

**The Yield Capability and Quality of
Ground Water in the Trenton Aquifer
Between Buford and Trenton,
North Dakota**

By

**Robert B. Shaver
North Dakota State Water Commission**

**NORTH DAKOTA STATE WATER COMMISSION
WATER-RESOURCE INVESTIGATION NO. 36**

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The Yield Capability and Quality of Ground Water in the Trenton Aquifer Between Buford and Trenton, North Dakota

Introduction

The Trenton aquifer between Buford and Trenton, North Dakota has the potential for relatively large-scale ground-water development. Currently, there are no permitted users of ground water in the Trenton aquifer. Given this potential for ground-water development, a need exists to provide local planners with a generalized hydrogeologic report that describes the yield capability and water quality in the Trenton aquifer. The purpose of this report therefore, is to describe the yield capability and water quality in the Trenton aquifer. Emphasis is placed on the presentation of ground-water data on easily readable maps. Geologic logs of drill holes and water quality analyses are provided in appendix I. In addition, the administrative procedure for obtaining a conditional water permit is outlined in appendix II.

Description of the Aquifer

The Trenton aquifer underlies an area of about 25 square miles of terrace along the north flank of the Missouri River between Buford and Trenton, North Dakota (fig. 1). The aquifer is comprised of stratified very fine to very coarse sand, and sand and gravel, which in places are interbedded with clay and silt layers. Throughout the area, the aquifer is overlain by a surficial silty, sandy clay layer about 20 feet thick and is underlain by bedrock shale, siltstone, sandstone, and lignite layers of the Fort Union Group (figs. 2-5). Based on 42 test holes that were drilled into the top of the bedrock Fort Union Group, the

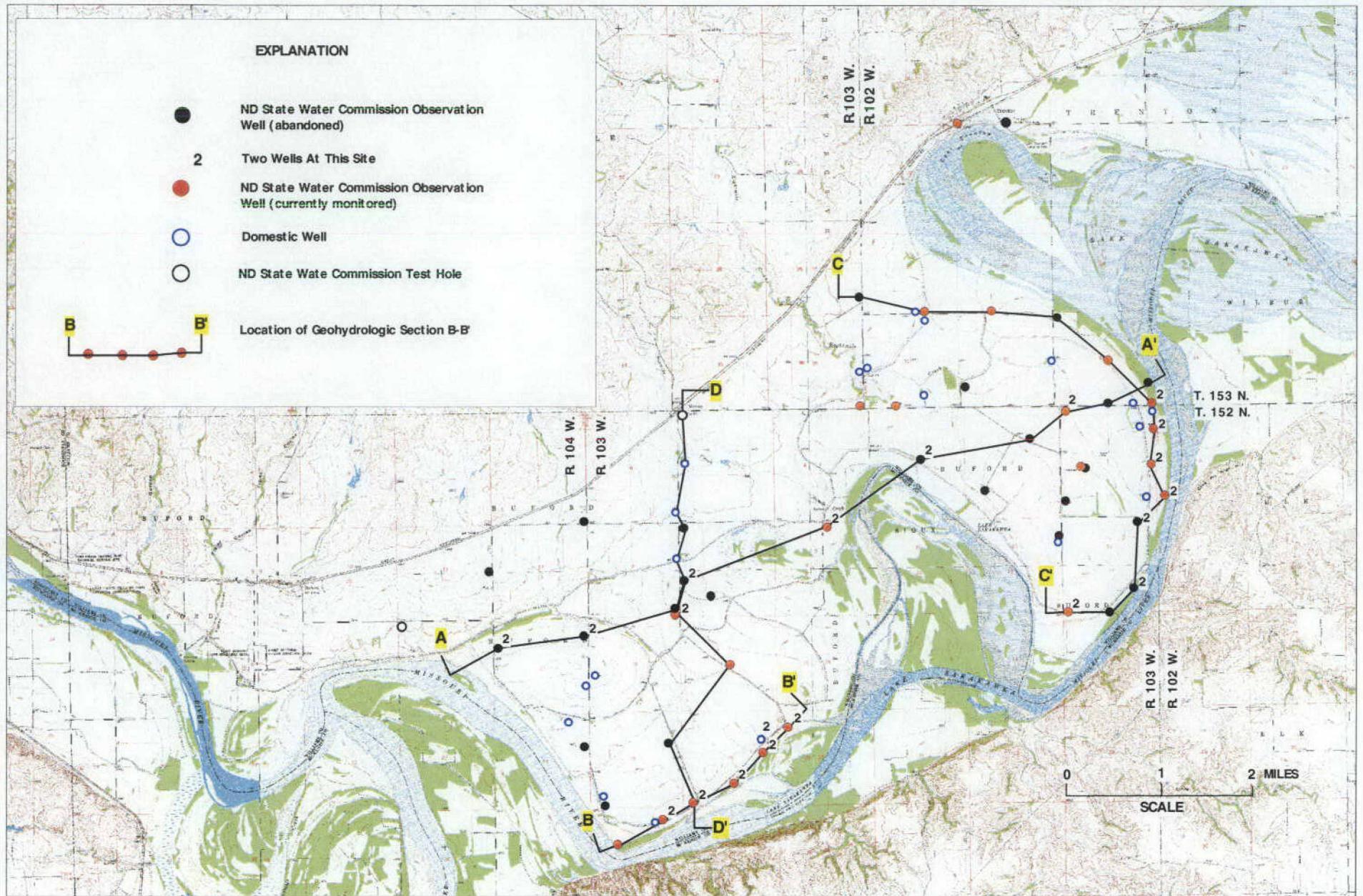


Figure 1. -- Location of wells, test holes and geohydrologic sections A-A' through D-D' in the Trenton aquifer study area

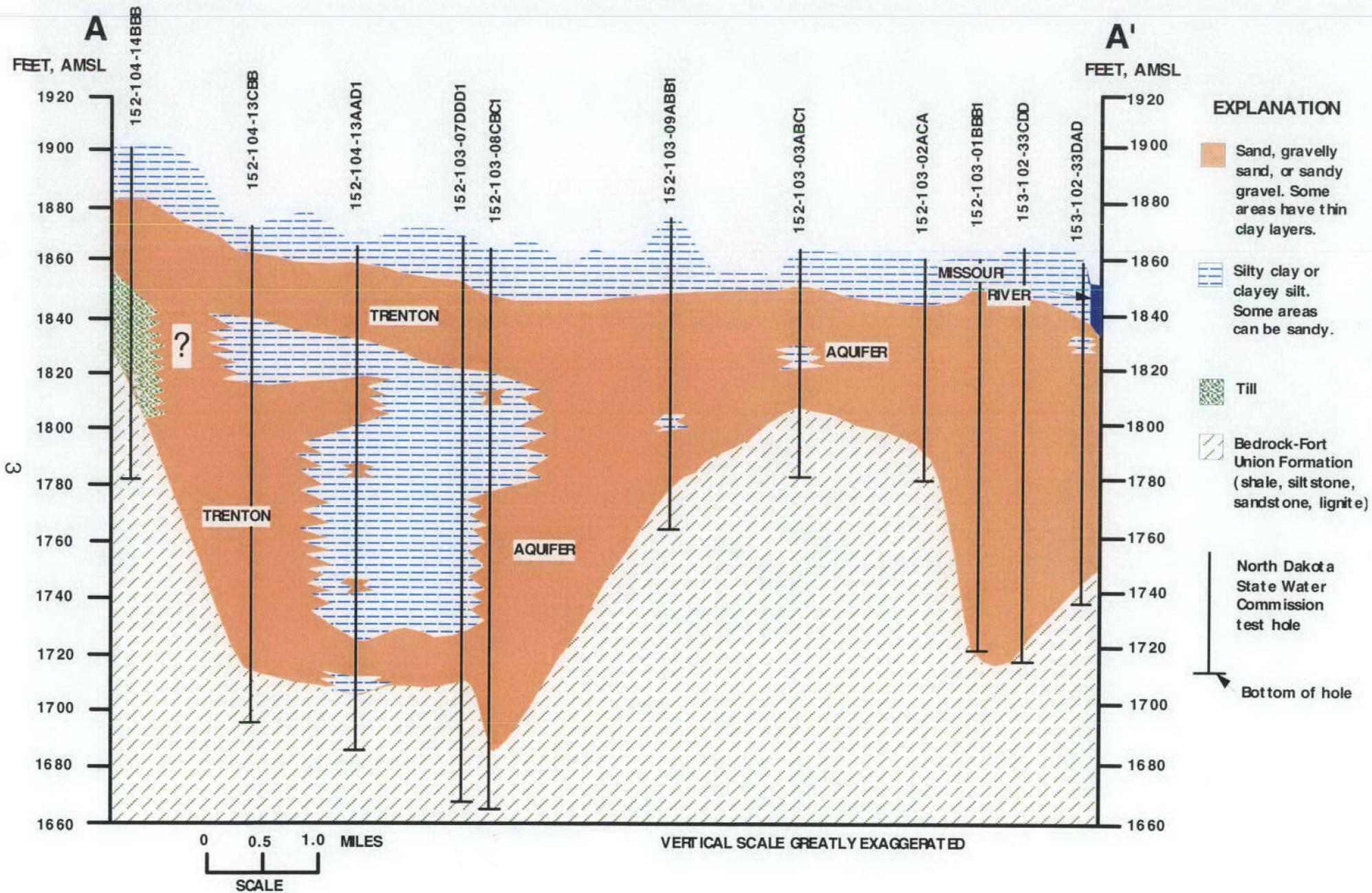


Figure 2. -- Geologic section A-A' showing the Trenton aquifer

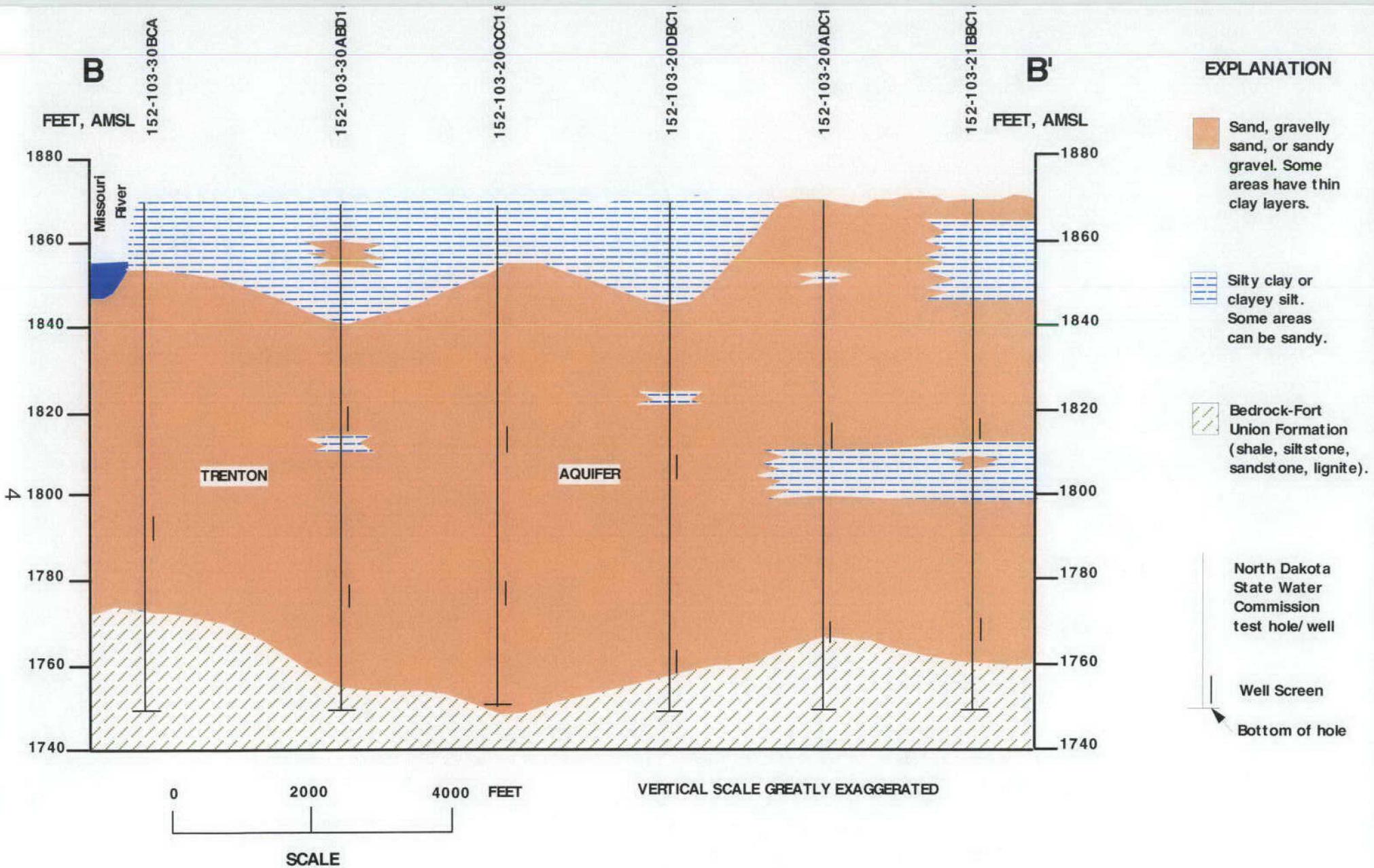


Figure 3. -- Geologic section B-B' showing the Trenton aquifer

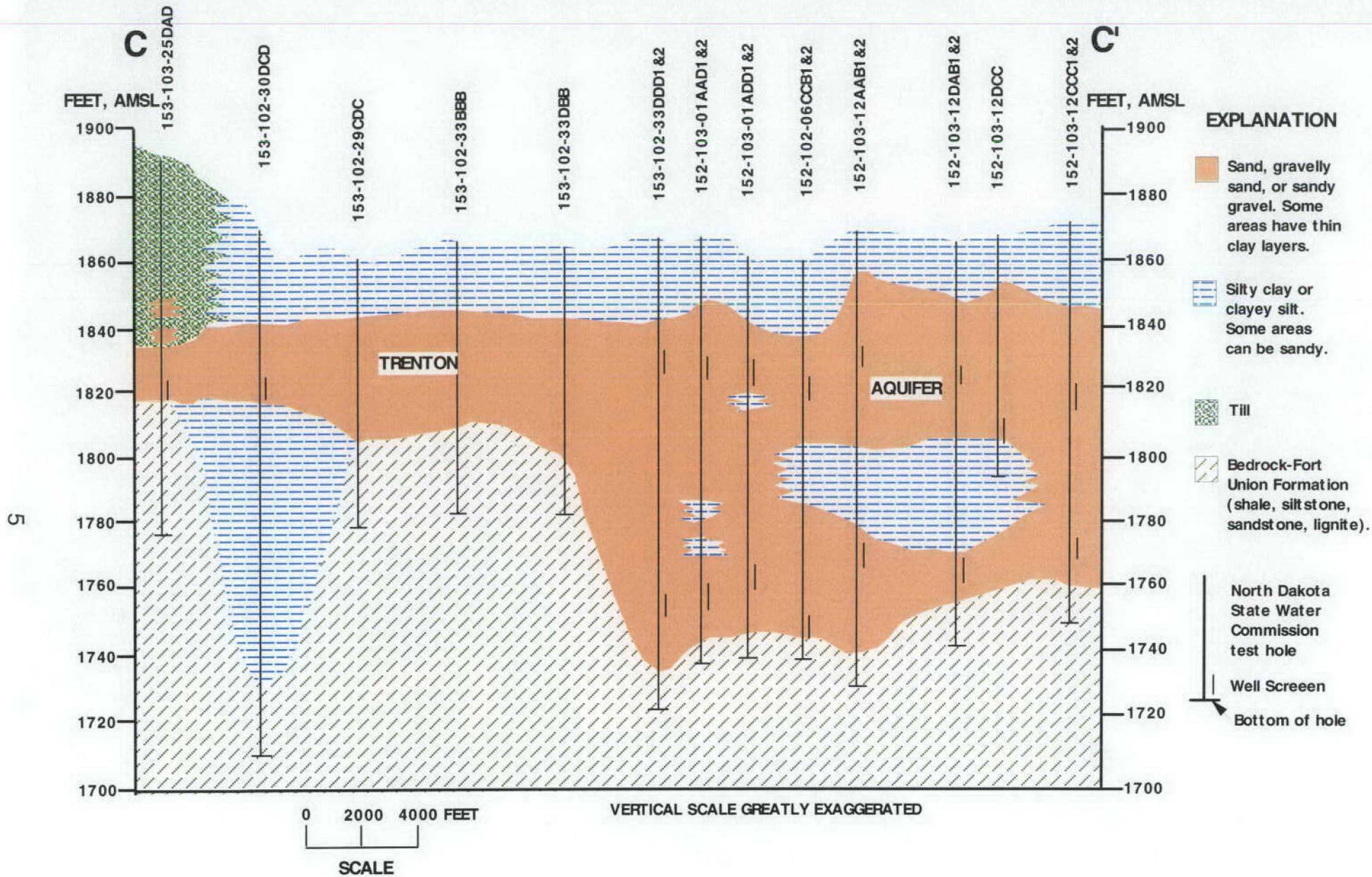


Figure 4. --Geologic section C-C' showing the Trenton aquifer

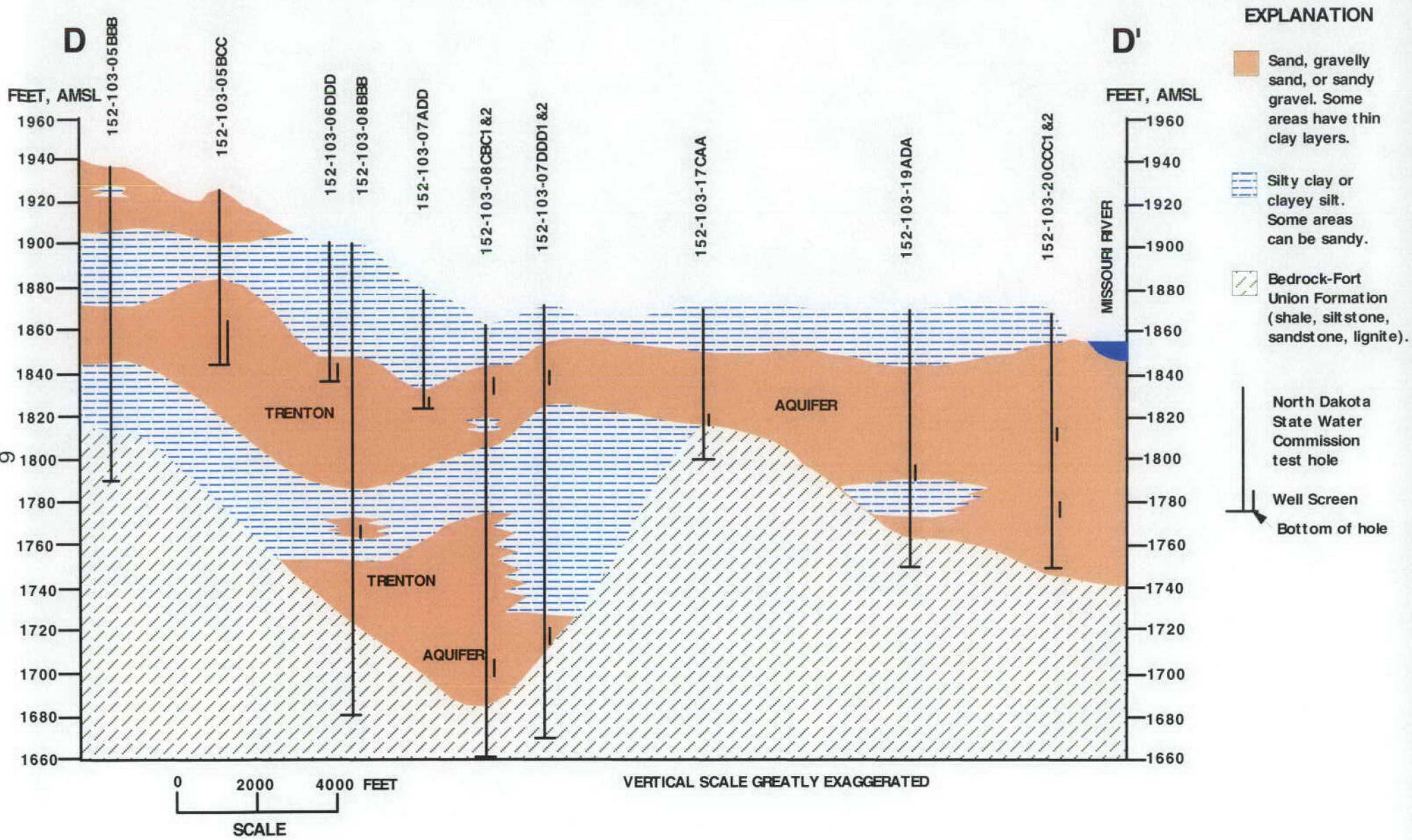


Figure 5. --Geologic section D-D' showing the Trenton aquifer

thickness of the Trenton aquifer ranges from greater than 131 feet at 152-103-01AAA to 16 feet at 152-103-07CCB. The average thickness of the aquifer is 65 feet. The thickest parts of the aquifer occur along ancestral channels of the Yellowstone/Missouri River that underlie the terrace between Buford and Trenton (fig. 6).

