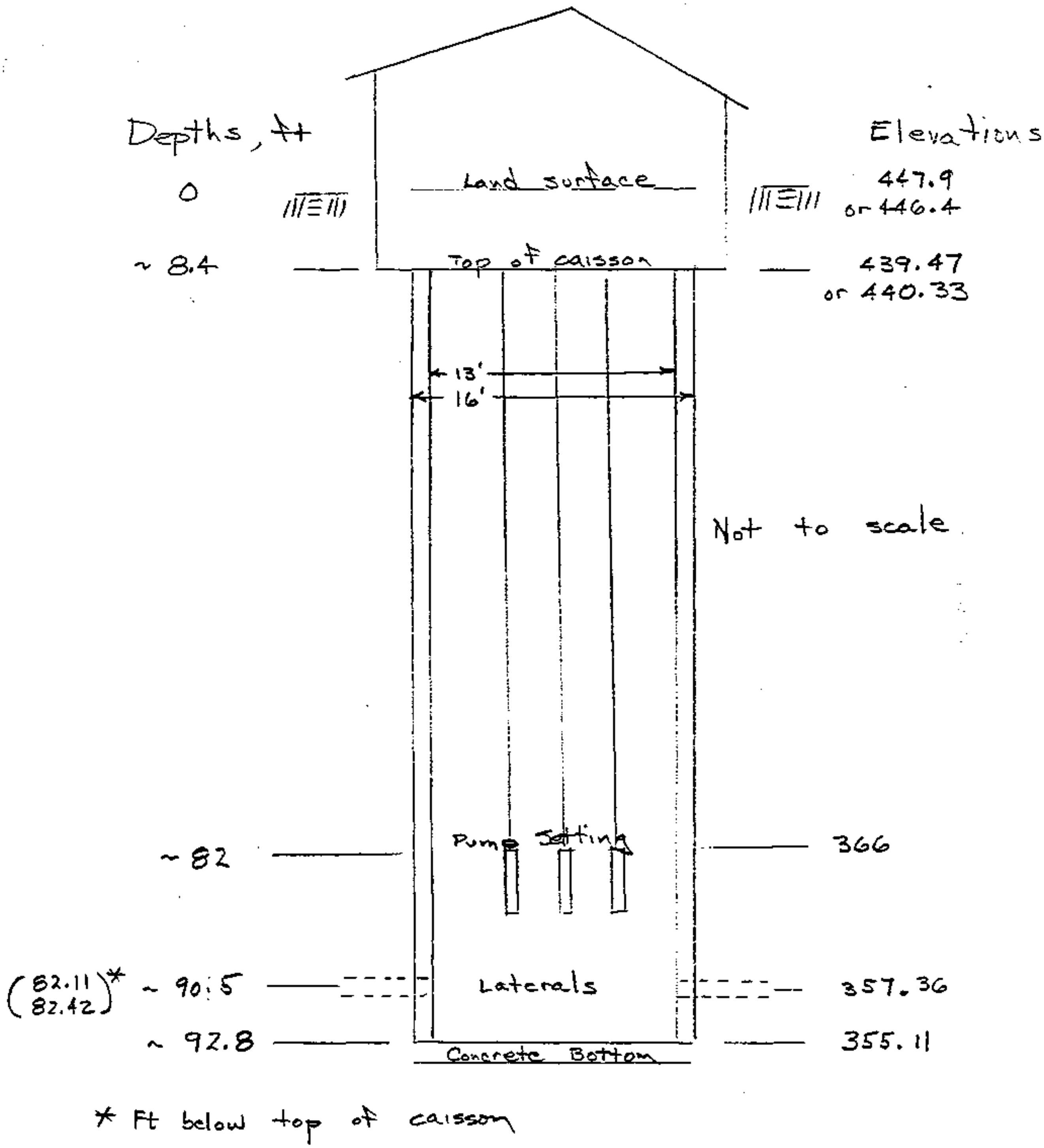
MEMORANDUM

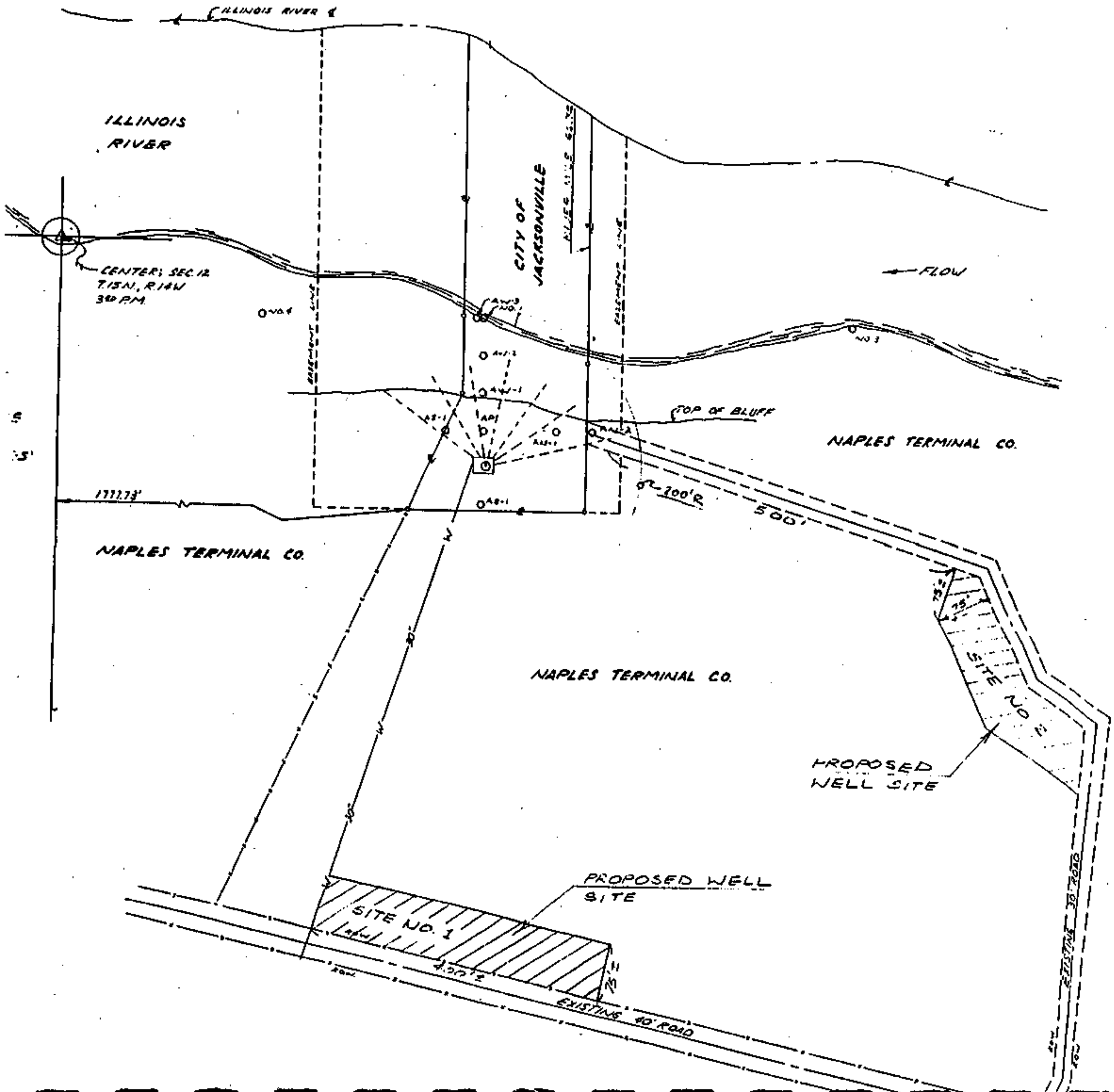
TO: Files

FROM: E.W. Sanderson and D.W. Woller

SUBJECT: Construction features of Collector No. 1, Jacksonville.

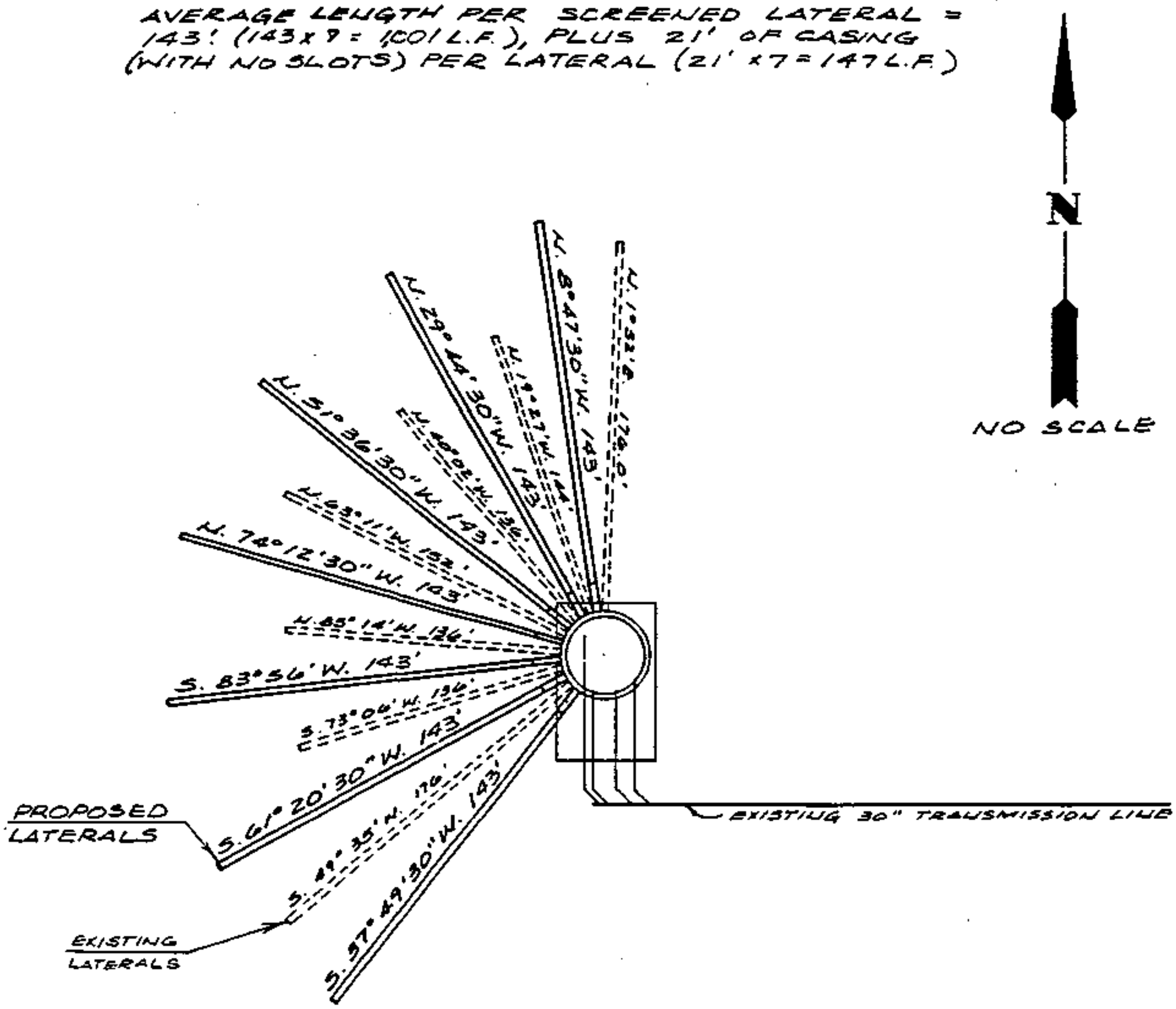
This sketch shows information submitted by the water superintendent and from the files as determined for inclusion in Bulletin 60.




ILLINOIS RIVER ℄
ILLINOIS RIVER
CENTER; SEC. 12
T.15N., R.14W
3RD P.M.
CITY OF JACKSONVILLE
FLOW
TOP OF BLUFF
NAPLES TERMINAL CO.
1777.73'
NAPLES TERMINAL CO.
200'R
500'
NAPLES TERMINAL CO.
SITE NO. 2
PROPOSED WELL SITE
PROPOSED WELL SITE
SITE NO. 1
EXISTING 40' ROAD
EXISTING 30' ROAD

NOTE:

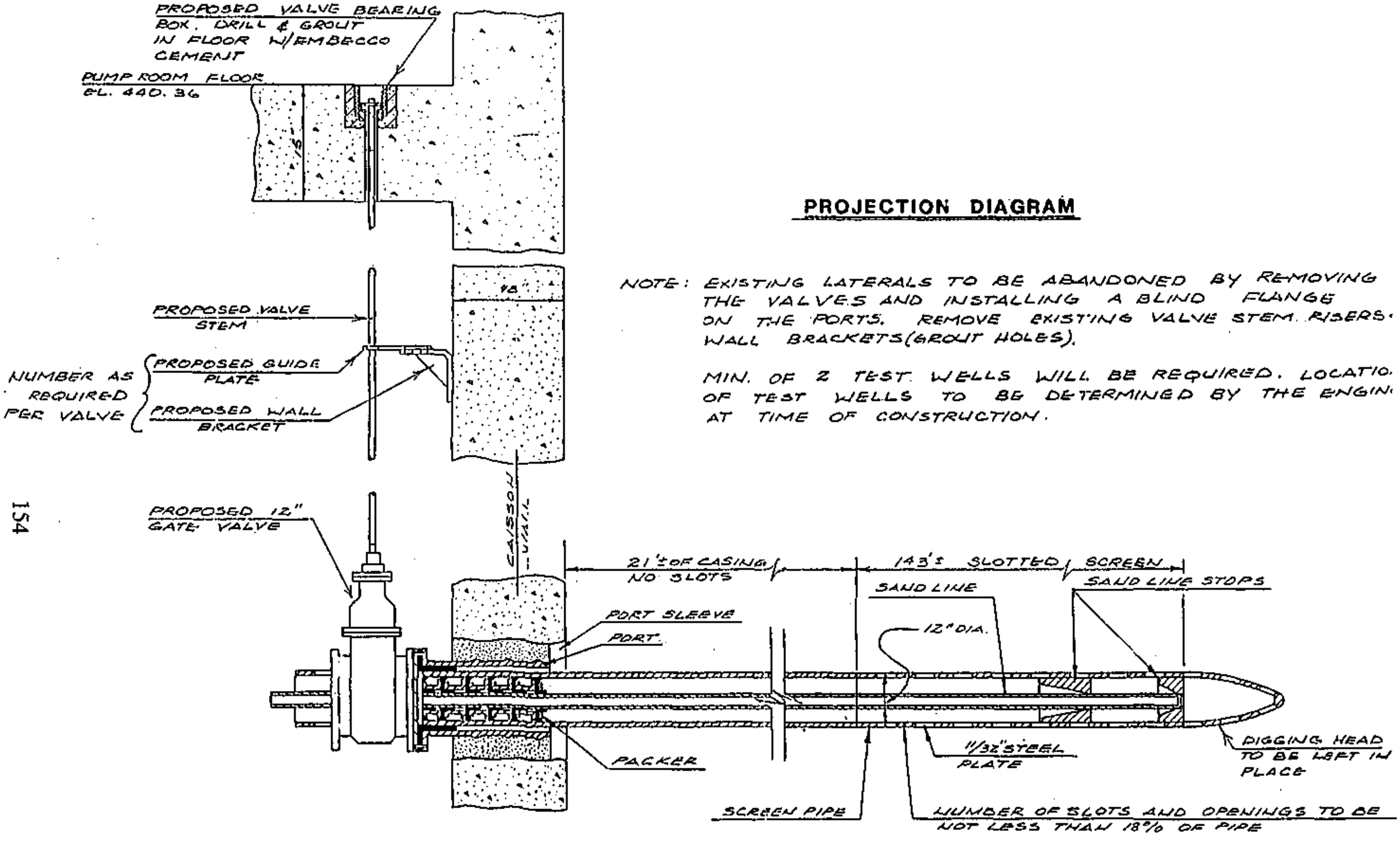
. TOTAL LENGTH OF LATERAL TO BE NOT LESS THAN 1,148 LINEAL FEET. ACTUAL LENGTH, ELEVATION, DIRECTION AND NUMBER OF LATERALS AS DETERMINED BY FIELD CONDITION. AVERAGE LENGTH PER SCREENED LATERAL = 143'. (143 x 7 = 1,001 L.F.), PLUS 21' OF CASING (WITH NO SLOTS) PER LATERAL (21' x 7 = 147 L.F.)



PROJECTION DIAGRAM

NOTE: EXISTING LATERALS TO BE ABANDONED BY REMOVING THE VALVES AND INSTALLING A BLIND FLANGE ON THE PORTS. REMOVE EXISTING VALVE STEM RISERS & WALL BRACKETS (GROUT HOLES).

MIN. OF 2 TEST WELLS WILL BE REQUIRED. LOCATION OF TEST WELLS TO BE DETERMINED BY THE ENGINEER AT TIME OF CONSTRUCTION.



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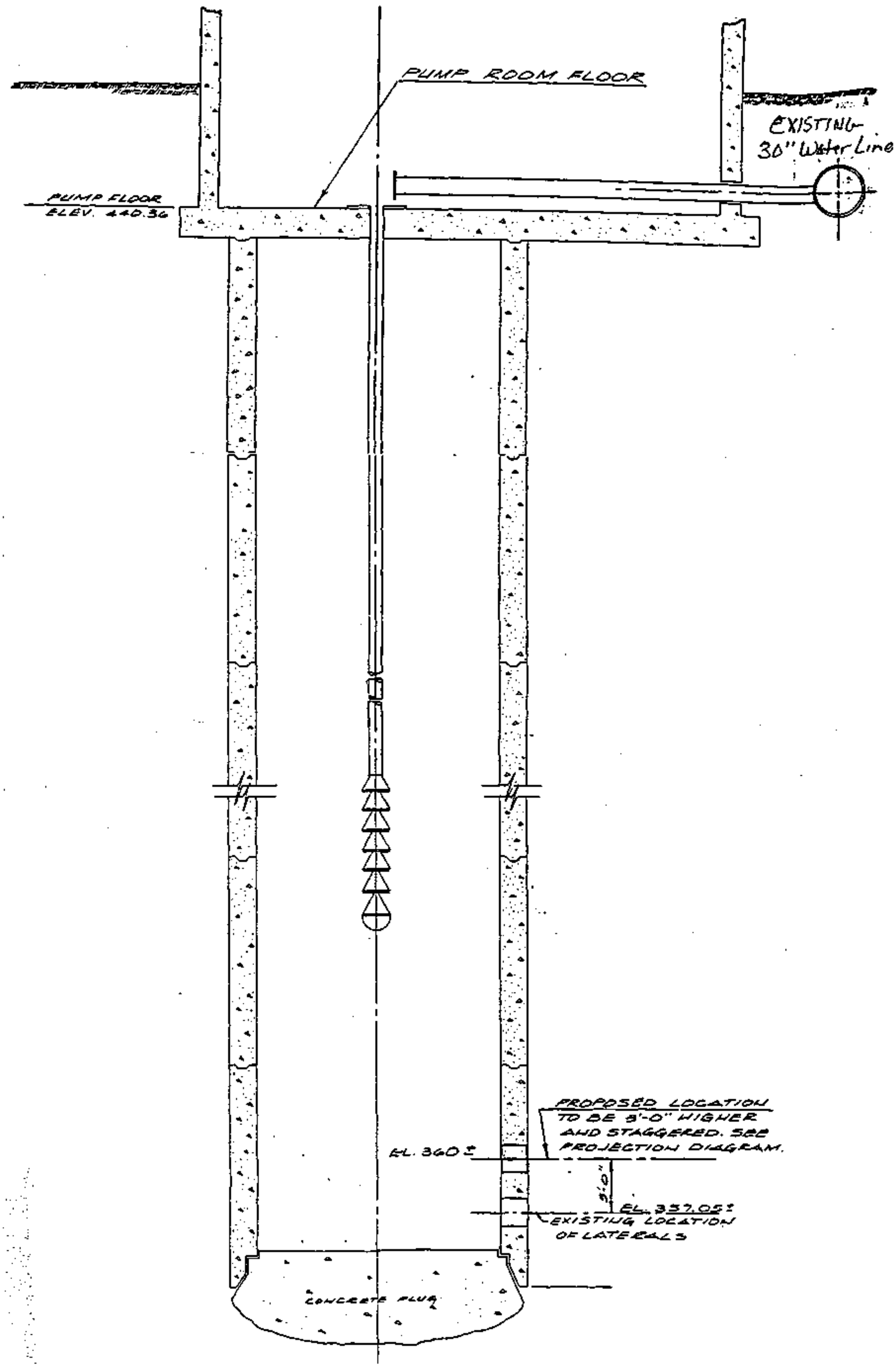
ENLARGED SECTION SHOWING SCREEN PIPE AND ACCESS??



VERTICAL SECTION THRU CAISSON

Appendix III-1. Summaries of Public Ground-Water Supplies in Township Tiers 19N, 20N, and 21N of Mason County

Details of the construction and production testing of the following public water supply wells have been described in a prior report (Woller and Gibb, 1975). The text for the descriptions of these wells is taken largely from this earlier publication. Additional updated information is included where appropriate.

<u>Easton</u>

The village of Easton uses two drilled, drift wells (Wells 1 and 2) as a source of municipal water supply.

Well 1 (15 ft north and 800 ft east of the southwest corner of Sec. 25, T21N, R7W) was drilled to a depth of 135 ft by William H. Hatfield, Easton, Illinois, in 1960. Sand and gravel was reported between depths of 40 and 135 ft, and the well was screened with a 10-ft length of 8-in. diameter, 25 slot well screen. The water level was lowered from a static level of 14.5 to 22.3 ft below grade after pumping at rates of 110 to 300 gpm for 3.5 hr.

The Illinois State Water Survey (ISWS) conducted a well production test using one observation well on Well 1 on October 5, 1960. The water level was lowered from a static level of 14.45 ft to 16.42 ft below the pump base. The specific capacity of the well for a pumping period of 7.1 hr and a pumping rate of 60 gpm was 30.5 gpm/ft.

Well 2 (9 ft north and 820 ft east of the southwest corner of Sec. 25, T21N, R7W) was drilled to a depth of 138 ft by E. C. Baker & Sons, Sigel, IL, in 1971. Sand and gravel was reported between depths of 40 and 142 ft, and the well was screened with a 10-ft length of 8-in. diameter, 30 slot Cook stainless steel well screen.

The ISWS conducted a well production test using one observation well on Well 2 on August 30, 1971, which was reported to Mr. Nathan Wilcoxon, CM&T, Consulting Engineers, Springfield, in a letter from Mr. Adrian P. Visocky, ISWS. The water level was lowered from a static level of 11.96 ft to 15.87 ft below grade. The specific capacity of the well for a pumping period of 3 hr and a pumping rate of 150 gpm was 38.4 gpm/ft. Based on available information at that time, it was reported that the well appeared capable of yielding as much as 300 gpm; however, fine materials within the aquifer would likely migrate toward the screen at this pumpage rate and cause a decline in well performance. In order to minimize this occurrence, it was suggested that the well should not be pumped in excess of 150 gpm.

Average daily pumpage for Easton in 1995 was reported to be 31,600 gpd.

An Illinois Environmental Protection Agency (IEPA) analysis of a raw water sample collected from Well 2 in 1992 showed the water to have a hardness of 296 mg/l, total dissolved minerals of 310 mg/l, and an iron content of 1.500 mg/l.

The water treatment process in 1996 was chlorination, fluoridation, and aeration before discharging into a 7000-gallon reaction basin. The water is then pumped, filtered, and discharged into the distribution system and 50,000-gallon elevated storage tank.

Havana

The city of Havana uses three drilled, drift wells (Wells 2, 4, and 5) as a source of municipal water supply. One of the wells (Well 4) is used only in emergency situations.

Well 2 (1530 ft south and 330 ft west of the northeast corner of Sec. 1, T21N, R9W) was drilled to a depth of 85 ft (originally drilled to 90 ft) by C. B. Layman, Havana, Illinois, in 1942. The well was screened with a 15-ft length of 12-in. diameter, 40 slot well screen from 70 to 85 ft below ground. In February 1948, the water level was lowered from a static level of 22 ft to 29 ft below the pump base after pumping at 950 gpm.

In 1962 and 1966, this well was cleaned and acidized by the Chris Ebert Co., Washington, Illinois. The original well capacity was reportedly restored each time.

In 1979, it was reported that the well pump was rated at about 650 gpm, but operated at about 550 gpm to keep from breaking suction.

Well 4 (1530 ft south and 405 ft west of the northeast corner of Sec. 1, T21N, R9W) was drilled to a depth of 78 ft by the Chris Ebert Co., Washington, Illinois, in 1960. The well was screened with a 20-ft length of 12-in. diameter, 30 slot well screen from 58 to 78 ft below ground. When the well was installed, the water level was lowered from a static level of 24 ft to 50 ft below grade after pumping at 900 to 1000 gpm for 8 hr.

In 1966, this well was acidized by the Chris Ebert Co. The original well capacity was reportedly restored.

In December 1990, the nonpumping water level was reported to be 36 ft.

Well 5 (2170 ft south and 175 ft east of the northwest corner of Sec. 6, T21N, R8W) was drilled to a depth of 96 ft with a 32-in. diameter bore hole by Luhr Bros., Columbia, Illinois, in 1974. A 12-in. diameter casing extends from 3 ft above ground to a depth of 46 ft followed by 50 ft of 12-in. diameter Johnson Everdur screen. The screened section consists of 9.8 ft of No. 50 slot, 33.8 ft of No. 20 slot, and 6.4 ft of No. 15 slot. The annulus between the bore hole and casing-screen assembly was filled with concrete from ground level to a depth of 17 ft and with gravel from 17 to 96 ft. A driller's log indicates sand from grade to 96.5 ft.

The ISWS conducted a well production test on this well on September 19, 1974, which was reported to Mr. Donald Houser of Casler, Houser, Hutchison, Inc., Consulting Engineers, in a letter from Mr. Richard J. Schicht, ISWS. The water level was lowered from a static level of 19.74 ft to 29.90 ft below grade. The specific capacity of the well for a pumping period of 3 hr and pumping rates ranging from 1130 to 966 gpm was 95.1 gpm/ft. Based on available information at that time, the long-term yield was estimated to be 1000 gpm.

Average daily pumpage for Havana in 1995 was reported to be 572,700 gpd.

An IEPA analysis of a raw water sample collected from Well 5 in 1990 showed the water to have a hardness of 200 mg/l, total dissolved minerals of 208 mg/l, and an iron content of 0.116 mg/l.

The water treatment process in 1996 was chlorination, feeding of potassium permanganate, filtering, and fluoridation before discharging to the distribution system and 300,000-gallon elevated storage tank.

Mason City

Mason City uses three drilled, drift wells (Wells 3, 4, and 5) as a source of municipal water supply.

Well 3 (1350 ft south and 320 ft east of the northwest corner of Sec. 8, T20N, R5W) was drilled to a depth of 197 ft by C. P. Brant, Indianapolis, Indiana, in 1916. The well was screened with a 12-ft length of 12-in. diameter, 30 slot well screen. In November 1919 and February 1948, nonpumping water levels were reported to be 60 and 54 ft below the pump base, respectively.

On December 27, 1957, this well was acidized and treated with polyphosphate. This well was acidized again in 1975 and 1991.

Well 4 (1330 ft south and 340 ft east of the northwest corner of Sec. 8, T20N, R5W) was drilled to a depth of 222 ft by the Baureisen Drilling Co., Chicago, Illinois, in 1928. Sand was reported between depths of 5 and 40 ft, 50 and 65 ft, 85 and 90 ft, and 195 and 220 ft, and the well is screened with a 12-ft length of 12-in. diameter Cook well screen.

On December 27, 1957, this well was acidized and treated with polyphosphate. This well was acidized again in June 1963.

Well 5 (1800 ft north and 400 ft west of the southeast corner of Sec. 7, T20N, R5W) was drilled to a depth of 208 ft by the Wehling Well Works, Beecher, Illinois, in 1976. The well was screened with a 30-ft length of 12-in. diameter, 30 slot stainless steel screen. A driller's log indicates sand and gravel from 70 to 80 ft, sand from 80 to 95 ft, and sand and gravel from 150 to 208 ft.

The Wehling Well Works conducted a well production test on Well 5 on January 5, 1977, which was reported to Mr. Larry W. Wells of Crawford, Murphy and Tilly, Inc., Consulting Engineers, in a letter from Mr. Ellis W. Sanderson, ISWS. The water level was lowered from a static level of 55 to 71 ft. The specific capacity of the well for a pumping period of 4 hr and pumping rates of 620 to 630 gpm was 39.4 gpm/ft. The pumping test data were not adequate to make an analysis of the safe yield of the well. However, it was indicated that the sand and gravel in this area was capable of supplying large quantities of water and could safely furnish the desired 500 gpm, if the well as constructed permits withdrawal on a long-term basis at a rate of 500 gpm without deterioration.

Average daily pumpage for Mason City in 1995 was reported to be 369,200 gpd.

An IEPA analysis of a raw water sample collected from Well 5 in 1978 showed the water to have a hardness of 278 mg/l, total dissolved minerals of 309 mg/l, and an iron content of 0.97 mg/l.

The water treatment process in 1996 was feeding of polyphosphate to keep iron in solution, chlorination, and fluoridation before discharging to the distribution system and 125,000 gallon elevated storage tank.

San Jose

The village of San Jose uses two drilled, drift wells (Wells 4 and 5) as a source of municipal water supply.

Well 4 (900 ft south and 400 ft west of the northeast corner of Sec. 1, T21N, R5W) was drilled to a depth of 101 ft and deepened in 1957 to 186 ft by the Chris Ebert Co., Washington, Illinois, in 1951. The well was screened with a 12-ft length of 6-in. diameter well screen. A driller's log indicates sand and gravel from 35 to 75 ft, sand from 75 to 101 ft, and sand and gravel from 101 to 186 ft.

Well 5 (875 ft south and 455 ft west of the northeast corner of Sec. 1, T21N, R5W) was drilled to a depth of 168 ft by Albrecht Well Drilling, Inc., Ohio, EL, in 1980. The well was screened with a 20-ft length of 6-in. diameter Johnson stainless steel telescope screen. When the well was installed, the static water level was reported to be 60.44 ft.

Average daily pumpage for San Jose in 1995 was reported to be 72,700 gpd. An IEPA analysis of a raw water sample collected from Well 5 in 1991 showed the water to have a hardness of 300 mg/l, total dissolved minerals of 333 mg/l, and an iron content of 4,400 mg/l.

The water treatment process in 1996 was fluoridation, chlorination, and filtering before discharging to the distribution system and 75,000-gallon elevated storage tank.