Ground-Water Flow

Water levels have been periodically monitored at observation wells 152-103-01BBB1, 152-103-01CCB1, 152-103-07DDD1, 153-102-17CCC, and 153-102-31CDC (fig. 7). Hydrographs showing water-level fluctuations at these observation wells are presented in figures 8 through 12. The pattern of water-level fluctuation is consistent throughout the Trenton aquifer generally indicating rising water levels throughout the spring and summer and falling water levels throughout the fall and winter. Water-level response in the above observation wells indicates a hydraulic connection exists between the aquifer and the Missouri River.

On June 4, 2002, water levels were measured in observation wells completed in the Trenton aquifer study area. Water-level elevations for wells less than and equal to 75 feet deep are shown in figure 13 and water-level elevations for wells greater than 75 feet deep are shown in figure 14. At sites where a shallow and deep well were installed the difference in water level elevation is less than a few tenths of a foot. At some sites the water level in the deeper well is higher in elevation than the water level elevation in the shallow well while at other sites the reverse is true. The small difference in

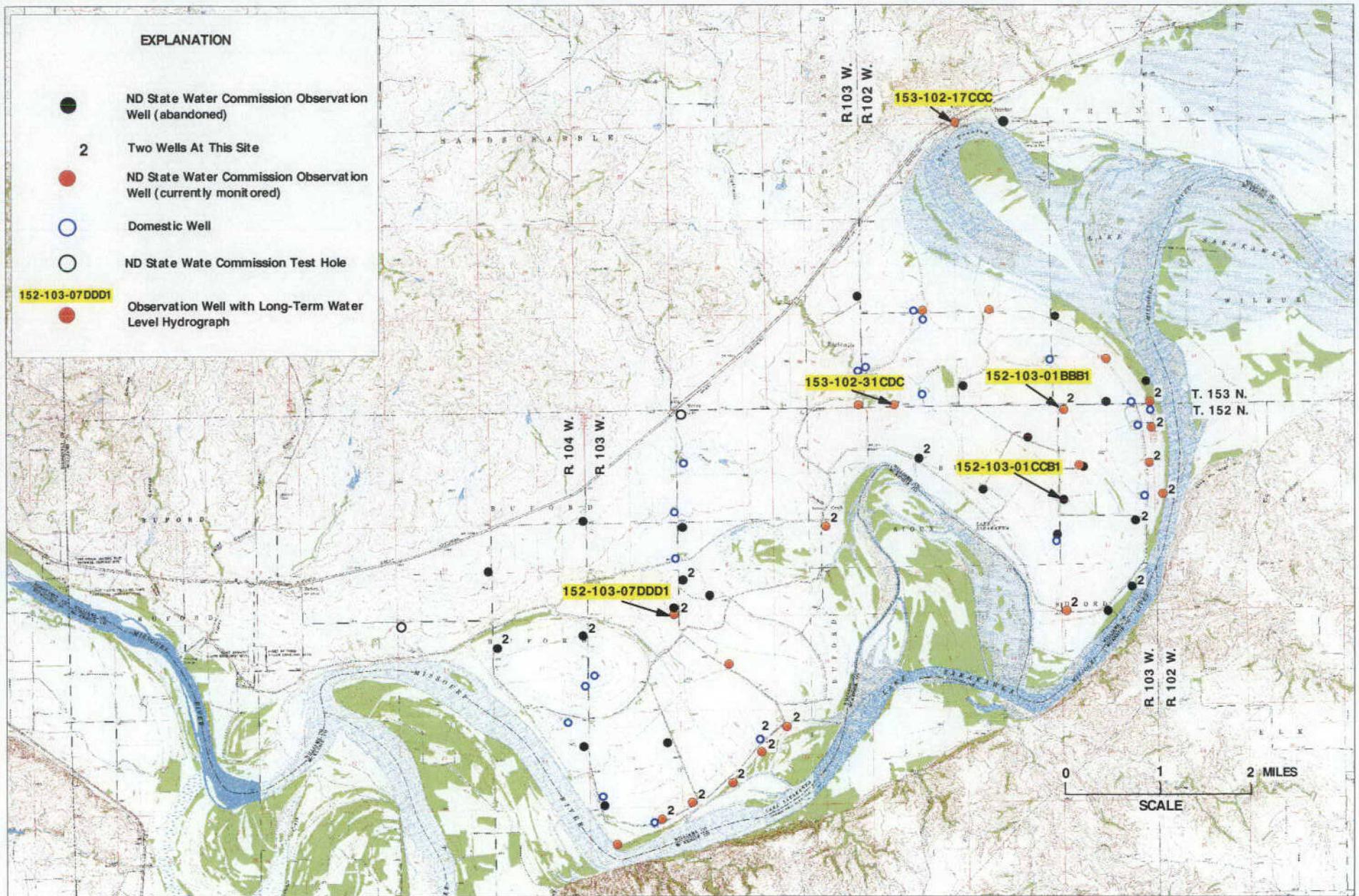


Figure 7. -- Location of observation wells with long-term water level hydrographs

OBSERVATION WELL 152-103-01BBB1
SCREENED INTERVAL = 105 - 110 Ft. BELOW LAND SURFACE
LAND SURFACE ELEVATION = 1860.85 Ft. ABOVE MEAN SEA LEVEL

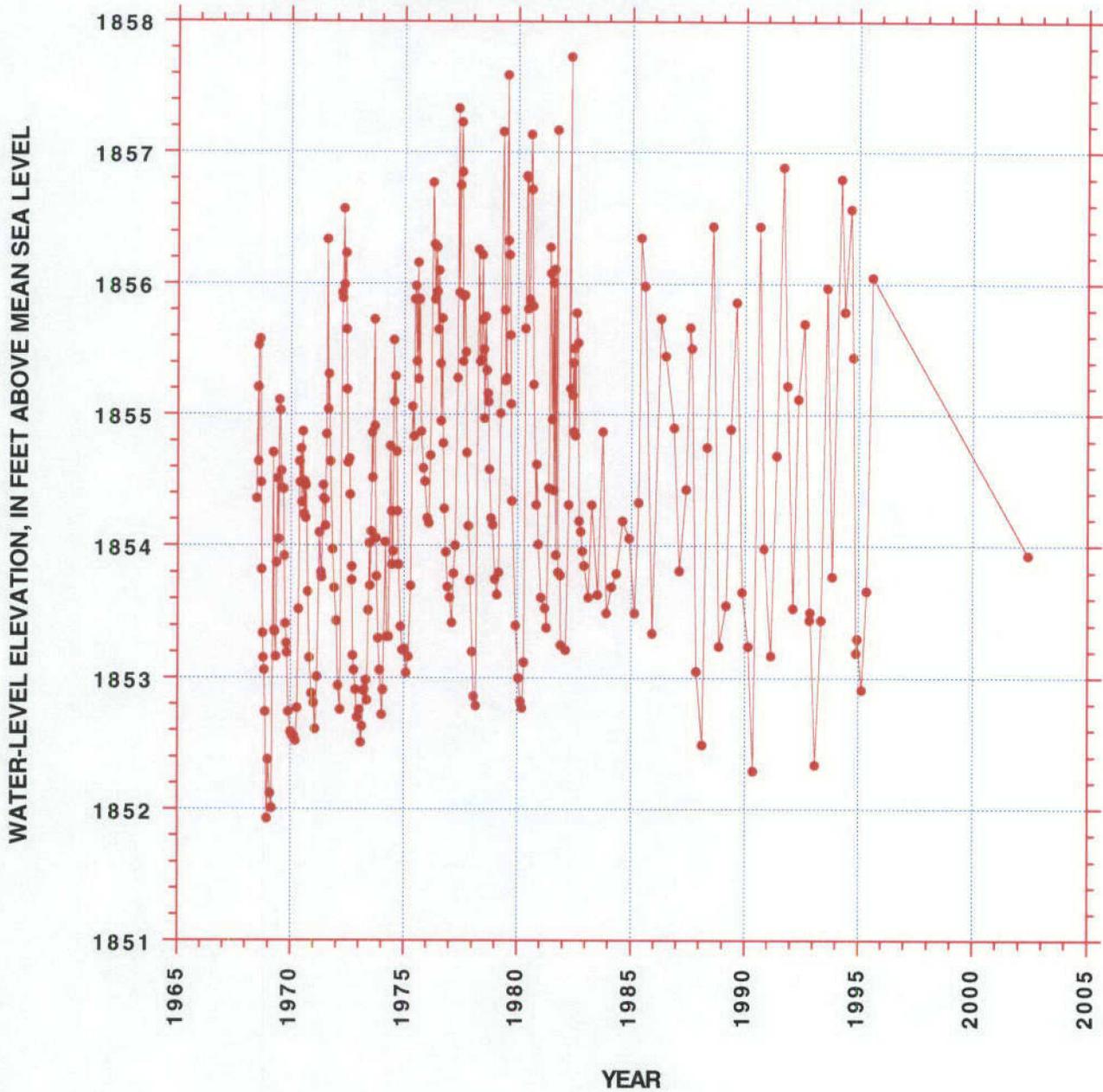


Figure 8. -- Hydrograph showing water-level fluctuations at observation well 152-103-01BBB1

OBSERVATION WELL 152-103-01CCB1
SCREENED INTERVAL = 41 - 44 Ft. BELOW LAND SURFACE
LAND SURFACE ELEVATION = 1861.40 Ft. ABOVE MEAN SEA LEVEL
WELL DESTROYED

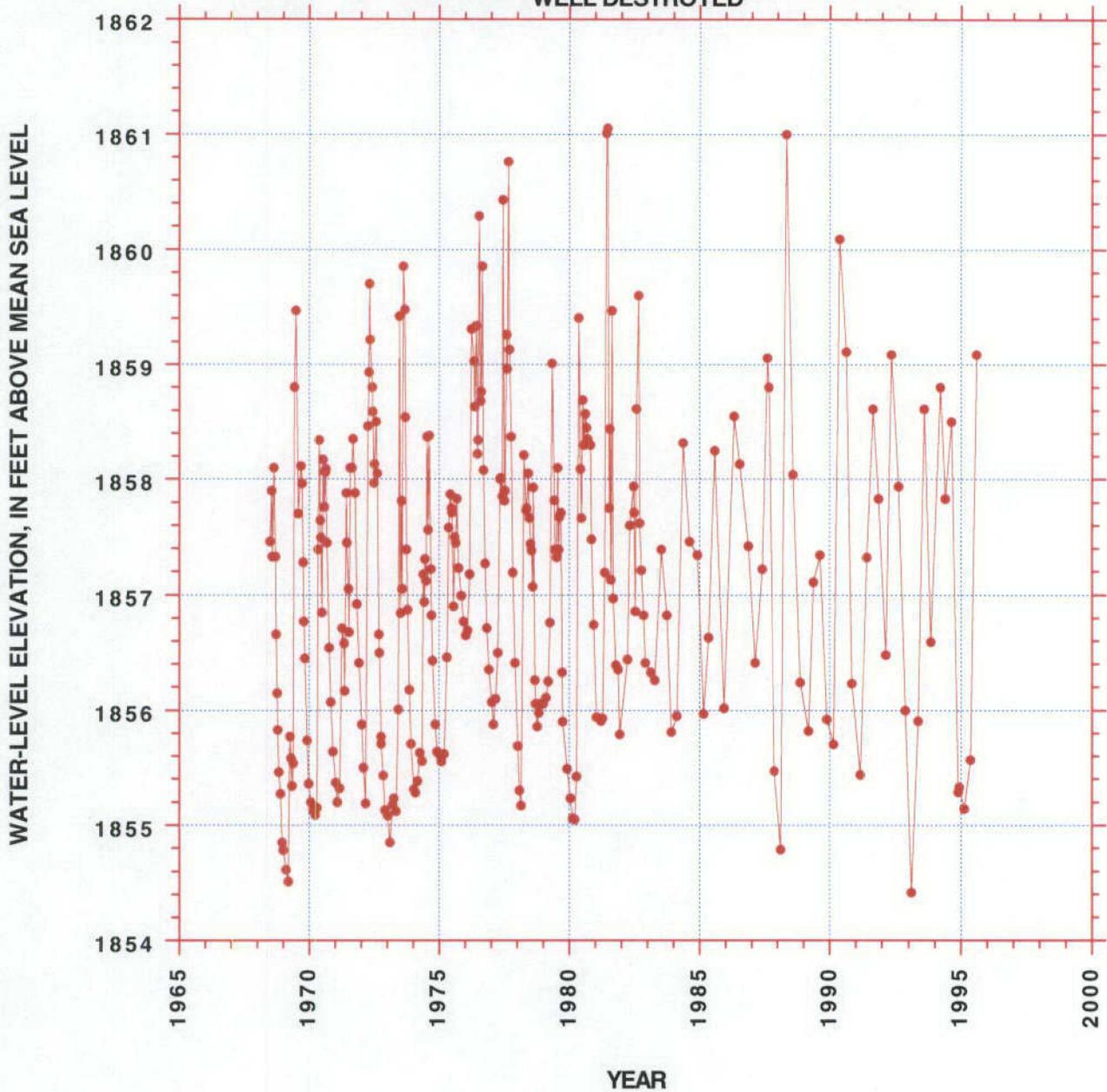


Figure 9. -- Hydrograph showing water-level fluctuations at observation well 152-103-01CCB1

OBSERVATION WELL 152-103-07DDD1
SCREENED INTERVAL = 150 - 153 Ft. BELOW LAND SURFACE
LAND SURFACE ELEVATION 1865.85 Ft. ABOVE MEAN SEA LEVEL

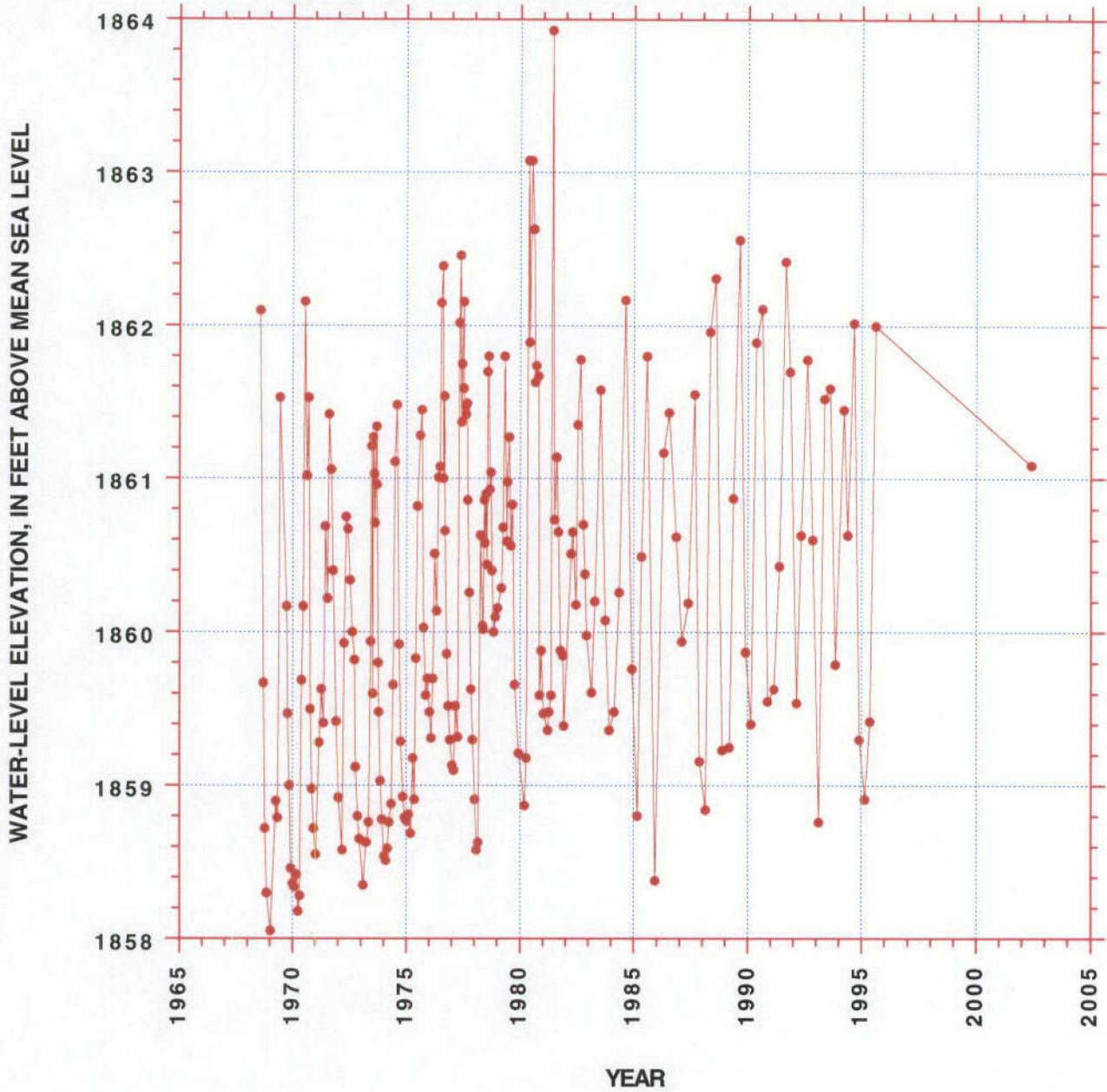


Figure 10. -- Hydrograph showing water-level fluctuations at observation well 152-103-07DDD1

OBSERVATION WELL 153-102-17CCC
TOTAL DEPTH = 75 Ft. (slotted bottom part of casing)
LAND SURFACE ELEVATION 1898.12 Ft. ABOVE MEAN SEA LEVEL

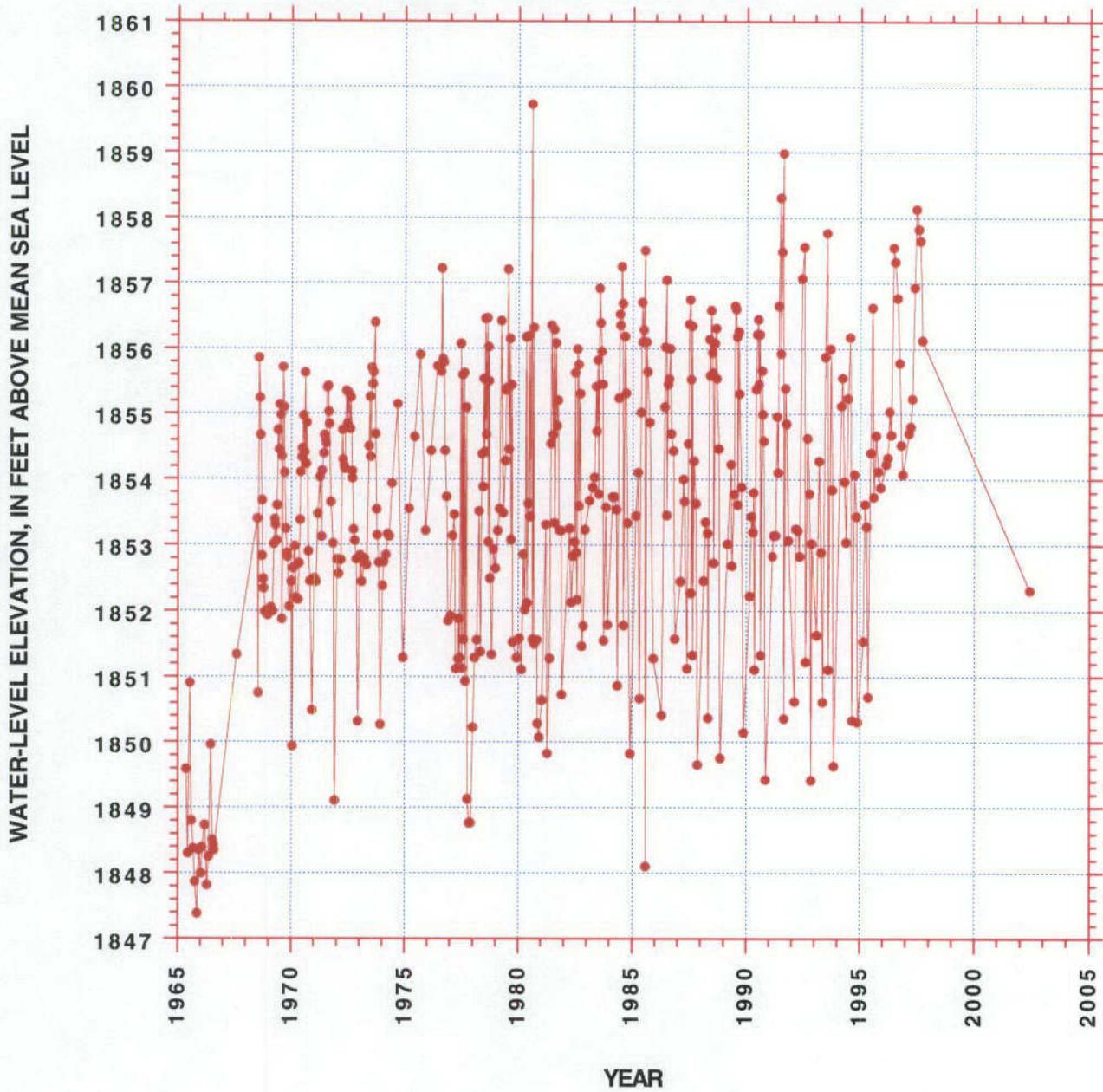


Figure 11. -- Hydrograph showing water-level fluctuations at observation well 153-102-17CCC