Appendix III-2. Available Records of Wells in Township Tiei s 19N, 20N, and 21N of Mason County

		Well				Screen			Test data								
Well location	Well owner	Year constructed	Depth (ft)	Diameter (in)	Type/ Use	Length (ft)	Diameter (in)	Slot size (in)	Date (mmyy)	Static level (ft)	Drawdown (ft)	Pumping rate (gpm)	Length of test (nr)	Specific capacity (gpm/ft)	Logged depth to sand and gravel (ft)	Logged depth to bedrock (ft)	Driller
12519N06W022H	EDWARD BLESSMAN	1993	53	5	DO	4	5	0.012	693	9					10		GROSCH
12519N08W035H	MAX GEBHARD	1991	75	16	IR	30	16-14	0.05	292	11	18	1250		69.4	6	75	GROSCH
12519N08W038D	LLOYD PRETTYMAN	1981	93	8	IR	15	8	0.06	381	12					28		ALBRECHT
12519N08W041D	IRWIN GEBHARD	1996	88	16	IR	30	16	0.05	1096	10	16	1750		109.4	2	88	GROSCH
12519N08W058E	GARY BELL	1979	127	16	IR	20	12	0.06	1179	22	20	1000	1	50	5	127	ALBRECHT
12519N08W062B	GARY BELUM DANIELS	1984	113	16	IR	33	16	080-.060-.080	284	22	16	1000	1	62.5	4		ALBRECHT
12519N09W	J G FRANKLIN	--	37	54-?	DO										0		--
12519N09W	A S LUCOR	--	23	--	DO										23		--
12519N09W017C	LOREN SIMMERMAKER	1994	98	10	IR	20	10	0.05							2	98	GROSCH
12519N09W025E	WM H LANE TRUST	1990	97	14	IR	20	12	0.05	790	30	20	1000		50	2		GROSCH
12519N09W026A	BILL LANE	1981	130	8	IR	8		0.06	1181	25					5		ALBRECHT
12519N09W031D	KEN SIELOCHOTT	1977	118	16	IR	64	16	3/16							2		GROSCH
12519N09W031E	KEN SIELOCHOTT	1977	91	16	IR	40	16	3/16							2		GROSCH
12519N09W036A	GARY E BELL	1995	108	16	IR	20	16	0.05	795	20					8		HATFIELD
12519N09W037C	FONOFF, STONE S BELL	1976	129	15	IR	20	12	0.08	676	33.5					0		ALBRECHT
12519N09W037F	MARGARET MINOR	197B	115	16	IR	40	16	3/16							A		GROSCH
12519N09W042B	GARY BELL	1981	107	16	IR	20	12	0.08							0		ALBRECHT
12519N09W042G	WILBER BELL	1978	118	16	IR	40	16	3/16							3		GROSCH
12519N09W045F	CLINT HURDLE	1984	70	5	DO	10	4	0.01							12		GROSCH
12519N09W046D	OAK GROVE FARMS	1979	67	5	DO	4	3	0.02	579	22					0		ALBRECHT
12519N09W047D	JEFF CLARK	1985	90	12	IR	20	12	0.05	485	9	29	1250		43.1	3	90	GROSCH
12519N09W054E	PAULINE CLARK	1983	113	16	IR	20	16	0.05	1083	7	21	1250		59.5	2		GROSCH
12519N09W058E	ARTHER FINCH	1979	100	8	IR	15	8	.040-.060	1279	13	20	350	1	17.5	0		ALBRECHT
12519N09W062H	BURKE EBKEN	1977	103	16	IR	40	16	3/16							2		GROSCH
12519N09W064D	JEFF CLARK	1988	85	8	IR	30	8	0.01							2		GROSCH
12519N09W064E	ARTHUR FINCH	1981	95	8	IR	15	8	0.06	181	10					0		ALBRECHT
12519N09W068D	PAULINE CLARK	1984	105	16	IR	20	16	0.05	1184	13	20	1250		62.5	2	105	GROSCH
12519N09W068D	JEFF CLARK	1995	92	16	IR	30	16	0.05	1195	11	16	1250		78.1	2	92	GROSCH
12519N09W072A	C R BELL	--	21	1.2	DO	3			160	14.34							BELL
12519N09W074D	MORRIS BELL	1964	86	18	IR	36	18	3/16	764	6.5	6.5	600	8	92.3	2		BROWN
12519N09W082F	NELDAGREB	1965	86	18	IR	40	18	3/16	??65	14	2.1	200	3	95.2	7		BROWN
12519N09W082H	NELDAGREB	1977	100	16	IR	40	16	3/16							2		GROSCH
12519N09W083B	O R ADKINS SR	1977	102	16	IR	40	16	3/16							2.5		GROSCH
12519N09W087B	HORTENSE BELL	1979	93	8	IR	10	8	.040-.060	379	10					0		ALBRECHT
12519N09W087H	NELDA GREB	1977	100	16	IR	40	16	3/16							2		GROSCH
12519N09W088D	HORTENSE BELL	1979	92	8	IR	15	8	0.04	378	12					0		ALBRECHT
12519N09W091D	FRANK STONE	1978	109	15	IR	20	12	0.06	378	30		1000	4		0		ALBRECHT
12519N09W097B	RON ROYER	1994	84	4	DO	4	4	0.015	894	33					2		HATFIELD
12519N09W101H	TRIPLE EDGE PORK INC #1	--	108	--	IC												--
12519N09W101H	TRIPLE EDGE PORK INC #2	1983	108	5	IC	8	4	0.02							0		GROSCH
12519N09W103D	TRIPLE EDGE PORK INC #3	1986	107	5	IC	10	4	0.01							2	107	GROSCH
12519N09W104D	TRIPLE EDGE PORK INC #4	1988	96	5	IC	10	4	0.02							2		GROSCH
12519N09W106G	GILBERT BELL	1979	123	15	IR	20	12	0.06	379	30		1000			0		ALBRECHT
12519N09W108B	STONE ATKINS	1978	94	16	IR	40	16	3/16							4		GROSCH
12519N09W111C	COMMERCIAL NATIONAL BANK	1966	73	4	DO	2	4	0.02	??56	29.7	3.1	15	1	4.8	10		HOFSTETTER
12519N09W111H	WILLIAM H LANE	1955	33	36-1.2	DO	3	1.2		760	25.65							SCHOOL BOARD
12519N09W173F	STONEY ATKINS	1978	110	16	IR	40	16	3/16							3		GROSCH
12519N09W174H	O R ADKINS	1968	61	4	DO	11	4	0.012	368	23.5	3.5	34	3	9.7	2		HOFSTETTER
12519N09W175E	OAKLIECH R ADKINS	1970	62	22-17	DO	36	22-17	1/4 X 3/8	1070	18	19	500	3.5	26.3	0		GIBBS

Notes: CO=commerclal, CS=community, DO=domestic, IC=lndustrlal/commerclal, IR=lrrigation, MO=monitoring, MU=munlclpal, NC=non-communlty, OB=observatlon, SC=school, ST=state, TH=test hole, TW=test well

Appendix III-2. (Continued)

Well location	Well owner	Well: Year constructed	Well: Depth (ft)	Well: Diameter (in)	Well: Type/Use	Screen: Length (ft)	Screen: Diameter (in)	Screen: Slot size (in)	Test data: Date (mmyy)	Test data: Static level (ft)	Test data: Drawdown (ft)	Test data: Pumping rate (gpm)	Test data: Length of test (hr)	Test data: Specific capacity (gpm/ft)	Logged depth to sand and gravel (ft)	Logged depth to bedrock (ft)	Driller
12519N09W175G	OAKLIECH R ADKINS	1960	44	16-4	DO	4	5	1/8 X 1/4	1160	22	4	25	2	6.3	0		GIBBS
12519N09W177H	O R ADKINS SR	1976	90	6	IR	16	5.6	.018-.020-.025	1076	22.3	4.2	110	3	26.2	63		HOFSTETTER
12519N09W18	WILBUR BELL	1996	87	16	IR	20	16	0.05							3		SHADOW MFG
12519N09W183C	RIGBY ROSKELLEY	1977	91	16	IR	40	16	3/16							2		GROSCH
12519N09W195D	WAYNE GERDES	1995	65	5	DO	4	5	0.015	795	13.5					0		ALBRECHT
12519N09W196O	DOUG GERDES	1994	79	5	DO	4	3	0.02	394	11.5					0		ALBRECHT
12519N09W208H	0 R ADKINS JR	1977	80	16	IR	40	16	3/16							2.5		GROSCH
12519N09W227G	STONEY ADKINS	1988	73	14	IR	20	12	0.05							2		GROSCH
12519N10W013B	JEFF CLARK	1995	94	14	IR	20	14	0.05							2	94	GROSCH
12519N10W013C	JEFF CLARK	1989	92	14	IR	20	12	0.05	1189	13	28	1000		35.7	4		GROSCH
12519N10W014G	JOHN K FLETCHER	1967	92	18	IR	40	18	3/16	??67	13	2.5	300	3	120	2		BROWN
12519N10W023C	CARROL BLESSMAN	1979	82	16	IR	18	16	3/16	1179	8	30	1250		41.7	2		GROSCH
12519N10W027E	LARRY BLESSMAN	1979	84	16	IR	20	16	3/16	1179	11	32	1250		39.1	2		GROSCH
12519N10W031D	RUDOLPH KOLVES	1980	94	8	IR	15	8	.040-.060							20		ALBRECHT
12519N10W031H	LARRY BLESSMAN	1980	76	16	IR	28	16	3/16	1080	12	51	1000		19.6	2	75	GROSCH
12519N10W036H	BEN HILTABRAND	1970	61	4	DO	10	4	.030-.025	970	5.6	10.4	120	5	11.6	0		HOFSTETTER
12519N10W042D	JAMES SARFF	1984	81	13	IR	20	12	0.05	484	12	18	1250		69.4	2	81	GROSCH
12519N10W046C	WM FELBER	1967	67	18	IR	40	18	3/16	??67	7	5.8	1000	3	172.4	4		BROWN
12519N10W082E	JIM SARFF	1975	84	16	IR	40	16	3/16							3		GROSCH
12519N10W084D	WARREN ISHMAEL	1981	75	18	IR	20	16	0.05	581	14	32	1250		39.1	2	75	GROSCH
12519N10W088B	ALLEN SARFF	1980	90	8	IR	20	8	.040-.060							0		ALBRECHT
12519N10W096C	URBAN KRAMER	1978	91	16	IR	40	16	3/16							3		GROSCH
12519N10W102B	LOYD DANIEL	1979	93	16	IR	20	12	0.08	1179	11	20	1000	1	50	0		ALBRECHT
12519N10W106G	RUDOLPH KOLVES	1989	96	8	IR	23	8	0.035							2	96	GROSCH
12519N10W106G	RUDOLPH KOLVES	1989	96	14	IR	20	12	0.05	1189	19					2	96	GROSCH
12519N10W107B	IRENE FLETCHER	1988	73	14	IR	20	12	0.05	788	7	15	1200		80	2		GROSCH
12519N10W108G	RUDOLPH KOLVES	1994	96	10	IR	20	10	0.05							2	96	GROSCH
12519N10W112C	UNIV OF ILL FOUNDATION	1990	80	16	IR	20	16	0.05	490	15	25	1000		40	2	80	GROSCH
12519N10W113G	ROY FLETCHER	1980	88	16	IR	20	16	3/16	1080	13	35	1250		35.7	2	88	GROSCH
12519N10W118B	HAROLD BANKS		37	42	DO				760	33.24							
12519N10W118G	RUSTY THOMAS	1993	64	5	DO	8	5	0.012	593	7					15		GROSCH
12519N10W126D	UNIV OF ILL FOUNDATION	1981	87	16	IR	40	16	3/16	181	12	26	1300		50	2	87	GROSCH
12519N10W133C	EDNA HERRMANN	1989	86	14	IR	20	12	0.05							10	86	GROSCH
12519N10W137G	ROY FLETCHER	1991	85	12	IR	20	12	0.05	1291	8	20	1000		50	2	85	GROSCH
12519N10W138B	LAURA LANE	1966	84		IR	40	18	3/16	7766	11	2.1	300	4	142.9	5	84	BROWN
12519N10W138F	WILLIAM LANE TRUST	1991	79	8	IR	20	8	0.05	691	12					2	79	GROSCH
12519N10W151B	ILLINOIS ROAD CONTRACTORS	1980	83	16	IR	20	12	0.08	880	9	20	1000	1	50	0		ALBRECHT
12519N10W153G	CARROLL BLESSMAN	1988	73	14	IR	20	12	0.05	788	7	15	1200		80	2	73	GROSCH
12519N10W157C	MORRIS SCRAFF	1977	101	15	IR	20	12	0.08	577	17		1750	0.5		3		ALBRECHT
12519N10W163G	TRIPLE EDGE PORK	1993	85	5	IC	8	5	0.012	593	18					0		GROSCH
12519N10W163G	TRIPLE EDGE PORK	1993	83	5	IC	8	5	0.012	593	18					0		GROSCH
12519N10W165C	LARRY BARRETT	1980	88	13	IR	28	13	3/16	480	18	52	1250		24	5	86	GROSCH
12519N10W166E	CINDY BURLOW	1989	95	14	IR	20	12	0.05	489	15	42	1250		29.8	2		GROSCH
12519N10W168A	SCOTT W LUCUS		29	1.2	DO	3			760	16.1							
12519N10W168A	SPUD FARMS	1976	92	15	IR	20	12	0.06	376	29.5		1000	2		0		ALBRECHT
12519N10W172D	SCHADD BROTHERS	1979	107	16	IR	20	12	0.06	979	11	20	1000	1	50	0		ALBRECHT
12519N10W172H	JIM SARFF	1977	78	16	IR	40	16	3/16							2		GROSCH
12519N10W181G	JAMES SARFF	1977	73	16	IR	40	16	3/16							2		GROSCH
12519N10W188C	R C ROSKELLY	1985	69	5	DO	12	2.5	.020-.015	285	10.5					4		ALBRECHT

Notes: CO=commerclal, CS=community, DO=domestic, IC=lndustrial/commerclal, IR=irrlgatlon, MO=monitoring, MU=municlpal, NC=non-communtty, OB=observation, SC=school, ST=state, TH=test hole, TW=test well

Appendix III-2. (Continued)

Well location	Well owner	Well: Year constructed	Well: Depth (ft)	Well: Diameter (in)	Well: Type/ Use	Screen: Length (ft)	Screen: Diameter (in)	Screen: Slot size (in)	Test data: Date (mmyy)	Test data: Static level (ft)	Test data: Drawdown (ft)	Test data: Pumping rate (gpm)	Test data: Length of test (hr)	Test data: Specific capacity (gpm/ft)	Logged depth to sand and gravel (ft)	Logged depth to bedrock (ft)	Driller
12519N10W168D	RIGBY ROSKELLEY	1977	78	16	IR	40	16	3/16							2	76	GROSCH
12519N10W191G	STALEY FARMS	1993	80	10	IR	20	10	0.05							2	80	GROSCH
12519N10W194E	STALEY BROTHERS	1977	81	16	IR	40	16	1/8	577	16					1.5		GROSCH
12519N10W203C	LLOYD STONE	1977	88	15	IR	20	12	0.08	577	20		1000	0.5		0		ALBRECHT
12519N10W207H	SPUD FARMS	1976	101	12	IR	20	12	0.06	376	11.5		1000			0		ALBRECHT
12519N10W214B	JIM BULA SPUD FARM	1976	91	15	IR	20	12	0.08	376	5.5		1000	0.5		0		ALBRECHT
12519N10W217D	WARREN ISHMAEL	1980	87	16	IR	28	16	3/16	480	18	45	1250		27.8	5	86	GROSCH
12519N10W224D	DOROTHY SANDIDGE	1981	72	18	IR	20	16	0.05	581	15	36	1250		34.7	2	72	GROSCH
12519N10W226C	MORRIS SARFF	1985	75	8	IR	20	8	0.04	885	14					7		GROSCH
12519N10W231E	DANNY RICH	1980	71	5	DO	12	2.5	.015-.020-.025							0		ALBRECHT
12519N10W231G	EULA DANIELS BROWN	1979	76	16	IR	24	16	3/16	1079	16	27	1200		44.4	2		GROSCH
12519N10W232B	D ERNEST BROWN	1967	73	18	IR	40	18		??67	16.5	15.5	1500	5	96.8	3	73	FAYHEE
12519N10W237B	JOHNSON FARMS	1980	73	16	IR	28	16	3/16	480	15	38	1250		329	5		GROSCH
12519N10W245G	LYNN HERRMANN	1984	83	16	IR	20	16	0.05	484	12	29	1250		43.1	2	83	GROSCH
12519N10W284H	MIKE LUMPP	1995	84	12	IR	20	12	0.05	395	25	19	1250		65.8	2	84	GROSCH
12519N10W295F	WILCOX FARMS	1987	53	14	IR	20	12	0.05	987			1500			7		GROSCH
12519N10W297E	WILCOX FARMS	1982	55	13	IR	28	13	3/16	682	6	25	1250		50	6	55	GROSCH
12519N10W298B	RICHARD BROWN	1970	40	22-17	IR	8	22-17	1/4 X 3/8	870	12	13.5	200	2	14.8	12		GIBBS
12519N10W301D	SANGANOIS CONS AREA #5	1976	62.5	48-30	CO	27	30	0.065	876	15	19	1500	4	78.9	0		MILLER
12519N10W301G	SANGANOIS CONS AREA #6	1976	62.5	48-30	CO	27	30	0.07	876	11	23	1900	4	82.6	0		MILLER
12519N10W303D	SANGANOIS CONS AREA #1	--		--	CO												--
12519N10W303D	SANGANOIS CONS AREA #4	1966	30	--	CO												--
12519N10W304G	A E STALEY JR	1967	66	18	IR	40	18	3/16	7767	7	2.7	300	3	111.1	2		BROWN
12519N10W307C	SANGANOIS CONS AREA #1	1976	69	48-30	CO	27	30	0.065	876	17	22	1600	4	72.7	10		MILLER
12519N11W135E	CRANE LAKE GAME PRESERVE	1977	83	16	IR	40	16	1/8	577	16					2		GROSCH
12519N11W137B	WILD WING LAND CO	1935	93	6	DO				1165	30		30					LAYMAN
12519N11W138A	SANGANOIS CONS AREA #2	1975	100	--	CO												--
12519N11W142A	WILDLIFE ACRES FARM	1965	87	18	IR	48	18	3/16	765	13	1.5	300	4	200	18		BROWN
12519N11W147B	GENE DAMENBERGER	1970	37	22-17	IR	16	22-17	1/4 X 3/8	870	4.2	3.8	200	1	52.6	16		GIBBS
12519N11W147E	EIGHTEENTH HOLE GOLF COURSE	1977	80	8	IR	10	8	0.04	977	6		300	1		12		ALBRECHT
12519N11W241B	W C BARKHAUSEN	1965	85	18	IR	48		3/16	??65	7	9.2	1000	3	108.7	0		BROWN
12519N11W241G	JIM SARFF	1991	76	16	IR	40	16		891	12	23	1000		43.5	2		GROSCH
12519N11W244H	ALBERT MAGNUS	1953	29	1.2	DO	3	1.2		760	14.75							MAGNUS
12519N11W248H	ALBERT MAGNUS	1956	65	6.6	DO	10	5.5	0.05	??56	4	21	550	3	26.2	0		SPAULDING/CLARK
12519N11W256F	SANGANOIS CONS AREA #8	1976	89	48-30	CO	27	30	0.09	776	11	29	2250	4	77.6	0		MILLER
12520N05W	MASON CITY (COAL BORING)	--	202	--	IC										35		--
12520N05W011A	SHERMAN SMITH	1968	100	4	DO	5	4	0.016	1068	44		12	2		51		CRUMPLER
12520N05W011B	HUBBARD ESTATE	--	100	4	DO		4		1233	50							--
12520N05W014E	J B HUBBARD	1884	85	4	DO		4		1233	55							MILLER
12520N05W018A	J L WALKER	--	85	4	DO		4		1233	40							WALKER
12520N05W018E	DOYLE ESTATE	--	100	48-4	DO				1233	55							--
12520N05W024A	JOHN THEOBALD	--	117	48-4	DO				1233	30							--
12520N05W024A	STEVEN BERGMAN	1996	62	5	DO	4	5	0.012	996	30					40		GROSCH
12520N05W025B	J G ELMORE	1921	122	48-4	DO		4		1233	77							INGRAM/PETERS
12520N05W031A	J H LAGER	--	90	4	DO				1233	60							--
12520N05W035C	F PROCTOR	1895	117	48-4	DO				1233	60							TURNER
12520N05W037B	MARTHA SINKS	1881	80	48-4	DO				1233	60							--
12520N05W042B	HARRY WEBB	1917	143	3	DO		3		1233	50							MINNER
12520N05W043B	HARRY WEBB	1890	137	48-4	DO		4		1233	50							INGRAM

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Appendix III-2. (Continued)

Well location	Well owner	Well: Year constructed	Well: Depth (ft)	Well: Diameter (in)	Well: Type/Use	Screen: Length (ft)	Screen: Diameter (in)	Screen: Slot size (in)	Test data: Date (mmyy)	Test data: Static level (ft)	Test data: Drawdown (ft)	Test data: Pumping rate (gpm)	Test data: Length of test (hr)	Test data: Specific capacity (gpm/ft)	Logged depth to sand and gravel (ft)	Logged depth to bedrock (ft)	Driller
12520N05W052A	WM COTTRELL ESTATE	--	130	4	DO		4		1233	60							--
12520N05W055A	HENRY BOCKWITZ	--	90	4	DO												--
12520N05W057A	L A FREEMAN	1893	143	4	DO		4		1233	70							MATTSON
12520N05W058A	A W PETERSON	1890	80	4	DO		4		1233	52							--
12520N05W058C	MRS JOHN MAYER	--	90	4	DO		4		1233	50							PETERS BROS
12520N05W058D	ARTHUR HANEL	1928	149	6	DO		6		133	60							PETERS BROS
12520N05W058D	JAMES T CURRY	1972	85	4	DO	3	4	0.012	572	65		12	3		55		ACME
12520N05W058E	JAMES CURRY	1995	149	5	DO	4	5	0.012	795	50					39		GROSCH
12520N05W058F	DAN HARRIS	1989	90	5	DO	4	5	0.015							5		GROSCH
12520N05W06	JAMES MCDONALD	1979	170	5	DO	4	5	0.018	1079	59	85	15	2	0.2	18		J & R DRILLING
12520N05W061D	MAIZIE HUBLY	--	140	4	DO		4		1233	60							PETERS BROS
12520N05W061E	CHAS ELMORE	--	140	4	DO		4		1233	60							--
12520N05W063A	BERT SPEAR	--	86	4	DO		4		1233	60							--
12520N05W067C	DRAY ESTATE	1883	120	48-4	DO				1233	70							--
12520N05W07	W T KEEN	--	90	--	DO										90		--
12520N05W07	HAROLD BROOKS	1965	161	6	DO	4		0.016	165	55							CRUMPLER
12520N05W071C	MASON CITY TH	1976	300	5	TH										35	227	WEHLING
12520N05W071C	MASON CITY #5	1976	208	12	MU	30	12	0.03	177	55	16	630	4	39.4	70		WEHLING
12520N05W075A	JERI EVANS	1986	155	5	DO	10	4	0.01							38		GROSCH
12520N05W076E	WILL HUFFMAN	1928	95	4	DO		4		134	60							PETERS BROS
12520N05W076H	C L MANGOLD	--	100	4	DO		4		134	60							--
12520N05W077E	JOHN MADDEN	1976	142	4	DO	5	4	0.016	976	49		10	2		6		CRUMPLER
12520N05W077F	LLOYD MCLAUGHLIN	1968	146	4	DO	5	4	0.016	1168	55		10	2		44		CRUMPLER
12520N05W077G	TOM ROOT	1994	148	5	DO	4	5	0.012	594	38					30		GROSCH
12520N05W078E	ALLEN CRAMWILL	1967	164	4	DO	5	4	0.016	367	64		1180	6		16		CRUMPLER
12520N05W078G	BROOKS MOTOR CO	1993	153	5	IC	4	5		393	43					115		GROSCH
12520N05W081C	KAISER CHEMICAL	1980	140	8	IR	20	8	0.01	780	32	11	100		9.1	83		GROSCH
12520N05W083E	W T AINSWORTH	--	125	4	DO		4		134	60							--
12520N05W084G	WM THEOBALD	1919	110	4	DO		4		1233	50							MINNER
12520N05W085E	CECIL POTTORF	1968	140	4	DO	5	4	0.016	1168	50	0	15	2	15	23		CRUMPLER
12520N05W088D	CHICAGO & ALTON RR	1926	211	10	IC	20		0.025	626	53.5	5	55	4.5	11			AYERS/FRANCE
12520N05W088F	MASON CITY #1	1889	200	06-Oct	MU	20	6		1114	65					15		TURNER/FIELDER
12520N05W088F	MASON CITY #2	1895	200	--	MU	20	6		1114	65							MOUNT
12520N05W088F	MASON CITY #3	1916	197	12	MU	12	12	0.03	248	54							BRANT
12520N05W088F	MASON CITY #4	1928	222	12	MU	12	12		248	67					5		BAUEREISEN
12520N05W09	DEKALB PLANT GENETICS MW#1	1992	24	2	MO	10	2	0.01									AQUA DRILLING
12520N05W09	DEKALB PLANT GENETICS MW#2	1992	29	2	MO	10	2	0.01									AQUA DRILLING
12520N05W09	DEKALB PLANT GENETICS MW#3	1992	29.5	2,	MO	10	2	0.01									AQUA DRILLING
12520N05W09	DEKALB PUNT GENETICS MW#4	1992	40	2	MO	10	2	0.01	1092	35					38		J & R DRILLING
12520N05W09	DEKALB PLANT GENETICS MW#5	1992	40	2	MO	10	2	0.01	1092	35					35		J & R DRILLING
12520N05W09	DEKALB PLANT GENETICS MW#6	1992	40	2	MO	10	2	0.01	1092	35					35		J & R DRILLING
12520N05W09	DEKALB PLANT GENETICS MWK7	1992	40	2	MO	10	2	0.01	1092	35					32		J & R DRILLING
12520N05W092H	R & W COON	--	100	48-4	DO		4		1233	60							PETERS BROS
12520N05W093H	W H PATTERSON	1914	100	4	DO		4		1233	60							PETERS BROS
12520N05W094H	RICHARD BROWN	1967	134	4	DO	4	4	0.016	867	67.5		10	3		23		CRUMPLER
12520N05W095A	R M AINSWORTH	--	80	4	DO				1233	60							--
12520N05W096H	HOWARD ELMORE	1890	100	48-4	DO		4		1233	40							MADISON
12520N05W097E	MASON CITY CEMETERY ASSN	--	145	4	NC		4		1233	60							--
12520N05W097F	MASON CITY CEMETERY ASSN	--	145	3	NC		3		1233	60							PETERS BROS

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12520N05W098E	MASON CITY CEMETERY	1996	80	5	NC	5	4	0.012	596	29					34		GROSCH
12520N05W098H	RICHARD BROWN	1977	168	4	DO	5	4	0.016	777	83		10	3		111		CRUMPLER
12520N05W10	WHITNEY FARMS	1992	168	14	IR	20	12	0.05	292	45	16	1000		62.5	2		GROSCH
12520N05W101A	CHICAGO & NORTHWESTERN RR	1918	122	12	IC	12	12								10		--
12520N05W101D	SCHOOL DISTRICT #9	--	90	4	SC		4		134	50							PETERS BROS
12520N05W102A	CHICAGO & NORTHWESTERN RR	1925	180	12	IC		10		1233	60							EBERT
12520N05W102A	RICHARD BROWN	1983	123	4	DO	10	4	0.01							35		GROSCH
12520N05W102B	LUTHER CROSS	--	55	48	DO				134	50							--
12520N05W105A	ALBERT CROSS	--	100	48-4	DO		4		134	50							--
12520N05W105A	DICK WHITNEY	1988	110	5	DO	10	4	0.01							33		GROSCH
12520N05W108A	R J DONOVAN	--	75	4	DO		4		1233	40							PETERS BROS
12520N05W108H	MRS G D CHESNUT	1918	117	4	DO		4		133	47							MINNER
12520N05W112B	JOHN LAGER	--	90	4	DO	4			1233	40							MINNER
12520N05W112H	JOHN LAGER	1890	80	4	DO		4		1233	40							SMITH
12520N05W114H	J CHRISTY	--	80	4	DO		4		1233	40							--
12520N05W117G	JERRY HANLEN	1992	146	14	IR	20	12	0.05	692	40	20	1000		50	14	146	GROSCH
12520N05W118C	FRED COPPER	1925	121	48-4	DO		4		134	60							PETERS BROS
12520N05W118C	ROBERT COPPER	1981	136	4	DO	8	4	0.01							64		GROSCH
12520N05W12	LOGAN HOLLAND	1963	106	3	DO	4		0.016									CRUMPLER
12520N05W122A	E M DOUGLAS	1907	90	4	DO		4		134	45							TRINKLE
12520N05W126H	WM THEOBALD	1909	110	4	DO		4		1233	35							TRINKLE
12520N05W126H	CHAS BARKER	1977	118	4	DO	5	4	0.016	377	54		10	3		90		CRUMPLER
12520N05W128A	WM G HOLLAND	--	40	48-4	DO		4		134	25							--
12520N05W131H	E M DOUGLAS	1916	85	4	DO		4		334	15							BRINNER BROS
12520N05W132B	H F HINDHAL	1929	58	3	DO		3		134	44							PETERS BROS
12520N05W133H	MRS WM KIRBY	1921	120	42-4	DO		4		134	20							MINNER
12520N05W135H	LOGAN HOLLAND	1915	85	42-4	DO		4		134	50							MINNER
12520N05W135H	L VIRGINIA HOLLAND	1981	72	4	DO	4	4	0.02	681	39	4	6	3	1.5	8		DEMENT
12520N05W138B	M E PETERSON	1923	80	48-4	DO		4		134	46							PETERS BROS
12520N05W141A	J G HOLLAND	--	67	48-4	DO		4		134	47							--
12520N05W141A	MILDRED CHESTNUT	1974	129	4	DO	5	4	0.016	974			10	3		85		CRUMPLER
12520N05W143H	J BOLINGER	1899	35	48	DO				134	25							MINNER
12520N05W143H	JOHN BOLINGER	1916	67	4	DO		4		134	40							MINNER
12520N05W143H	RAY DOUGLAS	1974	110	4	DO	5	4	0.016	574			10	2		87		CRUMPLER
12520N05W145G	WM HOLLAND	--	70	4	DO				134	40							--
12520N05W147A	DOUGLAS ESTATE	--	40	48	DO				134	35							--
12520N05W147A	DOUGLAS ESTATE	--	40	48	DO				134	36							--
12520N05W147G	MRS COTTRELL	--	60	48	DO				134	56	4	15	0.5	3.8			--
12520N05W153H	FLORA BEACH-W D WALTERS	--	75	48-4	DO		4		134	40							--
12520N05W156F	JIM W RENKEN	1988	173	14	IR	40	12	0.05	688	20	60	1250		20.8	32		GROSCH
12520N05W156H	MRS P ZIMMERMAN	--	71	4	DO		4		134	50							MINNER
12520N05W161A	MRS C PARROTKY	--	110	48-4	DO				134	55							--
12520N05W165H	ADA HOUSEWORTH	--	75	48-4	DO		4		134	60							--
12520N05W166A	JOHN DONAVAN	--	60	4	DO		4										--
12520N05W166A	JOHN DONOVAN	1932	79	4	DO		4		134	50							PETERS BROS
12520N05W171A	ALBERT DONOVAN	--	65	4	DO		4		134	55							--
12520N05W171D	MRS EMMA K RYAN	--	80	48-4	DO		4		134	40							--
12520N05W172B	AINSWORTH SEED CO	1988	155	14	IR	20	12	0.05	688			1000			30		GROSCH
12520N05W173F	AINSWORTH SEED CO	1988	195	14	IR	40	12	0.05	1088	47	19	1250		65.8	35		GROSCH

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12520N05W174H	V PUGH	--	140	4	DO		4		134	60							--
12520N05W177H	C T AINSWORTH	--	127	48-4	DO		4		134	50							--
12520N05W177H	ELLEN & ALLEN BLESSMAN	1985	159	5	DO	10	4	0.01							35		GROSCH
12520N05W178B	R M AINSWORTH	1926	110	4	DO	4			234	40		15	2		39		PETERS BROS
12520N05W18	NATIONAL BYPRODUCTS INC #2	--		--	IC												--
12520N05W181H	FEDERAL ICE REFRIG CO #1	1923	216.8	10	IC	18			134	40					40		MEISTER BROS
12520N05W181H	NATIONAL BYPRODUCTS INC #1	1976	230	12	IC	30	12	.025-.030	1176	84	41	400	24	9.8	20	228	KNIERIM
12520N05W181H	FEDERAL ICE REFRIG CO #2	--	216	10	IC	16			134	40							MEISTER BROS
12520N05W183H	W T AINSWORTH	--	160	4	DO		4		134	60							--
12520N05W188E	OSCAR B MARTIN	1880	86	48-4	DO				134	40							FISHER
12520N05W191H	J W AINSWORTH	--	132	48-4	DO		4		134	60							--
12520N05W198H	J W POWERS ESTATE	--	130	4	DO		4		134	40							--
12520N05W201H	ALBERT DONOVAN	--	50	4	DO		4		134	35							--
12520N05W201H	GLENN SHAWGO	1976	120	4	DO	5	4	0.016	276	54		10	4		99		CRUMPLER
12520N05W205H	F W KING	--	65	48-4	DO		4		134	40							--
12520N05W206A	W T AINSWORTH	1908	50	4	DO		4		134	6							MCNEAL/PETERS
12520N05W206F	W T AINSWORTH	--	110	48-4	DO		4		134	50							--
12520N05W206F	CLYDE A WOOLAND	1970	124	4	DO	5	4	0.016	670			10	2		43		CRUMPLER
12520N05W207C	J H DEARBORN	1922	80	4	DO				134	60							PETERS BROS
12520N05W207D	BOBBIE VAUGHAN	1991	74	5	DO	5	4	0.012	891	44					29		GROSCH
12520N05W208B	ELLEN & ALLEN BLESSMAN	1988	37	5	DO	10	4	0.02							2		GROSCH
12520N05W211B	J R MCCREERY	--	90	48-4	DO				134	40							--
12520N05W212A	DR C W CARGILL	1887	220	4	DO				134	65							INGRAM
12520N05W214A	GEO ZIMMERMAN	--	96	4	DO				134	56							--
12520N05W218E	JACK ANDERSON	--	100	4	DO												--
12520N05W218E	MRS GUSSIE HUBLY	--	85	42-4	DO		4		134	60							--
12520N05W218E	JACK ANDERSON	1990	93	5	DO	4	5	0.012	790	48					54		GROSCH
12520N05W221G	ELIZ BRUNNER	1903	80	4	DO		4		134	30							--
12520N05W221H	ARTHUR HEDRICK	1975	67	4	DO	5	4	0.016	775			10	3		60		CRUMPLER
12520N05W222A	A D BLACK ESTATE	1908	145	4	DO		4		134	60							BRINNER BROS
12520N05W222B	R 0 DONOVAN ESTATE	1925	167	3	DO		3		134	107							PETERS BROS
12520N05W225B	JACOB ZIMMERMAN ESTATE	1884	185	4	DO				134	63							INGRAM
12520N05W226B	ARTHUR MANGOLD	1913	84	48-4	DO		4		134	50							BRINNER
12520N05W226B	MRS S C MCCREERY	1977	175	4	DO	5	4	0.016	877	99		12	3		157		CRUMPLER
12520N05W228H	ISAAC EGGLESTON	1893	89	4	DO				134	44							--
12520N05W234H	RALPH MANGOLD	--	78	48-4	DO				134	50							--
12520N05W234H	ALFRED MANGOLD	1970	115	4	DO	5	4	0.016	870	20		10	5		64		CRUMPLER
12520N05W236H	JOE DONOVAN	1926	115	48-4	DO		4		134	50							PETERS BROS
12520N05W238A	WAYNE EIGENBROD	1987	144	8	IR	10	8	0.04							45		GROSCH
12520N05W238B	WAYNE EIGENBROD	1991	135	8	IR	15	8	0.05							31		GROSCH
12520N05W238D	PAUL DONOVAN	--	140	4	DO			SANDPOINT	134	55							--
12520N05W238D	HONEY LOCUST POULTRY FARM	1964	147	4	DO	4		0.016	364	67							CRUMPLER
12520N05W241D	MRS MARY VELDE	1883	76	4	DO		4		134	18							--
12520N05W241E	MRS MARY VELDE	--	103	4	DO		4										LYNVILLE BROS
12520N05W242B	ROBERT BROWNFIELD	1995	107	14	IR	20	12	0.05	195	6	34	1200		35.3	2		GROSCH
12520N05W245G	MRS KATE A SHARP	--	125	48-4	DO		4		134	40							--
12520N05W248B	BRINNER ESTATE	--	60	4	DO		4		134	15							--
12520N05W248F	JOHN LAMPE	1916	96	4	DO		4		134	45					96		GRIFFIN
12520N05W248G	ROBERT RABBE	1992	140	5	DO	5	4	0.012	592	70					20		GROSCH