OBSERVATION WELL 153-102-31CDC
SCREENED INTERVAL = 83-86 Ft. BELOW LAND SURFACE
LAND SURFACE ELEVATION = 1871.33 Ft. ABOVE MEAN SEA LEVEL

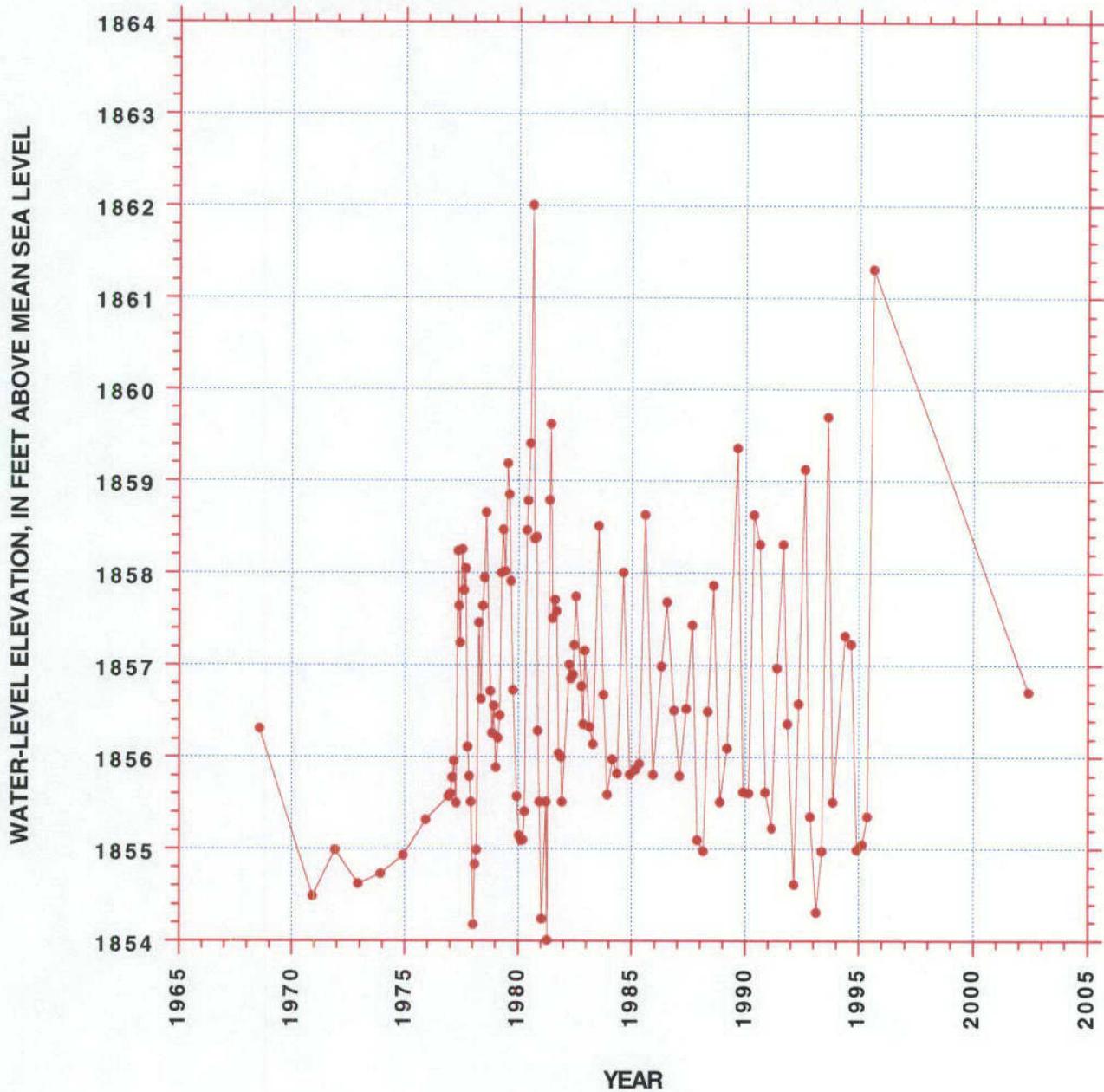


Figure 12. -- Hydrograph showing water-level fluctuations at observation well 153-102-31CDC

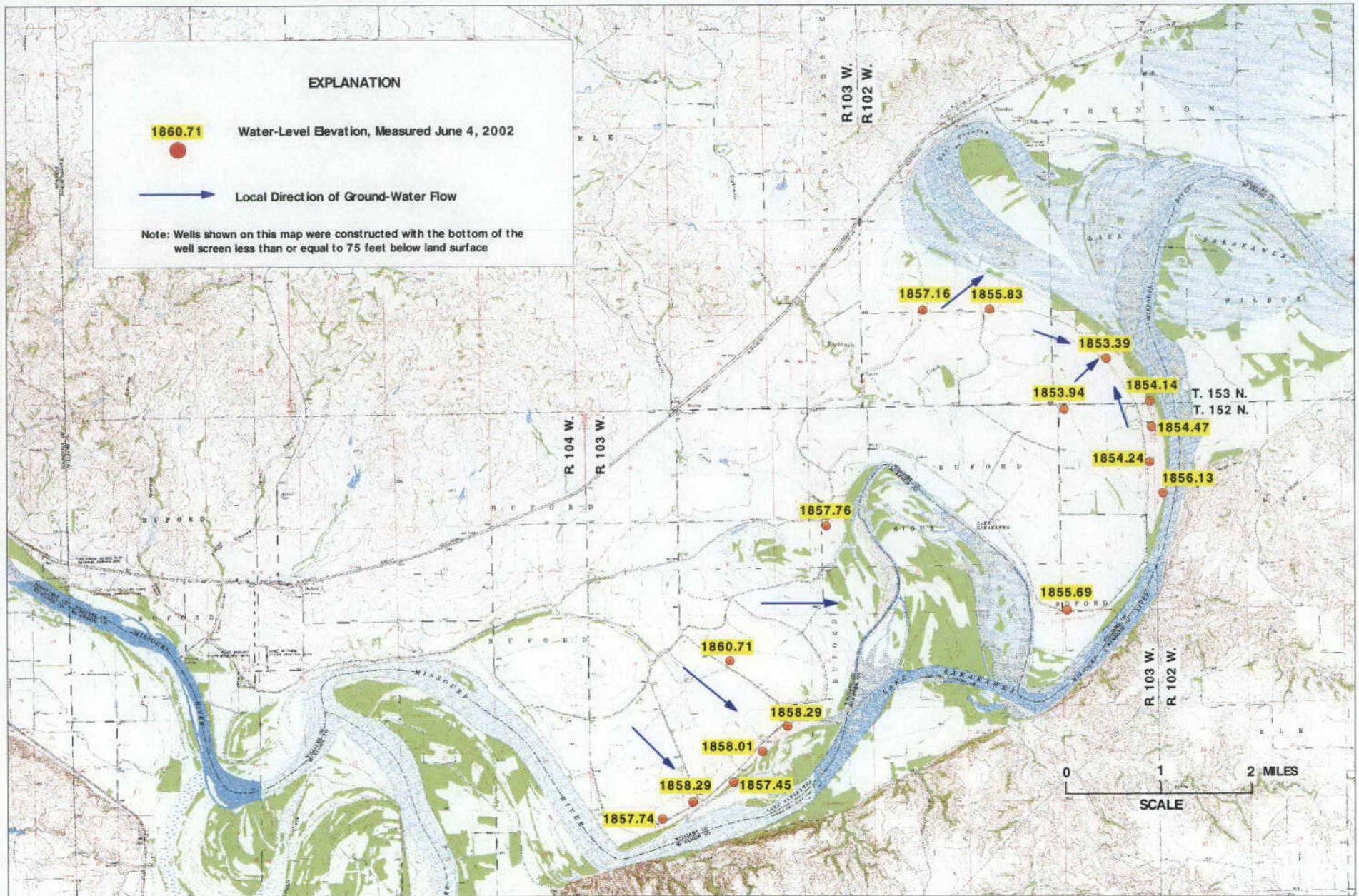


Figure 13. -- Altitude of potentiometric surface in the upper part of the Trenton aquifer and local directions of groundwater flow

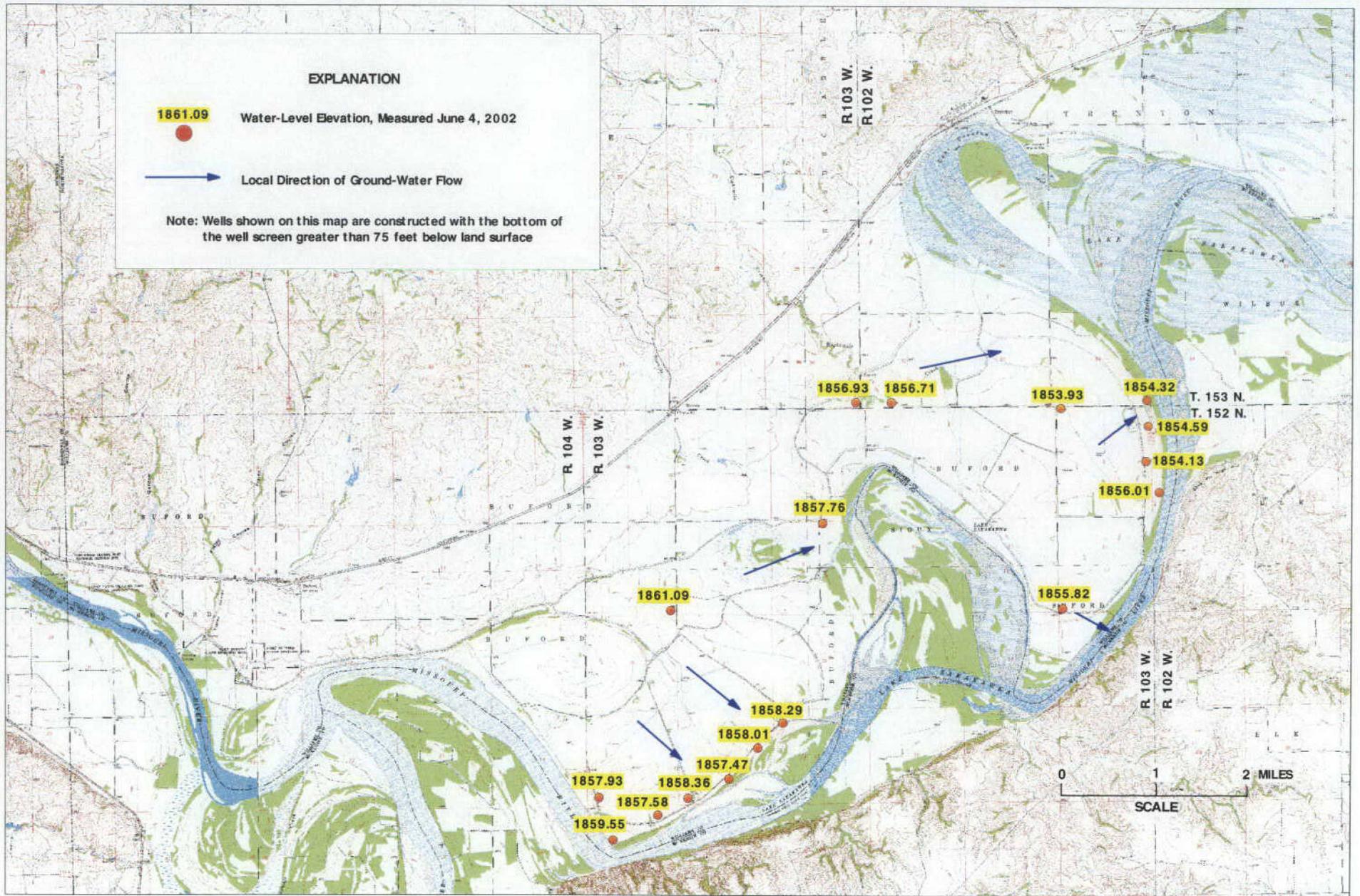


Figure 14. -- Altitude of potentiometric surface in the lower part of the Trenton aquifer and local directions of ground-water flow

water-level elevations suggests hydraulic continuity between the shallow and deep parts of the Trenton aquifer.

The areal distribution of water-level data is insufficient to characterize the shape and configuration of the water table over the entire aquifer area. However, available water-level data indicates ground-water flow in the shallow and deep parts of the Trenton aquifer is toward the Missouri River. The Missouri River is a major discharge area to the Trenton aquifer.

Well Yield

Three areas in the Trenton aquifer have been identified where individual well yields of between about 1000 and 2000 gallons per minute are possible. These areas are shown as Areas A, B, and C in figure 15. Areas A, B, and C are located along the principal axis of relatively deep, narrow buried ancestral river channels that contain relatively coarse, thick sand and gravel deposits. In Area A, typical depths for large-capacity wells should range from between about 100 and 160 feet and typical well depths in Area B and C should range from about 100 and 120 feet. Individual well yields of between about 300 to 700 gallons per minute are possible from properly completed wells adjacent to Areas A, B, and C. In these areas, the aquifer is thinner and not as deep. Typical well depths should range from about 50 to 75 feet.

Water Quality

To gain a better understanding of vertical variability in water quality in the Trenton aquifer, chemical analyses were partitioned into two groups with one group from wells less than 75 feet deep and the other group from wells

greater than 75 feet deep. The range and mean values for selected chemical constituents and parameters of the partitioned water quality analyses are shown in Table 1. Plots of concentration of iron, manganese, sodium, sulfate, chloride, dissolved solids and hardness versus well depth are shown in figures 16 through 22. In addition, the areal distribution of iron, manganese, sulfate, sodium, chloride, dissolved solids, and hardness, for wells less than 75 feet deep and for wells greater than 75 feet deep are shown in figures 23 through 36.

Based on the above, it is apparent that the Trenton aquifer is characterized by a variable water quality. Iron and manganese occur in concentrations greater than 0.3 milligrams per liter in the shallow (less than 75 feet deep) and in the deep (greater than 75 feet deep) parts of the Trenton aquifer in Areas A, B, and C. Sulfate concentrations exceed 250 milligrams per liter in many wells completed in both shallow and deep wells in Areas A, B, and C. The range in pH is relatively small ranging from slightly acidic (6.62) to slightly alkaline (7.73) in wells completed throughout the aquifer.

Wells 153-102-17CCC, 152-103-05BCB, 152-104-1DDD, and 152-104-11ADD are completed in the bottom part and near the north perimeter of the Trenton aquifer. In these areas, a significant amount of ground water from the flanking bedrock Fort Union Group flows into the Trenton aquifer. The dissolved solids and sulfate concentrations of ground water samples from these wells typically are about 3 to 4 times larger than wells completed further away from the perimeter of the aquifer where the influence of bedrock flow into the aquifer is less significant. Area A is located close to the northern perimeter of the Trenton aquifer. In addition, the principal axis of the buried

Table 1. - - Range and mean values of selected chemical constituents and parameters from ground-water samples in wells greater than and less than 75 feet deep in the Trenton aquifer.

	<u>NUMBER OF SAMPLES</u>	<u>MINIMUM VALUE</u>	<u>MAXIMUM VALUE</u>	<u>MEAN VALUE</u>
IRON				
>75 Ft.	45	<0.01	24	3.3
<75 Ft.	64	<0.01	14	4.1
MANGANESE				
>75 Ft.	41	0.01	2.2	0.67
<75 Ft.	62	0.01	2.8	0.88
SULFATE				
>75 Ft.	45	190	2430	589
<75 Ft.	64	101	3000	474
SODIUM				
<75 Ft.	45	100	1290	271
	64	43	1300	212
CHLORIDE				
>75 Ft.	45	5.6	100	18
<75 Ft.	64	5.1	150	20
DISSOLVED SOLIDS				
>75 Ft.	45	695	4610	1500
<75 Ft.	64	416	5460	1235
HARDNESS				
>75 Ft.	45	176	1200	653
<75 Ft.	64	219	1400	568
FIELD pH				
>75 Ft.	12	6.89	7.73	7.41
<75 Ft.	10	6.62	7.66	7.28

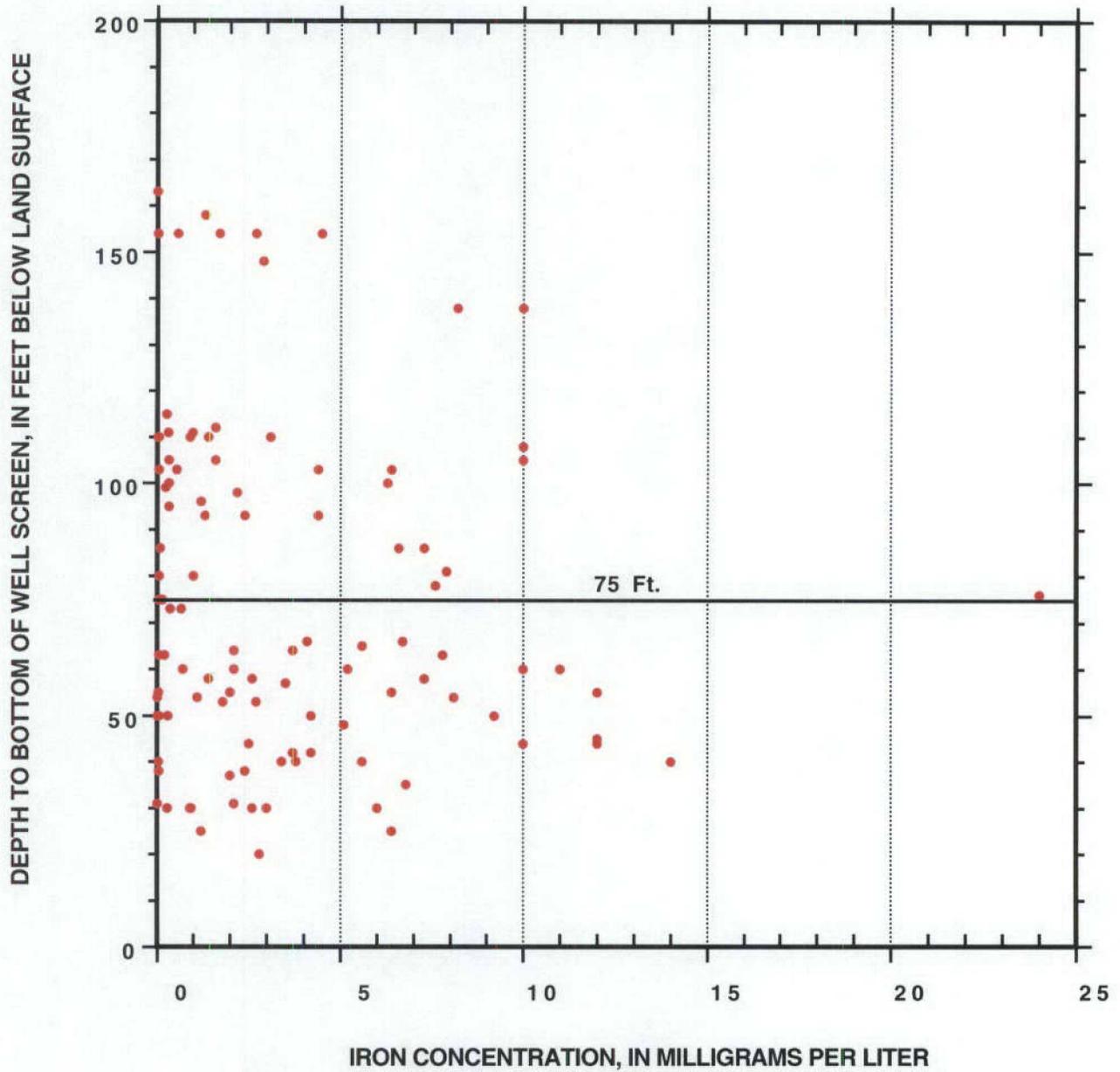


Figure 16. -- Relationship between iron concentration and well depth in the Trenton aquifer