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Appendix III-2. (Continued)

		Well				Screen			Test data						Logged	Logged	
Well location	Well owner	Year constructed	Depth (ft)	Diameter (in)	Type/ Use	Length (ft)	Diameter (in)	Slot size (in)	Date (mmyy)	Static level (ft)	Draw-down (ft)	Pumping rate (gpm)	Length of test (hr)	Specific capacity (gpm/ft)	depth to sand and gravel (ft)	depth to bedrock (ft)	Driller
12520N05W251B	V L WENDELL	--	60	4	DO	4			134	40							LYNVILLE BROS
12520N05W256A	H W GINTHER	--	70	48-4	DO		4										--
12520N05W256C	RALPH ALLEN	1992	125	14	IR	20	12	0.05	692	21					4	125	GROSCH
12520N05W261C	A J DONOVAN	--	20	1.2	DO			SANDPOINT	134	17							--
12520N05W261G	A J DONOVAN	--	40	4	DO		4		134	15							--
12520N05W268H	M A DONOVAN	1905	140	48-4	DO		4		134	50							BRINNER
12520N05W273G	WM WHITSEL	1989	122	5	DO	8	5								15		GROSCH
12520N05W274H	ANDREW QUICK	1911	95	4	DO		4		134	45							INGRAM
12520N05W284H	DR C W CARGILL	--	30	48	DO			SANDPOINT	134	27							--
12520N05W284H	DR C W CARGILL	1903	96	4	DO				134	56							MINNER
12520N05W285H	BOB MARTIN	--	200	4	DO												--
12520N05W285H	BOB MARTIN	1990	116	5	DO	4	5	0.012							56		GROSCH
12520N05W288G	MRS J H CANADA	1917	145	3	DO		3		133	65							MINNER
12520N05W291H	MRS J H CANADA	--	86	48-4	DO				134	50							--
12520N05W294H	J H DEARBORN	1926	85	4	DO		4		134	15							PETERS BROS
12520N05W297H	J H DEARBORN	1920	65	4	DO				134	30							PETERS BROS
12520N05W302A	J H DEARBORN	--	38	4	DO				134	20							--
12520N05W302A	DAVID JONES	1976	82	4	DO	5	4	0.016	576	41		10	3		31		CRUMPLER
12520N05W302G	MRS IRENE COVEY	1967	105	4	DO	5	3	0.016	467	42		10	2		83		CRUMPLER
12520N05W302H	J H DEARBORN	--	75	4	DO				134	63							--
12520N05W306D	AUG LUSENHOP	1907	65	4	DO		4		134	18							--
12520N05W306E	SOPHIA HIMMEL	--	80	4	DO			SANDPOINT	134	20							--
12520N05W308F	AUG LUSENHOP	--	85	4	DO				134	18							--
12520N05W328G	JOHN PARR	1982	180	4	DO	10	4	0.01							85		GROSCH
12520N05W361D	J A HALSTEAD	1911	64	4	DO		4		134	20							BRINNER
12520N05W361E	RYAN GINTHER	--	82	4	DO		4		134	30							BRINNER BROS
12520N05W365G	LOUIS DUDINGER	--	40	48-1.2	DO			SANDPOINT	134	27							--
12520N05W365G	GLEN DUGINGER	1985	76	5	DO	10	4	0.01							4		GROSCH
12520N06W011D	KENNETH CAVE	1995	158	14	IR	20	14	0.05	295	43	32	1200		37.5	2		GROSCH
12520N06W017A	CHUCK GORDON	1994	156	5	DO	4	5	0.012	594	51					20		GROSCH
12520N06W027A	JOE KEITH	1860	42	36	DO				760	38.44							--
12520N06W046A	DARE ESTATE	1987	190	5	DO	10	4	0.01							2		GROSCH
12520N06W051B	HILYARD	1989	210	14	IR	40	12	0.05	489	103	27	1250		46.3	2		GROSCH
12520N06W053B	KEN HOFF	1979	187	4	DO	4	2.5	0.02	1279	100		12	1		176		ALBRECHT
12520N06W054A	ARCHIE LIST	1971	160	4	DO	5	4	0.016	471	109		10	2		90		CRUMPLER
12520N06W055A	JUANITA LYNN	1992	122	5	DO	4	5	0.012	492	45					9		GROSCH
1252ON06W092A	STEVE TRACY	--	180	--	DO												--
12520N06W113B	TERRY HARBERS	1996	144	5	DO	4	5	0.012	996	62					3		GROSCH
12520N06W12	ST OF ILL STATE GARAGE	1963	206	6	ST	4		0.016	1263	65							CRUMPLER
12520N06W121E	VERLON ELMORE	1982	150	4	DO	10	4	0.01							36		GROSCH
12520N06W121E	MASON COUNTY SERVICE	1990	161	5	IC	8	5	0.02	1090	50					3		GROSCH
12520N06W125A	JERRY LEE NELSON	1968	152	4	DO	5	4	0.016	868	69.3		12	2		102		CRUMPLER
12520N06W125A	A W HANKINS	1972	138	4.5	DO	5	4	0.016	772	64		10	2		93		CRUMPLER
12520N06W125A	JAY GENSEAL	1995	150	5	DO	4	5	0.012	495	30					32		GROSCH
12520N06W125B	JERRY NELSON	1975	140	4	DO	5	4	0.016	775			15	3		21		CRUMPLER
12520N06W14	JOE SWAAR	--	130	4	DO												--
12520N06W142A	JOE SWAAR	1990	138	5	DO	4	5	0.015							26		GROSCH
12520N06W145A	HELEN BALINGER	1984	168	4	DO	10	4	0.01							70		GROSCH
12520N06W154A	TOM BURTON	1991	104	5	DO	4	5	0.012	791	41					55		GROSCH

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Appendix I1I-2. (Continued)

Well location	Well owner	Well: Year con-structed	Depth (ft)	Dia-meter (in)	Type/ Use	Screen: Length (ft)	Dia-meter (in)	Slot size (in)	Test data: Date (mmyy)	Static level (ft)	Draw-down (ft)	Pumping rate (apm)	Length of test (hr)	Specific capacity (gpm/ft)	Logged depth to sand and gravel (ft)	Logged depth to bedrock (ft)	Driller
12520N06W155A	ROBERT MARTIN	1987	168	5	DO	10	4	0.01							8		GROSCH
12520N06W172E	ELIZABETH SCHUSTER	1970	220	4	DO	5	4	0.016	570			10	3		110		CRUMPLER
12520N06W174E	MRS OLLIE SPEAR	1954	160	--	DO												--
12520N06W182E	GARY HUGHES	1978	252	4	DO	4	2.5	0.015	378	150					0		ALBRECHT
12520N06W183F	GARY HUGHES	1980	198	4	DO	4	2.5		580	120					16		ALBRECHT
12520N06W218H	JOHN A PETERS	1969	179	4	DO	5	4	0.016	1169	140		10	2		66		CRUMPLER
12520N06W223F	BOB MARTIN	1995	160	5	DO	4	5	0.012	795	51					39		GROSCH
12520N06W244D	ED SCHAUB	1974	120	4	DO	5	4	0.016	674			10	2		99		CRUMPLER
12520N06W245C	ALBERT HILL	1973	115	4	DO	5	4	0.016	1173	45		10	2		102		CRUMPLER
12520N06W273A	STANLEY REED	1982	171	4	DO	10	4	0.01	582						38		GROSCH
12520N06W276A	ALBERT COULTER	1990	229	5	DO	4	5	0.012	990	164					36		GROSCH
12520N06W281G	WAYNE FRIEND	1975	92	12	IR	18.8	10.5	0.08	375	12.5		1000	3		0		ALBRECHT
12520N06W292A	JIM HARBIN	1992	260	5	DO	4	5	0.012	1292	195					40		GROSCH
12520N06W313G	DONALD NANNEN	1993	200	5	DO	8	5	0.012	193	140					62		GROSCH
12520N06W318H	ALLEN BLESSMAN	1996	99	5	DO	4	5	0.012	196	17					40	99	GROSCH
12520N06W321H	TERRY WUNDERLE	1975	330	5	DO	8	4	0.016							40		KNIERIM
12520N06W325A	BRENT CARTER	1986	98	5	DO	10	4	0.01							10		GROSCH
12520N06W325H	STEVE BAGBY	1996	262	5	DO	4	5	0.012	696	202					40		GROSCH
12520N06W331G	LANE BRADLEY	1994	139	5	DO	4	5	0.012	694	80					55		GROSCH
12520N06W333G	HOWARD BAGBY	1973	129	4	DO	5	4	0.016	1173	59		10	2		112		CRUMPLER
12520N06W338D	LANE BRADLEY	1994	137	5	DO	4	5	0.012	194	45					10		GROSCH
12520N06W341E	GEORGE BROWN	1980	147	5	DO	4	2.5	0.012							70		ALBRECHT
12520N06W345G	LOUIS JIBBEN	1991	129	5	DO	4	5	0.012									GROSCH
12520N06W348H	L & L FARMS	1980	158	4	DO	10	4	0.01	1180	70	10	6		0.6	19		GROSCH
12520N06W353G	LEONARD REED	1982	168	4	DO	10	4	0.01							85		GROSCH
12520N06W353G	LEONARD REED	1991	113	5	DO	4	5	0.012	891	85					84		GROSCH
12520N06W354G	ERNIE SCHMIDT	1995	110	5	DO	4	5	0.012	1095	66					40		GROSCH
12520N06W355G	DICK WHITNEY	1991	107	5	DO	4	5	0.012	791	75					27		GROSCH
12520N06W358G	ROBERT & BENTLEY REED	1991	79	5	DO	4	5	0.012	691	33					27		GROSCH
12520N06W358H	ROBERT & BENTLEY REED	1972	93	4.5	DO	5	4	0.016							60		CRUMPLER
12520N06W368F	ALBERT HULL	1986	147	5	DO	10	4	0.01							6		GROSCH
12520N07W011D	FRANKLIN RIGGINS	1984	100	5	DO	10	4	0.01							2		GROSCH
12520N07W027B	ROBERT MONTGOMERY	1996	122	12	IR	20	12	0.05							37		GROSCH
12520N07W032A	MYRTLE SMITH	1915	65	1.2	DO	3	1.2		760	17.6							SMITH
12520N07W032C	BOB MONTGOMERY	1990	114	12	IR	20	12	0.05	390	19	34	1000		29.4	2	114	GROSCH
12520N07W032C	BOB MONTGOMERY	1994	117	14	IR	20	12	0.05							2		GROSCH
12520N07W038A	RICHARD SHOWALTER	1982	106	5	DO	6	2.5	0.012	1282	25					15		ALBRECHT
12520N07W044D	IONATOMLIN	1988	120	14	IR	20	12	0.05	1088	10	26	1100		42.3	7		GROSCH
12520N07W044D	IONATOMLIN	1994	119	14	IR	20	14	0.05							2	119	GROSCH
12520N07W05	FANTER FARMS	1992	115	10	IR	20	10	0.05							13		GROSCH
12520N07W051E	KRAIG KRAUSE	1988	73	5	DO	4	5	0.02							8		GROSCH
12520N07W061C	LEONARD KEITH	1980	108	16	IR	24	16	3/16	580			1250			2		GROSCH
12520N07W072C	STEVE KRAUSE	1984	105	16	IR	20	16	0.05	1284	8	21	1250		59.5	2	105	GROSCH
12520N07W077E	DALE URISH	1990	105	14	IR	20	12	0.05	390	18	29	1000		34.5	2		GROSCH
12520N07W085C	WANDA KRAUSE RODGERS	1996	66	5	DO	4	5	0.01	796	12					6		GROSCH
12520N07W09	IONA TOMLIN	1988	125	14	IR	20	12	0.05	1088	14	26	1175		45.2	15		GROSCH
12520N07W092G	EMILY INGERSOLL	1988	120	14	IR	20	12	0.05	1088	15	27	1250		46.3	2	120	GROSCH
12520N07W097A	KENNETH SMITH	1988	124	14	IR	20	12		688	25	20	1250		62.5	8		GROSCH
12520N07W101H	KENNETH SMITH	1982	127	5	DO		2.5	0.012	1082	30					47		ALBRECHT

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Appendix III-2. (Continued)

Welt location	Well owner	Well: Year con-structed	Well: Depth (ft)	Well: Dia-meter (in)	Well: Type/ Use	Screen: Length (ft)	Screen: Dla-meter (in)	Screen: Slot size (in)	Test data: Date (mmyy)	Test data: Static level (ft)	Test data: Draw-down (ft)	Test data: Pumping rate (gpm)	Test data: Length of test (hr)	Test data: Specific capacity (gpm/ft)	Logged depth to sand and gravel (ft)	Logged depth to bedrock (ft)	Driller
12520N07W106G	IONA TOMLIN	1988	125	14	IR	20	12	0.05	1088	20	31	1200		38.7	18		GROSCH
12520N07W11	JUANITA LYNN	1979	148	16	IR	20	12	0.06	879	31	20	1000	1	50	100		ALBRECHT
12520N07W114E	ROMONA T MATTSON	1964	88	4	DO	4		0.016	864	35							CRUMPLER
12520N07W114E	ALLEN TIBBS	1989	93	5	DO	4	5	0.015							4		GROSCH
12520N07W115H	VIRGIL STRADER	1974	91	4	DO	5	4	0.016	575			10	2		0		CRUMPLER
12520N07W122E	CLAYTON AINSWORTH	1984	175	16	IR	20	16	0.05	484	34	43	1250		29.1	6		GROSCH
12520N07W131D	JAN STOLTZENBURG	1995	180	5	DO	4	5	0.012	195	90					76		GROSCH
12520N07W133D	TOM TUCKER	1992	165	14	IR	20	12	0.05							60		GROSCH
12520N07W133D	TOM TUCKER	1992	190	10	IR	20	10	0.05	692	105	25	400		16	2	190	GROSCH
12520N07W137H	GLADYS MUNSCH	1968	115	4	DO	5	4	0.016							0		CRUMPLER
12520N07W145A	WILLIS URISH		157	4	DO	4		0.014		115							CRUMPLER
12520N07W146D	ORVETA ROBINSON	1992	141	14	IR	20	12	0.05	692	50	30	1050		35	2		GROSCH
12520N07W148A	WILLIS URISH		190		DO												
12520N07W15	RICHARD SHOWALTER	1994	129	14	IR	20	14	0.05							2		GROSCH
12520N07W152E	RANDY FAIROW	1989	106	5	DO	4	5	0.015							5		GROSCH
12520N07W156C	HOWARD J ERMELING	1977	165	12	IR	30	12	0.04	477	60		900	1		0		ALBRECHT
12520N07W158C	TODD & GREG HODGSON	1994	132	10	IR	30	10	0.05	694	25					2		GROSCH
12620N07W162D	ELDON SMITH	1979	81	5	DO	12	2.5	.015-.020-.025	879	25	10	35	1	3.5	0		ALBRECHT
12520N07W173G	ALBERT KRAUSE	1992	105	14	IR	20	12	0.05	292	10	19	1000		52.6	6		GROSCH
12520N07W174C	GARY HODGSON	1995	118	14	IR	30	14	0.05	395	14	15	1200		80	2		GROSCH
12520N07W181H	JOHN KRAUSE	1984	106	16	IR	20	16	0.05	1284	12	19	1250		65.8	2	106	GROSCH
12520N07W182B	JAMES HAWKS	1990	86	16	IR	20	16	0.05	390	18	23	1000		43.5	10	86	GROSCH
12520N07W195G	SPRINGFIELD TH4-64	1964	140		TH				??64	12.8		15			15		HAYES
12520N07W207A	TERRY SHOWALTER	1977	77	4	DO	5	4	0.016	677	37		10	3		71		CRUMPLER
12520N07W207H	D J & KATHY SHOWALTER	1974	76	4	DO	5	4	0.016	1274	41		10	2		0		CRUMPLER
12520N07W211A	ED KIRBY	1992	173	5	DO	4	5	0.012	992	75					6		GROSCH
12520N07W213A	T R KIRBY	1973	94	4	DO	5	4	0.016	1273	19		10	2		0		CRUMPLER
12520N07W218H	SPRINGFIELD TW3-64	1964	160		TH				??64	25.4					5	160	HAYES
12520N07W223A	KENNETH ARMBRUST	1992	123	5	DO	4	5	0.012	892	73					15		GROSCH
12520N07W225A	BRAD ARMBRUST	1980	186	4	DO				280			15	1		0		ALBRECHT
12520N07W225D	HOWARD ERMELING	1968	220	04-Jun	DO	5	4	0.016	368	134.3		10	3		90		CRUMPLER
12520N07W226C	HOWARD ERMELING		175	3	DO				760	159.42							
12520N07W234G	JAMES JOHNSON	1995	240	5	DO	4	5	0.012	1195	143					6		GROSCH
12520N07W235B	DONALD ONKEN, JR	1996	147	5	DO	4	5	0.012	896	88					5		GROSCH
12520N07W235C	JOHN KILLION	1971	117	4	DO	5	4	0.016	671	86		10	2		90		CRUMPLER
12520N07W235D	GEORGE BUCK	1983	190	4	DO	10	4	0.01							19		GROSCH
12520N07W235G	TERRY ALLEN	1992	185	5	DO	4	4	0.01	592	129.5					10		ALBRECHT
12520N07W235H	DALE HOGSDON	1994	177	5	DO	4	5	0.012	894	83					40		GROSCH
12520N07W238B	JOHN ZIEGELE	1971	151	4	DO	5	4	0.016	871			10	2		90		CRUMPLER
12520N07W238C	SAMMIE CURRY	1992	156	5	DO	4	4	0.015	892	48.5					22		ALBRECHT
12520N07W252H	ALAN BLESSMAN	1993	224	5	DO	4	5	0.012	993	160					2		GROSCH
12520N07W256D	JOE MCCLURE	1977	87	8	IR	20	8	0.04	777	10		600	1		0		ALBRECHT
12520N07W268E	NELDA FREEMAN	1969	84	4	DO	5	4	0.016	269	42		10	2		3		CRUMPLER
12520N07W272G	RIGGS FARM & INVESTMENTS	1979	82	7.6	DO	8	3	.025-.030	979	21	20	30	1	1.5	0		ALBRECHT
12520N07W277A	WALTER HERGET	1969	66	4	DO	5	4	0.016	869	19		10	2		33		CRUMPLER
12620N07W292H	EMERY SMITH	1974	200	4	DO	2	4	0.01	774	148.9	7.3	12	3	1.6	40		HOFSTETTER
12520N07W295H	EMERY SMITH	1976	137	4	DO	2	4	0.01	575	109.2	10.7	13	4	1.2	0		HOFSTETTER
12520N07W308A	BURTON HASSELBARG	1986	79	5	DO	10	4	0.01							8		GROSCH
12520N07W344G	ED KIRBY	1992	116	14	IR	30	12	0.05	292	10	14	1000		71.4	2	116	GROSCH

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Appendix III-2. (Continued)

Well location	Well owner	Well: Year constructed	Well: Depth (ft)	Well: Diameter (in)	Well: Type/Use	Screen: Length (ft)	Screen: Diameter (in)	Screen: Slot size (in)	Test data: Date (mmyy)	Test data: Static level (ft)	Test data: Drawdown (ft)	Test data: Pumping rate (gpm)	Test data: Length or test (hr)	Test data: Specific capacity (gpm/ft)	Logged depth to sand and gravel (ft)	Logged depth to bedrock (ft)	Driller
12520N07W346H	SPRINGFIELD TH2-64	1964	122	--	TH				??64	11.3					10	120	HAYES
12520N07W348B	SPRINGFIELD TH1-64	1964	119	--	TH										13.3	118	HAYES
12520N07W348B	DORIS WEIL	1968	68	4	DO	5	4	0.016	668	10.3		10	2		7		CRUMPLER
12520N07W355D	PEKIN UNION MISSION	1992	113	14	IR	20	14	0.05	492	7	56	1100		19.6	4	113	GROSCH
12520N07W365G	MARVIN STRADER	1986	123	5	DO	10	4	0.01							6		GROSCH
12520N08W01	HOWARD ERMELING	1992	107	10	IR	20	10	0.05	292	6					2		GROSCH
12520N08W01	HOWARD ERMELING	1992	99	12	IR	20	12	0.05	292	8	21	1000		47.6	2		GROSCH
12520N08W012C	HOWARD ERMELING	1977	94	16	IR	44	16	3/16							2		GROSCH
12520N08W014D	HOWARD ERMELING	1977	109	16	IR	56	16	3/16							2		GROSCH
12620N0BW015A	HOWARD ERMELING	1967	113	18	IR	40	18	3/16	??67	12	1.8	300	3	166.7	2		BROWN
12520N08W016D	HOWARD ERMELING	1967	114	18	IR	40	18	3/16	??67	11	1.2	300	3	250	2		BROWN
12520N08W018C	FRED KRUSE	1961	114	18	IR	60	18		161	10							THIESSEN
12520N08W024E	TED KRUSE		130	18	IR	62	18		161	14	10						THIESSEN
12520N08W025D	FRED KRUSE	1981	80	6	DO	10	4	0.06	881	88					7		ALBRECHT
12520N08W025E	GRAHAM CURTIS/TED KRUSE	1962	60	8	DO	20		3/8	??62	4.5	1.7	60	2.2	35.3	0		S & B WELL
12520N08W034A	PAUL FRIEND	1966	115	18	IR	40	18	3/16	??66	10.7	1.6	300	3	187.5	2		BROWN
12520N08W041A	RON FRIEND	1965	74	22-17	IR	20	22-17	1/4 X 3/8	565	7.3	3.5	200	3	57.1	2		GIBBS
12520N08W043E	GLENN VANDERVEEN	1984	126	16	IR	33	16	.060-.080	284	11	16	1000	1	62.5	2		ALBRECHT
12520N08W046F	LENORA SCHMIDT	1944	17.5	1.2	DO	3			760	6.97					5		VANDERVEEN
12520N08W047E	BERNICE VANDERVEEN	1992	98	10	IR	20	10	0.05							2	98	GROSCH
12520N08W051F	MARGARET ANN MOORE	1989	108	14	IR	20	12	0.05							2		GROSCH
12520N08W058A	GLEN & DICK VANDERVEEN	1989	105	14	IR	20	12	0.05	1289	13	30	1000		33.3	2	105	GROSCH
12520N08W084B	GLEN D VANETTEN	1997	106	14	IR	20	14	0.05	297	6	22	1000		45.5	2		GROSCH
12520N08W108B	BESSIE BARKER	1979	109	16	IR	28	16	3/16	1179	12	36	1250		34.7	2		GROSCH
12520N08W108G	MARIE GREGORY	1979	109	16	IR	40	16	3/16							6		GROSCH
12520N08W112G	HOWARD ERMELING	1978	135	15	IR	20	12	0.08	1278	18		1000			0		ALBRECHT
12520N08W117C	FLOYD KOKE	1979	105	16	IR	20	12	0.08	579	12					0		ALBRECHT
12520N08W117G	FLOYD KOKE	1967	108	18	IR	40	18	3/16	??67	8	2.7	300	3	111.1	2		BROWN
12520N08W118D	FLOYD KOKE	1966	96	18	IR	40	18	3/16	??66	15.2	2.3	500	3	217.4	3		BROWN
12520N08W124G	HOWARD ERMELING	1985	122	12	IR	20	12	0.05	485	4	26	1250		48.1	3		GROSCH
12520N08W126B	ROBERT RENNECKER	1981	125	13	IR	32	13	3/16	981	44	28	1250		44.6	10		GROSCH
12520N08W126D	HOWARD ERMELING	1981	118	16	IR	32	16	3/16	481	16	49	1250		25.5	2	118	GROSCH
12520N08W132C	EDITH WALSH TRUST	1992	113	14	IR	20	14	0.05	292	10	15	1000		66.7	6		GROSCH
12520N08W134G	GLEN VAN ETTEN	1981	117	16	IR	32	16	3/16	381	12	41	1250		30.5	2	117	GROSCH
12520N08W136E	VINCENT STOUT	1981	117	16	IR	32	16	3/16	481	24	47	1250		26.6	2	117	GROSCH
12520N08W142G	FRED KRUSE	1967	106	18	IR	40	18	3/16	??67	13	1.7	300	3	176.5	2		BROWN
12520N08W153A	EARL MURDOCK	1990	69	5	DO	5	4	0.012							1		GROSCH
12520N08W154D	EARL MURDOCK	1986	104	16	IR	20	16	0.05	486	14	21	1250		59.5	2	104	GROSCH
12520N08W163A	RON FRIEND	1981	135	16	IR	20	12	0.1	781	12					0		ALBRECHT
12520N08W171B	HAHN FARMS	1994	108	10	IR	30	10	0.05	594	2.5					2	108	GROSCH
12520N08W171G	LYLE DRAKE	1990	105	14	DO	20	12	0.05	290	12	19	1000		52.6	15		GROSCH
12520N08W181C	RON FRIEND	1989	109	14	IR	20	12	0.05	389	9	32	1250		39.1	2	109	GROSCH
12520N08W203A	EARL EBKEN	1985	112	8	IR	20	6	0.04	585	6	12	360		30	2	112	MCKINNEY
12520N08W205B	KILBOURNE FIRE DISTRICT	1980	71	6	CS	10	6	0.04	480	14		180	1		0		ALBRECHT
12520N08W211B	RONALD FRIEND	1968	114	18	IR	40	18	3/16	??68	15	2	300	3	150	2		BROWN
12520N08W212G	PAUL FRIEND	1967	106	18	IR	40	18	3/16	??67	13	1.2	200	3	166.7	3		BROWN
12520N08W214C	VICTOR LANE	1952	25.5	1.2	DO	3		WELL POINT	760	15.09					25.5		LANE
12520N08W214G	DONNA SISSON	1977	113	16	IR	40	16	3/16							2		GROSCH
12520N08W215D	BURKE EBKEN	1985	108	8	IR	20	6	0.04	585	12	16	360		22.5	2		MCKINNEY

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Appendix 1II-2. (Continued)

Well location	Well owner	Well: Year con-structed	Well: Depth (ft)	Well: Dia-meter (in)	Well: Type/Use	Screen: Length (ft)	Screen: Dia-meter (in)	Screen: Slot size (in)	Test data: Date (mmyy)	Test data: Static level (ft)	Test data: Draw-down (ft)	Test data: Pumping rate (gpm)	Test data: Length of test (hr)	Test data: Specific capacity (gpm/ft)	Logged depth to sand and gravel (ft)	Logged depth to bedrock (ft)	Driller
12520N08W216B	BURKE EBKEN	1985	108	8	IR	10	6	0.04	585	11	16	360		22.5	2		MCKINNEY
12520N08W216H	MARK SISSON	1994	92	5	DO	8	5	0.012	1194	18					2		GROSCH
12520N08W225C	JAMES HAWKS	1979	100	16	IR	20	12	0.08	579	20					0		ALBRECHT
12520N08W245E	GLEN VAN ETTEN	1981	117	16	IR	32	16	3/16	381	12	51	1250		24.5	2	117	GROSCH
12520N08W246A	BLAINE CLOSE	1958	23	1.2	DO	3		WELL POINT	760	13.94							BAHL
12520N08W246F	BLAINE CLOSE	--	25	1.2	DO	3		WELL POINT	959	18.52							--
12520N08W261B	C H VAN ETTEN	1961	104	18	IR	40	18	3/16	765	13	2.2	300	3	136.4	4		BROWN
12520N08W264A	SPENCER THOMPSON	1982	78	--	DO		2.5								25		ALBRECHT
12520N08W266G	ERMEUNG/HAVANA NATL BANK	1977	90	15	IR	20	12	0.06	977	30		1000	1		0		ALBRECHT
12520N08W272G	PETE HAWKS	1981	105	16	IR	20	12	0.08	281	25					0		ALBRECHT
12520N08W276C	JAMES HAWKS	1979	101	16	IR	20	12	0.06	479	25					0		ALBRECHT
12520N08W276H	JAMES HAWKS	1996	105	10	IR	20	10	0.05							4		GROSCH
12520N08W281A	DELBERTWIEBER	1971	68	4	DO	5	4	0.016	571	19		10	2		16		KILBOURNE
12520N08W281C	EDGAR E BISBY	1976	50	6-36	DO				576	31					0		ERWIN
12520N08W282B	DELFORD LANE	--	64	--	DO			SANDPOINT									--
12520N0BW286B	MT. ZION BAPTIST CHURCH	1996	40	1.2	NC	3	1.2	0.01	496	16					5		JONES
12520N08W286E	BALYKI SCHOOL	1979	63	5	SC	8	2.5	.020-.030	579	17	5	30	1	6	0		ALBRECHT
12520N08W287B	DAVE FORNOFF	1977	103	16	IR	41	16								10		GROSCH
12520N08W287F	BURKE EBKEN	1982	95	16	IR	20	10	0.08	482	9					0	95	ALBRECHT
12520N08W287G	MURRAY JOHNSON	1980	108	16	IR	28	16	3/16	480	6	45	1240		27.6	4	103	GROSCH
12520N08W294G	THEODORE R SISSION	1989	105	14	IR	20	12	0.05	389	16	28	1250		44.6	2	105	GROSCH
12520N08W297D	WILBUR EBKEN	1978	100	15	IR	20	12	.060-.080	378	20		1000	1		0		ALBRECHT
12520N08W302B	AL BAKER	1988	108	14	IR	20	12	0.05							2	108	GROSCH
12520N08W306F	EARL & RON EBKEN	1981	105	16	IR	32	16	3/16	181	9	37	1250		33.8	2	105	GROSCH
12520N08W308A	DELBERT SIELSCHOTT	1993	84	5	DO	8	5	0.012	693	8					5		GROSCH
12520N08W316C	LLOYD SUTTON	19B5	118	13	IR	20	12	0.05	485	15	45	1260		27.8	2		GROSCH
12520N08W321H	DAVE FORNOFF	1979	100	16	IR	40	16	3/16							10		GROSCH
12520N08W322B	HAZEL HUGHES	1989	100	14	IR	20	12	0.05	389	42					2		GROSCH
12520N08W322B	HAZEL HUGHES	1989	119	14	IR	20	12	0.05							2		GROSCH
12520N08W322H	FORNOFF FERTILIZER	1994	90	5	IC	8	5	0.012	394	13					2		GROSCH
12520N08W324A	GLEN HUGHES	--	36	1.5	DO	3	1.2		760	17.32							--
12520N08W326F	HAROLD RINGLAND	1985	121	16	IR	20	16	0.05	485	14	28	1250		44.6	4	121	GROSCH
12520N08W327B	ROY RANSON	1979	124	16	IR	20	12	0.08	1279	20	20	1000	1	50	23	124	ALBRECHT
12520N08W332F	GARY HODGSON	1997	98	12	IR	20	12	0.05	297	34	23	1250		54.3	2	98	GROSCH
12520N08W333E	GERALD BONNETT	1972	96	6	DO	4	6	0.035	1072	51.5		B0	2		0		HOPSON
12520N08W333E	GERALD BONNETT	1975	87	5	DO	3	6	0.025	775	53.5	25	30	2	1.2	0		HOPSON
12520N08W336B	MAX GEBHARDS	1996	102	12	IR	20	12	0.05							4		GROSCH
12520N08W342E	VINCENT STOUT	1967	101	18	IR	40	18	3/16	?767	30	2	300	3	150	0		BROWN
12520N08W347C	LEONARD STOUT	1950	38	1.2	DO	3		WELL POINT	959	25.49					15		STOUT
12520N08W357H	LEONARD STOUT	1979	76	5	DO	4	2.5	0.03	779	39	5	15	1	3	0		ALBRECHT
12520N08W363G	CECIL VAN ETTEN	1984	86	13	IR	20	12	0.05	484	8	24	1250		52.1	2		GROSCH
12520N09W	LESLIE L CLARK	--	26	--	DO										26		--
12520N09W011E	HOWARD ERMELING	1997	105	10	IR	20	10	0.05	297	18	14	650		46.4	2		GROSCH
12520N09W017C	HOWARD J ERMELING	1978	126	15	IR	20	12	0.1	178	10					0		ALBRECHT
12520N09W022C	HOWARD ERMELING	1985	107	16	IR	20	16	0.05	485	B	22	1250		56.8	2		GROSCH
12520N09W023C	HOWARD J ERMELING	1978	125	15	IR	20	12	0.08	178	12					0		ALBRECHT
12520N09W027E	HAROLD HAHN	1985	115	13	IR	20	12	0.05	485	8	22	1250		56.8	3		GROSCH
12520N09W032D	RALPH VANDERVEEN	1966	101	18	IR	40	18	3/16	??66	8.7	2.8	500	2	178.6	2		BROWN
12520N09W034E	RON HILLS	1980	57	5	DO	4	2.5	0.02	1280	25					5		ALBRECHT

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Appendix III-2. (Continued)

Well location	Well owner	Year constructed	Well Depth (ft)	Well Diameter (in)	Type/Use	Screen Length (ft)	Screen Diameter (in)	Slot size (in)	Test data Date (mmyy)	Static level (ft)	Drawdown (ft)	Pumping rate (gpm)	Length of test (hr)	Specific capacity (gpm/ft)	Logged depth to sand and gravel (ft)	Logged depth to bedrock (ft)	Driller
12520N09W035E	HAROLD HAHN	1996	114	12	IR	20	12	0.05	496	11					4		SHADOW MFG
12520N09W037B	D HEYE/D FLAHARTY	1990	114	8	DO	23	8	0.035	490	15					26	114	GROSCH
12520N09W042B	DONALD FLAHARTY	1991	92	8	IR	20	8	0.05	491	11					3		GROSCH
12520N09W047A	LAKEWOOD GOLF ASSN #2	1995	94	12	IR	20	12	0.05	395	9	24	1250		52.1	2	94	GROSCH
12520N09W08	BILL LEWIS	1994	70	5	DO	4	3	0.012	494	22.5					0		ALBRECHT
12520N09W082G	LAKEWOOD GOLF ASSN #1	1991	65	5	NC	4	5	0.012	891	34					2		GROSCH
12520N09W083F	NED RICH	1996	64	5	DO	8	5	0.012	296	26					2		GROSCH
12520N09W084D	L F CONNOLLY	1950	63	1.2	DO	3	1.2	WELL POINT	361	30							CONNOLLY
12520N09W084D	L F CONNOLLY	1956	35	1.2	DO	3		WELL POINT	760	15.34					12		CONNOLLY
12520N09W092C	EVERETT KEITHLEY	1977	90	15	IR	20	12	0.1	777	12		1000	1		0		ALBRECHT
12520N09W093F	HAROLD HEYE	1980	105	16	IR	20	12	0.08							0	103	ALBRECHT
12520N09W097F	HAHN FAMILY FARMS	1997	97	10	IR	20	10	0.05	297	6	14	650		46.4	2		GROSCH
12520N09W101D	VERNON HEYE	1977	111	15	IR	20	12	0.06	477	15		1000	1		0		ALBRECHT
12520N09W101H	VERNON HEYE	1989	104	8	IR	20	8	0.035							17		GROSCH
12520N09W104G	VERNON HEYE	1978	117	16	IR	40	16	3/16							10		GROSCH
12520N09W105C	WILFORD KOLVES	1978	105	16	IR	40	16	3/16							10		GROSCH
12520N09W112C	DARYL FORNOFF/S&D FARMS INC	1996	117	16	IC	20	16		1296	32			3		0		SHADOW MFG
12520N09W114A	STAN PRATT	1979	64	5	DO	3	3	0.04	979	21	20	15	1	0.8	0		ALBRECHT
12520N09W114C	DANNY PRATT	1994	70	4	DO	3	4	0.015							2		HATFIELD
12520N09W117G	DICK SHOWALTER	1979	113	16	IR	28	16	3/16	1079	18	14	1250		89.3	2		GROSCH
12520N09W121B	JACK SCHULTE	1974	120	12	IR	11	11	0.15	674	13.5	15	800	2	53.3	0		ALBRECNT
12520N09W122A	SPRINGFIELD TH6-64	1964	133.5	--	TH				??64	11.8					0	133.5	HAYES
12520N09W126C	MARGARET ANN MOORE	1989	115	14	IR	20	12	0.05	478	22	32	1250		39.1	2	115	GROSCH
12520N09W133B	DORIS GARLISCH	1994	80	5	DO	4	3	0.012	494	18.5					0		ALBRECHT
12520N09W134H	S&D FARMS INC	1991	110	8	IR	15	8	0.05	491	27					3		GROSCH
12520N09W136H	RUDOLPH & ROBERT STINAUER	--		--	DO												--
12520N09W141F	ST OF ILL DEPT CONSERVATION	1974	85	4	ST	4	3.5	0.016	794	14.5	9	20	6	2.2	0		CHADWICK
12520N09W152H	ALAN TONCRAY	1996	98	10	IR	20	10	0.05							.18		GROSCH
12520N09W157C	RALPH VANDERVEEN	1989	104	14	IR	20	12	0.05	489	13	24	1250		52.1	2		GROSCH
12520N09W157G	VERNON HEYE	1982	106	16	IR	32	16	3/16	382	9	31	1250		40.3	2		GROSCH
12520N09W161G	RAYMOND MIDDLEKAMP	1977	110	15	IR	20	12	0.08	477	15		1000	1		0		ALBRECHT
12520N09W163B	RAYMOND MIDDLEKAMP	1982	111	16	IR	20	12	0.08	482	11					0		ALBRECHT
12520N09W166B	RAYMOND MIDDLEKAMP	1979	105	15	IR	20	12	0.1	379	12					0		ALBRECHT
12520N09W167G	CARL SANDMAN	1989	105	14	IR	20	12	0.05	489	17	33	1250		37.9	2	105	GROSCH
12520N09W171A	RAYMOND MIDDLECAMP	1992	108	10	IR	20	10	0.05							2	108	GROSCH
12520N09W173D	CHUCK KELLOG	1979	69	5	DO	4	3	0.02	779	24	10	25	1	2.5	0		ALBRECHT
12520N09W173G	JASON MILLER	1997	108	12	IR	20	12	0.05	297	11	21	1000		47.6	2		GROSCH
12520N09W175B	CHARLES KELLOG	1979	105	16	IR	20	12	0.1	579	20					0		ALBRECHT
12520N09W177A	HOMER LASCELLES	1965	100	18	IR	40	18	3/16	?765	13	1.2	300	3	250	2		BROWN
12520N09W192E	MARVIN LASCELLES #1-77	1977	106	14	IR	30	10	0.04	1077	15	21	1153	2	54.9	0	104	LAYNE-WESTERN
12520N09W194H	KENNETH HARDY	1994	60	5	DO	4	5	0.012	694	28					1		GROSCH
12520N09W197B	MARVIN LASCELLES	1968	96	18	IR	40	18	3/16	??68	13	10.2	1100	2	107.8	2		BROWN
12520N09W197G	EVERITT KEITHLEY	1979	85	16	IR	20	--	.080-.100	1279	19	20	900	1	45	0		ALBRECHT
12520N09W202G	JIM BULA SPUD FARMS	1975	92	12	IR	20.8	10.5	0.08	575	4.5		1500	2		0		ALBRECHT
12520N09W203C	DON HODGSON	1979	96	16	IR	20	12	0.1	1279	16	20	1000	1	50	0		ALBRECHT
12520N09W206E	ROY FLETCHER	1981	102	16	IR	20	8	0.1	1181	6					0		ALBRECHT
12520N09W211A	TRIPLE EDGE PORK	1993	117	5	DO	8	5	0.012	693	14					0		GROSCH
12520N09W211A	TRIPLE EDGE PORK	1993	117	5	DO	8	5	0.012	693	14					0		GROSCH
12520N09W213B	DON HODGSON	1984	117	16	IR	33	16	080-.060-.080	384	11	16	1000	1	62.5	0		ALBRECHT

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Appendix HI-2. (Continued)

Well location	Well owner	Well: Year con-structed	Well: Depth (ft)	Well: Dia-meter (in)	Well: Type/ Use	Screen: Length (ft)	Screen: Dia-meter (in)	Screen: Slot size (in)	Test data: Date (mmyy)	Test data: Static level (ft)	Test data: Draw-down (ft)	Test data: Pumping rate (gpm)	Test data: Length of test (hr)	Test data: Specific capacity (gpm/ft)	Logged depth to sand and gravel (ft)	Logged depth to bedrock (ft)	Driller
12520N09W215E	JIM BULA SPUD FARM	1975	92	12	IR	20.8	10.5	0.08	575	13.5		1500	2		0		ALBRECHT
12520N09W217C	DONALD HODGSON	1977	121	15	IR	20	12	0.08	277	12		1000	1.5		5		ALBRECHT
12520N09W223B	DON FRIEND	1982	133	16	IR	40	16	0.085	482	20					0	133	ALBRECHT
12520N09W227A	DONALD FLAHARTY	1977	120	15	IR	20	12	0.08	377	16		1200	1		0		ALBRECHT
12520N09W227D	TRIPLE EDGE PORK	1993	92	5	DO	8	5	0.012	993	7					2		GROSCH
12520N09W227D	TRIPLE EDGE PORK	1993	92	5	DO	8	5	0.012	993	7					2		GROSCH
12520N09W24	SID VANETTEN	1991	102	10	IR	20	10	0.05	1291	4	16	400		25	2	102	GROSCH
12520N09W241B	RICHARD TONCRAY		77		DO												
12520N09W242F	MELVIN LEIDING	1989	108	14	IR	20	12	0.05	389	30	25	1000		40	2		GROSCH
12520N09W243B	KEEST ESTATE	1968	75	18	IR	40	18	3/16	??68	6	2.7	300	3	111.1	3		BROWN
12520N09W243H	SPRINGFIELD TH5-64	1964	132.5		TH				7764	7					3	128	HAYES
12520N09W252E	RUDOLPH KOLVES	1986	93	8	IR	20	6	0.04	486	6					6		GROSCH
12520N09W254B	CLIFFORD FRIEND	1983	122	16	IR	20	16	0.05	1183	6	18	1250		69.4	4		GROSCH
12520N09W254D	ARNOLD KOLVES	1978	106	16	IR	40	16	0.06	578	7	27	900	2	33.3	2		GROSCH
12520N09W255F	EARL EBKEN/RUDOLPH KOLUES	1985	113	16	IR	20	16	0.05	485	5	18	1250		69.4	2	113	GROSCH
12520N09W258A	ETHEL IRENE GOBEN	1985	57	5	DO	4	4	0.015	485	12	3	15		5	0		ALBRECHT
12520N09W267F	UNIVERSITY OF ILLINOIS	1969	105	18	IR		18										BROWN
12520N09W271C	DONALD FRIEND	1978	120	15	IR	20	12	0.08	178	17		1000	1		0		ALBRECHT
12520N09W271F	UNIVERSITY OF ILLINOIS	1994	84	6	IR	10	6	0.035	994	18					2		SHADOW MFG
12520N09W274F	LEO PFEIFFER	1978	120	15	IR	30	12	.060-.080	378	20		1400	1		0		ALBRECHT
12520N09W282B	LEO PFEIFFER	1974	125	12	IR										0		ALBRECHT
12520N09W285G	WILLARD G BROWN	1968	93	18	IR	36	18	3/16	7768	13	2.3	300	3	130.4	2		BROWN
12520N09W286H	LEO PFEIFFER	1995	98	4	DO	8	4	0.035							2		SHADOW MFG
12520N09W287B	WILLARD BROWN	1966	97	18	IR	36	18	3/16	7?66	12.7	1.6	400	3	250	0		BROWN
12520N09W287G	WILLARD BROWN	1965	110	18	IR	40	18	3/16	??65	13	2	300	3	150	14		BROWN
12520N09W291A	LEO PFEIFFER	1974	75	6	DO	4	4	0.02	374	13.5		50			0		ALBRECHT
12520N09W296C	DEAN PFEIFFER	1984	95	8	IR	15	8	.040-.060	384	7.5	16	1000	1	62.5	0		ALBRECHT
12520N09W298C	DEAN PFEIFFER	1984	95	8	IR	15	8	.040-.060	384	10	16	1000	1	61.5	5		ALBRECHT
12520N09W298H	BOB LACEY	1980	100	13	IR	28	13	3/16	1180	8	28	1250		44.6	2	100	GROSCH
12520N09W303B	HOMER LASCELLES	1959	104	18	IR		18		1259	12	7.3	750		102.7	0		GIBBS
12520N09W304D	HOMER LASCELLES	1959	25.5	12	DO	3		WELL POINT	760	10.09					25.5		
12520N09W306F	ELEANOR SANDIDGE	1997	108	12	IR	20	12	0.05	297	12	33	1000		30.3	2		GROSCH
12520N09W312D	LEO PFEIFFER	1980	114	16	IR	40	16-12	0.1	380	10		2000	0.5		0		ALBRECHT
12520N09W312G	HOMER LASCELLES	1966	87	18	IR	40	18	3/16	7?66	17.5	1.5	300	3	200	0		BROWN
12520N09W321G	DON FRIEND	1997	102	14	IR	20	14	0.05	297	10	26	1000		38.5	2		GROSCH
12520N09W325F	J BULA SPUD FARM	1976	100	15	IR	20	12	0.06	376	7.5		1000	3		0		ALBRECHT
12520N09W332A	WILBER BELL	1978	127	16	IR	40	16	3/16							3		GROSCH
12520N09W332G	DEAN PFEIFFER	1975	120	12	IR	18.8	10.5	0.08	475	23.5		1500	2		0		ALBRECHT
12520N09W337B	WILBER BELL	1979	116	16	IR	34	16	3/16							6		GROSCH
12520N09W341G	DONALD FRIEND	1978	103	15	IR	20	12	0.08	178	17		1000	1		0		ALBRECHT
12520N09W344H	TRIPLE EDGE PORK, INC #5	1991	97	5	IC	8	5	0.012	491	26					2		GROSCH
12520N09W347G	CLIFFORD FRIEND	1980	105	16	IR				480	20					0		ALBRECHT
12520N09W351H	CW FRIEND	1959	44	12	DO	3		WELL POINT	760	21.54							
12520N09W352G	CLIFFORD FRIEND	1976	110	12	IR	20.4	12	0.06	176	13.5		1000	0.5		0		ALBRECHT
12520N09W357B	KEN SIELSCHOTT	1977	101	16	IR	40	16	3/16							2		GROSCH
12520N09W358A	MASON COUNTY FARM SERVICE	1982	140	8	IR	20	8	0.03	1282	21					0		ALBRECHT
12520N09W363F	BERNICE SIMMERMOKER	1983	107	16	IR	20	16	0.05	1183	6	11	1250		113.6	2		GROSCH
12520N10W241C	EVERTT KEITHLEY	1977	88	15	IR	20	12	0.08	377	14		1000	1		0		ALBRECHT
12520N10W245B	CHARLES GAMBILL	1991	50	5	DO	4	5	0.012	991	18					2		GROSCH

Notes: CO=commercial, CS=community, DO=domestic, IC=lndustrial/commerclal, IR=frrigation, MO=monitoring, MU=munic[pal, NO=non-community, OB=observation, SO=school, ST=state, TH=test hole, TW=test well

Appendix III-2. (Continued)

Well location	Well owner	Well: Year con-structed	Well: Depth (ft)	Well: Dia-meter (in)	Well: Type/Use	Screen: Length (ft)	Screen: Dia-meter (in)	Screen: Slot size (in)	Test data: Date (mmyy)	Test data: Static level (ft)	Test data: Draw-down (ft)	Test data: Pumping rate (gpm)	Test data: Length of test (hr)	Test data: Specific capacity (gpm/ft)	Logged depth to sand and gravel (ft)	Logged depth to bedrock (ft)	Driller
12520N10W252F	RICHARD SMITH	1977	78	16	IR	40	16	3/16							0		GROSCH
12520N10W252G	RICHARD SMITH	1975	92	12	IR	20	10.5	.080-.070	575	2.5		2000	1		0		ALBRECHT
12520N10W252H	HELEN SMITH	1989	89	14	IR	20	12	0.05	489	22	31	1250		40.3	2	89	GROSCH
12520N10W255C	JERRY CARLOCK	1989	82	5	DO	8	5	0.012							1		GROSCH
12520N10W256B	RICHARD SMITH	1979	93	16	IR	28	16	3/16	1279	8	57	1250		21.9	2		GROSCH
12520N10W34	SNICARTE ISLAND GUN CLUB	1965	45	18	NC	28	18	3/16	??65	8	1.5	300	3	200	2		BROWN
12520N10W348F	DON DEGROOT	1979	45	15	NC	35	15	0.085	979	10					0		ALBRECHT
12520N10W348G	DON DEGROOT	1979	55	15	IR	30	15	0.085	979	10					0		ALBRECHT
12520N10W355D	TERRY CUTRIGHT	1996	29	1.2	DO	3	1.2	SANDPOINT	896	13					2		JONES
12520N10W355E	CHARLES STRODE	1995	34	2	DO	3	2	0.06	895	13							JONES
12520N10W365D	JOHN K FLETCHER	1977	99	16	IR	40	16	3/16							2		GROSCH
12520N10W366G	HOWARD HERRING	1977	93	15	IR	20	12	0.1	977	10		1000	1		0		ALBRECHT
12520N11W353B	WILLIAM DONNE SR	1983	106	16	IR	20	16	0.05	1283	18	22	1250		56.8	2		GROSCH
12521N05W011G	SAN JOSE TH 1-79	1979	200	4	TH	4	2.5	0.015	??79	58					10		ALBRECHT
12521N05W011G	SAN JOSE	1951	186	6	MU	12	6								35		CHRIS EBERT CO
12521N05W011G	SAN JOSE	1980	168	6	MU	20	6		7?80	60.44	8.3				168		ALBRECHT
12521N05W011H	GEORGE BECKER	--	80	4	DO		4		234	65					80		SMITH
12521N05W011H	SAN JOSE	1884	105	4	MU	20	4		1014	80					105		--
12521N05W011H	SAN JOSE	1917	101	6	MU	10	6	0.01	738	70					45		SMITH
12521N05W011H	SAN JOSE	1921	103	6	MU	8	6	0.01	738	70					45		SMITH
12521N05W012F	SAN JOSE	1910	80	4	MU		4		234	60					40		SMITH
12521N05W013G	MRS ELIZABETH BIGGS	--	211	4	DO		4		234	80					60		SMITH
12521N05W018D	V F DAVIS	1895	100	4	DO				134	60							SMITH
12521N05W018D	GERALD & KATHERINE GRAHAM	1973	119	4	DO	5	4	0.016	673	61		10	2		4		CRUMPLER
12521N05W02	NICK WINKEL	1963	93	4	DO	4		0.014	663	7							CRUMPLER
12521N05W021A	SARAH A FREEMAN ESTATE	--	190	42-4	DO		4		134	100							SMITH
12521N05W021A	FRANK SUBLETT	1965	126	4	DO	4		0.016	765	97							CRUMPLER
12521N05W021F	V E DAVIS	1913	115	4	DO		4		134	100					18		SMITH
12521N05W021G	TOBE KLEEN	--	100	4	DO		4		134	80							SMITH
12521N05W025H	E J SIEGRIST	1903	114	4	DO		4		134	26					114		SMITH
12521N05W028D	ROBERT DIERS	1970	122	--	DO	5	4	0.016	470			10	2		18		CRUMPLER
12521N05W031E	WATKINS BROS	--	90	4	DO		4		134	25							--
12521N05W031G	REED SCHOOL DIST #35	--	50	--	SC			SANDPOINT	234	12							--
12521N05W035D	JAMES DENNIS	1968	80	4	DO	5	4	0.016	668	31.3		10	2		33		CRUMPLER
12521N05W035H	NW RAILROAD	--	66	5	IC				760	6.97							--
12521N05W036C	KENNETH REED	--	60	4	DO				134	25					60		--
12521N05W037G	LOUIS FAUKINS	--	85	4	DO				234	35					85		--
12521N05W041G	LUCY COGSDELL ESTATE	--	32	--	DO				234	6							--
12521N05W042A	T D TAYLOR	--	80	4	DO				134	50							--
12521N05W043S	W H DIERS	--	52	42-1.2	DO				134	26							--
12521N05W045A	W H DIERS	1920	133	4	DO		4		134	80					133		SMITH
12521N05W05	PRAIRIE TRAILS MHP #1	--	136	--	MU												--
12521N05W051E	EMERSON LEINWEBER	1974	108	4	DO	5	4	0.016	774			20	4		4		CRUMPLER
12521N05W051G	W J LEINWEBER	1895	65	--	DO				134	15					60		--
12521N05W054A	ARCHIE WATKINS	--	80	4	DO				134	40					80		--
12521N05W058H	ASH GROVE SCHOOL DIST #115	--	60	--	SC				134	7					60		SMITH
12521N05W061E	CARL LEINWEBER	--	38	--	DO				134	5							--
12521N05W068E	MARTHA A COPPER ESTATE	--	56	--	DO			SANDPOINT	134	5					15		--
12521N05W071A	GEORGE MEEKER	1986	129	5	DO	10	4	0.01							22		GROSCH

Notes: CO=commercial, CS=community, DO=domestic, IC=industrial/commercial, IR=Irrigation, MO=monitoring, MU=municipal, NC=non-community, OB=observation, SC=school, ST=state, TH=test hole, TW=test well

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Appendix II1-2. (Continued)

Well location	Well owner	Well: Year con-structed	Well: Depth (ft)	Well: Dia-meter (in)	Well: Type/ Use	Screen: Length (ft)	Screen: Dia-meter (in)	Screen: Slot size (in)	Test data: Date (mmyy)	Test data: Static level (ft)	Test data: Draw-down (ft)	Test data: Pumping rate (gpm)	Test data: Length of test (hr)	Test data: Specific capacity (gpm/ft)	Logged depth to sand and gravel (ft)	Logged depth to bedrock (ft)	Driller
12521N05W071B	ROY GARDNER	--	80	42-4	DO				134	40							--
12521N05W071E	J F WATKINS	1914	87.5	6	DO				760	19.56							WATKINS
12521N05W071E	J F WATKINS	1918	60	4	DO		4		134	18							SMITH
12521N05W071E	RICHARD HORNER	1983	87	4	DO	10	4	0.01							1		GROSCH
12521N05W073F	MRS LYDIA HOUCHIN	--	80	4	DO				134	60							--
12521N05W075H	H J HILLER	--	80	4	DO		4		134	20					80		SMITH
12521N05W076H	DEAN SCHAFER	1982	82	4	DO	10	4	0.01							5		GROSCH
12521N05W081G	EMERSON W LEINWEBER	1977	116	4	DO	5	4	0.016	577	49		15	3		48		CRUMPLER
12521N05W081H	MRS R M AINSWORTH	1927	105	4	DO		4		134	45							SMITH
12521N05W082E	MAY SPARKS	--	190	4	DO				134	125					190		--
12521N05W084C	JOHN CUNNINGHAM	1989	195	14	IR	40	12	0.05	289	82	18	1200		66.7	15		GROSCH
12521N05W085D	JAS HOUCHIN	1858	225	42-4	DO				134	140							--
12521N05W085G	JOHN CUNNINGHAM	1984	135	16	IR	20	16	0.05	884	16	28	1250		44.6	2	135	GROSCH
12521N05W086F	LYMAN WATKINS	--	80	4	DO				134	40							--
12521N05W088D	MRS J J BARNETT	--	100	4	DO				134	60							MADISON
12521N05W093H	HARNACKE ESTATE	1904	80	4	DO		4		134	60					80		SMITH
12521N05W094D	W H HINDAHL	1892	140	4	DO				134	60					140		INGRAM
12521N05W094E	W H HINDAHL	1890	100	6-4	DO				134	67					100		SMITH
12521N05W097H	RICK SELLERS	1996	150	6	DO	10	6	0.05	996	80					4		GROSCH
12521N05W098D	MRS KATIE HOUCHIN	--	150	42-4	DO				134	100					150		--
12521N05W098D	DOROTHY LANCASTER	1974	178	4	DO	5	4	0.016							107		CRUMPLER
12521N05W098F	ST LUKE EV LUTHERAN CHURCH	1907	120	4	NC		4		134	75					120		SMITH
12521N05W098G	ST LUKES LUTHERAN CHURCH	1989	195	5	NC	4	5	0.015							1		GROSCH
12521N05W10	MRS M J ABBOTT	--	80	--	DO										80		--
12521N05W101B	MRS ALICE MCCARTY	1910	80	4	DO				134	60							--
12521N05W101C	MRS AMELIA RAPP	--	78	4	DO		4		134	52							--
12521N05W101C	PAUL LOCKENOUR	1981	121	4	DO	10	4	0.01							9		GROSCH
12521N05W101H	C C REED	--	140	4	DO				134	80					140		--
12521N05W106D	W H HINDAHL	1886	60	4	DO				134	45					60		SMITH
12521N05W111E	LOUIS BUXTON	--	130	4	DO				134	60							--
12521N05W112B	W T AINSWORTH	1930	90	4	DO		4		134	60					90		SMITH
12521N05W113C	ALBERT GARLISCH	1980	131	13	IR	28	13		180	35	73	823		11.3	30		GROSCH
12521N05W115A	W T AINSWORTH	--	90	42-4	DO		4		134	40							--
12521N05W117B	W T AINSWORTH	1929	65	4	DO		4		134	45					65		SMITH
12521N05W117C	ALBERT GARLISCH	1979	133	13	IR	28	13	3/16	1279	22	56	1250		22.3	30		GROSCH
12521N05W118E	HENRY WETZEL	--	140	42-4	DO		4		234	90					140		--
12521N05W12	MRS M J ABBOTT	--	140	--	DO										140		--
12521N05W121E	LILLIAN PROBASCO	--	70	4	DO		4		234	50							--
12521N05W121F	LILLIAN PROBASCO	1974	90	4	DO	5	4	0.016	274			10	2		39		CRUMPLER
12521N05W121H	J P ADOLPH	--	72	4	DO		4		234	50					50		SMITH
12521N05W121H	EARL GILMORE	1971	93	4	DO	5	4	0.016	1271	44		10	2		27		CRUMPLER
12521N05W122B	DELMER DURDLE	1993	146	14	IR	30	12	0.05	593	29	18	1000		55.6	36		GROSCH
12521N05W125A	JOHN WALKER	--	80	4	DO				234	50							--
12521N05W128D	ISSAC EGGLESTON	--	105	4	DO				134	70							--
12521N05W128F	IRA R ABBOTT	1931	185	42-4	DO		4		134	90					177		SMITH
12521N05W134H	C W AINSWORTH	--	80	42-4	DO				134	40							SMITH
12521N0SW138B	J J AINSWORTH ESTATE	--	80	4	DO		4		234	60							--
12521N05W138F	J J AINSWORTH ESTATE	--	100	42-4	DO		4		234	50							SMITH
12521N05W14	MYRA P ELLENBERGER	--	75	4	DO										15		--

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Appendix III-2. (Continued)

Well location	Well owner	Well: Year constructed	Well: Depth (ft)	Well: Diameter (in)	Well: Type/Use	Screen: Length (ft)	Screen: Diameter (in)	Screen: Slot size (in)	Test data: Date (mmyy)	Test data: Static level (ft)	Test data: Drawdown (ft)	Test data: Pumping rate (gpm)	Test data: Length of test (hr)	Test data: Specific capacity (gpm/ft)	Logged depth to sand and gravel (ft)	Logged depth to bedrock (ft)	Driller
12521N05W142C	EDWARD STAFFORD	1968	94	4	DO	5	4	0.016	768	46.3		12	2		81		CRUMPLER
12521N05W142C	EDWARD STAFFORD	1969	93	4	DO	5	4	0.016	269	42		10	2		30		CRUMPLER
12521N05W144D	ELDON GARLISCH	1994	77	5	DO	4	5	0.012	794	28					50		GROSCH
12521N05W144E	FRED RADEMAKER	--	75	42-4	DO		4		234	50							--
12521N05W144F	MRS J P ABBOTT	--	95	4	DO		4		234	45							--
12521N05W145B	WELDON RENKEN	1995	198	14	IR	30	12	0.05	495	17	27	1250		46.3	10		GROSCH
12521N05W145D	J H RANKIN	--	80	42-4	DO		4		234	55							--
12521N05W145D	WELDON RENKEN	1990	106	5	DO	4	4.8	0.012	990	44.5					32		SAUDER
12521N05W145E	ALBERT HARLESS	--	80	4	DO				234	60							--
12521N05W145E	ANNA MOEHRING	--	90	4	DO				234	60					90		--
12521N05W145E	DWAYNE BEARCE	1994	112	5	DO	4	4.8	0.012	594	44.5					18		SAUDER
12521N05W146F	LOUIS HABERLAND	--	65	42-1.2	DO				234	45							--
12521N05W146F	FRED PEBLOW	1925	85	4	DO		4								85		PETERS BROS
12521N05W146F	RAYMOND BEARCH	1995	115	5	DO	4	5	0.02	595	89	4				3		COLE
12521N05W147F	JOHN H RENKEN	--	67	4	DO	6	4		760	50.97					67		SMITH
12521N05W151C	JOHN WOLF	--	60	42-4	DO				134	40							--
12521N05W151H	JOHN WOLF	1916	160	4	DO		4		134	60					160		SMITH
12521N05W157A	RON BEHRENDS	1996	106	14	IR	30	12	0.05							46		GROSCH
12521N05W157G	MRS ALICE MCCARTY	--	100	4	DO		4								100		SMITH
12521N05W158D	JOHN WETZEL	--	90	4	DO				134	60							SMITH
12521N05W163A	ROUNDTREE ESTATE	--	136	42-4	DO				134	50							--
12521N05W166B	STRAUB ESTATE	--	85	4	DO				134	60							--
12521N06W167A	PHILLIP M KENNA	1984	138	5	DO	8	3	0.01							56		GROSCH
12521N05W167H	FRITZ HINDAHL ESTATE	--	170	4	DO				134	80							--
12521N05W171A	MRS JOHN CHAMBERS	1880	60	4	DO				134	35							--
12521N05W171C	LUSTER WATKINS	--	100	4	DO				134	40					100		--
12521N05W171E	J H RENKEN	--	80	4	DO		4		134	30							--
12521N05W171E	RAYMOND M RENKEN	1971	120	--	DO												--
12521N05W171G	GLENN RENKEN	1972	110	4	DO	5	4	0.016	272	59		10	2		95		CRUMPLER
12521N05W175D	JOHN CUNNINGHAM	1992	186	10	IR	30	10	0.05							14		GROSCH
12521N05W178B	ISABELLA SUMMERS	--	130	42-4	DO				134	60							--
12521N05W178H	JOSEPH KEHL	--	126	42-4	DO		4		134	40							--
12521N05W178H	LENORE THOMAS	1976	151	4	DO	5	4	0.016	376			12	4		11		CRUMPLER
12521N05W181H	CHAS LA FOLLETTE	--	100	42-4	DO				134	60							--
12521N05W183C	NATALIE GANSON	1996	198	14	IR	20	14	0.05	1296	57	27	1400		51.9	2		GROSCH
12521N05W184A	J J DONALDSON	--	125	42-4	DO		4		134	50							--
12521N05W185G	PETER MCKENNA ESTATE	--	180	42-4	DO		4		134	55							--
12521N05W188A	HOFFMAN BROS	--	85	4	DO				134	50					85		--
12521N05W191E	GROSCH IRRIGATION	1990	147	5	DO	8	5	0.012							51		GROSCH
12521N05W194D	KATE MCHARRY ESTATE	--	105	42-4	DO				134	60							--
12521N05W194E	C R WILSON ESTATE	--	80	4	DO				134	40							--
12521N05W195D	JOANNE L JACKSON	1972	185	4	DO	5	4	0.016							156		CRUMPLER
12521N05W198C	C B BENSCOTER	1909	197	4	DO		4		134	60					197		INGRAM
12521N05W201A	WILBUR MCNEIL	1980	106	4.5	DO	4	4	0.012	180	65.5	18	18	1	1	98		COPPENBARGER
12521N05W201A	WILBUR MCNEIL	1980	97	4.5	DO	4	4	0.014	480	56.5	33	6	2	0.2	60		COPPENBARGER
12521N05W201B	W E SURFACE	--	130	4	DO		4		134	60					130		--
12521N05W201E	EFFIE A ENLOWS	1914	75	42-4	DO		4		134	40					75		PETERS BROS
12521N05W205H	PETER MCKENNA ESTATE	--	85	42-4	DO		4		134	30							--
12521N05W208D	WILSON ESTATE	--	150	4-3	DO		3		134	80							--

Notes: CO=commerclal, CS=community, DO=domestic, IC=lndustrial/commercial, IR=irrigation. MO=monitoring, MU=municipat, NC=non-community, OB=observation, SC=school, ST=state, TH=test hole, TW=test well

Appendix III-2. (Continued)