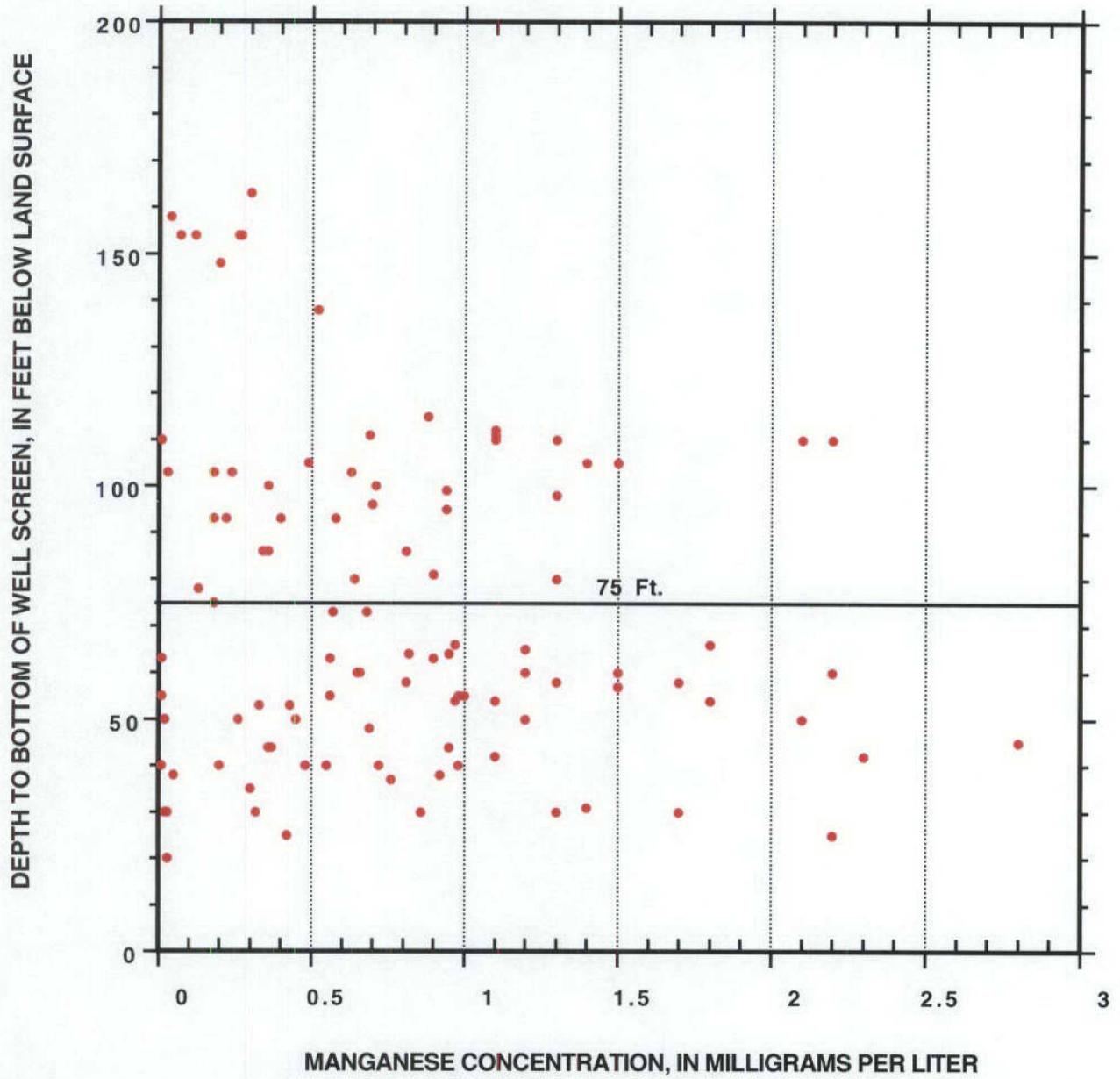


Figure 17. -- Relationship between manganese concentration and well depth in the Trenton aquifer

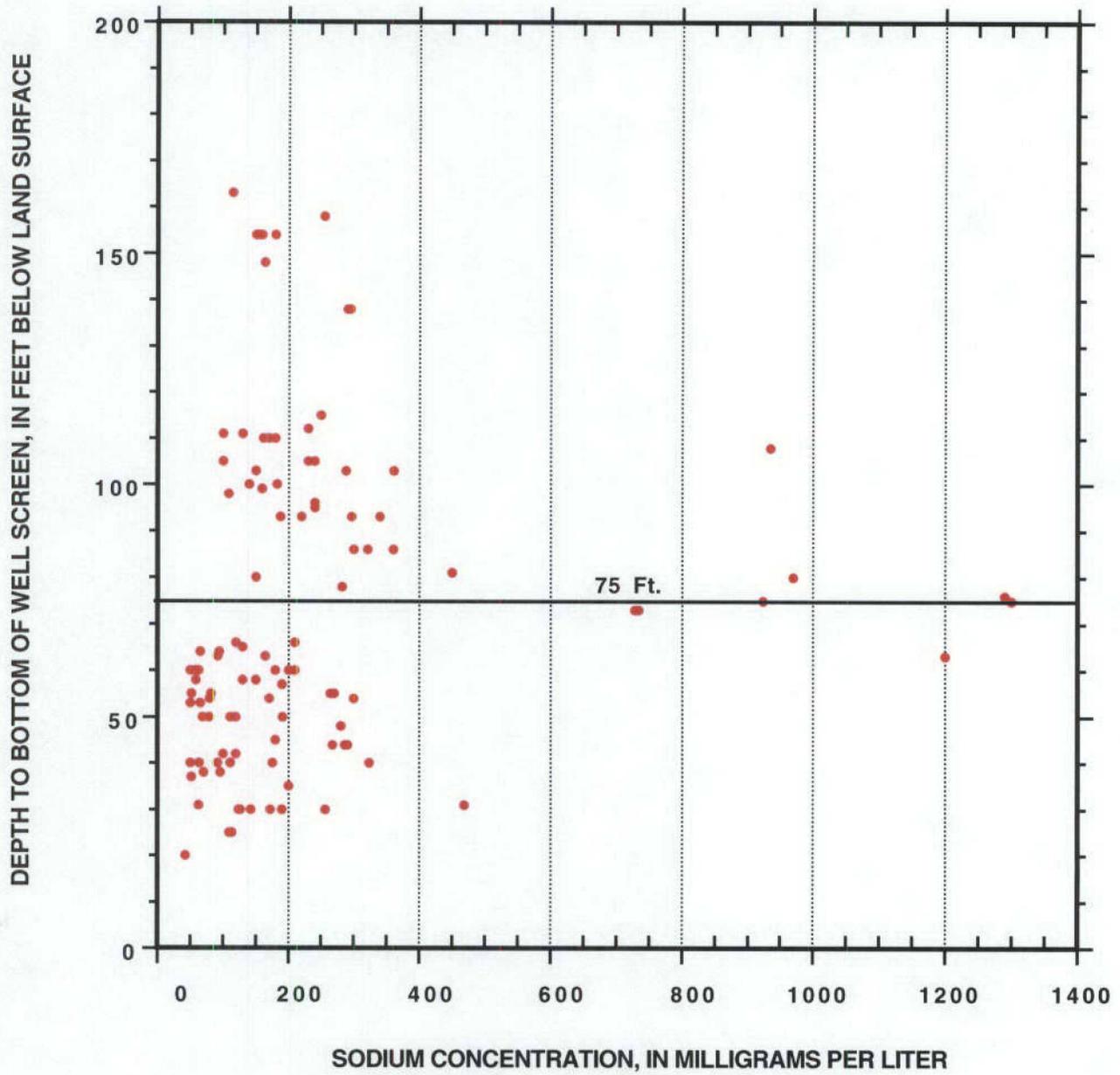


Figure 18. -- Relationship between sodium concentration and well depth in the Trenton aquifer

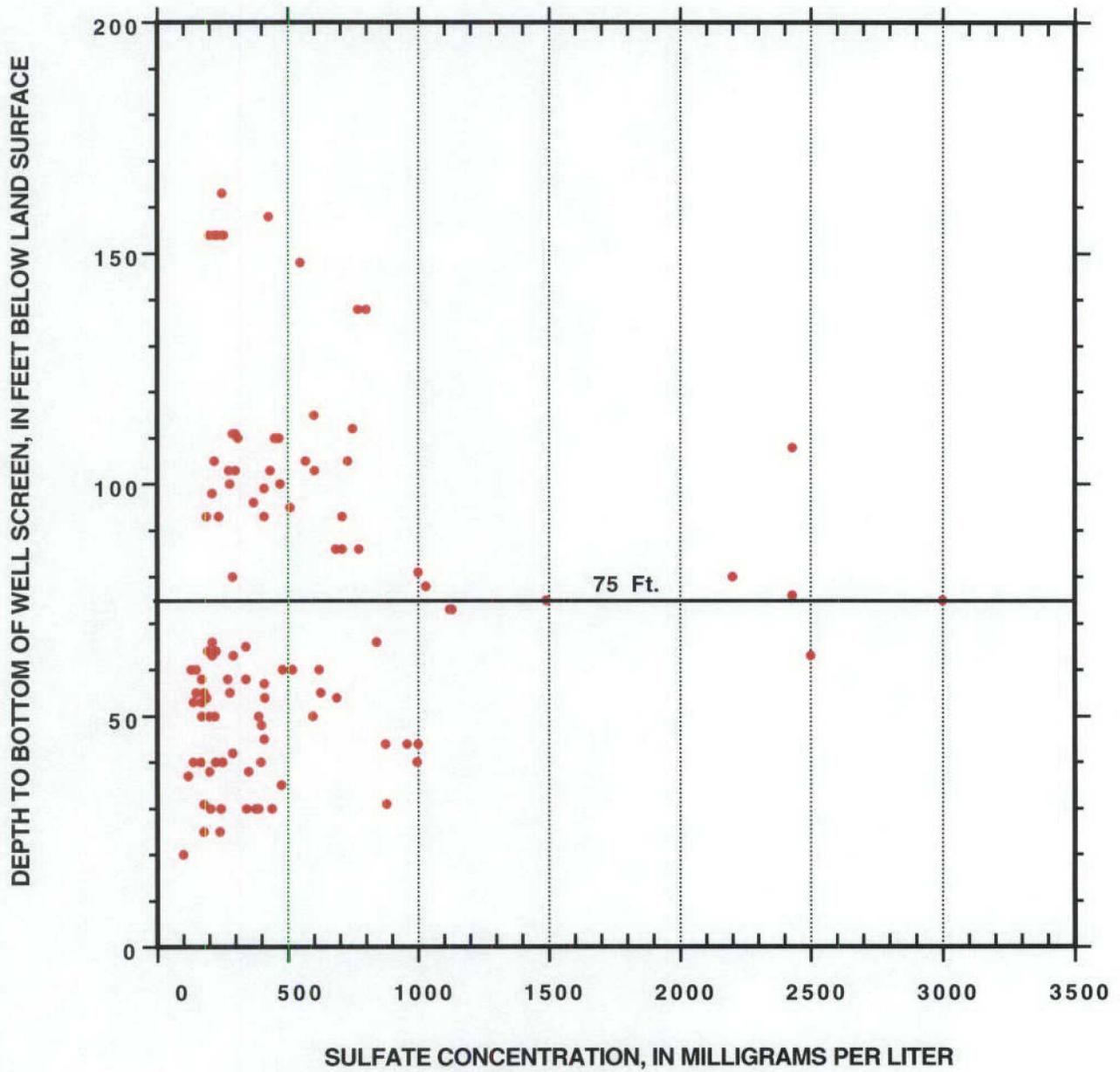


Figure 19. -- Relationship between sulfate concentration and well depth in the Trenton aquifer

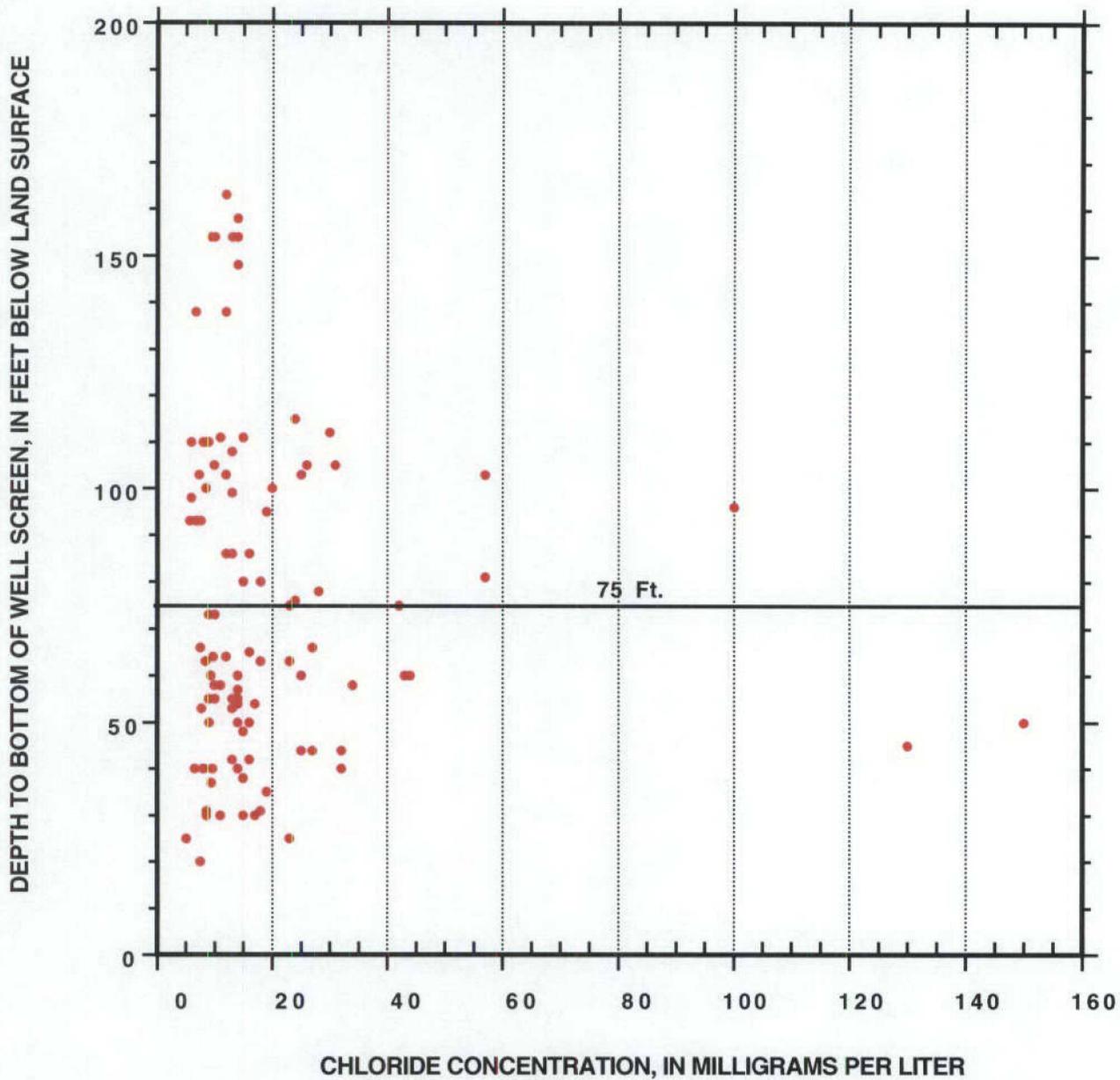


Figure 20. -- Relationship between chloride concentration and well depth in the Trenton aquifer

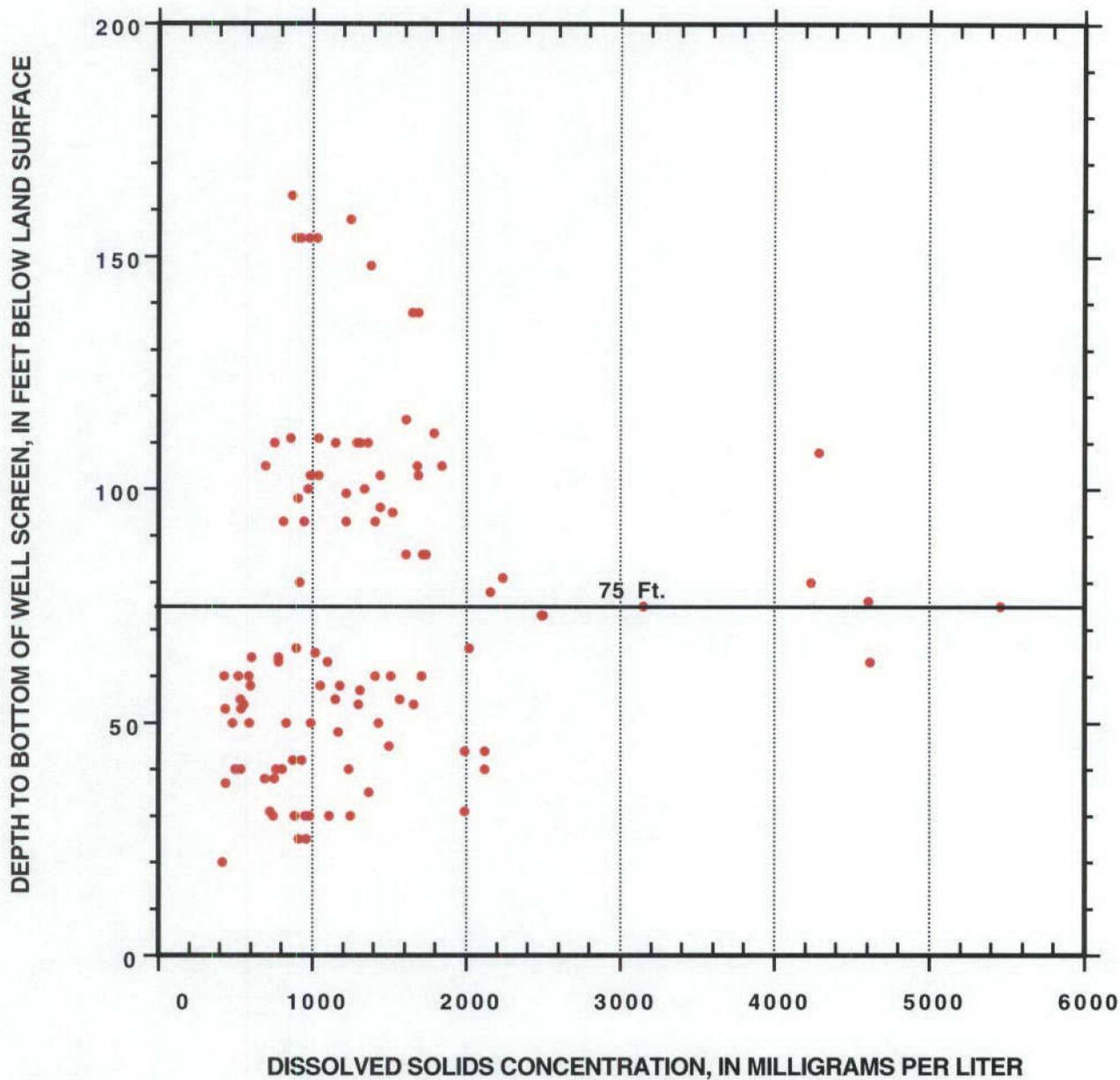


Figure 21. -- Relationship between dissolved solids concentration and well depth in the Trenton aquifer