Well location	Well owner	Well: Year con-structed	Well: Depth (ft)	Well: Dia-meter (in)	Well: Type/Use	Screen: Length (ft)	Screen: Dia-meter (in)	Screen: Slot size (in)	Test data: Date (mmyy)	Test data: Static level (ft)	Test data: Draw-down (ft)	Test data: Pumping rate (gpm)	Test data: Length of test (hr)	Test data: Specific capacity (gpm/ft)	Logged depth to sand and gravel (ft)	Logged depth to bedrock (ft)	Driller
12521N05W211C	RALPH JACOB	--	125	4	DO		4		134	50							--
12521N05W211F	MARY BOCKWITZ	--	125	4	DO				134	50					125		--
12521N05W211G	HENRY ZIEGLOWSKY	1994	90	5	DO	4	5	0.012	194	40					70		GROSCH
12521N05W218A	COTTRELL ESTATE	--	25	--	DO				134	15							--
12521N05W218F	WAYNE SHAWGO	1990	155	5	DO	4	5	0.012							21		GROSCH
12521N05W218H	NEALE SCHUESSLE	1973	89	4	DO	5	4	0.016	773			10	2		68		CRUMPLER
12521N05W221H	EFFIE A ENSLOW	--	140	42-4	DO				134	45							--
12521N05W228A	T J GALLAGHER	--	57	4	DO				134	37							--
12521N05W231A	ED CLARK	1926	84	42-4	DO				134	66							SMITH
12521N05W236A	WHITE & GALLAGHER	--	180	4	DO		4		134	20							--
12521N05W236A	WHITE & GALLAGHER	--	80	4	DO				134	20							--
12521N05W238H	WM MANGOLD ESTATE	--	140	42-4	DO		4		134	50					140		--
12521N05W241H	JACOB CLASSEN	1899	118	4	DO		4		134	40					118		SMITH
12521N05W246A	KOERT BARTMAN	--	85	4	DO		4		134	50							--
12521N05W247G	GEORGE FARNSWORTH	1989	181	14	IR	20	12	0.05	289	27	29	1250		43.1	41		GROSCH
12521N05W247H	SAN JOSE STATE BANK	--	140	4	DO		4		234	70							SMITH
12521N05W248H	WILLIAM ARNOLD	1965	140	4	DO	4		0.016	965	35							CRUMPLER
12521N05W251E	G W SMITH	--	85	4	DO				134	50							--
12521N05W253A	G W SMITH	1883	90	4	DO		4		134	60							SMITH
12521N05W258D	FAIRVIEW SCHOOL DISTRICT #38	--	80	4	SC				134	55					80		--
12521N05W258E	FRANKLIN LIFE INS CO	1882	93	4	DO		4		134	75					93		MATTSON
12521N05W263A	C H BOCKWITZ ESTATE	--	80	4	DO		4		134	30							--
12521N05W264G	LYDIA E FIDDLER	--	160	42-4	DO		4		134	60							--
12521N05W265A	JAMES BELL	--	45	4	DO												--
12521N05W265A	GEORGE BECKER	--	100	42-4	DO												--
12521N05W265A	JAMES BELL	1990	144	5	DO	4	5	0.012							54		GROSCH
12521N05W266H	WHITE & GALLAGHER	--	80	4	DO				134	20							--
12521N05W271F	WM BECKER	--	90	4	DO				234	40					90		--
12521N05W271G	DEVON SISTERS	1929	80	42-4	DO		4		234	30					80		PETERS BROS
12521N05W272G	RAYMOND M RENKEN	1978	120	--	DO												--
12521N05W274A	WM BECKER	--	130	4	DO		4		134	60							--
12521N05W278B	EARL BECKER	--	100	4	DO		4		134	50							SMITH
12521N05W278G	A L CROSS	--	57	4	DO				134	37							--
12521N05W281B	SCHOOL DISTRICT #39	1930	99	42-4	SC		4		134	60					99		PETERS BROS
12521N05W281C	MYRTLE TOMLIN	--	70	42-4	DO				134	20							--
12521N05W286G	ROBERT GREEN	1995	225	14	IR	20	12	0.05	395	80	35	1000		28.6	90		GROSCH
12521N05W287A	J W MONTGOMERY	1917	136	4	DO		4		134	60					136		PETERS BROS
12521N05W288E	JOHN BECKER	1930	136	4	DO		4		134	60					136		PETERS BROS
12521N05W291D	JOHN A PETERS	1970	110	4	DO	5	4	0.016	1070	64		10	2		23		CRUMPLER
12521N05W291F	ELIZABETH CHILDS	1916	112	42-4	DO		4		134	42							PETERS BROS
12521N05W295C	G A BARRIC	--	160	4	DO				134	60							--
12521N05W298G	DELBERT RENKEN	1984	210	5	DO	10	5	0.01							2		GROSCH
12521N05W298H	G D SUTTON	--	140	42-4	DO				134	70							--
12521N05W302H	LENNA PEINE	--	106	4	DO		4		134	40							--
12521N05W302H	ELMER PIENE	--	99	4	DO	6			760	78.2					99		--
12521N05W308D	HARMON BUSCH	--	105	4	DO		4		134	60							--
12521N05W308H	J J DONALDSON	1923	175	3	DO		3		134	90					100		SMITH
12521N05W313C	RANDY PHELPS	1996	168	14	IR	20	12	0.05	396	52	30	1250		41.7	28		GROSCH
12521N05W316H	TJ WIBLE	--	136	4-3	DO		3		1233	90							--

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Appeiiidix m-2. (Continued)

Well location	Well owner	Well: Year con-structed	Well: Depth (ft)	Well: Dia-meter (in)	Well: Type/ Use	Screen: Length (ft)	Screen: Dia-meter (in)	Screen: Slot size (in)	Test data: Date (mmyy)	Test data: Static level (ft)	Test data: Draw-down (ft)	Test data: Pumping rate (gpm)	Test data: Length of test (hr)	Test data: Specific capacity (gpm/ft)	Logged depth to sand and gravel (ft)	Logged depth to bedrock (ft)	Driller
12521N05W316A	MARY BIRD	--	92	4	DO										92		MINNER
12521N05W316H	EDITH WIBLE	1975	153	4	DO	5	4	0.016	975			10	2		66		CRUMPLER
12521N05W317A	JENNIE B KOPP	1976	84	4	DO	5		0.016	476	41		10	3		54		CRUMPLER
12521N05W321F	J HOWARD STONE	1966	160.9	4	DO												CRUMPLER
12521N05W321G	HOWARD STONE	1933	100	4	DO	4		0.03	1233	50					22		PETERS BROS
12521N05W325C	KAREN ALLEN	1996	178	14	IR	20	12	0.05	1196	58	29	1550		53.4	102		GROSCH
12521N05W325G	MARIAN STONE	1996	178	14	IR	20	14	0.05	1196	64	22	1400		63.6	11		GROSCH
12521N05W326H	RUSSELL STONE	1925	106	4	DO		4		1233	80					100		PETERS BROS
12521N05W328A	A L MCNEIL	--	106	36-4	DO		4		1233	60							--
12521N05W328A	MELVIN DOUGLAS	1981	132	4	DO	4	4	0.02	681	79		15	5		14		DEMENT
12521N05W328F	MANLEY MATHERS	--	180	42-4	DO		4		1233	60					180		--
12521N05W331E	J P BECKER JR	--	105	48-4	DO		4		1234	30							TRINKLE
12521N05W336H	H C CARGILL	--	86	4	DO		4		1234	40					86		--
12521N05W338E	G B MATHERS	1927	86	4	DO		4		1233	40					86		PETERS BROS
12521N05W344D	HARMON LAGER	--	80	4	DO		4		1234	35							--
12521N05W344H	LLOYD BECKER	--	22	48	DO				1233	16			1.5				--
12521N05W348D	J P BECKER JR	1918	100	4	DO		4		1234	50							TRINKLE
12521N05W348G	J P BECKER JR	1906	130	4	DO		4		1234	50					130		TRINKLE
12521N05W351A	T DOYLE	--	100	4	DO				134	40							TRINKLE
12521N05W353A	GERHARD HARMS	1963	126.3	--	DO												CRUMPLER
I2521N05W353B	C H BERGMAN	--	115	4	DO		4										--
12521N05W354H	GEORGE BOCKWITZ	--	160	48-4	DO		4		1233	80					160		--
12521N05W358F	ED DOYLE	--	102	4-3	DO		3		1233	72							SMITH
12521N05W358H	MRS JOHN CREW	1986	154	5	DO	10	4	0.01							31		GROSCH
12521N05W367D	W S BROOKS	--	80	42-4	DO		4		1233	40					80		--
12521N05W368G	DAN DOYLE	--	105	3	DO		3		1233	60							--
12521N06W	MRS KENNETH KNOLES	1968	200	--	DO												
12521N06W011A	MRS NELLIE LANG	--	60	--	DO				134	12							--
12521N06W013H	P J IMIG	--	64	--	DO				134	9							--
12521N06W021A	PETER IMIG	--	32	--	DO				234	6							--
12521N06W021A	PETER IMIG	--	110	--	DO				134	6							--
12521N06W021A	DAVID FRIEND	1989	79	5	DO	4	5	0.015							10		GROSCH
12521N06W031A	P LEINWEBER	1918	70	--	DO				134	20							SMITH
12521N06W031B	P LEINWEBER	1922	25	--	DO				134	20							--
12521N06W032H	P LEINWEBER	--	25	--	DO												--
12521N06W033H	PHILLIP LEINWEBER	--	20	1.2	DO				760	3.21							--
12521N06W04	EARL PFEIFFER	--		--	IR												--
12521N06W042G	RALPH HEINHORST	1975	124	12	IR	18.8	10.5	0.08	475	6.5			1		0		ALBRECHT
12521N06W045C	MRS A R GILMORE	--	65	--	DO				234	20							--
12521N06W047B	LEO PFEIFFER	1974	114	12	IR				374	38.5		60	2		0	112	ALBRECHT
12521N06W047D	LOUIS C PFEIFFER	1961	102	22-17	IR	20	22-17	1/4 X 3/8	461	14		700	4.5		4		GIBBS
12521N06W047F	ALVIN PFEIFFER	1982	117	16	IR	32	16	3/16	382	12	13	1250		96.2	2		GROSCH
12521N06W051A	CHARLES SCHUSSELLE ESTATE	1900	80	--	DO				234	8							INGERSOLL
12521N06W051D	MRS FRED ATWATER	1964	111	18	IR	40	18	3/16	?764	15	8.8	1300	4	147.7	0		BROWN
12521N06W051G	RALPH E HEINHORST	1968	68	4	DO	4	6	1/8X1/4	968	16.2	5.9	30	3	5.1	1		GIBBS
12521N06W054H	LEO PFEIFFER	1955	102	6	IR	10	6		964	3.33		350			0		HATFIELD
12521N06W055H	LEO PFEIFFER	--	94	4	DO				1272	8							--
12521N06W057G	W J HEINHORST	1908	35	--	DO				234	16							HEINHORST
12521N06W058D	LLOYD INGERSOLL	1981	105	8	IR	15	8	0.06	481	8					0		ALBRECHT

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Appendix III-2. (Continued)

Well location	Well owner	Well: Year con-structed	Well: Depth (ft)	Well: Dia-meter (in)	Well: Type/ Use	Screen: Length (ft)	Screen: Dia-meter (in)	Screen: Slot size (in)	Test data: Date (mmyy)	Test data: Static level (ft)	Test data: Draw-down (ft)	Test data: Pumping rate (gpm)	Test data: Length of test (hr)	Test data: Specific capacity (gpm/ft)	Logged depth to sand and gravel (ft)	Logged depth to bedrock (ft)	Driller
12521N06W058D	LLOYD INQERSOLL	1993	98	12	IR	30	16	0.05	293	4	15		2		2		SHADOW MFG
12521N06W061G	RALPH HEINHORST	1991	112	14	IR	20	12	0.05	491	4	23	1000		43.5	2		GROSCH
12521N06W064D	CLYDE D EATON	--		--	DO												--
12521N06W064E	CLYDE EATON ESTATE	1973	94	4	DO	5	4	0.016	373	3		10	2		0		CRUMPLER
12521N06W067A	CAP FISKE	--	82	--	DO				134	16							--
12521N06W074D	HANNA HOVEY	--	92	--	DO				134	18							--
12521N06W075B	J H HOVEY	--	16	--	DO				234	12							--
12521N06W075B	J H HOVEY	--	22	--	DO				234	12							--
12521N06W076C	PAUL TOMLIN	1992	69	5	DO	4	5	0.012	492	16					19		GROSCH
12521N06W077C	MIKE SEBRING	1995	115	14	IR	20	14	0.05	495						2		GROSCH
12521N06W081F	GEORGE KASTENDICK	--	33	--	DO				134	19							KASTENDICK
12521N06W081F	GEORGE KASTENDICK	1921	60	--	DO				134	19							STUFFLEBEAM
12521N06W087A	ROBERT SCHOONOVER	1932	60	--	DO				134	16							--
12521N06W094D	ROBERT SCHOONOVER	--	45	--	DO												--
12521N06W096H	H R NORTHRUP ESTATE	--	70	--	DO												--
12521N06W097B	JOHN SCHOONOVER	1900	60	--	DO				134	10							EVERETT
12521N06W097H	DAN RAINVILLE	1996	74	5	DO	4	3	0.012	196	12.5					0		ALBRECHT
12521N06W107A	B L MCFADDEN	--	60	--	DO												--
12521N06W107D	B L MCFADDEN	--	48	--	DO												--
12521N06W108B	B L MCFADDEN	--		--	DO				234	7							--
12521N06W111E	BRUCE MCFADDEN	1919	103	--	DO				134	6							MINNER
12521N06W118H	BRUCE MCFADDEN	--	40	--	DO				134	6							--
12521N06W121G	MRS ANNA SCHAFER	--	75	--	DO				134	30							--
12521N06W131D	HENRY BUSE	--	90	4	DO				134	45							--
12521N06W131D	CARGILL LEWIS	1985	137	5	DO	10	4	0.01							23		MCKENNEY
12521N06W131E	L K ELLSBERRY	--	85	4	DO				134	40							--
12521N06W137D	LUCY S WILSON	--	85	4	DO		4		234	30							--
12521N06W145C	G R POTTORF	--	90	4	DO		4								84		MINNER
12521N06W145E	I L POTTORF	1907	84	--	DO				134	15							MINNER
12521N06W151D	E F MARTIN	1932	67	--	DO				134	10							PETERS BROS
12521N06W151E	C A MCHARRY	1932	32	--	DO				134	15							--
12521N06W151E	MONICA SEILER	1986	105	5	DO	10	4	0.01							8		GROSCH
12521N06W158B	L G KESLING	--	64	--	DO												--
12521N06W161B	L G KESLING	1919	54	--	DO												SMITH
12521N06W166F	JOHN EVERETT	1927	65	4	DO				134	20							EVERETT
12521N06W167E	HAROLD EVERETT	1970	80	4	DO	5	4	0.016	1070	11		10	2		9		CRUMPLER
12521N06W171H	ROBERT SCHOONOVER	--	55	--	DO				134	10							--
12521N06W172B	WILLIS URISH	1958	48.5	2	DO	3		WELLPOINT	760	3.8							--
12521N06W172E	ED BRUNINGA	1971	88	4	DO	5	4	0.016	1171			10	2		21		CRUMPLER
12521N06W175C	ROBERT SCHOONOVER	1884	55	--	DO				134	15							HERICANICK
12521N06W176B	SMITH SCHOONOVER	1933	53	--	DO				134	15							--
12521N06W183B	SARAH SEVERNS	1933	90	--	DO												--
12521N06W184E	HENRY BARTELS	--	80	11	DO				134	15							INGERSOLL
12521N06W185A	FRANK FURRER	1925	66	--	DO				134	15							--
12521N06W194B	GERALD PHELPS	1970	86	4	DO	5	4	0.016	1270	29		10	3				CRUMPLER
12521N06W198B	T L MORGAN	1931	55	--	DO				134	25					61		--
12521N06W204H	HENRY BEHRENDS	1921	70	--	DO												PERKINS
12521N06W204H	CAREY BEHRENDS	1964	72	4	DO	4		0.02	664	8							CRUMPLER
12521N06W205A	BLAINE & ETTA TOMLIN	1931	35	--	DO				134	9							--

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Appendix III-2. (Continued)

Well location	Well owner	Well: Year constructed	Depth (ft)	Dia-meter (in)	Type/ Use	Screen: Length (ft)	Dia-meter (in)	Slot size (in)	Test data: Date (mmyy)	Static level (ft)	Draw-down (ft)	Pumping rate (gpm)	Length of test (hr)	Specific capacity (gpm/ft)	Logged depth to sand and gravel (ft)	Logged depth to bedrock (ft)	Driller
12521N06W212E	JOE FINK	1915	100	4	DO		4		134	25							--
12521N06W214D	J H SEVERNS	1933	65	--	DO				134	20							EVERETT
12521N06W217E	B ETZEN	1932	40	--	DO				134	10							ETZEN
12521N06W221E	MARY B HOFFMAN	--	90	48-4	DO		4		134	40							TYLER
12521N06W226E	EMILY KNEEN	1986	89	5	DO	10	4	0.01							30		GROSCH
12521N06W227E	MILES VAN HORN	1900	56	--	DO				134	20							HERICANICK
12521N06W231C	C W PUGH	1918	119	4	DO		4		134	37							MINNER
12521N06W231E	C W PUGH	1912	108	4	DO		4		134	40							MINNER
12521N06W233D	HARMON THEE	--	108	4	DO		4		134	50							--
12521N06W235E	C W PUGH	1892	135	42-4	DO		4		134	40							COLINGHAM
12521N06W235E	GEORGE L MARTIN	1900	149	6	DO				760	48.35							--
12521N06W245E	M ELMORE	--	135	4	DO		4		134	50							GRIFFIN
12521N06W247B	FRED HESS	1924	119	4	DO		4		134	30							PETERS BROS
12521N06W247H	MRS KENNETH KNOLES	--	200	4	DO										200		--
12521N06W247H	FRED HESS	1885	86	48-4	DO		4		134	75							MATSON
12521N06W252E	K C COPPER	--	130	4	DO		4		134	60							--
12521N06W253A	L K ELLSBERRY	--	180	4	DO		4		134	100							--
12521N06W253A	DICK ROBERTSON	1991	155	5	DO	4	5								6		GROSCH
12521N06W253B	DICK ROBERTSON	1992	175	14	IR	30	12	0.05							4		GROSCH
12521N06W255E	H LAUMEIER	--	130	48-4	DO				134	60							--
12521N06W261E	H LEESMAN	--		--	DO												--
12521N06W262A	TOM MCCLAUGHLIN	1994	134	4	DO	3	4	0.015							97		SHADOW MFG
12521N06W262D	HARLAN FLEENER	--	176	4	DO				134	80							--
12521N06W264E	A V HUBBARD	--	100	42-4	DO												--
12521N06W265D	JOHN & MARY BURNHAM	--	80	48-4	DO				134	30							--
12521N06W271D	FRANK BROOKS	--	85	48-4	DO		4		134	40							--
12521N06W273E	J L GREEN	1993	154	5	DO	4	5	0.012	693	43					19		GROSCH
12521N06W274D	FRED HINDAHL	--	70	48-4	DO				134	35							--
12521N06W277E	PAUL MANGOLD	1991	160	5	DO	4	5	0.012	791	64					3		GROSCH
12521N06W278E	HARRY MANGOLD	1916	180	4	DO												SMITH
12521N06W287D	L F MATHERS	--	85	48-1.5	DO										85		--
12521N06W288E	E F MARTIN ESTATE	1927	67	--	DO				134	15							PETERS BROS
12521N06W291E	DELMAR MCGINNIS	1994	82	5	DO	4	5	0.012	894	13					6		GROSCH
12521N06W292B	MABEL KRAMER	1984	107	16	IR	20	16	0.05	1294	16	45	1250		27.8	2	107	GROSCH
12521N06W296D	M B MATHERS	--	85	--	DO										85		--
12521N06W296D	M B MATHERS	1931	85	48-1.5	DO										85		--
12521N06W301E	D A LEWIS	1933	40	--	DO												--
12521N06W303C	DARRELL BEHRENDS	1989	119	14	IR	20	12	0.05	389	13	3	1250		416.7	2	119	GROSCH
12521N06W305E	MAUDE TERRELL	--	75	48-1.2	DO				134	18							--
12521N06W308C	ROY TERRELL	1934	67	--	DO				134	15					67		HAYNES
12521N06W31	RANDY PHELPS	1992	140	10	IR	20	10	0.05	292	20					2		GROSCH
12521N06W313H	WM PHELPS	--	65	--	DO												--
12521N06W318A	COTTRELL ESTATE	1919	65	--	DO				134	13							STUFFLEBEAM
12521N06W318D	CHARLES HAEGAN	--	96	4	DO		4		134	35							STUFFLEBEAM
12521N06W32	GARY CURRY	1993	101	4	DO	4	4	0.014	1093	29	4		1		3		SHADOW MFG
12521N06W322E	MASON COUNTY POOR FARM	1911	129	4	DO				760	54.47					90		SMITH
12521N06W323D	ANDY GILMORE	1898	150	4	DO				134	85							INGERSOLL
12521N06W324D	JESSE HUFF	1982	95	4	DO	10	4	0.01							7		GROSCH
12521N06W325D	ALBERT DARE	--	75	36-1.5	DO												--

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Appendix III-2. (Continued)

Well location	Well owner	Well				Screen			Test data						Logged depth to sand and gravel (ft)	Logged depth to bedrock (ft)	Driller
		Year con-structed	Depth (ft)	Dia-meter (in)	Type/ Use	Length (ft)	Dia-meter (in)	Slot size (in)	Date (mmyy)	Static level (ft)	Draw-down (ft)	Pumping rate (gpm)	Length of test (hr)	Specific capacity (gpm/ft)			
12521N06W325D	WM EVERETT	1912	100	36-4	DO										100		LEWIS
12521N06W327E	KENNETH TOMLIN	1967	105	4	DO				467	46		120	10		63		CRUMPLER
12521N06W332D	M MCCLUGGAGE ESTATE	1880	180	48-4	DO				134	75							--
12521N06W335E	DEN BENSCOTER	--	175	4	DO		4		134	60					175		PETERS BROS
12521N06W341E	W H BROOKS	1917	96	4	DO		4		134	88					96		EVERETT
12521N06W342B	PAUL FLEENER	1993	184	14	IR	30	14	0.05	493	85	8	1000		125	2		GROSCH
12521N06W344E	C A MCHARRY	1927	86	4	DO		4		134	40					86		PETERS BROS
12521N06W345E	C A MCHARRY	1926	207	3	DO				134	60					207		PETERS BROS
12521N06W351B	LEO L FRATZKE	--	89	4	DO			SLOTTED PIP	760	67.27					89		--
12521N06W351B	MRS PALMER	1932	96.5	48-3	DO		3		134	40					96.5		PETERS BROS
12521N06W357E	C A MCHARRY	--	130	48-4	DO		4		134	60							--
12521N06W357G	FIRST OF AMERICA	1992	174	14	IR	30	12	0.05	592	63	20	1000		50	14		GROSCH
12521N06W361A	MRS LENA PEINE	--	118	4	DO		4		134	50							--
12521N06W361A	RICK SMITH	1989	166	5	DO	8	5	0.015							50		GROSCH
12521N06W364H	F W MCHARRY	--	185	4	DO		4		134	100							--
12521N06W368B	HERMAN HARRIES	--		4	DO												--
12521N07W011F	P S INGERSOLL ESTATE	1910	58	--	DO										58		STUFFLEBEAM
12521N07W013D	A J KNUPPEL	1900	54	--	DO				334	6					54		STUFFLEBEAM
12521N07W013D	A J KNUPPEL	1914	73	--	DO				334	6					73		DREXLER
12521N07W021D	ELVIN G KNUPPEL	1940	57.5	1.2	DO	3		WELL POINT	760	3.36					7		STUFFLEBEAM
12521N07W021E	J G KNUPPEL	1900	60	--	DO										60		INGERSOLL
12521N07W021E	JOHN G KNUPPEL	1925	52	--	DO				334	5					52		STUFFLEBEAM
12521N07W022E	MARJORIE PHELPS	1994	82	5	DO	4	5	0.012	994	7					4		GROSCH
12521N07W023B	J H HARFST	--	72	--	DO				334	15							--
12521N07W023B	J H HARFST	1912	72	--	DO				334	15					72		DREXLER
12521N07W023E	LAKE SHORE SCHOOL	1918	55	--	SC				334	7					55		STUFFLEBEAM
12521N07W024H	NELSON OLLER	1966	93	4	DO	4		0.016	766	15							CRUMPLER
12521N07W025E	H E KASTENDICK ESTATE	1907	101	--	DO				334	35							STUFFLEBEAM
12521N07W025E	H E KASTENDICK	1925	99.5	--	DO												STUFFLEBEAM
12521N07W027C	TERRY GATHMAN	1989	118	14	IR	20	12	0.05							2		GROSCH
12521N07W027G	RICHARD TRIMPE	1987	103	16	IR	20	16	0.05	1187	10	15	1200		80	2		GROSCH
12521N07W031E	MRS GEORGE KESLING	--		--	DO				334	30							STUFFLEBEAM
12521N07W031E	MRS GEORGE KESLING	1927	65	--	DO				334	20					65		STUFFLEBEAM
12521N07W032C	MARIE GREGORY	1997	107	14	IR	20	14	0.05							9		GROSCH
12521N07W034H	STEVE FORNOFF	1995	123	10	IR	20	10	0.05							7	123	GROSCH
12521N07W038D	M PFEIFFER ESTATE	1909	65	--	DO										65		STUFFLEBEAM
12521N07W041A	HENRY FRESE	1919	75	--	DO				334	20					75		STUFFLEBEAM
12521N07W046B	WILLIAM MOLDENHAUER	1966	80	18	IR	40	18	3/16	??66	5	1.5	400	4	266.7	3		BROWN
12521N07W046F	KEITH HEMMELL	1977	120	16	IR	40	16	3/16	1277						4		GROSCH
12521N07W047G	FRIEDA WIEMER	--	26.5	1.2	DO	3		WELL POINT	760	18.7					26.5		WIEMER
12521N07W048A	WM MOLDENHAVER	1972	95	4.5	DO	5	4	0.016	1172	37		10	2		0		CRUMPLER
12521N07W048A	DARRELL PFEIFFER	1979	126	15	IR	20	12	0.08	279	12					0		ALBRECHT
12521N07W048F	J H WIEMER	1922	23	--	DO				334	10							--
12521N07W048F	J H WIEMER	1933	24	--	DO				334	11							--
12521N07W048F	JULIUS WIEMER	1977	105	15	IR	20	12	.080-.060							6		ALBRECHT
12521N07W048G	JULIUS WEIMER	1977	101	15	IR	22	12	0.06	577	10		1000	0.5		5		ALBRECHT
12521N07W052D	SCHOOL DISTRICT #50	--	60	--	SC				334	18							--
12521N07W052D	G A PELSTER	--	45	--	DO												--
12521N07W052D	G A PELSTER	1928	57	--	DO					0					57		STUFFLEBEAM

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Appendix III-2. (Continued)

Well location	Well owner	Well: Year constructed	Well: Depth (ft)	Well: Diameter (in)	Well: Type/Use	Screen: Length (ft)	Screen: Diameter (in)	Screen: Slot size (in)	Te!3t data: Date (mmyy)	Te!3t data: Static level (ft)	Te!3t data: Drawdown (ft)	Te!3t data: Pumping rate (9Pm)	Te!3t data: Length of test (hr)	Te!3t data: Specific capacity (gpm/ft)	Logged depth to sand and gravel (ft)	Logged depth to bedrock (ft)	Driller
12521N07W052F	HOWARD ERMEUNG	1977	116	16	IR	40	16	3/16							2		GROSCH
12521N07W056D	EVENING STAR CAMPGROUND	1979	42	--	NC	4	4	0.018	479	9.5	5	100	4	20	0		HATFIELD
12521N07W056F	RAY CARPENTER	1962	128	18	IR	40	18	3/16	??62	16	12.3	1480	3	120.3	0		S&BWELLCO
12521N07W056F	RAY CARPENTER	1962	113	18	IR	40	18	3/16	??62	16	12.3	1480	3	120.3	0		S & B WELL CO
12521N07W058F	C H ZURBURG	1921	63	--	DO				334	29					63		DREXLER
12521N07W062E	FRANK BUTT	1931	23	--	DO				334	15							STUFFLEBEAM
12521N07W062H	HUGH MCHARRY	1990	114	14	IR	20	12	0.05	290	41	17	1000		58.8	2	114	GROSCH
12521N07W063A	DELBERT HACKMAN	1977	118	16	IR	40	16	3/16							2	116	GROSCH
12521N07W063B	HACKMAN FARMS	1989	117	14	IR	20	12	0.05	1189	15	37	1000		27	2		GROSCH
12521N07W064E	ZURBURG BROS	--	45	--	DO										45		--
12521N07W07	KENNETH KRAUSE	1992	98	10	IR	20	10	0.05	292	14					2		GROSCH
12521N07W072B	CARL SCHMIDT	--		--	DO				334	16							--
12521N07W072B	CARL SCHMIDT	1931		--	DO				334	16							--
12521N07W076A	GEORGE L ATHEY	1924	42	--	DO												EVERETT
12521N07W076A	KENNETH KRAUSE	1964	47	6	DO	16	6	1/4	??64	18	2.5	100	3	40	2		BROWN
12521N07W077C	KENNETH KRAUSE	1976	142	12	IR	20	12	0.06	976	16.5		1000			35		ALBRECHT
12521N07W078F	FOREST CITY TW1-95	1995	143	--	TW				195	24.5					20	143	--
12521N07W078G	DAN CAULKINS	1977	100	16	IR	40	16	3/16							2		GROSCH
12521N07W081H	MINNIE BUSCH	1914	40	--	DO				334	19					40		DREXLER
12521N07W081H	MINNIE BUSCH	1917	45	--	DO										45		STUFFLEBEAM
12521N07W083C	MELVIN ESSELADAN	1978	124	16	IR	40	16	3/16							15		GROSCH
12521N07W083H	PASCHAL & ANDREW ALLEN	1985	115	13	IR	20	12	0.05	285	10	48	1250		26	2	115	GROSCH
12521N07W087E	PASCHAL & ANDREW ALLEN	1985	115	13	IR	20	12	0.05	285	15	46	1250		27.2	2	115	GROSCH
12521N07W096C	CALVIN HOFF	1968	94	18	DO	36	18	3/16	??68	12	2.3	300	3	130.4	2		BROWN
12521N07W098A	HEATER BROS	--	70	42-1.2	DO												--
12521N07W098C	HEATER BROS	--	56	--	DO				334	30					56		DREXLER
12521N07W098C	HEATER BROS	--	56	--	DO				334	30					56		DREXLER
12521N07W098E	DARRELL PFEIFFER	1979	117	16	IR	40	16	3/16							3		GROSCH
12521N07W101H	PFEIFFER ESTATE	--	90	--	DO												--
12521N07W108B	CAROLINE MCHARRY	1928	68	--	DO				334	18					68		STUFFLEBEAM
12521N07W111D	MARY J CUNNINGHAM	1898	66	--	DO				334	5					66		INGERSOLL
12521N07W111D	MARY J CUNNINGHAM	1900	16	--	DO				334	5							INGERSOLL
12521N07W117F	CAROLINE MCHARRY	1924	96	--	DO				334	30					96		STUFFLEBEAM
12521N07W118G	CAROLINE MCHARRY	1930	45	--	DO				334	12							STUFFLEBEAM
12521N07W121C	CHARLES WHITEHEAD ESTATE	--	70	--	DO				334	6							--
12521N07W121C	CHARLES WHITEHEAD ESTATE	1926	15	--	DO				334	6							--
12521N07W121F	W L STILL	--	14	--	DO				334	5							--
12521N07W121G	W L STILL	--	22	--	DO				334	5					22		--
12521N07W128A	HUGH B CUNNINGHAM	--	16	--	DO				334	5							DREXLER
12521N07W128A	HUGH B CUNNINGHAM	1911	67	--	DO				334	5					67		DREXLER
12521N07W131H	JOHN WHITEHEAD	1911	22	--	DO				334	5							--
12521N07W131H	JOHN WHITEHEAD	1911	22	--	DO				334	5							--
12521N07W141F	GID BEHRENDS	1905	40	--	DO				234	4							BEHRENDS
12521N07W146A	IRA BELL	--	85	--	DO				234	30							STUFFLEBEAM
12521N07W146A	DOROTHY BELL	1971	90	6	DO	5	4	0.016							0		CRUMPLER
12521N07W147A	BECK SCHOOL DISTRICT #52	--	65	--	SC				234	20					65		STUFFLEBEAM
12521N07W148A	KRAMPFF ESTATE	--	70	--	DO				234	20							--
12521N07W148A	CLARENCE PFEIFFER	1977	73	4	DO	4	2.5	0.015	1277	25					0		ALBRECHT
12521N07W148E	R C BEHRENDS	--	102	4	DO				334	30					102		BEHRENDS

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Appendix HI-2. (Continued)