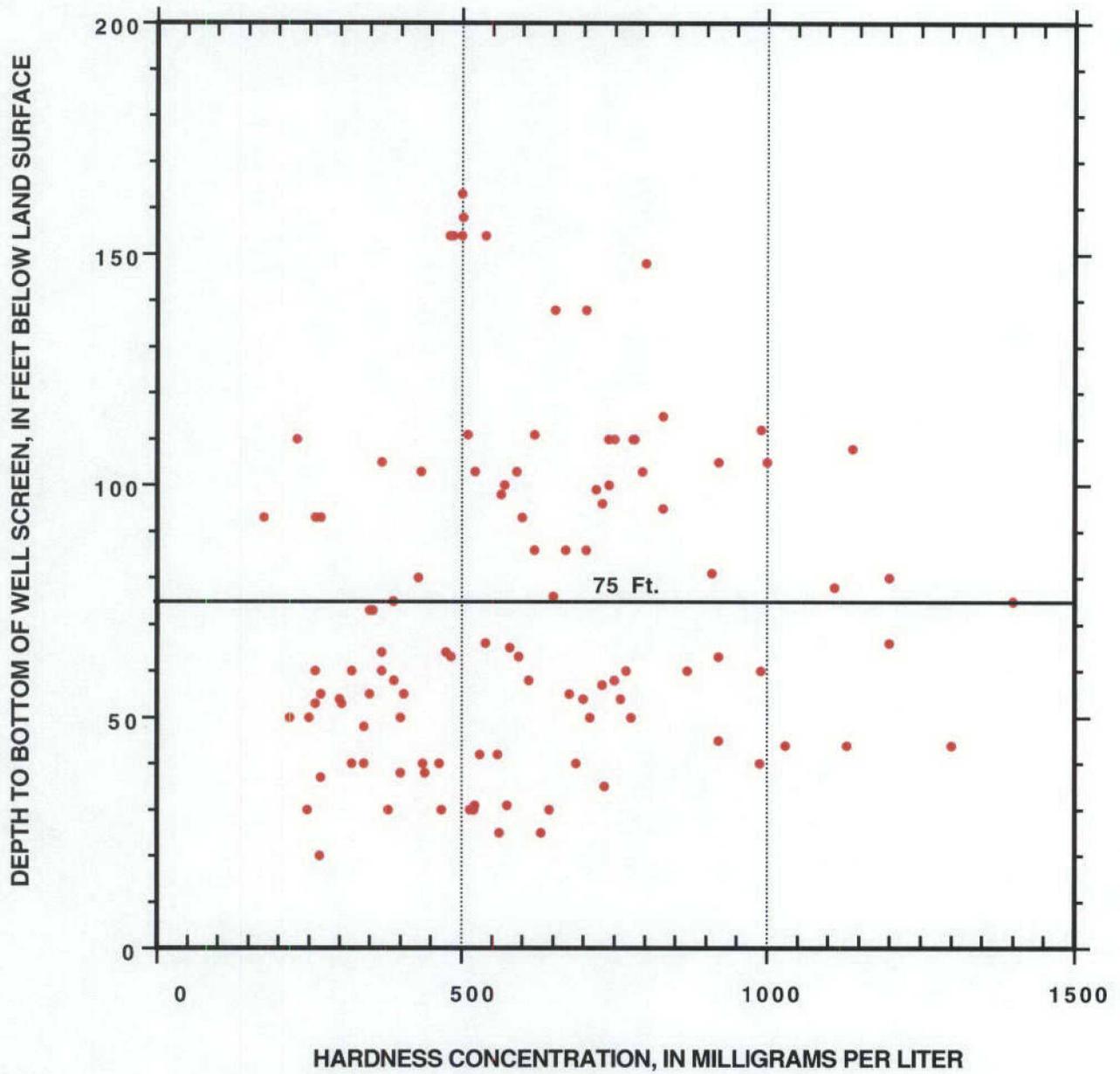


Figure 22. -- Relationship between hardness and well depth in the Trenton aquifer

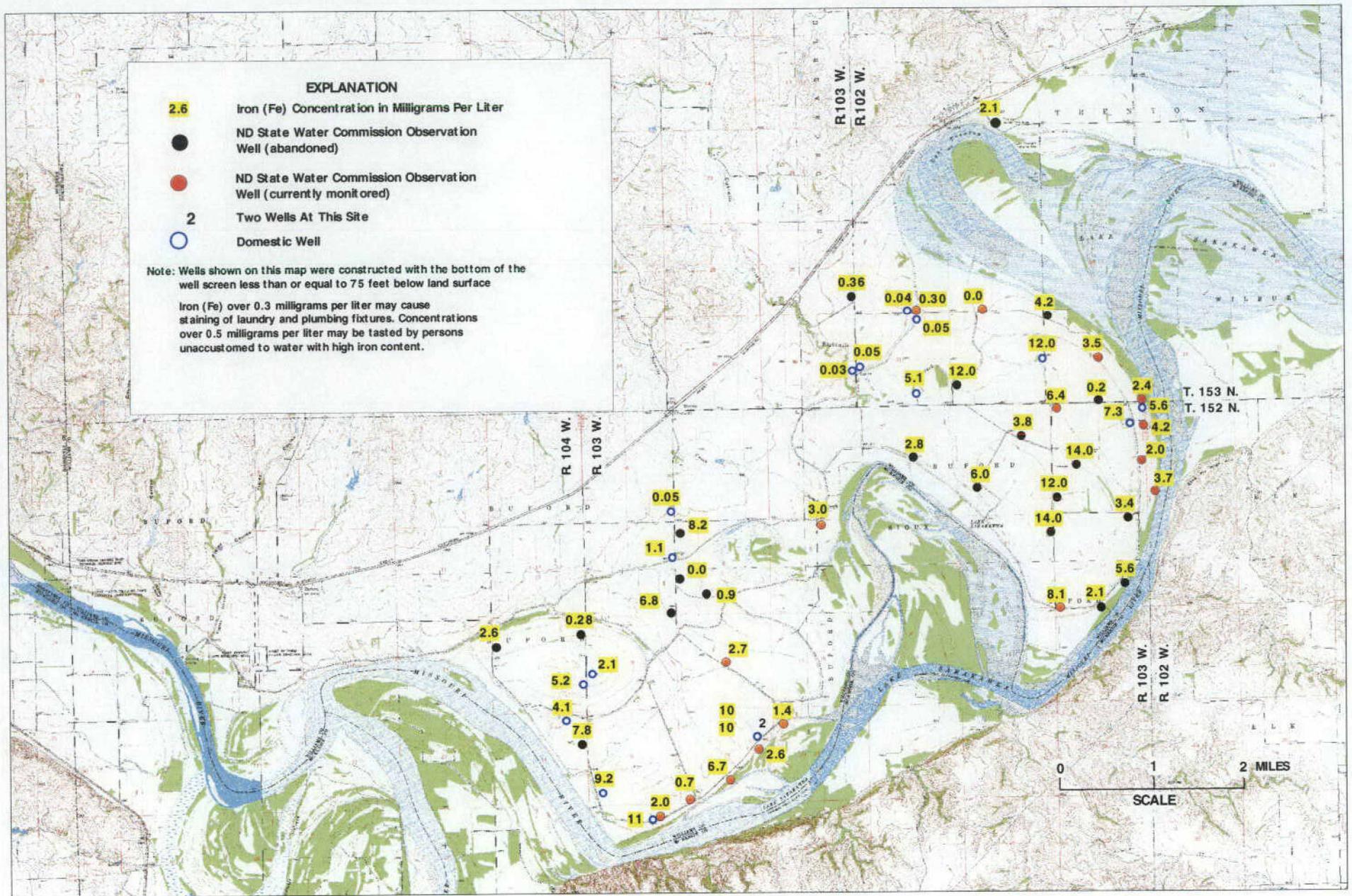


Figure 23. -- Areal distribution of iron from wells less than 75 feet deep in the Trenton aquifer

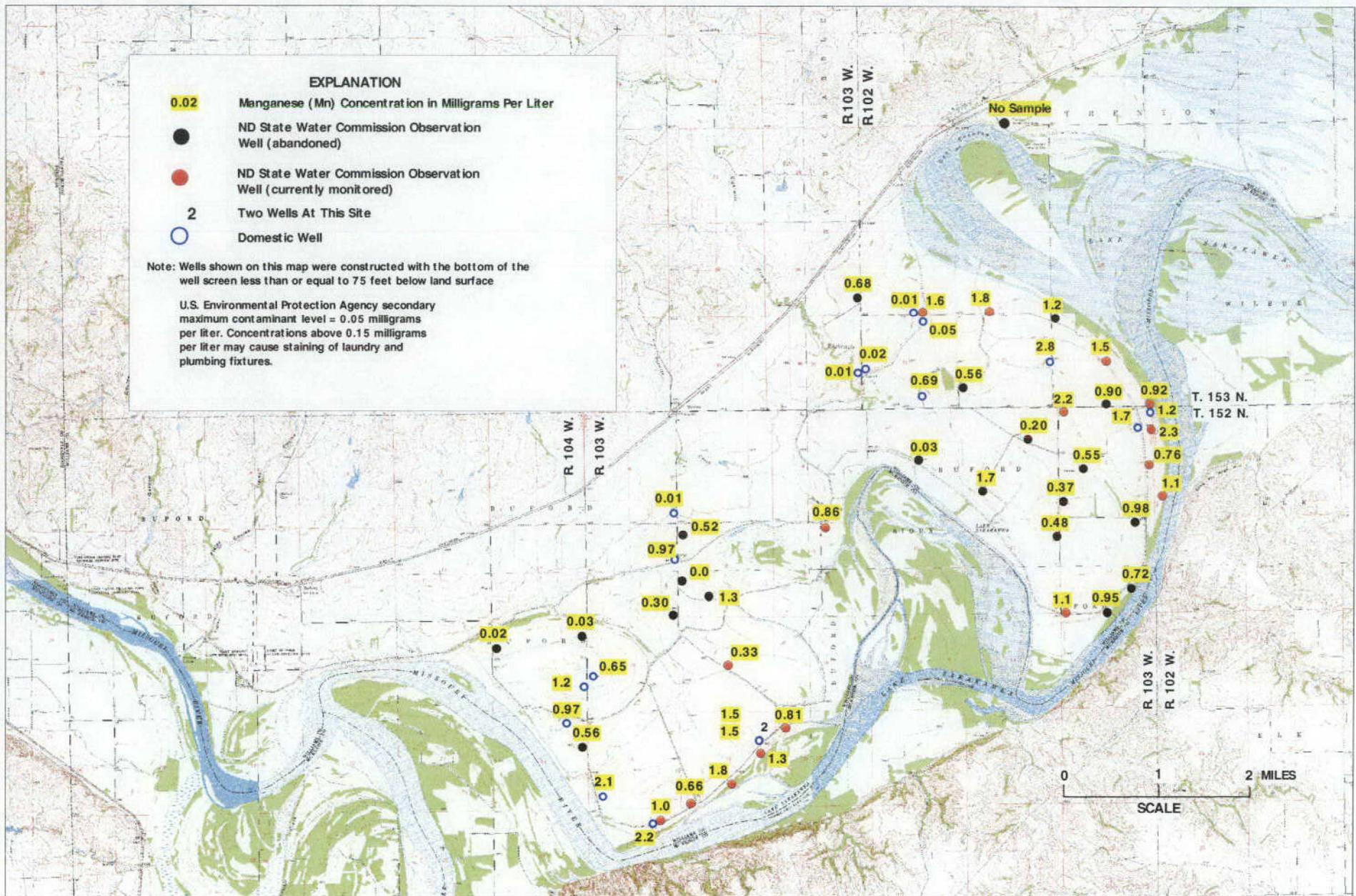


Figure 24. -- Areal distribution of manganese from wells less than 75 feet deep in the Trenton aquifer

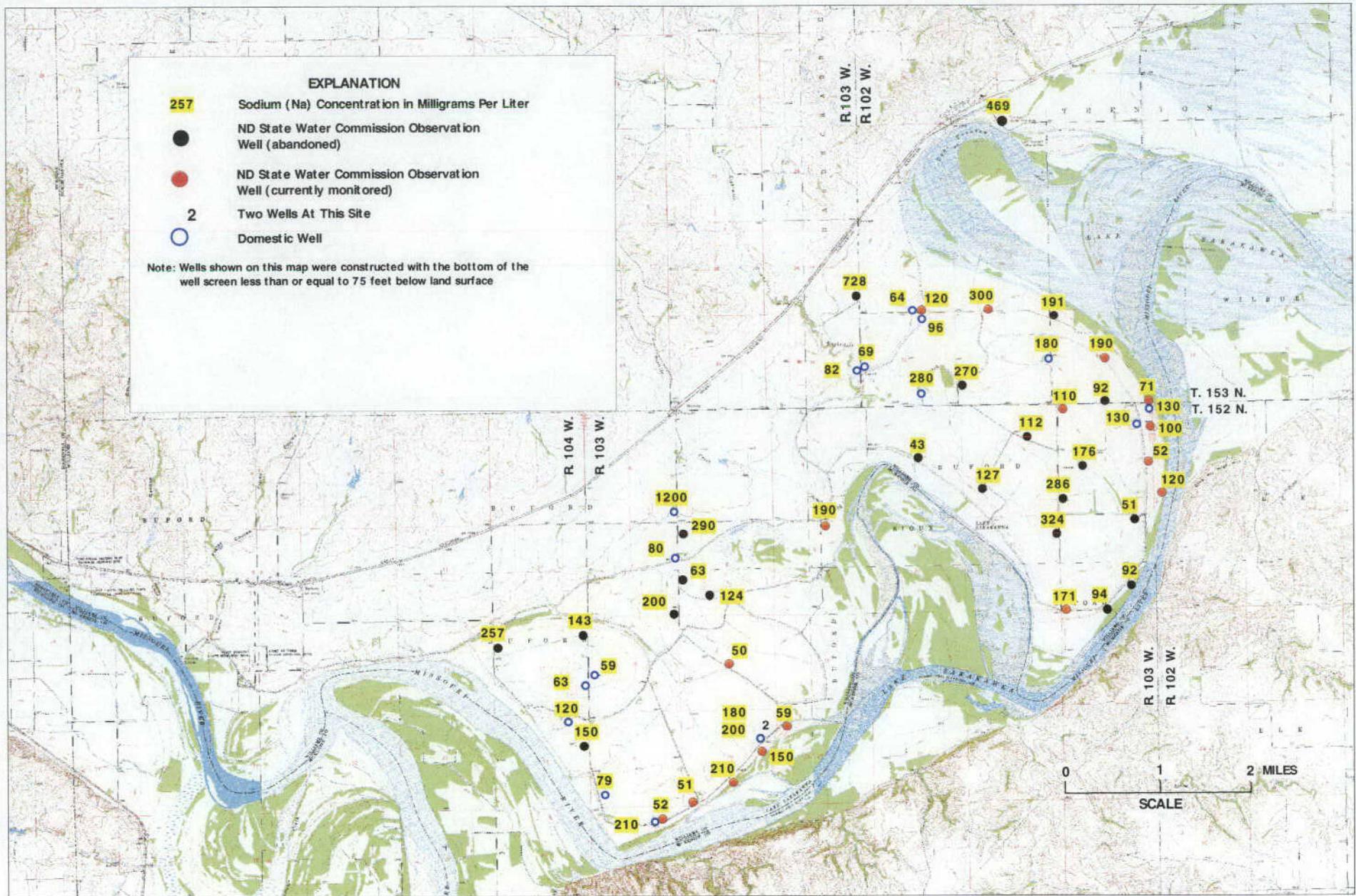


Figure 25. -- Areal distribution of sodium from wells less than 75 feet deep in the Trenton aquifer

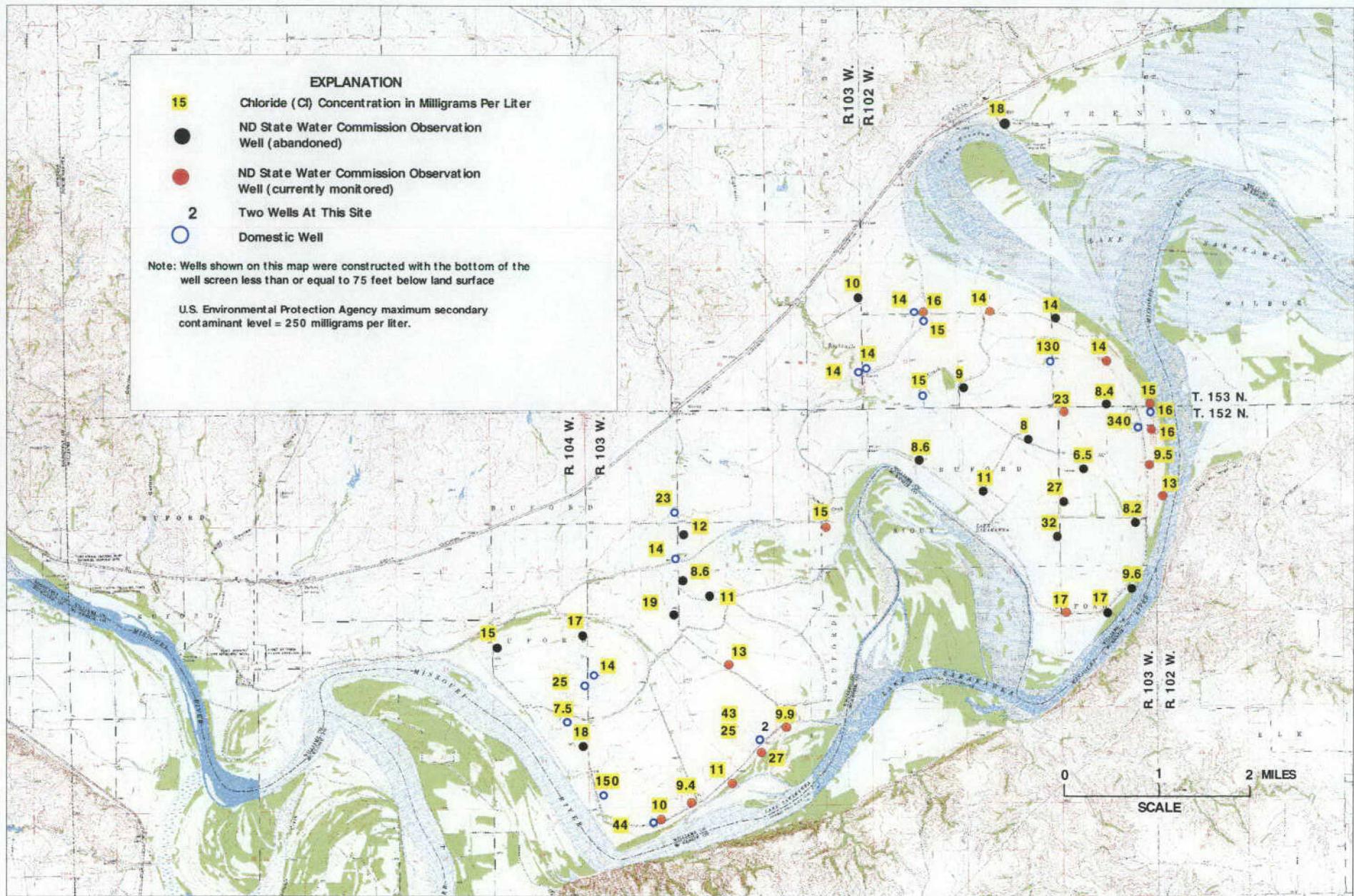


Figure 27. -- Areal distribution of chloride from wells less than 75 feet deep in the Trenton aquifer