Well location	Well owner	Well: Year constructed	Well: Depth (ft)	Well: Diameter (in)	Well: Type/Use	Screen: Length (ft)	Screen: Diameter (in)	Screen: Slot size (in)	Test data: Date (mmyy)	Test data: Static level (ft)	Test data: Drawdown (ft)	Test data: Pumping rate (gpm)	Test data: Length of test (hr)	Test data: Specific capacity (gpm/ft)	Logged depth to sand and gravel (ft)	Logged depth to bedrock (ft)	Driller
12521N07W151A	CLARENCE PFEIFFER	1964	108	18	IR	40	18	3/16	864	8	3.2	300	2	93.8	3		BROWN
12521N07W151G	BRAUER PORK	1994	115	5	DO	4	3	0.025	494	24.5					17		ALBRECHT
12521N07W153E	M J HERNAN	--	55	--	DO				234	15							STUFFLEBEAM
12521N07W153F	BURNELL STEINHAUER	1959	119	18	IR				1060			1400			4		--
12521N07W155D	HAVANA NATL BANK TRUST	1994	114	16	IR	20	16	0.05	1294	4					2		SHADOW MFG
12521N07W157C	ANNA HIMMEL	--	63	--	DO				234	10							STUFFLEBEAM
12521N07W157D	HAROLD R SINCLAIR #1	1950	63	--	DO												--
12521N07W157D	HAROLD R SINCLAIR #2	1958	15	1.2	DO				669	8	20						--
12521N07W157G	BURNELL STEINHAUER	1962	112	18	IR	52		3/16	763	6.7	3.6	650	6	180.6	2	111	S & B WELL CO
12521N07W161D	HAROLD R SINCLAIR	1955	14	1.2	DO	3		WELLPOINT	760	4.09							SINCLAIR
12521N07W162F	HAVANA NATL BANK TRUST	1994	114	10	IR	10	10	0.05	1294	3.5					2		SHADOW MFG
12521N07W164A	MARGARET NIEDERER	1988	115	16	IR	20	16	0.05	1088	12	29	1250		43.1	2		GROSCH
12521N07W165H	AUG BUSCH	--	35	--	DO				234	12							--
12521N07W165H	AUG BUSCH	--	35	--	DO				234	12							HARACANICK
12521N07W167E	DENNIS MOLDENAUER	1982	105	16	IR	20	16	0.085	482	7					0		ALBRECHT
12521N07W168B	JOHN F DAVIS	--	68	--	DO				234	10					68		--
12521N07W168C	H STANSBURY	--	65	--	DO				234	15							--
12521N07W171D	ANDREW LARSON	1980	130	16	IR	20	8	0.08	480	15					5		ALBRECHT
12521N07W172C	HERMAN LANDWER	1892	80	--	DO				234	20							DREXLER
12521N07W172F	JAMES WILLIAMS	1966	107	18	DO	40	18	3/16	??66	8	1.2	300	4	250	2		BROWN
12521N07W173C	HERMAN LANDWER	1874	80	--	DO				234	15					80		SANDERS/DUNBAR
12521N07W173H	HERMAN LANDWER	1920	60	--	DO										60		DREXLER
12521N07W173H	HERMAN LANDWER	1921	45	--	DO				234	15							--
12521N07W174H	SOUTH HEATER SCHOOL DIST #51	--	70	--	SC				234	20					70		STUFFLEBEAM
12521N07W175F	BEULAH WILLIAMS	1992	114	10	IR	20	10	0.05							13		GROSCH
12521N07W182B	DAVID LARSON/ROGER THOMPSON	1990	115	8	DO	15	8	0.05	1190	12					2	115	GROSCH
12521N07W182H	MARY A HAHN	--		--	DO												--
12521N07W183C	HERMAN LANDWER	--	40	--	DO												STUFFLEBEAM
12521N07W187H	RON KRAUSE	1989	107	14	IR	20	12	0.05	489	11	14	1250		89.3	2		GROSCH
12521N07W188A	ANDREW LARSON, SR	1968	95	--	DO	40	18	3/16	??68	15	3	300	3	100	2		BROWN
12521N07W188G	DAN STEPHENS	1996	66	4	DO	4	4	0.015							0		DOWELL
12521N07W192F	RINGHOUSE BROS	1977	97	15	IR	20	*******	0.06	477	12		800	2		0		ALBRECHT
12521N07W194D	FRED KOKE	--	48	42-1.5	DO				234	30							--
12521N07W196A	MILLER	1907	41	--	DO												STUFFLEBEAM
12521N07W198A	LOUIS DESMEYER	1916	31	--	DO												STUFFLEBEAM
12521N07W198A	CHARLES WELLS	1931	29	--	DO												STUFFLEBEAM
12521N07W198B	LESTER SHORES	1973	81	4	DO	5	4	0.016	1173	16		10	2		0		CRUMPLER
12521N07W198D	JOHN PREISEL ESTATE	1926	65	--	DO				334	16					65		STUFFLEBEAM
12521N07W198F	J SHORES	1905	35	--	DO				334	25							BARDOWELER
12521N07W201E	H N STAGING	1890	25	--	DO				234	5.5							STAGING
12521N07W204G	J E MEYER	--	45	--	DO												LAYMAN
12521N07W204G	J E MEYER ESTATE	--	45	--	DO												--
12521N07W211A	AINSWORTH ESTATE	--	28	--	DO				234	8							STUFFLEBEAM
12521N07W211A	AINSWORTH ESTATE	1934	20	--	DO				234	8							STUFFLEBEAM
12521N07W216C	JAMES M TOMLIN	1990	106	14	IR	20	12	0.05	490	21	31	1000		32.3	2		GROSCH
12521N07W218D	M D TOMLIN	--	50	--	DO				234	10					50		STUFFLEBEAM
12521N07W218G	JOHN F DAVIS	--	50	--	DO				234	10							--
12521N07W222B	CAVE ESTATE	1931	15	--	DO				234	6							CAVE
12521N07W222C	LEO PFEIFFER/DON PHELPS	1974	109	12	IR	15	10.2	.060-.070	574	4.5		1500			3		ALBRECHT

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Appendix III-2. (Continued)

Well location	Well owner	Well: Year constructed	Well: Depth (ft)	Well: Diameter (in)	Well: Type/Use	Screen: Length (ft)	Screen: Diameter (in)	Screen: Slot size (in)	Test data: Date (mmyy)	Test data: Static level (ft)	Test data: Drawdown (ft)	Test data: Pumping rate (gpm)	Test data: Length of test (hr)	Test data: Specific capacity (gpm/ft)	Logged depth to sand and gravel (ft)	Logged depth to bedrock (ft)	Driller
12521N07W222G	LOUIS PFIEFFER	1967	114	22-17	IR	48	22-17	1/4 X 3/8	467	10.3	5.7	600	4	105.3	0		GIBBS
12521N07W226C	ASCHIMMELPFENING	1977	124.5	14-10	IR	30	10	0.04	1177	13	15	1124	1	74.5	0	145	LAYNE-WESTERN
12521N07W227C	B L MCFADDEN	1916	70	--	DO				234	20					70		STUFFLEBEAM
12521N07W227G	PEGGY LUCAS	1989	108	14	IR	20	12	0,05	489	9	23	1000		43.5	2		GROSCH
12521N07W228E	B L MCFADDEN	1919	20	--	DO				334	8							CAVE
12521N07W231C	D C VAN ETTEN	--	65	--	DO				234	10					65		SAUNDERS
12521N07W231C	D C VAN ETTEN	--	80	--	DO				234	18					80		STUFFLEBEAM
12521N07W234H	IRA BELL	--	70	--	DO				234	25							--
12521N07W241A	FURRER ESTATE	--	55	--	DO				234	16					55		STUFFLEBEAM
12521N07W245G	JOS UNBACK	--	70	--	DO				234	18					70		STUFFLEBEAM
12521N07W245G	JOS UNBACH	--	60	--	DO				234	18							--
12521N07W25	EASTON FIRE DEPT	1947	152	4	NC	10	3		??47	12.5							HAYNES
12521N07W25	NELSON MW1	1992	18.2	2	MO	10	2	0.01	492	10.6					0		ADV ENVIRONMENTAL
12521N07W25	NELSON MW2	1992	17	2	MO	10	2	0.01	492	10.1					0		ADV ENVIRONMENTAL
12521N07W25	NELSON MW3	1992	17	2	MO	10	2	0.01	492	10.1					0		ADV ENVIRONMENTAL
12521N07W251C	ED WITT	1993	103	5	DO	4	5	0.012	693	22					30		GROSCH
12521N07W251E	MORGAN LUCAS	--	85	--	DO												--
12521N07W251E	M LUCAS	--	75	--	DO												--
12521N07W252E	M LUCAS	1922	70	--	DO										70		STUFFLEBEAM
12521N07W253C	CAROL UMBACH	1984	132	16	IR	20	16	0.05	484	8	25	1250		50	27		GROSCH
12521N07W253G	WALTER BEHRENDS	1990	123	14	IR	20	12	0.05	490	21	33	1000		30.3	2	123	GROSCH
12521N07W254A	EASTON GRAMMAR SCHOOL	--	58	--	SC				234	13					58		STUFFLEBEAM
12521N07W254A	WAYNE CURRY	1922	58	--	DO				234	13					58		STUFFLEBEAM
12521N07W255A	E H NEIDER	--	60	--	DO				234	13					60		STUFFLEBEAM
12521N07W255A	LUTHER JONES	--	58	--	DO				234	13					58		STUFFLEBEAM
12521N07W255A	DAVE STREET	--	74	--	DO				234	13					74		STUFFLEBEAM
12521N07W255A	D A LEWIS	--	63	--	DO				234	13					63		STUFFLEBEAM
12521N07W255E	JOHN WHITEHEAD	1893	71	--	DO				234	15					71		PERKINS
12521N07W255E	JOHN WHITEHEAD	1919	67	--	DO				234	15					67		--
12521N07W256A	I W RINGLAND	--	54	--	DO				234	13					54		STUFFLEBEAM
12521N07W256A	GEORGE ATHEY	--	58	--	DO				234	13					58		STUFFLEBEAM
12521N07W256A	A HAWKS	--	58	--	DO				234	13					58		STUFFLEBEAM
12521N07W256A	HOME OIL CO	--	58	--	IC				234	13					58		STUFFLEBEAM
12521N07W256A	W A ESTEP	--	65	--	DO				234	13					65		STUFFLEBEAM
12521N07W256A	CHARLES BARTEL	--	62	--	DO				234	13					62		STUFFLEBEAM
12521N07W256A	A SCHRIEBER	--	57	--	DO				234	13					57		STUFFLEBEAM
12521N07W256A	MARY CAROL TUCKER	1981	70	4	DO	10	4	0.01							20		GROSCH
12521N07W256B	LLOYD CAVE	--	55	--	DO				234	13					55		STUFFLEBEAM
12521N07W256B	HAROLD WALTERS	--	65	--	DO				234	13					65		STUFFLEBEAM
12521N07W256B	FRED INGERSOLL	--	62	--	DO				234	13					62		STUFFLEBEAM
12521N07W257A	CORN STATE BANK	--	80	--	DO				234	13					80		STUFFLEBEAM
12521N07W257A	BOMAN HOUK	--	85	--	DO				234	13					85		STUFFLEBEAM
12521N07W257A	IDA STEVENS	--	85	--	DO				234	13					57		STUFFLEBEAM
12521N07W257A	EASTON #1	1960	135	8	MU	10	8	0.025	1060	14.45	1.97	60	7.1	30.4	15		HATFIELD
12521N07W257A	EASTON #2	1971	138	8	MU	10	8	0.03	871	11.96	3.91	150	3	38.4	27		BAKER
12521N07W257A	EASTON FIRE DEPT	1955	150	6	NC	10	6		760	11.78					150		HATFIELD
12521N07W257B	MRS FANNIE ROOT	--	32	--	DO				234	13							STUFFLEBEAM
12521N07W257B	HARRY HENNIGER	--	65	--	DO				234	13					65		STUFFLEBEAM
12521N07W257B	LULU LIST	--	60	--	DO				234	13					60		STUFFLEBEAM

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Appendix III-2. (Continued)

		Well				Screen			Test data								
Well location	Well owner	Year con-structed	Depth (ft)	Dia-meter (in)	Type/ Use	Length (ft)	Dia-meter (in)	Slot size (in)	Date (mmyy)	Static level (ft)	Draw-down (ft)	Pumping rate (gpm)	Length of test (hr)	Specific capacity (gpm/ft)	Logged depth to sand and gravel (ft)	Logged depth to bedrock (ft)	Driller
12521N07W258A	WM WALTERS	--	60	--	DO				234	13					60		STUFFLEBEAM
12521N07W258A	JOHN WHITEHEAD	--	65	--	DO				234	13					65		STUFFLEBEAM
12521N07W258A	TOM WALKER	--	65	--	DO				234	13					65		STUFFLEBEAM
12521N07W258A	MRS W R GRANT	--	58	--	DO				234	13					58		STUFFLEBEAM
12521N07W258A	MARY BOMAN	--	60	--	DO				234	13					60		STUFFLEBEAM
12521N07W258A	GARAGE	--	60	--	DO				234	13					60		STUFFLEBEAM
12521N07W258A	BROOKS GRAIN CO	--	55	--	IC				234	13					55		STUFFLEBEAM
12521N07W258A	EASTON FIRE PROTECTION	1986	129	6	NC	10	4	0.05	386			400			12		GROSCH
12521N07W258B	HENRY PALMAN	--	66	--	DO				234	13					66		STUFFLEBEAM
12521N07W258B	H D MCDOWELL	--	60	--	DO				234	13					60		STUFFLEBEAM
12521N07W258D	ROBERT LOWERS	1973	83	4	DO	10	4	0.016	673			26	2		52		CRUMPLER
12521N07W261A	R B SAMUEL	1895	80	48-1.2	DO				234	25					80		INGERSOLL
12521N07W261E	EASTON COMM HS (DEEPENED)	1940	148	4	SC	4		0.01	940	12.2		8	1		53	148	STUFFLEBEAM/HAYNES
12521N07W271H	JOS UMBACH	1911	60	--	DO				234	14					60		DREXLER
12521N07W271H	JOSEPH UMBACH ESTATE	1955	16	1.2	DO	3		WELLPOINT	760	9.46					16		UMBACH
12521N07W272B	R B SAMUEL	1899	60	--	DO				234	12					60		INGERSOLL
12521N07W272C	R B SAMUEL	1899	60	--	DO				234	12					60		INGERSOLL
12521N07W273B	MABLE SCHULTE	1898	72	--	DO				234	12					72		STUFFLEBEAM
12521N07W273H	JOS UMBACH	--	18	--	DO				234	12					18		--
12521N07W276G	MABEL SCHULTE	1918	28	--	DO				234	8							--
12521N07W277A	K G BEHRENDS	--	45	--	DO				234	12					45		--
12521N07W281A	B H CAVE	--	28	--	DO				234	8							--
12521N07W284A	SHERMAN VALLEY SCHOOL	--	60	--	SC				234	8					60		STUFFLEBEAM
12521N07W284C	G A BIGGS ESTATE	--	35	--	DO				234	12							STUFFLEBEAM
12521N07W286F	BERT HAGVALL	1906	45	--	DO												STUFFLEBEAM
12521N07W287C	PEGGY LUCAS	1989	99	14	IR	20	12	0.05	489	9	32	1250		39.1	2		GROSCH
12521N07W287F	CLYDE EATON	1928	56	--	DO												STUFFLEBEAM
12521N07W288F	BRUCE HAGVALL	1928	58	--	DO												STUFFLEBEAM
12521N07W292B	HAVANA NATL BANK	1983	116	16	IR	20	16	0.05	783			1250			8		GROSCH
12521N07W292F	HELENA REEBER	1906	35	--	DO				234	14					35		PERKINS
12521N07W294A	G A BIGGS	--	35	--	DO				234	15					35		--
12521N07W294A	G A BIGGS	1909	20	--	DO				234	15							HUBER
12521N07W296A	G M HOFF	1919	53	--	DO				234	15					53		STUFFLEBEAM
12521N07W301H	JEAN RINGHOUSE	--	35	--	DO				234	18							STUFFLEBEAM
12521N07W303F	E C RINGHOUSE	1959	105	18	IR	40			161	10	10	1310	2	131			GROSCH
12521N07W303G	E C RINGHOUSE	1959	105	22-17	IR	40	22-17		760	10	14	1310	2	93.6	5		GROSCH
12521N07W305B	MARIA GREGORY	1992	115	10	IR	20	10	0.05							2		GROSCH
12521N07W305D	ROSE KRAUSE	--	35	--	DO				234	12							--
12521N07W305D	ROSE KRAUSE	--	25	--	DO				234	12							--
12521N07W305D	EARL MURDOCK	1990	130	8	IR	20	8	0.035							2		GROSCH
12521N07W306E	MARTIN JOHNSON	--	30	--	DO				234	16							--
12521N07W307E	MARTIN JOHNSON	1931	32	--	DO				234	18					32		--
12521N07W307F	MARIE GREGORY	1988	107	14	IR	20	12	0.05	488	15	15	1000		66.7	2		GROSCH
12521N07W312B	DENA HAHN	1990	120	16	IR	20	14	0.05	390	19	21	1000		47.6	2		GROSCH
12521N07W313H	JOHN HOLSTLAW	1952	22.5	1.2	DO	3		WELLPOINT	760	1.27					22.5		--
12521N07W314C	C H KREILING	--	30	--	DO				234	8							--
12521N07W314C	C H KREILING	1930	31	--	DO				234	8							KREILING
12521N07W314G	RINGHOUSE INC	1990	103	14	IR	20	14	0.05	1290	4	18	1000		55.6	2		GROSCH
12521N07W315D	W HALL	--	35	--	DO				234	7					35		STUFFLEBEAM

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Appendix m-2. (Continued)

Well location	Well owner	Well: Year constructed	Well: Depth (ft)	Well: Diameter (in)	Well: Type/Use	Screen: Length (ft)	Screen: Diameter (in)	Screen: Slot size (in)	Test data: Date (mmyy)	Test data: Static level (ft)	Test data: Drawdown (ft)	Test data: Pumping rate (gpm)	Test data: Length of test (hr)	Test data: Specific capacity (gpm/ft)	Logged depth to sand and gravel (ft)	Logged depth to bedrock (ft)	Driller
12521N07W316B	PAUL SEBADE	1984	116	16	IR	20	16	0.05	484	5	40	1250		31.3	2		GROSCH
12521N07W321H	SCOTT LUCAS	--	55	--	DO				234	12					55		STUFFLEBEAM
12521N07W323C	ALBERT KRAUSE	1988	125	14	IR	20	12	0.05	1088			1250			12		GROSCH
12521N07W324G	ART SCHIMMELPHENNING	1977	95	16	IR	48	16	3/16							2		GROSCH
12521N07W326F	HARPHAM ESTATE	--	67	--	DO				234	12					67		STUFFLEBEAM
12521N07W326F	HARPHAM ESTATE	--	35	--	DO				234	12							STUFFLEBEAM
12521N07W327G	MAX KRAUSE	--	25	--	DO				234	11							KRAUSE
12521N07W327G	MAX KRAUSE	1921	35	--	DO				234	11					35		STUFFLEBEAM
12521N07W334G	KENNETH CAVE	1995	103	8	IR	15	8	0.05							2		GROSCH
12521N07W334H	LUCIEN BASTEIN ESTATE	1930	45	--	DO				234	18							STUFFLEBEAM
12521N07W335D	FRED HAHN	--	60	--	DO												STUFFLEBEAM
12521N07W337A	DALE FORNOFF	1976	95	4	DO	4	4	0.016	476	31.3	8	20	1	2.5	0		CHADWICK
12521N07W338E	F B HUBER	--	14	--	DO				234	10					14		HUBER
12521N07W341F	LUCY LEE ESTATE	--	40	--	DO												--
12521N07W341G	LUCY LEE ESTATE	--	40	--	DO												--
12521N07W343A	BOB MONTGOMERY	1990	113	14	DO	20	12	0.05							35		GROSCH
12521N07W348H	B H CAVE	1900	28	--	DO				234	14							--
12521N07W348H	B H CAVE	1930	28	--	DO				234	10							CAVE
12521N07W348H	JAY & JENNY CAVE	1992	114	14	IR	20	12	0.05	692	7	27	1000		37	2	114	GROSCH
12521N07W353B	SAMUEL HUDGENS	1911	65	--	DO				234	12							STUFFLEBEAM
12521N07W353F	HOWARD ERMELING	1996	130	16	IR	20	16	0.05	396	8					8		SHADOW MFG
12521N07W357B	JOHN E HALL	--	60	--	DO				234	15					60		STUFFLEBEAM
12521N07W361C	IDA SIKES	--		--	DO												--
12521N07W361D	B ETZEN	--	50	--	DO												--
12521N07W363C	STAN ETZEN	1990	138	14	IR	20	12	0.05	390	15	28	1000		35.7	2	138	GROSCH
12521N07W363H	WALTER FURRER	1903	90	--	DO										90		--
12521N07W366H	JOHN RYNO	--	70	--	DO				234	13					70		STUFFLEBEAM
12521N07W366H	CHAS GILMORE ESTATE	--	57	--	DO				234	13					57		STUFFLEBEAM
12521N07W366H	SAMUEL HUDGENS	--	92	4	DO				234	13					92		STUFFLEBEAM
12521N07W367H	R S HAGAN	--	60	--	DO				234	13					60		STUFFLEBEAM
12521N07W367H	P E STUFFLEBEAM	--	75	--	DO				234	13					75		STUFFLEBEAM
12521N07W367H	O T EVEREST	--	57	--	DO				234	13					57		STUFFLEBEAM
12521N07W367H	ADELINE SILTMAN	--	70	--	DO				234	13					70		STUFFLEBEAM
12521N07W367H	WM EVERETT	--	57	--	DO				234	13					57		--
12521N07W368D	SAMUELS ESTATE	1919	60	--	DO										60		STUFFLEBEAM
12521N07W368H	GEORGE ROBERTS	--	53	--	DO				234	13					53		STUFFLEBEAM
12521N07W368H	ARTHUR VAN LANINGHAM	--	55	--	DO				234	13					55		STUFFLEBEAM
12521N07W368H	O R HAYNES	--	55	--	DO				234	13					55		--
12521N08W	QUEEN ANN'S COURT MHP	--	60	6	MU												--
12521N08W011A	HENRY EMME	1981	123	16	IR	20	16	0.08	281	10					0		ALBRECHT
12521N08W011D	ILL VALLEY IRRIGATION	1977	65	16	IR	40	16	3/16							1		GROSCH
12521N08W012G	MRS HERMAN ESSELMAN	1966	96	18	IR	40	18	3/16	??66	12.5	1.3	300	3	230.8	2		BROWN
12521N08W016C	GARY GATHMAN	1984	112	16	IR	30	16	.080-.060-.080	284	8	16	1000	1	62.5	4		ALBRECHT
12521N08W016G	NELSON ESSELMAN	1993	114	10	IR	20	10	0.05							2		GROSCH
t2521N08W018E	LESLIE HENNINGER	1959	28	1.2	DO	3		WELLPOINT	160	20.9							HENNINGER
12521N08W018F	ROBERT HENNINGER	1967	86	18	IR	43	18		??67	16	9	1580	5.5	175.6	3		FAYHEE & SONS
12521N08W022B	TREVOR JONES	1965	96	18	IR	40	18	3/16	??65	11	1	300	3	300	5		BROWN
12521N08W024C	HARRY SPECKETER	1965	105	18	IR		18	3/16	??65	13	1.2	500	3	416.7	3		BROWN
12521N08W025C	PAUL ROAT CONST	1974	63	6	IC	4	6	0.03	374	18.5	35	50		1.4	0		HOPSON

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Appendix III-2. (Continued)

		Well				Screen			Test data						Logged	Logged	
Well location	Well owner	Year constructed	Depth (ft)	Diameter (in)	Type/ Use	Length (ft)	Diameter (in)	Slot size (in)	Date (mmyy)	Static level (ft)	Drawdown (ft)	Pumping rate (gpm)	Length of test (hr)	Specific capacity (gpm/ft)	depth to sand and gravel (ft)	depth to bedrock (ft)	Driller
12521N08W025G	DELBERT HACKMAN	1964	85	18	IR	40		3/16	?764	18	1	200	5	200	0		BROWN
12521N08W028A	KENNETH SPECKETER	1992	60	5	DO	8	5	0.012	692	17					0		GROSCH
12521N08W028H	DELBERT HACKMAN	1964	114	18	IR	40	18	3/16	?764	13.7	0.8	300	4	375	2		BROWN
12521N08W032G	DELBERT HACKMAN	1964	99	18	IR	40		3/16	??64	12.6	1.4	250	4	178.6	2		BROWN
12521N08W041D	PAUL ROAT	1979	58	5	IR		3		779	19	10	20	1	2	0		ALBRECHT
12521N08W041D	JERRY ROAT	1982	70	2	DO	10	5	0.02	682	18					0		ALBRECHT
12521N08W041F	RUDY SCHILLING	1966	85	18	IR	40	18	3/16	??66	18	1.2	150	3	125	2		BROWN
12521N08W042D	ANDREW N LARSON	1945	21.5	1.2	DO	3		WELLPOINT	760	16.72							--
12521N08W043C	ANDREW LINDSAY	1981	109	8	IR	15	8	.040-.060							3	109	ALBRECHT
12521N08W045B	GERALD NETELER	1973	60	6.6	DO	4	6	0.016	1073	9.5		25	4		3		CHADWICK
12521N08W045H	DENNIS L MILLER	--	83	4	DO	4	4	0.016		33.5	8	20	1	2.5	0		CHADWICK
12521N08W045H	DON BLESSMAN	1977	66	4	DO	4	3.5	0.014	477	26.5	4	10	1	2.5	0		CHADWICK
12521N08W045H	RANDY MONROE	1977	64	4	DO	4	3.5	0.014	477	18.5					0		CHADWICK
12521N08W045H	DON BLESSMAN	1977	82	4	DO	4	3.5	0.014	577	23.5					0		CHADWICK
12521N08W045H	DON BLESSMAN	1977	66	4	DO	4	3.5	0.014	677	25.5					0		CHADWICK
12521N08W046H	CHARLES TURPIN	1976	74	4	DO	4	4	0.016	876	22.5	9	10	2	1.1	0		CHADWICK
12521N08W047A	RON JENKINS	1995	71	5	IR	4	5	0.012	895	37.5					0		ALBRECHT
12521N08W048G	STEVEN CAGLE	1976	66	4	DO	4	4	0.016	476	19.5	9	15	1	1.7	0		CHADWICK
12521N08W048G	DON BLESSMAN	1978	70	4	DO	4	4	0.018	178	16.5	9	10	8	1.1	0		CHADWICK
12521N08W048H	JOHN MICHAEL	1976	86	4	DO	4	3.5	0.014	176	26.5		10	1		15		CHADWICK
12521N08W048H	DON BLESSMAN	1978	70	4	DO	4	4	0.018	178	16.5		10	8		0		CHADWICK
12521N08W048H	DON BLESSMAN	1978	68	4	DO	4	4	0.018	178	14.5	9	10	8	1.1	0		CHADWICK
12521N08W05	DON BLESSMAN	1977	65	4	DO	4	3.5	0.014	477	23.5	3	10	1	3.3	0		CHADWICK
12521N08W051C	ERIC & MICHELLE TIBBS	1996	52	5	DO	4	5	0.012	796	35					1		GROSCH
12521N08W051D	JOHN BUERIS	1981	63	5	DO	5	5	0.015							0		ALBRECHT
12521N08W052A	STEVE LEONARD	1991	100	5	DO	4	4	0.015	1191	18.5					0		ALBRECHT
12521N08W052B	DON BLESSMAN	1977	66	4	DO	4	3.5	0.014	477	24.5	4	10	1	2.5	0		CHADWICK
12521N08W053C	RICHARD WOIWODE	1978	50	5	DO	4	2.5	0.02	878	20	10		15		0		ALBRECHT
12521N08W053D	DON BLESSMAN	1979	55	5	DO	4	2.5	0.025	379	25					0		ALBRECHT
12521N08W054C	CHRIS SMITH	1979	65	5	DO	3	3	0.045	979	21	20	15	1	0.8	0		ALBRECHT
12521N08W054D	RICHARD DECKARD	1978	50	5	DO	4	2.5	0.02	778	26					0		ALBRECHT
12521N08W057G	HAVANA NATIONAL BANK	1967	83	18	IR	44	18		??67	11	14	1000	5.6	71.4	5		FAYHEE & SONS
12521N08W06	PAUL BEHRENDS	1995	39	5	DO	4	5	0.02	495	12.5					5		ALBRECHT
12521N08W063A	HAVANA TW	1980	135	5	TW	4	2.5	0.02	480	45.5					0		ALBRECHT
12521N08W065D	CHICAGO & ILL MIDLAND	1949	92	--	IC	4		0.03	749	15	15	50		3.3	6		BOLLINGER
12521N08W065E	DWIGHT SHAW	1996	50	2	DO	4	2	0.01	796	13					5		JONES
12521N08W068A	LES DAVIS	1981	65	5	DO	8	4-2	015-.012	481	25					0		ALBRECHT
12521N08W068E	HAVANA #5	1974	96	12	MU	50	12	.050-.020-.015	974	19.74	10.16	966	3	95.1	0		LUHR BROS
12521N08W07	JOHN & SUSAN LACEY	1995	83	4	DO	3	4	0.015	1095	29.5					7		DOWELL
12521N08W07	WALKER FORGE MW-4D	1992	40	2	MO	5	2	0.01							0		TESTING ENGINEERS
12521N08W07	WALKER FORGE MW-4S	1992	12.5	2	MO	5	2	0.01							0		TESTING ENGINEERS
12521N08W07	WALKER FORGE MW-5D	1992	40	2	MO	5	2	0.01							0		TESTING ENGINEERS
12521N08W07	WALKER FORGE MW-5S	1992	15	2	MO	5	2	0.01							0		TESTING ENGINEERS
12521N08W07	WALKER FORGE MW-6S	1992	17.5	2	MO	5	2	0.01							0		TESTING ENGINEERS
12521N08W07	WALKER FORGE MW-P1S	1992	20	1	MO	5	1	0.01							0		TESTING ENGINEERS
12521N08W07	WALKER FORGE MW P2S	1992	12.5	1	MO	5	1	0.01							0		TESTING ENGINEERS
12521N08W07	WALKER FORGE MW-PID	1992	45	1	MO	5	1	0.01							0		TESTING ENGINEERS
12521N08W074D	NATIONAL STANDARD CO #2	1979	98	16	IC	25	16	0.045	1079	11	10.5	946	8	90.1	66		LAYNE-WESTERN
12521N08W074F	NATIONAL STANDARD CO #1	1967	98.2	16	IC	20	16		267	12	10	851	8	85.1			LAYNE-WESTERN

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Appendix III-2. (Continued)