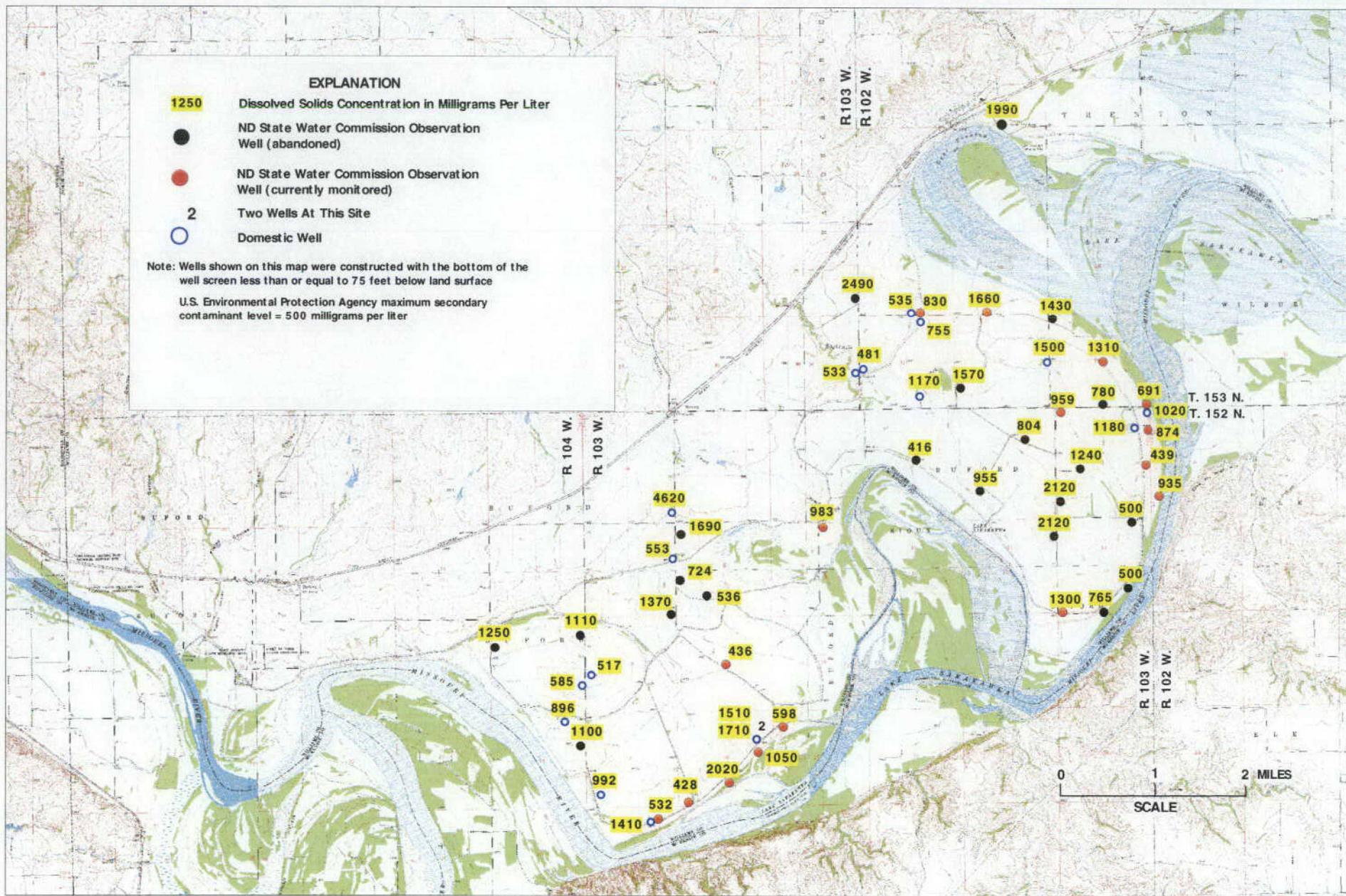


Figure 28. -- Areal distribution of dissolved solids from wells less than 75 feet deep in the Trenton aquifer

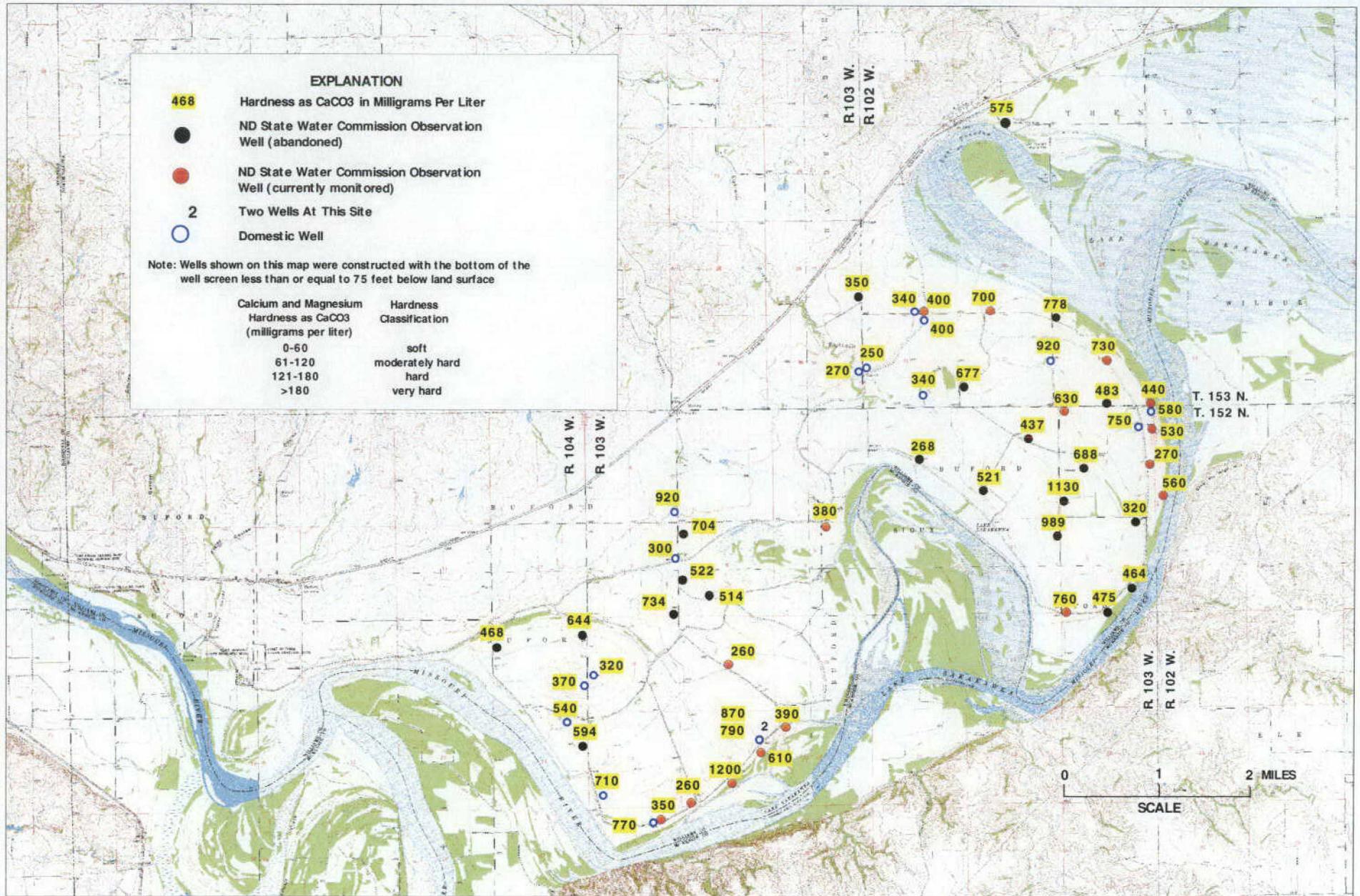


Figure 29. -- Areal distribution of hardness from wells less than 75 feet deep in the Trenton aquifer

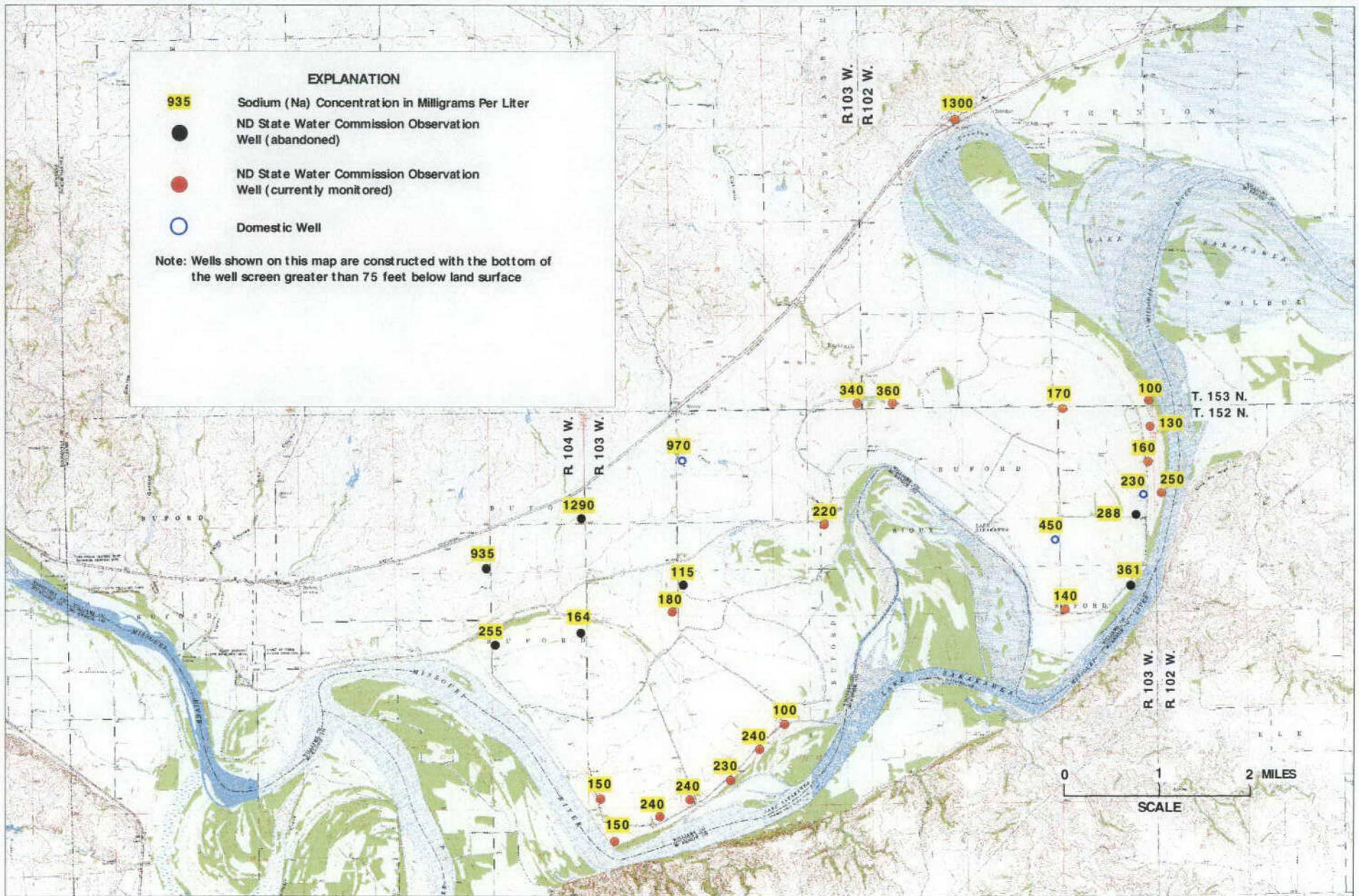


Figure 32. -- Areal distribution of sodium from wells greater than 75 feet deep in the Trenton aquifer

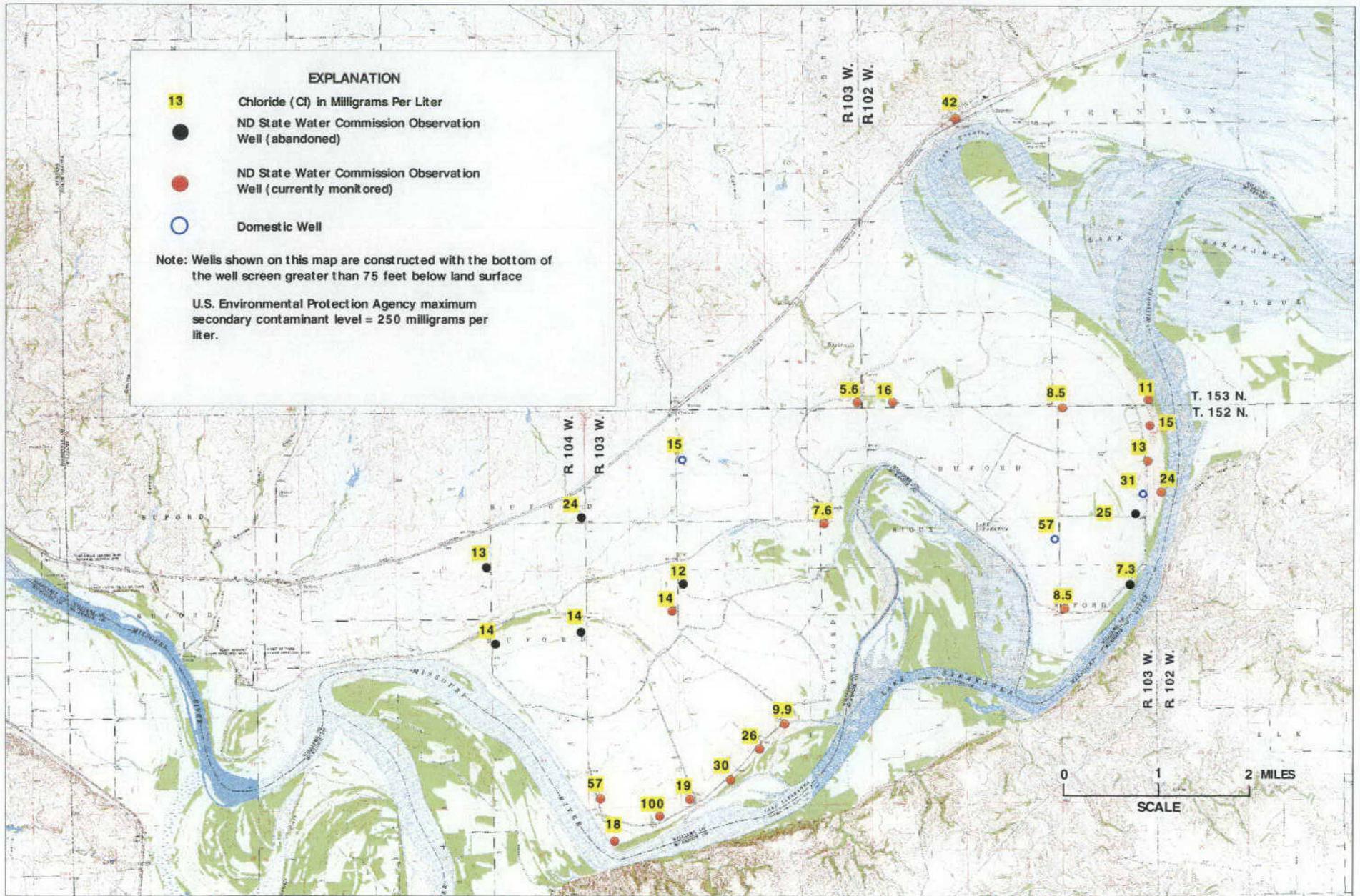


Figure 34. -- Areal distribution of chloride from wells greater than 75 feet deep in the Trenton aquifer

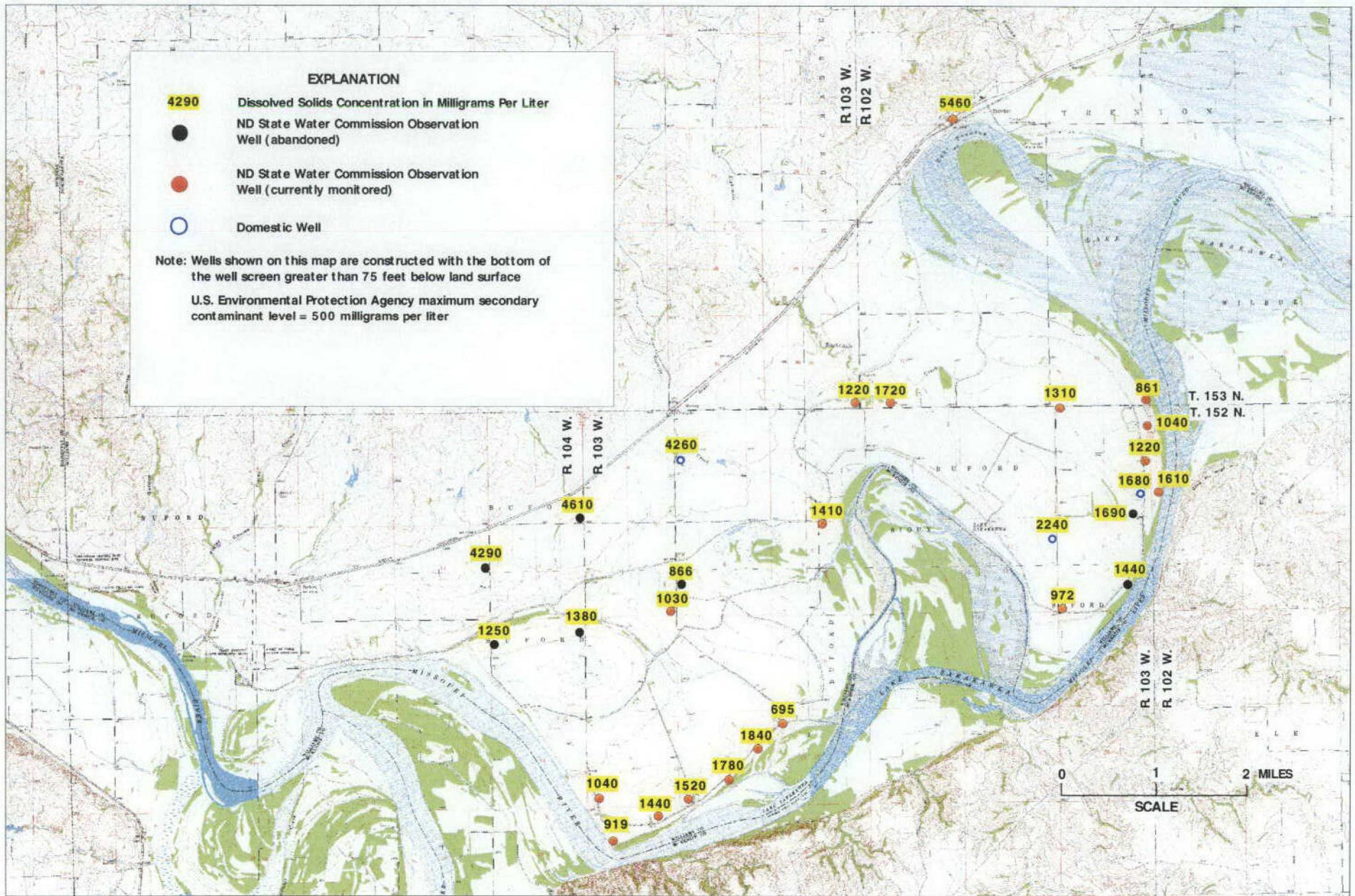


Figure 35. -- Areal distribution of dissolved solids from wells greater than 75 feet deep in the Trenton aquifer

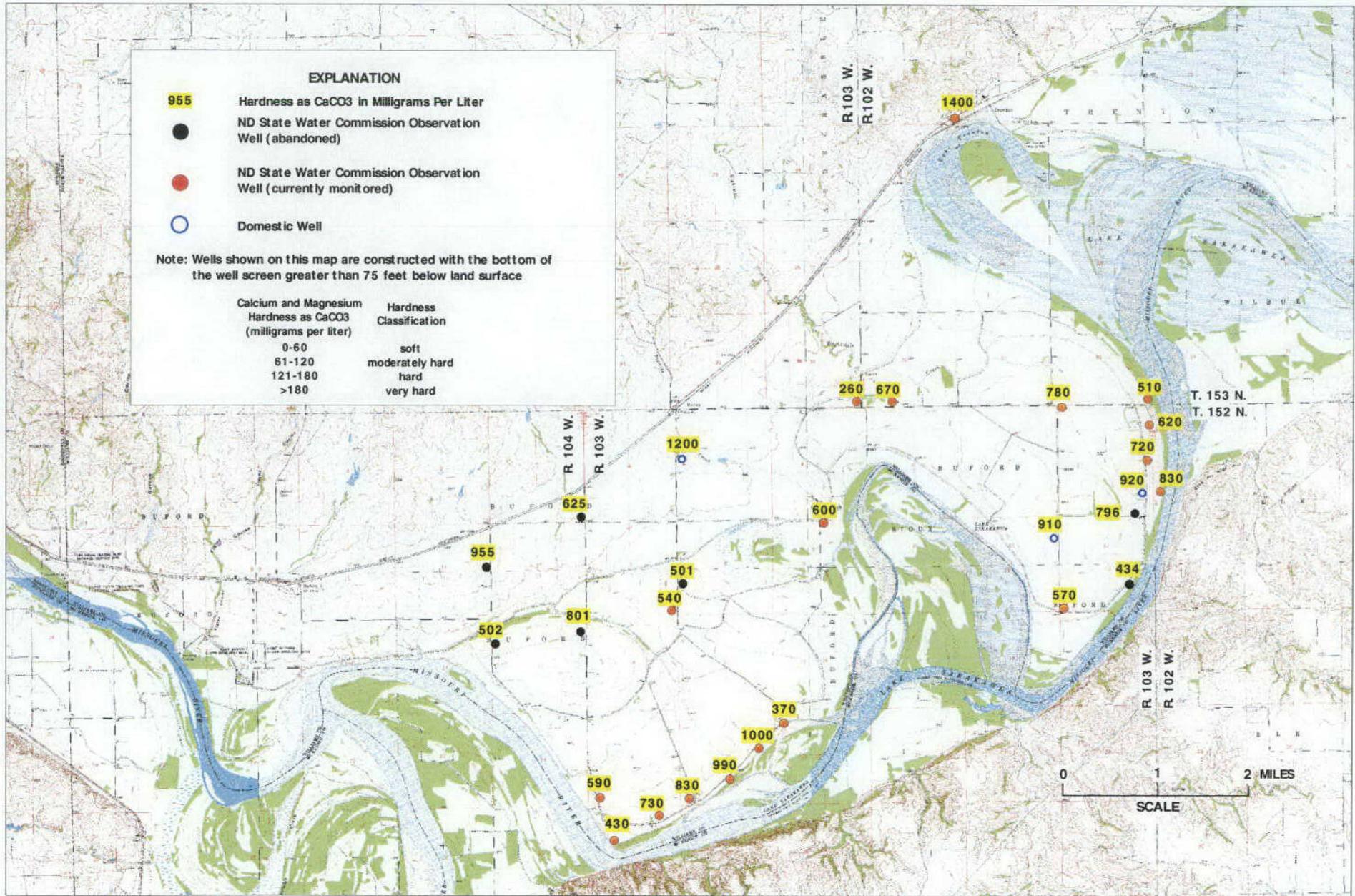


Figure 36. -- Areal distribution of hardness from wells greater than 75 feet deep in the Trenton aquifer

valley associated with Area A is incised relatively deep into the bedrock layers of the Fort Union Group. Large-scale ground-water withdrawals in Area A likely will result in water quality deterioration over time as high salinity bedrock water is captured by large-scale pumping. Therefore, even though Area A is characterized by large individual well yields, this area should be avoided because of concerns with regard to long-term water quality deterioration.