Well location	Well owner	Well: Year constructed	Well: Depth (ft)	Well: Diameter (in)	Well: Type/Use	Screen: Length (ft)	Screen: Diameter (in)	Screen: Slot size (in)	Test data: Date (mmyy)	Test data: Static level (ft)	Test data: Drawdown (ft)	Test data: Pumping rate (gpm)	Test data: Length of test (hr)	Test data: Specific capacity (gpm/ft)	Logged depth to sand and gravel (ft)	Logged depth to bedrock (ft)	Driller
12521N08W075G	KEVIN FORNOFF	1996	52	4	DO	3	4	0.015							0		SHADOW MFG
12521N08W077H	CAMP DREIER D-5	--	75	--	NC												--
12521N08W078E	ARTHUR & MARY LOU RAY	1974	124	4	DO	4	3.5	0.016	474	38.5	10	10	4	1	0	122	CHADWICK
12521N08W081A	BONNETT INC	1974	43	6	IC	4	6	0.025	474	12.5	21	20	2	0.9	12		HOPSON
12521N08W081A	BONNETT INC	1977	58	5	IC	4	6	0.025	477	20.5	23.5	20	2	0.9	0		HOPSON
12621N08W081H	RODNEY YETTER	1994	62	5	DO	4	5	0.012	694	8					15		GROSCH
12521N08W082B	TREVOR JONES	--	96	--	DO												--
12521N08W087G	S & D FARMS, INC #1	1993	104	16	IR	30	16	0.05	593	10	16	1000		62.5	2	104	GROSCH
12521N08W088A	ELDON YETTER/DAN ROAT	1990	104	14	IR	20	14	0.05	290	16.5	18.5	1000		54.1	6	104	GROSCH
12521N08W092D	MICHAEL ROAT	1983	104	16	IR	44	16	3/16	583	4	21	1250		59.5	2		GROSCH
12521N08W093F	ELDON YETTER/DAN ROAT	1990	105	14	IR	20	12	0.05	290	18	17	1000		58.8	2	105	GROSCH
12521N08W096C	TREVOR JONES	1974	106	12	IR	12	10.2	0.015	674	2.5	26	800	2	30.8	0		ALBRECHT
12521N08W112A	ALVIN HACKMAN	1965	88	18	IR	36	18	3/16	??65	13	1.2	300	3	250	1		BROWN
12521N08W112B	ALVIN HACKMAN/DAVID LARSON	1984	105	16	IR	20	16	0.05	284	15	18	1250		69.4	2	105	GROSCH
12521N08W112G	DAVID LARSON	1966	96	18	IR	40	18	3/16	??66	14.2	2.3	500	3	217.4	2		BROWN
12521N08W122C	DOUGLAS BUDKE	1966	100	18	IR	40	18	3/16	??66	8	4.3	500	3	116.3	2		BROWN
12521N08W123B	EUGENE RINGHOUSE	1988	90	8	IR	30	8	0.04	488			500			2		GROSCH
12521N08W127D	ROBERT BARRETT	1988	112	14	IR	20	12	0.05	1088	23	31	1250		40.3	2		GROSCH
12521N08W127G	EARL KING	1979	108	16	IR	40	16	3/16							5		GROSCH
12521N08W127G	JERRY STEPHENS	1952	48	1.2	DO	3		WELLPOINT	760	20.33							--
12521N08W131A	KENNETH LEININGER	1972	69	4	DO	5	4	0.016							3		CRUMPLER
12521N08W133D	HOWARD ERMELING	1983	105	16	IR	20	16	0.06	1183	12	6	1250		208.3	2	105	GROSCH
12521N08W134G	HOWARD ERMELING	1990	114	8	IR	20	8	0.035							2		GROSCH
12521N08W14	ROGER THOMPSON	1995	59	5	DO	4	5	0.015	695	13.5					0		ALBRECHT
12521N08W141A	HOWARD ERMELING	1996	118	16	IR	20	16	0.05	396	9					0		SHADOW MFG
12521N08W141H	ROD JUMP	1996	63	5	DO	4	5	0.012	996	30					1		GROSCH
12521N08W148E	KIRK HILST	1996	62	5	DO	8	5	0.012	996	22					2		GROSCH
12521N08W151D	DONALD R FIELDS	1996	50	2	DO	3	2	0.01	??96	25							JONES
12521N08W154B	JOHN ROAT	1965	105	18	IR	40	18	3/16	??65	12	1.1	300	3	272.7	2		BROWN
12521N08W158G	CARL STEGING	1966	86	18	IR	40	18	3/16	??66	11	3.3	400	3	121.2	2		BROWN
12521N08W158H	CHARLES ROAT	1964	99	18	IR	40	18	3/16	??64	9	6.8	750	4	110.3	4		BROWN
12521N08W161C	MARVIN ROAT	1962	108	22-17	IR	24	22-17	1/4 X 3/8	662	7	12.8	850	1.5	66.4	2		GIBBS
12521N08W173B	BERNICE HAHN	1988	100	14	IR	20	12	0.05	1088	13	22	1250		56.8	2	100	GROSCH
12521N08W177G	FRED VANDERVEEN	1977	94	15	IR	22	12	0.06	577	6		1000	1		0		ALBRECHT
12521N08W181A	LOUIS BUSCH JR	1966	72	18	IR	40	18	3/16	?766	8.8		300	4		3		BROWN
12521N08W182F	DARRELL EBKEN	1992	110	16	IR	30	16-14	0.05							2	110	GROSCH
12521N08W197A	MRS ALVINA FRYE	1918	32	--	DO												FRYE
12521N08W197A	MRS ALVINA FRYE	1918	42	--	DO												FRYE
12521N08W201C	HERMAN H LEIDING	1953	325	1.2	OB	3		WELLPOINT	760	8.17					32.5		LEIDING
12521N08W202H	GLENN SPECKETER	--		--	DO												--
12521N08W207A	BERNICE HAHN	1993	108	14	IR	30	12	0.05							2	108	GROSCH
12521N08W208G	HAROLD & JOHN WALLBAUM	1989	110	14	IR	20	12	0.05	1189	15	28	1000		35.7	2	110	GROSCH
12521N08W212G	JULIUS STELTER	1965	104	18	IR	40	18	3/16	??65	5	1	300	3	300	2		BROWN
12521N08W214B	MARVIN ROAT	1963	105	18	IR	44	18	3/16	??63	4.8	0.9	400	4	444.4	2		BROWN
12521N08W214F	LOUIS STELTER	1960	96	--	IR												THIESZEN
12521N08W214F	LOUIS STELTER	1960	110	18	IR	60		SLOTTED PIP	161	10					110		THIESZEN
12521N08W215E	DON HAHN	1984	112	16	IR	33	16	.060-.080	284	4	16	1000	1	62.5	4		ALBRECHT
12521N08W216F	LOUIS STELTER	1962	99	22-17	IR	40	22-17	1/4 X 3/8	762	3.8	8.7	600	2.5	69	1.5		GIBBS
12521N08W218D	KENNETH SPECKETER	1991	75	5	DO	8	5		691	7					2		GROSCH

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Appendix m-2. (Continued)

Welt location	Well owner	Well: Year con-structed	Well: Depth (ft)	Well: Dia-meter (in)	Well: Type/ Use	Screen: Length (ft)	Screen: Dia-meter (in)	Screen: Slot size (in)	Test data: Date (mmyy)	Test data: Static level (ft)	Test data: Draw-down (ft)	Test data: Pumping rate (gpm)	Test data: Length of test (hr)	Test data: Specific capacity (gpm/ft)	Logged depth to sand and gravel (ft)	Logged depth to bedrock (ft)	Driller
12521N08W222H	BONNETT INC #3	1976	63	6	IC	3	5	0.018	1176	16.5	32	50	2	1.6	0		HOPSON
12521N08W228D	WILLIS FLEER/ARNO HAHN	1988	106	14	IR	20	12	0.05	1088	10	24	1250		52.1	2		GROSH
12521N08W2328	BONNETT INC #6	1976	43	5	IC	3	5	0.018	1176	14.5	24	20	2	0.8	0		HOPSON
12521N08W238D	WILHELMINA & FRIEDA HAHN	1977	91	16	IR	40	16	3/16							2		GROSCH
12521N08W238G	WILHELMINA HAHN	1966	115	18	IR	40	18	3/16	??66	8	1.2	250	4	208.3	2		BROWN
12521N08W241E	G H PREISEL	1921	60	--	DO				334	16							STUFFLEBEAM
12521N08W242G	JOHN KNUPPEL	1967	95	18	IR	40	18	3/16	??67	13.8	1.4		3		7		BROWN
12521N08W243B	HOWARD ERMELING	1968	106	18	IR	40	18	3/16	??68	10	2.4	300	3	125	2		BROWN
12521N08W245C	MRS WADE FRIEDRICK	1977	120	15	IR	20	12	0.06	477	10		1000	1		0		ALBRECHT
12521N08W246E	R G JUSTICE	--	105	--	IR												--
12521N08W252G	DON HAHN	1992	108	10	IR	20	10	0.05	292	20					2		GROSCH
12521N08W252G	GEORGE GLICK	1966	104	40	IR	18		3/16	??66	6	3.5	500	3	142.9	2		BROWN
12521N08W257G	JOHN KNUPPEL	1966	105	18	IR	40		3/16	??66	5	1.8	300	3	166.7	2		BROWN
12521N08W262A	SPRINGFIELD TH 7-64	1964	123.5	--	TH				??64	9.4					1	123.5	HAYES
12521N08W272C	JOHN ERMELING	1977	121	15	IR	20	12	0.1	977	17		1000	2		0		ALBRECHT
12521N08W273C	HOWARD ERMELING	1996	108	14	IR	20	12	0.05	496	12		1250			3		GROSCH
12521N08W274C	DANNY CAULKINS	1980	105	16	IR	28	16	3/16	380	18	57	885		15.5	0	104	GROSCH
12521N08W275F	MARVIN LASCELLES	1980	135	16	IR	20	12	0.1	180	11		1000	1		0		ALBRECHT
12521N08W281B	ALVIN PEPMEYER	1965	105	18	IR	40	18	3/16	7765	16	1.5			3	0		BROWN
12521N08W281G	JULIUS STELTER	1959	122	18	IR	56			961	13	4.3	1000		232.6	22		THIESZEN
12521N08W282F	BERNICE VANDERVEEN	1996	103	8	IR	20	8	0.05							2		GROSCH
12521N08W293A	WAYNE VANDERVEEN	1996	101	12	IR	20	12	0.05							4	101	GROSCH
12521N08W304D	P M CRATER	--		--	DO												--
12521N08W304D	P M CRATER	--		--	DO												--
12521N08W306H	W D FRYE TRUST	1996	79	5	DO	4	3	0.03	896	28.5					0		ALBRECHT
12521N08W308G	ELMER FRYE	1967	87	18	IR	40	18	3/16	??67	15	3	300	3	100	3		BROWN
12521N08W312F	MURRAY JOHNSON	1992	110	16	IR	20	16	0.05							2	110	GROSCH
12521N08W314B	MRS HANSON	--	25	--	DO												--
12521N08W314B	MRS HANSON	--	25	--	DO												--
12521N08W318F	KATHY MOORE	1989	105	14	IR	20	12	0.05	1289	18	23	1000		43.5	35		GROSCH
12521N08W322E	HARMON SEBADE	--	33	--	DO				334	8							--
12521N08W323F	DOROTHY BOHM	1990	103	14	IR	20	12	0.05	390	9	25	1000		40	2		GROSCH
12521N08W324E	HARMON SEBADE	1915	33	--	DO				334	8							SEBADE
12521N08W333D	PAUL FRIEND	1965	115	18	IR	40	18	3/16	??65	7	1.5	300	3	200	3		BROWN
12521N08W333F	JOE MCCLURE	1990	99	10	IR	20	10	0.035							2		GROSCH
12521N08W334A	DONALD COOPER	1980	60	5	DO	4	2.5	0.025	780	29					0		ALBRECHT
12521N08W335D	JOE MCCLURE	1989	102	8	IR	20	8	0.035	1289						2	99	GROSCH
12521N08W335H	FRANCES HANSON	1969	44	4	DO	3	4	0.018	??69	12	3.2	10	4	3.1	5		BROWN
12521N08W337G	JOE MCCLURE	1989	105	14	IR	20	12	0.05	1289	25	31	1000		32.3	2		GROSCH
12521N08W342B	GLEN FANTER	1980	118	16	IR	32	16	3/16	980	15	27	1250		46.3	2	118	GROSCH
12521N08W344B	GLEN FANTER	1980	107	16	IR	28	16	3/16	980	13	55	1250		22.7	2	107	GROSCH
12521N08W347E	J D WEAVER	1996	66	4	DO	3	4	0.015	296	32.5					0		DOWELL
12521N08W347G	JOHN W ERMELING	1967	97	18	IR	40	18	3/16	??67	9	2.5	300	3	120	2		BROWN
12521N08W348A	M O SEARS	--	192	48-1.5	DO				334	12							PERKINS
12521N08W348A	M O SEARS	1920	27.7	--	DO				334	12							SEARS
12521N08W352B	TED KRUSE	1959	122	18	IR	60	18		161	8							THIESZEN
12521N08W355G	MURRAY JOHNSON	1980	103	16	IR	28	16	3/16	480	22	47	1250		26.6	4	101	GROSCH
12521N08W358A	JOHN ERMELING	--	70	--	DO												--
12521N08W358H	DWIGHT KOLVES	1981	78	5	DO	4	5	0.018	881	30					0		ALBRECHT

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Appendix III-2. (Continued)

Well location	Well owner	Well: Year con-structed	Well: Depth (ft)	Well: Dia-meter (in)	Well: Type/Use	Screen: Length (ft)	Screen: Dia-meter (in)	Screen: Slot size (in)	Test data: Date (mmyy)	Test data: Static level (ft)	Test data: Draw-down (ft)	Test data: Pumping rate (gpm)	Test data: Length of test (hr)	Test data: Specific capacity (gpm/ft)	Logged depth to sand and gravel (ft)	Logged depth to bedrock (ft)	Driller
12521N08W363C	JESSIE JOHNSON	1963	100	18	IR	40		3/16	??63			1000	4		2		BROWN
12521N08W367B	JESSIE JOHNSON	1960	106	18	IR	40	18	3/16	??60	6	10	1150	3	115	6		S & B WELL CO
12521N09W	OR F G MORRILL	--	26.5	48	DO										26.5		--
12521N09W01	HAVANA TW	1990	92	--	TW												AL8RECHT
12521N09W011F	HAVANA #1	1930	85	36-26	MU	20	36-26		438	33					85		THORPE
12521N09W011F	HAVANA #2	1942	85	12	MU	15	12	0.04	248	22	7	950		135.7	85		LAYMAN
12521N09W011F	HAVANA #4	1960	78	12	MU	20	12	0.03	760	24	26	1000	8	38.5	78		EBERT
12521N09W012F	HAVANA (10 WELL GROUP)	1889	72	6	MU	20			??14	30							--
12521N09W012F	HAVANA #3	1952	113	12	MU	35	12	.040-.050-.020	1252	55	21.5	635	5	29.5	113		EBERT
12521N09W012G	TED YETTER	1992	106	5	DO	8	5	0.012	792	62					2		GROSCH
12521N09W111D	ST OF ILL DIV OF WATERWAYS	1967	62	6	ST	10	6	3/16	??67	21.3	9.7	300	3	33.3	6		BROWN
12521N09W112C	ILLINOIS POWER CO #1	1946	84.3	30-18	IC	15	18								0		TICER
12521N09W112C	ILLINOIS POWER CO #2	1946	85	30-18	IC	15	18		446	17.6	10	410		41	0		TICER
12521N09W112C	ILLINOIS POWER CO #3	1946	85	30-18	IC	16	18		1146	26		430			0		TICER
12521N09W112C	ILLINOIS POWER CO #4	1948	82.7	18	IC	15	18		1148	30	10	500	8	50	6		TICER
12521N09W112C	ILLINOIS POWER CO #5	1974	83.2	16	IR	20	16	0.1	974	20.7	12.1	600	4	49.6	0		LINKER
12521N09W113C	ILLINOIS POWER CO HAMW-121	1994	33	2	MO	15	2	0.01	894	28					0		BURLINGTON ENVIR
12521N09W113C	ILLINOIS POWER CO HAMW-122	1994	33	2	MO	15	2	0.01	894	28							BURLINGTON ENVIR
12521N09W113C	ILLINOIS POWER CO HAMW-122	1994	33.5	2	MO	15	2	0.01	894	28					0		BURLINGTON ENVIR
12521N09W113C	ILLINOIS POWER CO HAMW-124	1994	33	2	MO	15	2	0.01	894	28					0		BURLINGTON ENVIR
12521N09W123F	HENRY ANDERSON	1975	70	4	DO	4	3.5	0.014	775	25.5	5	10	1	2	0		CHADWICK
12521N09W128E	IL DEPT OF TRANSPORTATION	1991	61	4	ST	4	3.8	0.02	691	18.4	6.3	35	4	5.6	1		SAUDER
12521N09W128F	SCOTTS MHP #1	--	64	--	MU			SANDPOINT							64		--
12521N09W128F	SCOTTS MHP #2	--	64	--	MU			SANDPOINT							64		--
12521N09W128F	SCOTTS MHP #3	--	34	--	MU			SANDPOINT							34		--
12521N09W128F	SCOTTS MHP #5	--	43	--	MU			SANDPOINT							43		--
12521N09W128F	SCOTTS MHP #6	--	43	--	MU			SANDPOINT							43		--
12521N09W128F	SCOTTS MHP #7	--	43	--	MU			SANDPOINT							43		--
12521N09W128G	JERRY NETLER	1996	45	4	DO	3	4	0.015							25		DOWELL
12521N09W128G	SCOTTS MHP #4	--	34	--	MU			SANDPOINT							34		--
12521N09W132G	JIM STELTER	1985	90	13	IR	20	12	0.05	485	8	23	1250		54.3	4	90	GROSCH
12521N09W132G	DONNA KAY STELTER	1993	97	16	IR	10	16	0.05	593	7	17		2		2		SHADOW MFG
12521N09W136D	GERALD BONNETT	1965	91	18	IR	40	18	3/16	??65	11	1.5	300	3	200	2		BROWN
12521N09W14	RUSTY SCHAD	1972	52	4	DO	5	4	0.016	272	15		10	2		0		CRUMPLER
12521N09W14	F QWIGGLE	1974	62	4	DO	4	4	0.016	1274	18.5	3	15	4	5	0		CHADWICK
12521N09W14	JIM HAINLINE	1974	80	4	DO	4	3.5	0.06	175	16.5	4	20	8	5	0		CHADWICK
12521N09W14	THOMAS HASTINGS JR	1976	58	4	DO	8	4	0.02	476	16.5	27	20		0.7	0		CHADWICK
12521N09W14	LOCAL DEVELOPMENT	1976	78	4	DO	4	4	0.016	476	25.5	18	10	6	0.6	0		CHADWICK
12521N09W14	JIM HAINLINE TH	1960	80	4	TH	4	4	0.04	1274	14.5	4	15	3	3.8	0		CHADWICK
12521N09W141H	J W MCHARRY MD	1978	75	4	DO	4	4	0.014	578	24	5	10	3	2	0		CHADWICK
12521N09W142A	FRED SPECKMAN	1952	26	1.2	DO	3		WELLPOINT	760	9.99					5		SPECKMAN
12521N09W142D	GERALD BONNETT	1967	74	18	IR	40	18	3/16	?767	12	1.2	200	3	166.7	2		BROWN
12521N09W143C	RAY WHETSELL	1995	53	5	DO	4	5	0.02	995	20.5					5		ALBRECHT
12521N09W143C	GEORGE PORTER	1995	58	5	DO	4	5	0.01	995	16.5					0		ALBRECHT
12521N09W143D	MARK SCHMINK	1977	38	2	DO		2	SANDPOINT							0		CHADWICK
12521N09W143D	GERALD BONNETT	1975	45	5	DO	3	6	0.02	775	18.5	20	20	2	1	3		HOPSON
12521N09W143D	BONNETT INC	1977	44	6	DO	4	6	0.025	377	10.5	23	40	2	1.7	22		HOPSON
12521N09W144D	JAMES LUDWIG	1979	57	5	DO	4	2.6	0.025	879	19	10	15	1	1.5	0		ALBRECHT
12521N09W144D	DON BLESSMAN	1979	50	5	DO	4	2.5	0.015	379	20					0		ALBRECHT

Notes: CO=commerc!al, CS=communlty, DO=domestic, IC=industrial/commerclal, IR=lrrlgation, MO=monitoring, MU=munlclpal, NC=non-community, OB=observatlon, SC=school, ST=state, TH=test hole, TW=test well

Appendix HI-2. (Concluded)

Well location	Well owner	Well: Year constructed	Well: Depth (ft)	Well: Diameter (in)	Well: Type/Use	Screen: Length (ft)	Screen: Diameter (in)	Screen: Slot size (in)	Test data: Date (mmyy)	Test data: Static level (ft)	Test data: Drawdown (ft)	Test data: Pumping rate (gpm)	Test data: Length of test (hr)	Test data: Specific capacity (gpm/ft)	Logged depth to sand and gravel (ft)	Logged depth to bedrock (ft)	Driller
12521N09W144D	GERALD BONNETT	1974	55	5	DO	4	6	0.02	374	18.5	30	20	2	0.7	0		HOPSON
12521N09W144D	HAROLD HEAVOR	1978	54	5	DO	4	2.5	0.016	678	20		30			0		ALBRECHT
12521N09W144E	WILBUR BROWNFIELD	1989	59	5	DO	8	5								0	59	GROSCH
12521N09W144E	G BONNETT	1975	51	5	DO	5	6	0.025	775	18.5	20	50	2	2.5	2		HOPSON
12521N09W144F	JOHN WATSON	1972	48	6	DO	4	5	0.01	1072	18.5	10	20	2	2	0		HOPSON
12521N09W144F	JOHN STIGALL	1972	56	6	DO	4	5	0.015	1172	19.5	29	10	2	0.3	0		HOPSON
12521N09W144F	DON BLESSMAN AGENCY	1972	50	6	DO	4	5	0.02	1172	18.5	15	20	2	1.3	0		HOPSON
12521N09W144F	DON BLESSMAN AGENCY	1972	50	6	DO	4	5	0.025	1172	16.5	17	20	2	1.2	16		HOPSON
12521N09W145C	JEWEL STELTER	1977	63	6	DO	4	6	0.02	377	38.5	10	20	2	2	0		HOPSON
12521N09W145E	JAMES HAINLINE	1975	68	4	DO	4	3.5	0.016	775	23.5	5	10	1	2	0		CHADWICK
12521N09W145E	BONNETT INC	1978	58	6	IC	4	6	0.025	478	20.5	18	20	2	1.1	0		HOPSON
12521N09W145E	JOHN STEWART	1977	57	5	DO	4	6	0.02	477	28.5	20	20	2	1	0		HOPSON
12521N09W146G	RICHARD SHOEMAKER	1996	42	2	DO	3	2								22		SHADOW MFG
12521N09W222C	WILLIAM D PARSLEY	1996	33	2	DO	3	2	0.01	7796	13					4.5		JONES
12521N09W235E	DR ALAN DECKARD	1996	70	5	DO	8	5	0.012	896	29					1		GROSCH
12521N09W241H	BONNETT TURKEY HATCHERY	1979	40	5	IC	4	3	0.018	779	14	10	20	1	2	0		ALBRECHT
12521N09W242H	GERALD BONNETT	1965	93	18	IR	40		3/16	865	16.8	1.4	300	3	214.3	2		BROWN
12521N09W245G	RAYMOND MASTEN	1966	87	18	IR	40	18	3/16	?766	6.2	2.1	400	3	190.5	2		BROWN
12521N09W262G	WAYNE VANDERVEEN	1980	94	16	IR	32	16	3/16	1180			1200			2		GROSCH
12521N09W272B	R E MOORE	1995	65	4	DO	4	4	0.015							15		SHADOW MFG
12521N09W272H	ROBERT DIERKER	1996	53	4	DO	3	4	0.015	696	15					4		SHADOW MFG
12521N09W275C	VERA VANDERVEEN	1988	99	14	IR	20	12	0.05	688	10	50	1250		25	2		GROSCH
12521N09W275C	RICHARD VANDERVEEN	1991	98	14	IR	20	12	0.05	691	10	40	1000		25	2	98	GROSCH
12521N09W277B	BOB DIERKER	1996	88	10	IR	20	10	0.05	1196	15					0		SHADOW MFG
12521N09W333D	JOSEPH SARFF		17.5	1.2	DO	3		WELLPOINT	760	3.4					17.5		SARFF
12521N09W346C	STEVEN STOUT	1997	100	14	IR	20	14	0.05	297	17	20	1000		50	2		GROSCH
12521N09W348A	JOE MCCLURE	1981	90	8	IR	20	8	0.08	381	10					0		ALBRECHT
12521N09W352D	FRIEDA MEYER	1978	112	16	IR	40	16	3/16							3		GROSCH
12521N09W353A	HAROLD HAHN	1991	102	10	IR	20	10	0.05	1291	10					2	102	GROSCH
12521N09W353Q	FRIEDA MEYER	1984	98	8	IR	30	8	0.01							2		MCKINNEY
12521N09W354B	RUDOLPH NORDHAUSEN	1991	102	8	IR	15	8	0.05	491	18					2		GROSCH
12521N09W356C	ADOLPH HAHN	1985	106	13	IR	20	12	0.05	485	5	25	1250		50	3		GROSCH
12521N7W25	NELSON MW4	1992	25	2	MO	10	2	0.01	492	10.3					0		ADV ENVIRONMENTAL

Notes: CO=commerclal, CS=community, DO=domestic, IC=lndustrial/commercial, IR=irrigation, MO=monitorlng, MU=municlpal, NC=non-community, OB=observatlon, SOschool, ST=state, TH=test hole, TW=test well

Appendix III-3. Chemical Analyses of Water Samples Taken in Township Tiers 19N, 20N, and 21N of Mason County

Well location	Welt owner	Sample date	Lab. analysi number	Well depth (ft)	Iron (mg/l)	Manganese (mg/l)	Ammonium (mg/l)	Sodium (mg/l)	Calcium (mg/l)	Magnesium (mg/l)	Silica (mg/l)	Fluoride (mg/l)	Nitrate (mg/l)	Chloride (mg/l)	Sulfate (mg/l)	Alkalinity (mg/l as CaC03)	Hardness	TDM (mg/l)	Temp (F)
12519N09W074D	MORRIS BELL	07/16/64	1-0164290	86	0.1	--	--	--	--	--	--	--	2.6	1	--	116	144	194	59
12519N09W074D	MORRIS BELL	10/05/68	1-0176855	86	0.1	--	--	--	--	--	--	--	7.4	3	--	112	152	187	--
12519N09W082F	NELDAGREB	09/09/66	1-0169907	86	0.1	--	--	--	--	--	--	--	7.0	4	--	96	124	177	58
12519N10W138B	LAURA LANE	09/09/66	1-0169906	84	0.1	--	--	--	--	--	--	--	5.4	5	--	128	156	210	59
12519N10W232B	D ERNEST BROWN	08/11/67	1-0172912	73	0.1	--	--	--	--	--	--	--	14.4	4	--	110	156	190	58.5
12519N10W303D	SANGANOIS CONS AR #4	05/12/76	5-0201829	30	0.0	0.01						0.1	19.2	5	--	284	328	391	--
12519N11W137B	WILD WING LAND CO	11/14/35	1-0077018	93	0.8	0.0	--	6.2	57.7	21.4	15.0		1.1	2.0	18.5	200	232	262	--
12519N11W138A	SANGANOIS CONS AR #2	05/12/76	5-0201830	100	0.9	0.47	--	--	--	--	--	0.1	0.3	3	--	190	206	235	--
12519N11W142A	WILDLIFE ACRES FARM	07/22/65	1-0167471	87	2.8		--	--	--	--	--		2.4	8	--	248	256	297	59
12520N05W071C	MASON CITY #5	01/05/77	5-0204126	208	1.0	0.66	--	--	--	--	--	0.2	0.3	5	--	286	294	309	--
12520N05W071C	MASON CITY #5	07/13/77	7-B001922	208	1.1	0.53	--	--	--	--	--				--		289		--
12520NO5WO71C	MASON CITY #5	08/31/78	7-B011158	208	0.97	0.47	0.9	6.1	67	31	22	0.2	0.4	2.6	16	280	278	309	--
12520N05W071C	MASON CITY *5	08/19/81	7-B009939	208	1.21	0.322	1.0	6	63	28	21	0.21	0.04	2	12	278	278	288	--
12520N05W071C	MASON CITY #5	01/11/84	7-B026627	208	1.200	0.319	1.0	6	63	29.4	22	0.15	0.8	1.5	12	273	280	275	--
12520N05W071C	MASON CITY #5	02/13/86	7-Z001314	208	1.108	0.288	0.9	4.2	63	30	21	0.14	<0.4	2.2	14	286	--	294	58.1
12520N05W071C	MASON CITY #5	09/16/93	7-B314633	208	1.400	0.270	--	--	--	--	--	--	--	2	16	277	--	306	63.4
12520N05W071C	MASON CITY #5	09/22/95	7-B514036	208	1.2	0.260	--	8	--	--	--	--	--	0	12	269	--	145	58.4
12520N05W088F	MASON CITY #1	01/24/08	5-0017030	200		--					--	--	0.92	4		280	--	290	--
12520N05W088F	MASON CITY #1	01/??/11	5-0021714	200	0.3	--	0.9	9.5	61.9	28.0	--	--	1.1	2.0	1.4		270		--
12520N05W088F	MASON CITY #1	11/02/14	5-0029142	200		--					--	--	0.6	4		274		290	--
12520N05W088F	MASON CITY #3	03/15/89	7-B903515	197	1.758	0.258	0.8	6.2	75	32	17	0.13	2.4	5.0	32	280	331	356	--
12520N05W088F	MASON CITY #3	11/05/19	5-0042053	197	0.80	0.30	1.55	7.76	63.45	27.86	16.75	--	0.86	4.00	2.01	280	273	285	--
12520N05W088F	MASON CITY #3	07/28/38	5-0083960	197	1.5									4.0	0.0	278	263	272	--
12520N05W088F	MASON CITY #3	02/16/48	5-0113474	197	0.7	0.8	Trace	12.2	81.2	32.8	15.8	0.3	10.0	13.0	43.6	292	338	381	55.2
12520N05W088F	MASON CITY #3	08/26/74	7-B102411	197	1.6	0.24	0.9	5	67	33	19	0.2	2.8	6	28	268	303	324	--
12520N05W088F	MASON CITY #3	11/08/76	7-A010400	197	1.97	0.22	1.0	5.0	66.0	30.0	18	0.2	3.0	5	20	265	291	350	--
12520N05W088F	MASON CITY #3	11/15/78	7-B021806	197	1.73	0.23	0.9	5	69	30	19	0.3	2.6	3.5	23	279	289	311	--
12520N05W088F	MASON CITY #3	05/10/82	7-B044610	197	1.600	0.237	1.0	6	66	31.1	18	0.14	3.0	3.2	28	284	280	401	--
12520N05W088F	MASON CITY #3	02/13/86	7-Z001316	197	1.599	0.219	0.8	4.8	69	32	18	0.11	2.6	4.2	31	285		444	57.2
12520N05W088F	MASON CITY #3	04/07/70	7-0040374	197	1.6	0.3	0.4	5.5	62	30	6.2	0.2	2.7	5	16	264	284	338	--
12520N05W088F	MASON CITY #4	03/15/89	7-B903513	222	0.234	0.229	0.4	5.8	67	29	20	0.11	4.0	2.7	<10	269	291	297	--
12520N05W088F	MASON CITY #4	07/28/38	5-0083959	222	0.06	0.034	Trace	10.1	63.2	26.5	20.0	--	3.8	0.0	0.0	285	267	290	--
12520N05W088F	MASON CITY #4	01/15/73	7-B106025	222	0.18	0.44	0.6	4	68	29	20	0.2	0.9	2	0	276	289	276	--
12520N05W088F	MASON CITY #4	05/28/75	7-A020660	222	0.2	0.3	0.6	5.5	65	27.7	21	0.2	0.9	2	10	265	275	290	--
12520N05W088F	MASON CITY #4	09/21/77	7-A006027	222	0.30	0.31	0.51	4.0	61.0	25.2	22	0.1	2.6	1	5	260	256	295	--
12520N05W088F	MASON CITY #4	01/07/80	7-B029342	222	0.38	0.24	0.2	5	60	28	23	0.14	1.8	2.0	17	270	255	362	--
12520N05W088F	MASON CITY #4	05/10/82	7-B044607	222	0.480	0.242	0.4	4	57	26.6	21	0.14	1.9	1.0	<10	272	249	277	--
12520N05W088F	MASON CITY *DA*	05/18/84	7-Z001317	222	0.281	0.222	0.5	4	57	28	24	0.18	3.1	1.3	<10	277	--	278	57.2
12520N05W088F	MASON CITY #4	08/28/84	7-Z001318	222	0.343	0.244	0.4	4.7	58	29	22	<0.1	2.9	1	<10	274	--	362	56.3
12520N05W088F	MASON CITY #4	11/14/84	7-Z001319	222	0.294	0.242	0.3	4.4	61	30	21	0.1	2.9	1.3	10	270	--	295	56.3
12520N05W088F	MASON CITY #4	02/07/85	7-Z001321	222	0.349	0.278	0.5	6.4	66	32	21	0.13	3.2	1.2	12	274	--	331	57.2
12520N05W088F	MASON CITY #4	04/07/70	7-0040375	222	0.3	0.5	0.26	5	59	28	5.8	0.2	0.9	1	3	266	266	300	--
12520N05W122A	E M DOUGLAS	01/02/34	1-0080934	90	5.5	0.0	0.3	10.1	136.6	44.8	13.0	--	3.2	15.0	41.3	482	526	542	--
12520N05W222A	A D BLACK EST	02/02/34	1-0080324	145	0.3	0	--	6.7	71.4	37.0	14		13.3	2	9.7	322	331	329	--
12520N06W092A	STEVE TRACY	03/27/91	1-0224039	180	2.90	0.20	--	4.2	64.7	28.7	--	0.2	<0.1	1.2	19.7	258	279	284	--
12520N06W174E	MRS OLLIE SPEAR	08/12/69	1-0179241	160	24	20	--	--	--	--	--	--	1.8	2	--	324	316	358	--
12520N06W174E	MRS OLLIE SPEAR	08/12/69	1-0179242	160	1.0	0.74	--	--	--	--	--	--	0.7	1	--	320	312	356	--
12520N07W148A	WILLIS URISH	07/00/64	1-0163302	190	0.3		--	--	--	--	--	--	0.9	5	--	320	358	392	--
12520N07W195G	SPRINGFIELD TH4-64	11/00/64	5-0164656	127	1.6	0.27	--	--	--	--	--	0.1	0.8	2	--	316	330	365	--
12520N07W218H	SPRINGFIELD TH3-64	11/00/64	5-0164654	147	1.3	0.25	--	--	--	--	--	0.1	0.4	4	--	328	328	379	--
12520N07W218H	SPRINGFIELD TH3-64	11/00/64	5-0164655	105	0.9	0.23	--	--	--	--	--	0.1	0.4	3	--	340	342	381	--
12520N07W346H	SPRINGFIELD TH2-64	11/00/64	5-0164653	105	0.5	0.36	--	--	--	--	--	0.1	0.4	3	--	332	328	366	--
12520N07W348B	SPRINGFIELD TH1-64	11/00/64	5-0164652	105	1.1	0.43	--	--	--	--	--	0.1	1.2	2	--	338	324	357	--
12520N08W024E	TED KRUSE	11/17/60	1-0153757	130	2.6				59.2	17.5	--		2.4	1	30.4	188	220	261	55
12520N08W025E	GRAHAM CURTIS	06/05/91	1-0224263	60	0.02	0.41	<0.1	7.3	79.2	24.9	--	<0.1	2.6	11.6	82.0	246	300	406	
12520N08W034A	PAUL FRIEND	07/05/67	1-0172197	115	0.7	--	--	--	--	--	--	--	3.3	2	--	164	194	221	58
12520N08W041A	RONALD FRIEND	08/18/66	1-0169909	74	0.5	--	--	--	--	--	--	--	1.9	9	--	148	180	218	57.6
12520N08W118D	FLOYD KOKE	07/05/67	1-0172196	96	Trace	--	--	--	--	--	--	--	1.9	1	--	116	154	178	58
12520N08W118D	FLOYD KOKE	09/08/69	1-0179888	96	1.3	--	--	--	--	--	--	--	4.7	2	--	194	224	273	--

Appendix III-3. (Continued)

Well location	Well owner	Sample date	Lab. analysi number	Well depth (ft)	Iron (mg/l)	Manganese (mg/l)	Ammonium (mg/l)	Sodium (mg/l)	Calcium (mg/l)	Magnesium (mg/l)	Silica (mg/l)	Fluoride (mg/l)	Nitrate (mg/l)	Chloride (mg/l)	Sulfate (mg/l)	Alkalinity (mg/l as CaC03)	Hardness (mg/l as CaC03)	TDM (mg/l)	Temp (F)
12520N08W142G	FRED KRUSE	09/08/69	1-0179880	106	1.6	--	--	--	--	--	--	--	13	2	--	164	188	231	--
12520N08W212G	PAUL FRIEND	08/18/67	1-0172911	106	0.5	--	--	--	--	--	--	--	0.3	4	--	142	170	194	58
12520N08W261B	C H VAN ETTEN	07/29/65	1-0167475	104	0.8	--	--	--	--	--	--	--	2.8	6	--	188	200	235	58
12520N08W282B	DELFORD LANE	09/10/80	1-0214334	64	0.14	0.27	--	3.3	--	--	--	--	14	4	--	112	148	168	--
12520N08W342E	VINCENT STOUT	08/11/69	1-0179294	101	0.2	--	--	--	--	--	--	--	5.5	0	--	182	216	256	--
12520N09W032D	RALPH VANDERVEEN	07/17/67	1-0172875	101	0.1	--	--	--	--	--	--	--	7.2	1	--	92	120	146	58
12520N09W084D	L F CONNOLLY	03/14/61	1-0154330	63	Trace	--	--	--	27.4	--	--	--	3.0	0	30.9	80	109	143	56
12520N09W122A	SPRINGFIELD TH6-64	11/17/64	5-0164686	135.5	0.9	0.26	--	--	--	--	--	0.2	0.4	1	--	198	206	251	--
12520N09W132H	R & R STINAUER	06/09/93	1-0226825		0.23	0.14	--	3.9	59.5	19.1		0.1	<0.1	19.3	48.1	159	227	274	--
12520N09W177A	HOMER LASCELLES	08/07/67	1-0172904	100	Trace	--	--	--	--	--	--	--	7.6	0	--	64	84	91	58
12520N09W192E	MARVIN LASCELLES	10/11/77	1-0206603	101.5	0.1	--	--	--	--	--	--	--	5.1	3	--	90	114	151	--
12520N09W241B	RICHARD TONCRAY	06/19/69	1-0179296	77	1.0	--	--	--	--	--	--	--	1.2	2	--	180	216	258	--
12520N09W243H	SPRINGFIELD TH5-64	11/16/64	5-0164685	128	0.7	0.17	--	--	--	--	--	0.2	0.3	2	--	254	238	290	--
12520N09W267F	UNIV OF ILLINOIS	11/17/81	1-0216400	105	0.140	0.10	--	2.8	41.2	15.0	--	--	8.1	6	--	134	164	174	--
12520N09W267F	UNIV OF ILLINOIS	06/25/69	1-0178588	105	0.1	--	--	--	35.6	124	--	--	6.5	2	--	120	140	187	--
12520N09W287B	WILLARD BROWN	07/17/67	1-0172880	97	Trace	--	--	--	--	--	--	--	5.3	2	--	76	100	125	58
12520N09W287G	WILLARD BROWN	08/07/67	1-0172910	110	0.1	--	--	--	--	--	--	--	6.5	6	--	120	149	182	58
12520N09W303B	HOMER LASCELLES	08/07/67	1-0172879	104	0.2	--	--	--	--	--	--	--	6.7	2	--	96	124	155	68
12520N09W312G	HOMER LASCELLES	08/17/67	1-0172882	87	0.2	--	--	--	--	--	--	--	7.0	2	--	106	132	168	58
12521N05W011G	SAN JOSE #4	06/16/58	5-0146861	186	2.4	--	0.4	--	--	--	--	0.1	0.2	3	12.5	316	300	342	--
12521N05W011G	SAN JOSE #4	06/28/60	5-0152609	186	4.6	0.1	Trace	4	74.9	34.7	20.9	0.2	1.6	3	15.8	316	330	352	--
12521N05W011G	SAN JOSE #4	01/08/73	7-B105815	186	2.8	0.12	0.4	4	74	38	21	0.1	0	3	28	312	341	354	--
12521N05W011G	SAN JOSE #4	08/14/73	7-B101542	186	3.7	0.06	0.4	6	74	35	24	0.2	0.9	2	24	306	329	395	--
12521N05W011G	SAN JOSE #4	06/10/75	7-A021435	186	2.5	0.10	0.00	5.2	65	35	23	0.2	0.0	2	18	298	310	350	--
12521N05W011G	SAN JOSE #4	12/01/78	5-0209862	186	2.2	0.04	--	--	--	--	--	0.2	7.8	1	--	304	320	345	62.6
12521N05W011G	SAN JOSE #4	01/04/82	7-B031226	186	2.420	0.079	0.3	5	69	32.3	21	0.21	<0.4	1	31	297	285	293	--
12521N05W011G	SAN JOSE #4	05/18/84	7-Z001432	186	2.414	0.078	0.3	4.4	61	31	20	0.23	<0.4	15	33	280	--	312	55.4
12521N05W011G	SAN JOSE #4	08/27/84	7-Z001433	186	2.447	0.081	0.1	4.9	63	32	21	0.18	<0.4	<1.0	27	291	--	292	55.4
12521N05W011G	SAN JOSE #4	11/13/84	7-2001434	186	2.550	0.083	0.1	4.8	66	33	20	0.18	<0.4	1	32	287	--	329	54.5
12521N05W011G	SAN JOSE #4	02/28/85	7-Z001436	186	2.476	0.086	0.3	6.4	66	33	22	0.21	<0.4	<1.0	31	302	--	348	56.3
12521N05W011G	SAN JOSE #4	06/29/90	7-B009780	186	2.555	0.100	--	--	--	--	--	--	--	2	34	294	--	374	59
12521N05W011G	SAN JOSE #4	05/23/91	7-B107255	186	2.400	0.087	--	--	--	--	--	--	--	2	42	253	--	340	56.5
12521N05W011G	SAN JOSE #4	08/26/91	7-B112026	186	2.595	0.097	--	--	--	--	--	--	--	2	30	300	--	334	59.3
12521N05W011G	SAN JOSE #4	12/16/91	7-B117568	186	2.400	0.090	--	--	--	--	--	--	--	2	44	278	--	342	51.4
12521N05W011G	SAN JOSE #4	12/30/91	7-B117873	186	3.300	0.103	0.2	4.8	71.2	33.8	22.0	0.20	<0.04	2.4	43	298	297	347	--
12521N05W011G	SAN JOSE #4	02/24/92	7-B202623	186	2.655	0.113	--	--	--	--	--	--	--	3	37	284	--	343	54.7
12521N05W011G	SAN JOSE #4	06/26/92	7-B209762	186	2.600	0.098	--	--	--	--	--	--	--	2	36	262	--	340	55.4
12521N05W011G	SAN JOSE #4	09/18/92	7-B214456	186	2.400	0.084	--	--	--	--	--	--	--	2	46	246	--	363	55.2
12521N05W011G	SAN JOSE #4	11/10/92	7-B217161	186	2.600	0.102	--	--	--	--	--	--	--	--	--	260	--	--	55
12521N05W011G	SAN JOSE #5	05/07/84	7-B042422	168	2.3	0.076	0.4	5	67	34.2	23	0.19	<0.4	1	23	299	319	420	--
12521N05W011G	SAN JOSE #5	10/23/85	7-Z001430	168	2.244	0.071	0.4	5.4	71	36	22	0.22	<0.4	1.6	31	293	--	353	56.3
12521N05W011G	SAN JOSE #5	12/30/91	7-B117875	168	4.400	0.109	0.4	5.0	69.1	33.1	18.9	0.24	<0.04	2.1	20	306	300	333	--
12521N05W011H	SAN JOSE #1	11/02/14	5-0029169	105	0	0.08	--	12.91	98.64	41.78	15.8	--	79.54	29.0.	47.14	268	418	538	--
12521N05W011H	SAN JOSE #2	11/05/19	5-0042051	101	1.00	--	0.06	16.82	102.17	40.83	13.00	--	53.15	39.00	60.16	302	423	526	--
12521N05W011H	SAN JOSE #2	07/28/38	5-0083955	101	0.34	0.0	0.0	8.1	96.1	41.4	14.5	--	33.2	23.0	82.1	282	410	494	--
12521N05W011H	SAN JOSE #3	01/08/73	7-B105816	103	4.0	0.50	0.4	14	88	45	18	--	0.4	13	67	334	404	434	--
12521N05W081H	MRS R M AINSWORTH	01/26/34	1-0080933	105	0.1	0.0	0.06	9.7	86.4	36.4	14.0	--	32.8	6.0	17.1	308	366	375	--
12521N05W171E	RAYMOND M RENKEN	03/01/90	1-0223385	120	0.21	<0.02	--	9.8	61.1	28.2	--	0.2	45.5	11.6	34.4	213	268	330	--
12521N05W272G	RAYMOND M RENKEN	03/01/90	1-0223386	120	3.25	0.17	--	5.2	95.7	39.6	--	0.2	<0.1	10.8	41.7	370	402	433	--
12521N05W321G	HOWARD STONE	02/02/34	1-0080325	100	0.2	0.1	--	9.4	85.7	42.5	13.0	--	66.4	10	19.6	300	389	410	--
12521N06W04	EARL PFEIFFER	05/24/62	1-0158909		1.5	--	--	--	--	--	--	--	14	4	--	212	240	247	59
12521N06W047D	LOUIS C PFEIFFER	08/15/67	1-0172884	102	0.4	--	--	--	--	--	--	--	4.8	5	--	216	246	297	58
12521N06W054H	LEO PFEIFFER	08/06/64	1-0164289	102	1.7	--	--	--	--	--	--	--	5.4	0	--	212	224	277	57
12521N06W055H	LEO PFEIFFER	12/13/72	1-0190587	94	3.1	--	--	--	--	--	--	--	0.3	23	--	216	318	400	--
12521N06W161B	L G KEISLING	03/10/37	1-0080907	54	1.5	0.0	Trace	3.7	69.0	22.1	10.0	--	13	3.0	28.0	238	264	305	--
12521N06W253A	L K ELLSBERRY	02/02/34	1-0080323	180	0.4	0.2	--	3.2	64.3	31.6	10	--	1.3	1	3.3	292	291	280	--
12521N07W046B	WILLIAM MOLDENHAUER	07/11/66	1-0169554	80	0.5	--	--	--	--	--	--	--	2.5	4	--	136	160	200	58.3
12521N07W056F	RAY L CARPENTER	05/24/62	1-0158911	128	0.3	--	--	--	--	--	--	--	2.4	3	--	116	152	169	60
12521N07W056F	RAY L CARPENTER	07/09/63	1-0160777	128	0.4	--	--	--	--	--	--	--	2.4	3	--	120	160	194	62

Appendix III-3. (Continued)

Well location	Well owner	Sample date	Lab. analysl number	Well depth (ft)	Iron (mg/l)	Manganese (mg/l)	Ammonium (mg/l)	Sodium (mg/l)	Calcium (mg/l)	Magnesium (mg/l)	Silica (mg/l)	Fluoride (mg/l)	Nitrate (mg/l)	Chloride (mg/l)	Sulfate (mg/l)	Alkalinity (mg/l as CaC03)	Hardness (mg/l as CaC03)	TDM (mg/l)	Temp (F)
12521N07W058F	C H ZURBURG	03/09/37	1-0080906	63	0.1	0.0	--	3.0	29.0	8.2	6.0	--	1.5	0.0	26.9	84	107	130	--
12521N07W151A	CLARENCE PFEIFFER	08/07/64	1-0164287	108	2.5	--	--				--	--	3.5	5		252	304	362	60
12521N07W153F	BURNELL STEINHAUER	10/24/60	1-0153758	119	6.9	--	--	--	73.6	22.4	--	--	1.3	1	36.4	240	276	313	55
12521N07W157D	HAROLD R SINCLAIR SR	06/07/69	1-0178366	15	0.0	--	--	--	--	--	--	--	117	62	--	200	462	572	--
12521N07W157D	HAROLD R SINCLAIR SR	06/08/69	1-0178367	63	2.8	--	--	--	--	--	--	--	1.4	2	--	218	250	310	--
12521N07W157D	HAROLD R SINCLAIR SR	07/00/69	1-0178776	15	0.1	--	--	--	--	--	--	--	24.9	12	--	172	300	383	--
12521N07W157G	BURNELL STEINHAUER	07/01/63	1-0160568	112	3.6	--	--	--	--	--	--	--	0.7	1	--	256	264	318	--
12521N07W172F	JAMES WILLIAMS	08/09/66	1-0169905	107	0.1	--	--	--	--	--	--	--	2.1	3	--	112	136	189	57.7
12521N07W226C	ART SCHIMMELPFENINQ	11/17/77	1-0206972	124.5	3.1	--	--	--	--	--	--	--	0.5	7	--	214	282	356	
12521N07W257A	EASTON #1	12/14/92	7-B218874	135	1.6	0.177	0.2	5.4	68.2	30.6	20.5	0.15	<0.04	2.3	40	255	295	317	--
12521N07W257A	EASTON #1	03/29/60	5-0151962	135	1.5	0.1	--	--	--	--	--	0.2	0.3	2	--	264	285	280	50
12521N07W257A	EASTON #1	12/09/60	5-0153764	135	2.1	0.2	Trace	3	63.1	28.2	18.0	0.2	1.0	1	24.1	252	274	284	55
12521N07W257A	EASTON #1	12/05/73	7-B105997	135	1.6	0.14	0.1	4	60	28	25	0.2	1.3	2	38	240	267	289	--
12521N07W257A	EASTON #1	09/16/76	7-B011970	135	1.3	0.17	0.2	4.0	57	30	18	0.4	0.1	3	32	248	266	393	--
12521N07W257A	EASTON #1	05/23/77	7-B047357	135	1.5	0.17	0.14	5	63	28	18	0.2	0.0	2.0	26	263	274	353	--
12521N07W257A	EASTON #1	11/26/79	7-B023465	135	1.55	0.16	<0.1	4	65	28	18	0.15	<0.4	1.0	37	246	277	309	--
12521N07W257A	EASTON #1	01/04/82	7-B031213	135	1.69	0.154	0.2	4	67	29.1	17	0.16	<0.4	1	41	245	268	315	--
12521N07W257A	EASTON #1	10/28/85	7-Z001347	135	1.548	0.170	<0.1	5.2	68	32	20	0.14	<0.4	17	32	270	--	362	56.3
12521N07W257A	EASTON #1	11/08/93	7-B317605	135	1.700	0.173	--	--	--	--	--	--	--	0	48	258	--	770	56.5
12521N07W257A	EASTON #1	11/23/94	7-B416764	135	1.600	0.180								2	35	259	--	402	55.6
12521N07W257A	EASTON #2	12/14/92	7-B218869	138	1.5	0.209	<0.1	5.8	70.4	32.3	21.5	0.27	<0.04	2.3	24	275	296	310	
12521N07W257A	EASTON #2	08/30/71	5-0186524	138	1.1	0.21	--	--	--	--	--	0.2	0.0	0	--	274	278	296	56
12521N07W257A	EASTON #2	01/08/73	7-B105804	138	1.3	0.22	0.1	6	64	31	20	0.1	0	4	30	256	287	316	--
12521N07W257A	EASTON #2	05/27/75	7-A020466	138	1.4	0.1	0.1	6.0	65	27.7	20	0.2	4.0	3	25	255	280	300	--
12521N07W257A	EASTON #2	05/23/77	7-B047353	138	1.3	0.19	0.12	8	68	30	19	0.2	0.0	2.2	15	307	278	361	--
12521N07W257A	EASTON #2	11/26/79	7-B023476	138	1.33	0.19	0.1	6	65	29	21	0.16	<0.4	1.0	20	278	288	286	--
12521N07W257A	EASTON #2	01/04/82	7-B031224	138	1.490	0.182	<0.1	5	69	30.1	19	0.16	<0.4	1.3	29	291	278	363	--
12521N07W257A	EASTON #2	05/22/84	7-Z001339	138	1.305	0.188	0.04	5.7	66	31	19	0.13	0.3	1	15	295	--	326	56.3
12521N07W257A	EASTON #2	08/28/84	7-Z001340	138	1.421	0.179	<0.1	5.3	63	31	20	0.1	<0.4	1.4	32	282	--	326	56.3
12521N07W257A	EASTON #2	08/28/84	7-Z001341	138	1.488	0.183	<0.1	5.8	63	30	20	0.14	<0.4	1.5	20	282	--	299	56.3
12521N07W257A	EASTON #2	11/14/84	7-Z001342	138	1.297	0.185	<0.1	5.5	65	31	20	0.1	1.0	1	22	288	--	316	55.4
12521N07W257A	EASTON #2	02/27/85	7-Z001344	138	1.394	0.174	<0.1	6.3	63	30	21	0.12	<0.4	2	20	289	--	331	56.3
12521N07W261E	EASTON COMM HS	09/23/40	1-0088931	148	0.1	0.2	0.1	20.2	65.7	22.8	19.0	--	0.9	1.0	2.9	298	258	329	--
12521N07W303G	E C RINGHOUSE	07/22/60	1-0152855	105	0.2	--	--	--	--	--	--	--	--	2	--	144	179	194	58
12521N07W303G	E C RINGHOUSE	07/21/64	1-0164288	105	0.1							--	14.9	7		118	144	178	60
12521N07W348H	B H CAVE	02/17/34	1-0081058	28	0.1	16	0.04	26.2	118.6	37.9	13.0	--	48.7	21.0	148.3	286	452	573	--
12521N08W012G	MELVIN ESSELMAN	07/11/67	1-0172233	96	0.1	--	--	--	--	--	--	--	5.9	0	--	110	148	186	58
12521N08W018F	ROBERT HENNINGER	08/15/67	1-0172888	86	0.2	--	--	--	--	--	--	--	11.9	4	--	148	196	248	58
12521N08W024C	HARRY SPECKETER	08/15/66	1-0169910	105	0.1	--	--	--	--	--	--	--	6.4	4	--	144	180	220	58
12521N08W025G	DELBERT HACKMAN	08/10/67	1-0172908	85	Trace	--	--	--	--	--	--	--	60.0	4	--	98	176	247	58
12521N08W028H	DELBERT HACKMAN	08/10/67	1-0172874	114	0.3	--	--	--	--	--	--	--	7.6	3	--	144	180	219	58
12521N08W032G	DELBERT HACKMAN	07/23/65	1-0167479	99	0.3	--	--	--	--	--	--	--	8.5	3	--	160	192	236	60
12521N08W041F	RUDOLPH SCHILLING	08/15/67	1-0172887	85	0.2	--	--	--	--	--	--	--	12.1	6	--	140	184	221	58
12521N08W057G	HAVANA NATIONAL BANK	08/07/67	1-0172889	83	0.2	--	--	--	--	--	--	--	11.3	5	--	120	172	196	58
12521N08W063A	HAVANA TW	04/09/80	5-0213231	135	0.4	0.29	--	4.1	--	--	--	<0.1	0.3	1	--	154	176	209	--
12521N08W063A	HAVANA TW	07/29/80	5-0214015	135	0.5	0.29	--	3.6	45.7	14.4	--	<0.1	0.2	0	--	148	178	206	--
12521N08W068E	HAVANA #5	09/25/90	7-B014452	96	0.116	0.132	2.08	3.1	52.4	17.0	12	<0.1	2.08	4.4	43	159	200	208	--
12521N08W068E	HAVANA #5	09/17/74	5-0196914	96	0.0	0.13	--	--	--	--	--	0.2	5.5	5	--	122	162	210	57
12521N08W068E	HAVANA #5	05/23/77	7-B047351	96	0.2	0.13	0.01	4	44	15	12	0.1	10	5.4	35	141	177	252	--
12521N08W068E	HAVANA #5	12/03/79	7-B024833	96	0.197	0.138	<0.1	4	41	14	11	0.09	3.5	3.4	36	122	160	214	--
12521N08W068E	HAVANA #5	04/21/82	7-B042537	96	0.100	0.145	0.2	4	43	14.4	9.7	<0.1	1.3	1.9	42	136	163	288	--
12521N08W068E	HAVANA #5	05/22/84	7-Z001411	96	0.177	0.160	0.1	3.5	46	16	10	<0.1	3.1	3.4	40	142	--	227	58.1
12521N08W068E	HAVANA #5	08/27/84	7-Z001412	96	0.275	0.153	<0.1	5.7	49	18	12	<0.1	8.4	11	38	156	--	254	58.1
12521N08W068E	HAVANA #5	11/14/84	7-Z001413	96	0.200	0.160	<0.1	6.2	52	18	11	<0.1	8.8	10	40	152	--	269	57.2
12521N08W068E	HAVANA #5	11/14/84	7-Z001414	96	0.204	0.161	<0.1	6.1	51	18	11	<0.1	8.9	10	42	152	--	285	57.2
12521N08W068E	HAVANA #5	02/27/85	7-Z001416	96	0.196	0.152	<0.1	7.3	50	17	12	0.16	8.9	10	42	153	--	271	58.1
12521N08W068E	HAVANA #5	07/23/86	7-Z001419	96	0.270	0.215	<0.1	6.7	54	17	11	<0.1	8.0	11	40	154	--	287	57.2
12521N08W068E	HAVANA #5	06/29/90	7-B009779	96	0.105	0.172	--	--	--	--	--	--	--	5	45	153	--	269	58.1
12521N08W068E	HAVANA #5	05/23/91	7-B107254	96	0.117	0.139	--	--	--	--	--	--	--	4	43	146	--	234	57.6

Appendix III-3. (Continued)

Well location	Well owner	Sampl date	Lab. analyst number	Well depth (ft)	Iron (mg/l)	Manganese (mg/l)	Ammonium (mg/l)	Sodium (mg/l)	Calcium (mg/l)	Magnesium (mg/l)	Silica (mg/l)	Fluoride (mg/l)	Nitrate (mg/l)	Chloride (mg/l)	Sulfate (mg/l)	Alkalinity (mg/l as CaC03)	Hardness (mg/l as CaC03)	TDM (mg/l)	Temp (F)
12521N08W068E	HAVANA #5	08/26/91	7-B112023	96	<0.050	0.145	--	--	--	--	--	--	--	5	47	161	--	222	57.6
12521N08W068E	HAVANA #5	12/16/91	7-B117571	96	0.064	0.128	--	--	--	--	--	--	--	5	46	158	--	235	56.7
12521N08W068E	HAVANA #5	02/28/92	7-B202626	96	0.106	0.157	--	--	--	--	--	--	--	5	44	164	--	247	57
12521N08W068E	HAVANA #5	06/22/92	7-B209436	96	0.092	0.123	--	--	--	--	--	--	--	4	40	153	--	232	57.6
12521N08W068E	HAVANA #5	09/16/92	7-B214347	96	0.111	0.139	--	--	--	--	--	--	--	5	45	152	--	259	58.1
12521N08W068E	HAVANA #5	11/10/92	7-B217162	96	0.100	0.137	--	--	--	--	--	--	--	--	--	146	--	--	57.2
12521N08W074D	NATL STANDARD CO #2	10/08/79	1-0212194	98	0.0	0.00	--	--	--	--	--	<0.1	0.6	1	--	136	172	231	58
12521N08W074F	NATL STANDARD CO #1	03/00/67	1-0171065	98	0.1	0.07	--	--	--	--	--	--	--	1	--	128	164	193	--
12521N08W077H	CAMP DRIER D-5	12/14/35	1-0077177	75	0.3	0.0	--	6.9	36.5	14.3	12.0	--	4.0	0.0	17.7	124	151	166	--
12521N08W082B	TREVOR JONES	08/08/67	1-0172914	96	0.3	--	--	--	--	--	--	--	6.2	4	--	130	178	225	58
12521N08W112A	ALVIN HACKMAN	07/12/66	1-0169593	88	0.3	--	--	--	--	--	--	--	1.0	3	--	124	160	182	58.1
12521N08W112G	DAVID LARSON	07/28/69	1-0179291	96	0.9	--	--	--	--	--	--	--	4.5	1	--	139	180	252	--
12521N08W122C	DOUGLAS BUDKE	06/29/67	1-0172194	100	0.2	--	--	--	--	--	--	--	7.5	5	--	152	192	212	58
12521N0BW154B	JOHN ROAT	07/17/67	1-0172877	105	0.3	--	--	--	--	--	--	--	3.0	2	--	148	182	215	58
12521N08W158G	CARL STEQING	07/12/66	1-0169553	86	Trace	--	--	--	--	--	--	--	3.8	7	--	140	160	201	58.0
12521N08W158H	CHARLES ROAT	07/20/64	1-0164285	99	0.2	--	--	--	--	--	--	--	3.4	1	--	128	152	187	60
12521N08W161C	MARVIN ROAT	06/27/62	1-0158349	108	0.3	--	--	--	--	--	--	--	0.4	2	--	140	180	224	60
12521N08W181A	LOUIS BUSCH JR	08/11/69	1-0179883	72	1.8	--	--	--	--	--	--	--	0.3	1	--	136	172	215	--
12521N08W202H	GLENN SPECKETER	10/07/96	1-0229743		<0.01	<0.01	--	3.8	58.6	16.2	--	0.1	19.14	7.8	28.3	182	212	362	--
12521N08W202H	GLENN SPECKETER	11/00/94	1-0228149		0.03	<0.01	--	7.2	72.5	22.1	--	0.1	21.6	11.5	51.0	195	272	397	--
12521N08W214B	MARVIN ROAT	08/03/64	1-0164286	105	0.4	--	--	--	--	--	--	--	1.1	4	--	142	178	223	57
12521N08W238G	WILHELMINA HAHN	09/02/66	1-0169904	115	0.5	--	--	--	--	--	--	--	3.8	4	--	176	196	253	57.0
12521N08W238G	WILHELMINA HAHN	07/06/67	1-0172195	115	0.1	--	--	--	--	--	--	--	20.0	6	--	152	200	226	58
12521N08W242G	JOHN KNUPPEL	08/08/67	1-0172881	95	0.2	--	--	--	--	--	--	--	3.8	2	--	128	174	217	58
12521N08W246E	R G JUSTICE	06/27/69	1-0179292	105	1.2	--	--	--	--	--	--	--	19.8	3	--	104	162	238	--
12521N08W252G	GEORGE GLICK	08/31/66	1-0169900	104	0.4	--	--	--	--	--	--	--	13	2	--	128	152	193	58
12521N08W257G	JOHN KNUPPEL	07/05/67	1-0172192	105	0.4	--	--	--	--	--	--	--	0.2	2	--	128	166	198	58
12521N08W262A	SPRINGFIELD TH7-64	11/08/64	5-0164687	123.5	0.5	0.08	--	--	--	--	--	0.2	0.3	0	--	142	152	211	--
12521N08W281B	ALVIN PEPMEYER	07/19/66	1-0169552	105	0.7	--	--	--	--	--	--	--	13	4	--	164	184	227	58.0
12521N08W281G	JULIUS STELTER	07/11/61	1-0155596	122	0.4	--	--	13	--	--	--	--	4.7	3	--	164	191	238	61
12521N08W308G	ELMER FRYE	09/02/69	1-0179884	87	1.2	--	--	--	--	--	--	--	3.5	2	--	162	194	232	--
12521N08W333D	PAUL FRIEND	09/12/66	1-0169911	115	0.7	--	--	--	--	--	--	--	3.0	5	--	144	184	214	57
12521N08W363C	JESSIE JOHNSON	07/12/63	1-0160803	100	1.2	--	--	--	--	--	--	--	1.5	3	--	184	216	248	61
12521N08W367B	JESSIE JOHNSON	06/21/62	1-0158350	106	1.3	--	--	--	--	--	--	--	0.9	4	--	192	222	267	60
12521N09W011F	HAVANA #1	09/22/21	5-0046148	85	0.2	0.0	0.03	4.5	41.8	15.0	9.3	--	8.0	6.0	27.0	136	166	237	--
12521N09W011F	HAVANA #1	07/28/38	5-0083962	85	0.07	0.0	Trace	14	47.6	18.9	15.0	--	7.4	5.0	37.6	148	197	232	--
12521N09W011F	HAVANA #2	02/16/48	5-0113476	85	0.2	0.1	Trace	2.5	48.5	15.6	16.9	0.1	7.5	6.0	39.3	136	186	232	56.5
12521N09W011F	HAVANA #2	12/04/73	7-B105911	85	0.17	0.12	0.5	9	52	18	16	0.1	2.6	16	40	160	204	326	--
12521N09W011F	HAVANA #2	05/27/75	7-A020462	85	0.1	0.05	0.0	14.5	54	17.2	12	0.2	7.9	22	50	145	205	270	--
12521N09W011F	HAVANA #2	05/23/77	7-B047352	85	0.2	0.13	0.02	4	44	16	12	0.0	0.0	3.5	42	142	175	258	--
12521N09W011F	HAVANA #2	12/03/79	7-B024831	85	0.31	0.23	<0.1	4	49	18	13	0.05	<0.4	4.0	43	158	197	232	--
12521N09W011F	HAVANA 02	04/21/82	7-B042543	85	0.410	0.242	<0.1	5	51	17.7	12	<0.1	<0.4	3.1	59	155	192	213	--
12521N09W011F	HAVANA #4	09/25/90	7-B014451	78	0.167	0.132	<0.01	10.3	58.7	19.0	13	<0.1	9.3	16	44	179	221	297	--
12521N09W011F	HAVANA #4	01/10/73	7-0105916	78	0.16	0.14	0	6	52	16.5	16	0.0	9.7	8	45	140	197	240	--
12521N09W011F	HAVANA #4	05/27/75	7-A020463	78	0.1	0.02	0.0	6.0	52	16.7	13	0.1	10.1	8	45	145	200	240	--
12521N09W011F	HAVANA #4	05/23/77	7-B047350	78	0.2	0.11	0.06	9	49	17	13	0.1	8.8	13	41	154	194	288	--
12521N09W011F	HAVANA #4	12/03/79	7-B024896	78	0.197	0.104	<0.1	9	52	18	13	0.05	8 0	13	40	150	210	249	--
12521N09W011F	HAVANA #4	04/21/82	7-B042533	78	0.160	0.116	<0.1	10	56	18.5	12	<0.1	8.4	15	50	168	209	318	--
12521N09W011F	HAVANA #4	07/23/86	7-Z001421	78	1.365	0.322	<0.1	3.8	51	17	11	<0.1	<0.4	3.3	46	154	--	283	58.1
12521N09W012F	HAVANA #3	12/12/52	5-0130814	113	0.4	0.1	Trace	2.3	44.9	15.6	19.3	0.1	0.2	3	24.7	152	177	197	--
12521N09W012F	HAVANA-10 well group	11/03/14	5-0029175	72	0	0.08	--	5.7	40.8	13.9	17.0	--	7.0	4.0	21.8	--	159	196	--
12521N09W11	ILL POWER CO #1	02/00/69	1-0177474	84.3	0.1	--	--	--	--	--	--	--	6.5	2	--	156	192	228	--
12521N09W128F	SCOTTS MHP #1	10/06/87	7-B716387	64	<0.050	<0.005	<0.1	3	51	18	11	<0.1	40.3	8.2	34	133	198	232	61.5
12521N09W128F	SCOTTS MHP #2	10/06/87	7-B716388	64	<0.050	<0.005	<0.1	2.9	55	19	12	<0.1	40.0	8.8	33	147	213	248	61.3
12521N09W128F	SCOTTS MHP #3	10/06/87	7-B716389	34	<0.050	<0.005	<0.1	3.1	51	18	11	<0.1	39.8	8	33	129.2	199	235	63.4
12521N09W128F	SCOTTS MHP #5	10/06/87	7-B716391	43	<0.050	<0.005	<0.1	2.8	54	19	12	<0.1	42.1	8.9	35	140	211	235	71.8
12521N09W128F	SCOTTS MHP #7	10/06/87	7-B716392	43	0.581	0.338	<0.1	3.1	51	16	10	<0.1	0.4	3.6	58	145	195	225	69.4
12521N09W128G	SCOTTS MHP *4	10/06/87	7-B716390	34	2.636	0.024	0.2	2.9	51	17	9.7	<0.1	39.0	7.9	34	129	197	224	72.5
12521N09W142D	GERALD BONNETT	07/17/67	1-0172899	74	0.5	--	--	--	--	--	--	--	17.1	3	--	148	202	244	57

Appendix II1-3. (Concluded)

Well location	Well owner	Sample date	Lab. analysi number	Well depth (ft)	Iron (mg/l)	Manganese (mg/l)	Ammonium (mg/l)	Sodium (mg/l)	Calcium (mg/l)	Magnesium (mg/l)	Silica (mg/l)	Fluoride (mg/l)	Nitrate (mg/l)	Chloride (mg/l)	Sulfate (mg/l)	Alkalinity (mg/l as CaC03)	Hardness (mg/l as CaC03)	TDM (mg/l)	Temp (F)
12521N09W242H	GERALD BONNETT	08/06/65	1-0167477	93	0.3	--	--	--	--	--	--	--	13.4	6	--	156	192	259	--
12521N09W245G	RAYMOND MASTEN	07/17/67	10172886	87	0.5	--	--	--	--	--	--	--	5.9	2	--	130	174	213	58

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