Areas B and C are located adjacent to the Missouri River. Depending on the local hydraulic connection between the deeper part of the Trenton aquifer and the Missouri River in these two areas, a significant amount of Missouri River water could be captured over time by large capacity pumping wells. Two Missouri River water quality analyses (collected 7/19/01) indicate dissolved solids concentrations of about 360 milligrams per liter, sulfate concentrations of 130 milligrams per liter and iron and manganese concentrations well below 0.3 milligrams per liter.

Based on water quality, the most favorable site for large-capacity ground-water withdrawal in the Trenton aquifer is the northeast part of Area C as close as practically possible to the Missouri River. Although iron, manganese, and sulfate concentrations are high, only iron and manganese will require treatment for removal. Over the long-term the potential exists for reduction of dissolved solids concentrations, in particular, iron, manganese, and sulfate, if a significant volume of water can be captured from the Missouri River by pumping.

Ground-water temperatures in the Trenton aquifer are relatively constant ranging from about 7 to 9 degrees centigrade. The temperature of surface

water in the nearby Missouri River is more variable throughout the year ranging from about 5 to 25 degrees centigrade. Depending on the local hydraulic connection between the Trenton aquifer and the Missouri River, the temperature of ground water pumped from the aquifer could increase somewhat during the summer.

Shallow wells, up to about 60 feet deep completed near the Missouri River could also provide a sufficient ground-water supply for the proposed industrial use. Individual well yields of about 300 to 400 gallons per minute are possible. Utilization of shallow wells could potentially reduce sulfate concentrations, which are somewhat larger in the deeper parts of the aquifer and in the shallow parts of the aquifer at greater distances from the Missouri River. In the shallow parts of the aquifer near the Missouri River in Area C, iron and manganese concentrations are high and, therefore, the water may require treatment for removal for certain uses.

APPENDIX I

Lithologic Logs of Wells and Test Holes and Water Chemistry Analyses*

* Concentrations of major ions are reported in milligrams per liter (mg/L) and concentrations of trace elements are reported in micrograms per liter (ug/L).

Date Completed:	09/12/2001	Purpose:	Observation Well
L.S. Elevation (ft):	1867.33	Well Type:	2in. - PVC
Depth Drilled (ft):	120	Aquifer:	Trenton
Screen Int. (ft.):	110-115	Data Source:	Bob Shaver

Completion Info:

Remarks: North Well

Lithologic Log

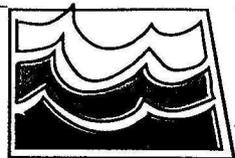
Depth (ft)	Unit	Description
0-18	CLAY	silty, yellow brown, oxidized, soft, some very fine silty, clayey, sand layers, cohesive
18-25	CLAY	as above, gray, unoxidized
25-42	SAND & GRAVEL	sand (90%), and gravel (10%), stratified sequence, variable bit chatter, sand is very fine to very coarse, predom. medium to coarse, gravel up to about 3/4 inch in diameter, comprised of western silicates, lignite, scoria, claystones, siltstones, subangular to well rounded, light bit chatter, takes water, caving, mixed 1 bag mud @ 25 feet
42-48	SAND	very fine to fine, drills smooth, no bit chatter, most sample returns in suspension, mud darkened
48-49	CLAY	silty, slightly sandy, gray, cohesive, good recovery, bit slowed
49-55	SAND & GRAVEL	as above, good bit chatter
55-75	CLAY	silty, gray, soft, cohesive, mixed 1 bag of mud at 55 feet
75-79	SAND	very fine to fine?, drilling mud very thick, almost all returns into suspension, bit slipped faster than in above clay
79-115	SAND & GRAVEL	as above, mud very thick, most sand into suspension, gravel up to 1 inch in diameter, mixed 1 bag of mud @ 100 feet, good bit chatter
115-120	CLAY	silty, moderately hard, light gray, drills slow, smooth, good recovery, bedrock, (Fort Union Group)

Chemistry

1 of 1

Location

15210206CCB1



Lab ID	NDSWC Lab	<input checked="" type="checkbox"/> Verified	
Surface		Sample Source	WC
Date Sampled	10/03/01	Sampling Method	A
Time Sampled	17:39:00	Stage	-99999
Pump Time	30	Surface Depth	0
Yield	2	Downhole Temp	-99999
Water Level	19.95	Dissolved O2	-99999
Total Evacuated		Field Conduct	1959
		Field pH	7.52
		Field Temp	-99999
		Lab Conduct	2160
		Lab pH	7.8

Major Cations and Anions

Silica	-99999
Calcium	200
Magnesium	80
Potassium	14
Sodium	250
Flouride	0.4
Bicarbonate	892
Carbonate	0
Sulfate	600
Chloride	24
Nitrate	0.1
Hydroxide	-99999
Phosphate	-99999
Boron	-99999
Iron	0.27
Manganese	0.88

Trace Elements

Selenium	3
Lead	2
Mercury	0.1
Arsenic	5
Lithium	100
Molybdenum	3
Strontium	2300
Cadmium	-99999

General Characteristics

Suspended Solid	-99999
TDS Determined	1470
TDS Calculated	1610
Hardness	830
NCH	97
ALK as CaCO3	-99999
SAR	3.8
RSC	0
Percent NA	39

EPM

Cations		Anions	
Ca	9.98	HCO3	14.62
Mg	6.58	CO3	0
Na	10.88	SO4	12.49
K	0.36	Cl	0.68
		F	0.02
TOT	27.8	NO3	0
		CH	-99999
		TOT	27.81

Color

Date Started

Date Ended

Remarks

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Date Completed:	09/12/2001	Purpose:	Observation Well
L.S. Elevation (ft):	1867.3	Well Type:	2in. - PVC
Depth Drilled (ft):	50	Aquifer:	Trenton
Screen Int. (ft.):	37-42	Data Source:	Bob Shaver

Completion Info:

Remarks: South Well

Lithologic Log

<u>Depth (ft)</u>	<u>Unit</u>	<u>Description</u>
0-18	CLAY	silty, yellow brown, soft, some very fine, silty, slightly clayey, sand layers, soft, cohesive, also some thin very fine to fine sand layers
18-24	CLAY	as above, gray, unoxidized
24-43	SAND & GRAVEL	Sand (90%), and gravel (10%), stratified sequence, variable bit chatter, sand very fine to very coarse, predom. medium to coarse, gravel up to about 3/4 inch in diameter, comprised of western silicates, lignite, scoria, claystones, siltstones, subangular to well rounded, light bit chatter, takes some water, mixed 2 bags of mud at 40 at feet

Chemistry

1 of 1

Location

15210206CCB2



Verified

Lab ID
 Surface
 Date Sampled
 Time Sampled
 Pump Time
 Yield
 Water Level
 Total Evacuated

Sample Source
 Sampling Method
 Stage
 Surface Depth
 Downhole Temp
 Dissolved O2

Field Conduct
 Field pH
 Field Temp
 Lab Conduct
 Lab pH

Major Cations and Anions

Silica
 Calcium
 Magnesium
 Potassium
 Sodium
 Fluoride
 Bicarbonate
 Carbonate
 Sulfate
 Chloride
 Nitrate
 Hydroxide
 Phosphate
 Boron
 Iron
 Manganese

Trace Elements

Selenium
 Lead
 Mercury
 Arsenic
 Lithium
 Molybdenum
 Strontium
 Cadmium

General Characteristics

Suspended Solid
 TDS Determined
 TDS Calculated
 Hardness
 NCH
 ALK as CaCO3
 SAR
 RSC
 Percent NA

EPM

Cations		Anions	
Ca	<input type="text" value="6.99"/>	HCO3	<input type="text" value="10.28"/>
Mg	<input type="text" value="4.11"/>	CO3	<input type="text" value="0"/>
Na	<input type="text" value="5.22"/>	SO4	<input type="text" value="6.04"/>
K	<input type="text" value="0.19"/>	Cl	<input type="text" value="0.37"/>
		F	<input type="text" value="0.02"/>
TOT	<input type="text" value="16.51"/>	NO3	<input type="text" value="0"/>
		CH	<input type="text" value="-99999"/>
		TOT	<input type="text" value="16.71"/>

Color
 Date Started
 Date Ended

Remarks

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Date Completed:	09/13/2001	Purpose:	Observation Well
L.S. Elevation (ft):	1861.49	Well Type:	2in. - PVC
Depth Drilled (ft):	130	Aquifer:	Trenton
Screen Int. (ft.):	106-111	Data Source:	Bob Shaver

Completion Info:

Remarks: North Well

Lithologic Log

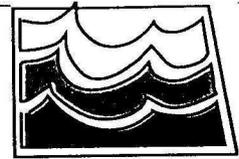
<u>Depth (ft)</u>	<u>Unit</u>	<u>Description</u>
0-12	CLAY	silty, and very fine sand, silty, v slightly clayey, very soft, yellow brown, oxidized
12-16	CLAY	as above, some interbedded very fine to fine sand
16-20	CLAY	as in 12 to 16 interval, olive gray, unoxidized
20-42	SAND	very fine to very coarse predom. fine to medium, some scoria and lignite fragments up to about 1/2 inch diameter, comprised of western silicates, scoria, lignite, claystones, siltstones, subangular to well rounded, drills fast and smooth, no bit chatter
42-82	SAND	very fine to very coarse, predom. medium to coarse, stratified sequence with gravel layers, may be more gravel than sand, caving very badly, taking lots of water, mixed lots of drilling mud, moderate bit chatter, subangular to well rounded, composition as above
82-87	CLAY	silty, gray, bit slowed, drilled smooth, fair recovery
87-92	SAND & GRAVEL	as interval from 42 to 82 feet
92-97	CLAY	silty, gray, bit slowed, drilled smooth, fair recovery
97-123	SAND & GRAVEL	as in interval from 42 to 82 feet
123-124	CLAYSTONE	and limestone, hard, brittle chips, medium brown, bedrock (Ft. Union Group)
124-130	CLAY	silty, light gray, soft, cohesive, bedrock (Ft. Union Group)

Chemistry

1 of 1

Location

15210301AAD1



Verified

Lab ID: NDSWC Lab
 Surface:
 Date Sampled: 10/03/01
 Time Sampled: 16:04:00
 Pump Time: 30
 Yield: 3
 Water Level: 14.8
 Total Evacuated:

Sample Source: WC
 Sampling Method: A
 Stage: -99999
 Surface Depth: 0
 Downhole Temp: -99999
 Dissolved O2: -99999

Field Conduct: 1398
 Field pH: 7.51
 Field Temp: -99999
 Lab Conduct: 1510
 Lab pH: 8.01

Major Cations and Anions

Silica: -99999
 Calcium: 150
 Magnesium: 59
 Potassium: 12
 Sodium: 130
 Flouride: 0.4
 Bicarbonate: 757
 Carbonate: 0
 Sulfate: 300
 Chloride: 15
 Nitrate: 0.1
 Hydroxide: -99999
 Phosphate: -99999
 Boron: -99999
 Iron: 0.98
 Manganese: 0.69

Trace Elements

Selenium: 3
 Lead: 2
 Mercury: 0
 Arsenic: 4
 Lithium: 100
 Molybdenum: 3
 Strontium: 1500
 Cadmium: -99999

General Characteristics

Suspended Solid: -99999
 TDS Determined: 969
 TDS Calculated: 1040
 Hardness: 620
 NCH: 0
 ALK as CaCO3: -99999
 SAR: 2.3
 RSC: 0
 Percent NA: 31

EPM

Cations		Anions	
Ca	7.49	HCO3	12.41
Mg	4.85	CO3	0
Na	5.66	SO4	6.25
K	0.31	Cl	0.42
		F	0.02
		NO3	0
TOT	18.31	CH	-99999
		TOT	19.1

Color: 1
 Date Started: 10/10/01
 Date Ended: 03/15/02

Remarks

Percent Diff: 2.11

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source: NDHD Lab

NO3 Samp Method: Cadmium Reductio

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Date Completed:	09/13/2001	Purpose:	Observation Well
L.S. Elevation (ft):	1861.16	Well Type:	2in. - PVC
Depth Drilled (ft):	50	Aquifer:	Trenton
Screen Int. (ft.):	37-42	Data Source:	Bob Shaver

Completion Info:

Remarks: South Well

Lithologic Log

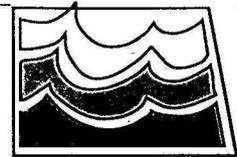
<u>Depth (ft)</u>	<u>Unit</u>	<u>Description</u>
0-12	CLAY	silty, and very fine sand, silty, very slightly clayey, very soft, yellow brown, oxidized
12-18	CLAY	as above, with some interbedded very fine to fine sand
18-22	CLAY	as in interval from 12 to 18 feet, olive gray, unoxidized
22-37	SAND	very fine to very coarse, predom. fine to medium, some scoria and lignite fragments, up to about 1/2 inch in diameter, comprised of western silicates, scoria, lignite, claystones, siltstones, subangular to well rounded, drills fast and smooth, no bit chatter
37-50	SAND & GRAVEL	sand very fine to very coarse, predom. medium to coarse, stratified sequence with gravel up to about 3/4 inch in diameter, appears to be more gravel with depth, subangular to well rounded, composition as above, hole caving, taking water, mixed 2 bags of mud

Chemistry

1 of 1

Location

15210301AAD2



Lab ID	NDSWC Lab	<input checked="" type="checkbox"/> Verified
Surface		Sample Source WC
Date Sampled	10/03/01	Sampling Method A
Time Sampled	00:00:00	Stage -99999
Pump Time	-99999	Surface Depth 0
Yield	4	Downhole Temp -99999
Water Level	13.55	Dissolved O2 -99999
Total Evacuated		Field Conduct 1220
		Field pH 7.31
		Field Temp -99999
		Lab Conduct 1300
		Lab pH 7.81

Major Cations and Anions

Silica	-99999
Calcium	130
Magnesium	49
Potassium	6.6
Sodium	100
Flouride	0.4
Bicarbonate	559
Carbonate	0
Sulfate	290
Chloride	16
Nitrate	0.1
Hydroxide	-99999
Phosphate	-99999
Boron	-99999
Iron	4.2
Manganese	2.3

Trace Elements

Selenium	3
Lead	2
Mercury	0
Arsenic	9
Lithium	100
Molybdenum	2
Strontium	1300
Cadmium	-99999

General Characteristics

Suspended Solid	-99999
TDS Determined	855
TDS Calculated	874
Hardness	530
NCH	68
ALK as CaCO3	-99999
SAR	1.9
RSC	0
Percent NA	29

EPM

Cations		Anions	
Ca	6.49	HCO3	9.16
Mg	4.03	CO3	0
Na	4.35	SO4	6.04
K	0.17	Cl	0.45
		F	0.02
		NO3	0
		CH	-99999
		TOT	15.67
TOT	15.04		

Color

Date Started 10/10/01

Date Ended 03/15/02

Remarks

Percent Diff 2.05

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source NDHD Lab

NO3 Samp Method Cadmium Reductid

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

152-103-01ADA

Dean Bauste

Date Completed:	11/10/1983	Purpose:	Domestic Well
L.S. Elevation (ft):	N/A	Well Type:	5in. - PVC
Depth Drilled (ft):	65	Aquifer:	Trenton
Screen Int. (ft.):	55-65	Data Source:	

Completion Info:

Remarks:

Lithologic Log

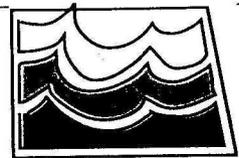
<u>Depth (ft)</u>	<u>Unit</u>	<u>Description</u>
0-2	CLAY	sandy
2-18	SAND	
18-49	SAND & GRAVEL	
49-54	CLAY	
54-65	GRAVEL	

Chemistry

1 of 1

Location

15210301ADA



Verified

Lab ID
 Surface
 Date Sampled
 Time Sampled
 Pump Time
 Yield
 Water Level
 Total Evacuated

Sample Source
 Sampling Method
 Stage
 Surface Depth
 Downhole Temp
 Dissolved O2

Field Conduct
 Field pH
 Field Temp
 Lab Conduct
 Lab pH

Major Cations and Anions

Silica
 Calcium
 Magnesium
 Potassium
 Sodium
 Flouride
 Bicarbonate
 Carbonate
 Sulfate
 Chloride
 Nitrate
 Hydroxide
 Phosphate
 Boron
 Iron
 Manganese

Trace Elements

Selenium
 Lead
 Mercury
 Arsenic
 Lithium
 Molybdenum
 Strontium
 Cadmium

General Characteristics

Suspended Solid
 TDS Determined
 TDS Calculated
 Hardness
 NCH
 ALK as CaCO3
 SAR
 RSC
 Percent NA

EPM

Cations		Anions	
Ca	<input type="text" value="7.49"/>	HCO3	<input type="text" value="10.42"/>
Mg	<input type="text" value="4.11"/>	CO3	<input type="text" value="0"/>
Na	<input type="text" value="5.66"/>	SO4	<input type="text" value="7.08"/>
K	<input type="text" value="0.25"/>	Cl	<input type="text" value="0.45"/>
		F	<input type="text" value="0.02"/>
TOT	<input type="text" value="17.51"/>	NO3	<input type="text" value="0"/>
		CH	<input type="text" value="-99999"/>
		TOT	<input type="text" value="17.97"/>

Color
 Date Started
 Date Ended

Remarks

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

152-103-01ADB

Dean Bauste

Date Completed: 10/15/1989
L.S. Elevation (ft): N/A
Depth Drilled (ft): 60
Screen Int. (ft.): 54-58

Purpose: Domestic Well
Well Type: 5in. - PVC
Aquifer: Trenton
Data Source:

Completion Info:

Remarks:

Lithologic Log

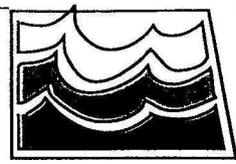
<u>Depth (ft)</u>	<u>Unit</u>	<u>Description</u>
0-8	CLAY	sandy, brown
8-42	SAND	brown
42-44	GRAVEL	
44-45	GRAVEL	with coal
45-58	GRAVEL	
58-60	SAND & GRAVEL	

Chemistry

1 of 1

Location

15210301ADB



Lab ID	NDSWC Lab	<input checked="" type="checkbox"/> Verified	
Surface		Sample Source WC	
Date Sampled	07/18/01	Sampling Method	
Time Sampled	13:15:00	Stage	-99999
Pump Time	2	Surface Depth	0
Yield	15	Downhole Temp	-99999
Water Level	-99999	Dissolved O2	-99999
Total Evacuated		Field Conduct	1370
		Field pH	-99999
		Field Temp	-99999
		Lab Conduct	1700
		Lab pH	7.46

Major Cations and Anions

Silica	-99999
Calcium	190
Magnesium	66
Potassium	8.5
Sodium	130
Flouride	0.3
Bicarbonate	808
Carbonate	0
Sulfate	340
Chloride	34
Nitrate	0.1
Hydroxide	-99999
Phosphate	-99999
Boron	-99999
Iron	7.3
Manganese	1.7

Trace Elements

Selenium	-99999
Lead	-99999
Mercury	-99999
Arsenic	-99999
Lithium	-99999
Molybdenum	-99999
Strontium	-99999
Cadmium	-99999

General Characteristics

Suspended Solid	-99999
TDS Determined	1200
TDS Calculated	1180
Hardness	750
NCH	84
ALK as CaCO3	-99999
SAR	2.1
RSC	0
Percent NA	27

EPM

Cations		Anions	
Ca	9.48	HCO3	13.24
Mg	5.43	CO3	0
Na	5.66	SO4	7.08
K	0.22	Cl	0.96
		F	0.02
		NO3	0
TOT	20.79	CH	-99999
		TOT	21.3

Color

Date Started

Date Ended

Remarks

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Date Completed:	09/12/2001	Purpose:	Observation Well
L.S. Elevation (ft):	1862.73	Well Type:	2in. - PVC
Depth Drilled (ft):	120	Aquifer:	Trenton
Screen Int. (ft.):	94-99	Data Source:	Bob Shaver

Completion Info:

Remarks: West well

Lithologic Log

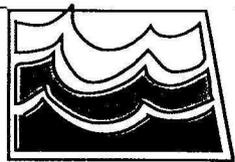
Depth (ft)	Unit	Description
0-11	CLAY	silty, yellow brown, oxidized, soft, drilled smooth
11-21	SAND	very fine, silty, slightly clayey, cohesive, very soft, olive gray, unoxidized
21-42	SAND	ver fine to medium, predom. fine, some lignite and scoria fragments, drills smooth and fast, no bit chatter, most returns into suspension
42-46	CLAY	gray, soft, bit slowed, good recovery
46-53	SAND & GRAVEL	95% sand and 5% gravel, sand very fine to very coarse, predom. medium to coarse, gravel up to about 3/4 inch in diameter, stratified sequence, comprised of western silicates, scoria, lignite, claystones, siltstones, subangular to well rounded, taking some water, light bit chatter
53-80	SAND	very fine to coarse, predom. fine to medium, lignite fragments, no bit chatter, drilled smooth and fast, lots of sand in suspension
80-117	SAND & GRAVEL	caving very bably, strong bit chatter, mixed 101/2 bags of mud, mud very thick, most sample returns into suspension, comprised of western silicates, scoria, lignite, claystone, siltstone, subangular to well rounded
117-120	CLAY	silty, light gray, soft, bedrock (Fort Union Group)

Chemistry

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Location

15210301ADD1



Lab ID	NDSWC Lab	<input checked="" type="checkbox"/> Verified
Surface		Sample Source WC
Date Sampled	10/03/01	Sampling Method A
Time Sampled	16:54:00	Stage -99999
Pump Time	30	Surface Depth 0
Yield	2	Downhole Temp -99999
Water Level	13.8	Dissolved O2 -99999
Total Evacuated		Field Conduct 1578
		Field pH 7.51
		Field Temp -99999
		Lab Conduct 1700
		Lab pH 7.77

Major Cations and Anions

Silica	-99999
Calcium	180
Magnesium	65
Potassium	13
Sodium	160
Flouride	0.4
Bicarbonate	763
Carbonate	0
Sulfate	410
Chloride	13
Nitrate	0.1
Hydroxide	-99999
Phosphate	-99999
Boron	-99999
Iron	0.23
Manganese	0.94

Trace Elements

Selenium	3
Lead	2
Mercury	0
Arsenic	2
Lithium	100
Molybdenum	3
Strontium	2000
Cadmium	-99999

General Characteristics

Suspended Solid	-99999
TDS Determined	1100
TDS Calculated	1220
Hardness	720
NCH	91
ALK as CaCO3	-99999
SAR	2.6
RSC	0
Percent NA	32

EPM

Cations		Anions	
Ca	8.98	HCO3	12.51
Mg	5.35	CO3	0
Na	6.96	SO4	8.54
K	0.33	Cl	0.37
		F	0.02
		NO3	0
TOT	21.62	CH	-99999
		TOT	21.44

Color

Date Started 10/10/01

Date Ended 03/15/02

Remarks

Percent Diff 0.42

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source NDHD Lab

NO3 Samp Method Cadmium Reductio

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Date Completed:	09/12/2001	Purpose:	Observation Well
L.S. Elevation (ft):	1862.15	Well Type:	2in. - PVC
Depth Drilled (ft):	0	Aquifer:	Trenton
Screen Int. (ft.):	32-37	Data Source:	Bob Shaver

Completion Info:

Remarks: East well

Lithologic Log

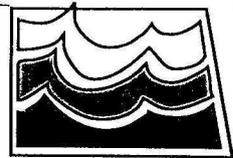
Depth (ft)	Unit	Description
0-8	CLAY	silty, yellow brown, oxidized, soft, drilled smooth
8-16	SAND	very fine, silty, slightly clayey, very soft, yellow brown, oxidized
16-22	SAND	very fine, silty, slightly clayey, very soft, gray, unoxidized
22-43	SAND	very fine to medium, predom. fine, some scoria and lignite fragments, drills smooth and fast, no bit chatter, most returns into suspension
43-48	CLAY	silty, moderately hard, gray
48-50	SAND & GRAVEL	Sand (95%), and gravel (5%), sand very fine to very coarse, predom. medium to coarse, gravel up to about 3/4 inch in diameter, stratified sequence, comprised of western silicates, scoria, lignite, claystones, siltstones, subangular to well rounded, taking some water, light bit chatter

Chemistry

1 of 1

Location

15210301ADD2



Lab ID	NDSWC Lab	<input checked="" type="checkbox"/> Verified
Surface		Sample Source WC
Date Sampled	10/03/01	Sampling Method A
Time Sampled	16:35:00	Stage -99999
Pump Time	15	Surface Depth 0
Yield	4	Field Conduct 688
Water Level	13.3	Field pH 7.57
Total Evacuated		Field Temp -99999
		Lab Conduct 698
		Lab pH 7.71

Major Cations and Anions

Silica	-99999
Calcium	69
Magnesium	24
Potassium	4.7
Sodium	52
Flouride	0.8
Bicarbonate	316
Carbonate	0
Sulfate	120
Chloride	9.5
Nitrate	0.1
Hydroxide	-99999
Phosphate	-99999
Boron	-99999
Iron	2
Manganese	0.76

Trace Elements

Selenium	3
Lead	2
Mercury	0
Arsenic	11
Lithium	100
Molybdenum	4
Strontium	670
Cadmium	-99999

General Characteristics

Suspended Solid	-99999
TDS Determined	450
TDS Calculated	439
Hardness	270
NCH	12
ALK as CaCO3	-99999
SAR	1.4
RSC	0
Percent NA	29

EPM

Cations		Anions	
Ca	3.44	HCO3	5.18
Mg	1.97	CO3	0
Na	2.26	SO4	2.5
K	0.12	Cl	0.27
		F	0.04
TOT	7.79	NO3	0
		CH	-99999
		TOT	7.99

Color

Date Started 10/10/01

Date Ended 03/15/02

Remarks

Percent Diff 1.27

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source NDHD Lab

NO3 Samp Method Cadmium Reductio

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

152-103-01BBB1
NDSWC 1

Date Completed:	06/17/1968	Purpose:	Observation Well - Recorder
L.S. Elevation (ft):	1860.85	Well Type:	4in. - Steel
Depth Drilled (ft):	140	Aquifer:	Trenton
Screen Int. (ft.):	105-110	Data Source:	

Completion Info:

Remarks: NORTH WELL
MP Elevation Surveyed 6/02 = 1862.23
LS Elevation Surveyed 6/02 = 1860.85

Lithologic Log

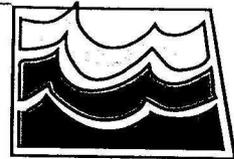
Depth (ft)	Unit	Description
0-9	CLAY	Slightly silty, yellowish brown to olive-gray, soft
9-26	SAND	Fine with some medium, moderately well-sorted, angular to subangular, approximately 20 to 25 percent lignite
26-55	GRAVEL	Fine to coarse, some sand, moderately sorted, subangular to subrounded, grades to mainly coarse after 45 ft., pebbly-mud, very heavy (thick)
55-60	GRAVEL	Coarse to very coarse, moderately well-sorted(?), cannot determine amount of fine due to thick mud
60-70	GRAVEL	Fine to coarse, very sandy, poorly sorted
70-73	SAND	Poor sample return but drilled quiet
73-76	GRAVEL	As above
76-79	SAND	Poor sample return but drilled quiet
79-97	GRAVEL	As above
97-99	SAND	Fine to medium (poor sample return)
99-116	GRAVEL	Medium to coarse, sandy, subrounded, moderately sorted, some cobbles-chert, porphritic rocks and black igneous rocks
116-140	SAND	Medium to coarse, poor sample return, large amount of coal, could not determine material after 135 ft.

Chemistry

1 of 5

Location

15210301BBB1



Lab ID

Verified

Surface

Sample Source

WC

Date Sampled

06/18/68

Sampling Method

Field Conduct

-99999

Time Sampled

00:00:00

Stage

-99999

Field pH

-99999

Pump Time

330

Surface Depth

0

Field Temp

-99999

Yield

75

Downhole Temp

-99999

Lab Conduct

1860

Water Level

-99999

Dissolved O2

-99999

Lab pH

7.8

Total Evacuated

Major Cations and Anions

Silica	27
Calcium	216
Magnesium	59
Potassium	10
Sodium	162
Flouride	0.4
Bicarbonate	825
Carbonate	0
Sulfate	468
Chloride	8
Nitrate	0
Hydroxide	-99999
Phosphate	-99999
Boron	0.12
Iron	3.1
Manganese	1.3

Trace Elements

Selenium	-99999
Lead	-99999
Mercury	-99999
Arsenic	-99999
Lithium	-99999
Molybdenum	-99999
Strontium	-99999
Cadmium	-99999

General Characteristics

Suspended Solid	-99999
TDS Determined	1360
TDS Calculated	1360
Hardness	783
NCH	106
ALK as CaCO3	-99999
SAR	2.5
RSC	-99999
Percent NA	31

EPM

Cations		Anions	
Ca	10.78	HCO3	13.52
Mg	4.85	CO3	0
Na	7.05	SO4	9.74
K	0.26	Cl	0.23
		F	0.02
TOT	22.94	NO3	0
		CH	-99999
		TOT	23.51

Color

M

Date Started

07/08/68

Date Ended

07/15/68

Remarks

W

Percent Diff

1.2

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

Unknown

NO3 Samp Method

Unknown

Nitrate Remarks

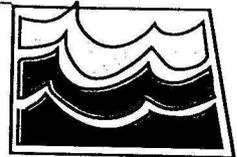
Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Chemistry

1 of 5

Location

15210301BBB1



Lab ID	<input type="text"/>	<input checked="" type="checkbox"/> Verified
Surface	<input type="text"/>	Sample Source <input type="text" value="WC"/>
Date Sampled	<input type="text" value="08/20/80"/>	Sampling Method <input type="text" value="A"/> Field Conduct <input type="text" value="1110"/>
Time Sampled	<input type="text" value="15:30:00"/>	Stage <input type="text" value="-99999"/> Field pH <input type="text" value="-99999"/>
Pump Time	<input type="text" value="30"/>	Surface Depth <input type="text" value="0"/> Field Temp <input type="text" value="9.5"/>
Yield	<input type="text"/>	Downhole Temp <input type="text" value="-99999"/> Lab Conduct <input type="text" value="1150"/>
Water Level	<input type="text" value="-99999"/>	Dissolved O2 <input type="text" value="-99999"/> Lab pH <input type="text" value="9"/>
Total Evacuated	<input type="text"/>	

Major Cations and Anions

Silica	<input type="text" value="1.9"/>
Calcium	<input type="text" value="6"/>
Magnesium	<input type="text" value="52"/>
Potassium	<input type="text" value="8.9"/>
Sodium	<input type="text" value="180"/>
Flouride	<input type="text" value="0.1"/>
Bicarbonate	<input type="text" value="321"/>
Carbonate	<input type="text" value="31"/>
Sulfate	<input type="text" value="310"/>
Chloride	<input type="text" value="6"/>
Nitrate	<input type="text" value="1"/>
Hydroxide	<input type="text" value="-99999"/>
Phosphate	<input type="text" value="-99999"/>
Boron	<input type="text" value="0.06"/>
Iron	<input type="text" value="0.02"/>
Manganese	<input type="text" value="0.01"/>

Trace Elements

Selenium	<input type="text" value="-99999"/>
Lead	<input type="text" value="-99999"/>
Mercury	<input type="text" value="-99999"/>
Arsenic	<input type="text" value="-99999"/>
Lithium	<input type="text" value="-99999"/>
Molybdenum	<input type="text" value="-99999"/>
Strontium	<input type="text" value="-99999"/>
Cadmium	<input type="text" value="-99999"/>

General Characteristics

Suspended Solid	<input type="text" value="-99999"/>
TDS Determined	<input type="text" value="766"/>
TDS Calculated	<input type="text" value="755"/>
Hardness	<input type="text" value="230"/>
NCH	<input type="text" value="0"/>
ALK as CaCO3	<input type="text" value="-99999"/>
SAR	<input type="text" value="5.2"/>
RSC	<input type="text" value="2"/>
Percent NA	<input type="text" value="62"/>

EPM

Cations		Anions	
Ca	<input type="text" value="0.3"/>	HCO3	<input type="text" value="5.26"/>
Mg	<input type="text" value="4.28"/>	CO3	<input type="text" value="1.03"/>
Na	<input type="text" value="7.83"/>	SO4	<input type="text" value="6.45"/>
K	<input type="text" value="0.23"/>	Cl	<input type="text" value="0.17"/>
		F	<input type="text" value="0.01"/>
TOT	<input type="text" value="12.64"/>	NO3	<input type="text" value="0.02"/>
		CH	<input type="text" value="-99999"/>
		TOT	<input type="text" value="12.94"/>

Color

Date Started

Date Ended

Remarks

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

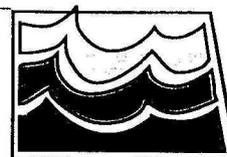
Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Chemistry

1 of 5

Location

15210301BBB1



Lab ID	<input type="text"/>	<input checked="" type="checkbox"/> Verified
Surface	<input type="text"/>	Sample Source <input type="text" value="WC"/>
Date Sampled	<input type="text" value="06/04/85"/>	Sampling Method <input type="text"/>
Time Sampled	<input type="text" value="14:00:00"/>	Field Conduct <input type="text" value="1750"/>
Pump Time	<input type="text" value="-99999"/>	Stage <input type="text" value="-99999"/>
Yield	<input type="text"/>	Surface Depth <input type="text" value="0"/>
Water Level	<input type="text" value="-99999"/>	Downhole Temp <input type="text" value="-99999"/>
Total Evacuated	<input type="text"/>	Dissolved O2 <input type="text" value="-99999"/>
		Field pH <input type="text" value="7.51"/>
		Field Temp <input type="text" value="6.9"/>
		Lab Conduct <input type="text" value="1500"/>
		Lab pH <input type="text" value="8.06"/>

Major Cations and Anions

Silica	<input type="text" value="21"/>
Calcium	<input type="text" value="180"/>
Magnesium	<input type="text" value="74"/>
Potassium	<input type="text" value="11"/>
Sodium	<input type="text" value="170"/>
Flouride	<input type="text" value="0.2"/>
Bicarbonate	<input type="text" value="469"/>
Carbonate	<input type="text" value="0"/>
Sulfate	<input type="text" value="450"/>
Chloride	<input type="text" value="9"/>
Nitrate	<input type="text" value="1"/>
Hydroxide	<input type="text" value="-99999"/>
Phosphate	<input type="text" value="-99999"/>
Boron	<input type="text" value="0.08"/>
Iron	<input type="text" value="0.91"/>
Manganese	<input type="text" value="2.1"/>

Trace Elements

Selenium	<input type="text" value="-99999"/>
Lead	<input type="text" value="-99999"/>
Mercury	<input type="text" value="-99999"/>
Arsenic	<input type="text" value="-99999"/>
Lithium	<input type="text" value="-99999"/>
Molybdenum	<input type="text" value="-99999"/>
Strontium	<input type="text" value="-99999"/>
Cadmium	<input type="text" value="-99999"/>

General Characteristics

Suspended Solid	<input type="text" value="-99999"/>
TDS Determined	<input type="text" value="1030"/>
TDS Calculated	<input type="text" value="1150"/>
Hardness	<input type="text" value="750"/>
NCH	<input type="text" value="370"/>
ALK as CaCO3	<input type="text" value="-99999"/>
SAR	<input type="text" value="2.7"/>
RSC	<input type="text" value="0"/>
Percent NA	<input type="text" value="33"/>

EPM

Cations		Anions	
Ca	<input type="text" value="8.98"/>	HCO3	<input type="text" value="7.69"/>
Mg	<input type="text" value="6.09"/>	CO3	<input type="text" value="0"/>
Na	<input type="text" value="7.4"/>	SO4	<input type="text" value="9.37"/>
K	<input type="text" value="0.28"/>	Cl	<input type="text" value="0.25"/>
		F	<input type="text" value="0.01"/>
		NO3	<input type="text" value="0.02"/>
		CH	<input type="text" value="-99999"/>
TOT	<input type="text" value="22.75"/>	TOT	<input type="text" value="17.34"/>

Color

Date Started

Date Ended

Remarks

W

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

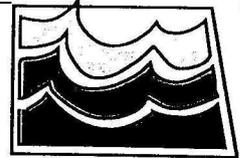
Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Chemistry

1 of 5

Location

15210301BBB1



Lab ID	NDSWC Lab	<input checked="" type="checkbox"/> Verified
Surface		Sample Source <input type="text" value="UG"/>
Date Sampled	<input type="text" value="08/23/93"/>	Sampling Method <input type="text" value=""/>
Time Sampled	<input type="text" value="13:03:00"/>	Stage <input type="text" value="-99999"/>
Pump Time	<input type="text" value="-99999"/>	Surface Depth <input type="text" value="0"/>
Yield	<input type="text" value=""/>	Downhole Temp <input type="text" value="-99999"/>
Water Level	<input type="text" value="-99999"/>	Dissolved O2 <input type="text" value="-99999"/>
Total Evacuated	<input type="text" value=""/>	Field Conduct <input type="text" value="1870"/>
		Field pH <input type="text" value="7.48"/>
		Field Temp <input type="text" value="-99999"/>
		Lab Conduct <input type="text" value="1740"/>
		Lab pH <input type="text" value="7.77"/>

Major Cations and Anions

Silica	<input type="text" value="24"/>
Calcium	<input type="text" value="180"/>
Magnesium	<input type="text" value="71"/>
Potassium	<input type="text" value="11"/>
Sodium	<input type="text" value="170"/>
Flouride	<input type="text" value="0.3"/>
Bicarbonate	<input type="text" value="729"/>
Carbonate	<input type="text" value="0"/>
Sulfate	<input type="text" value="460"/>
Chloride	<input type="text" value="8.9"/>
Nitrate	<input type="text" value="0"/>
Hydroxide	<input type="text" value="-99999"/>
Phosphate	<input type="text" value="-99999"/>
Boron	<input type="text" value="0.15"/>
Iron	<input type="text" value="1.4"/>
Manganese	<input type="text" value="1.1"/>

Trace Elements

Selenium	<input type="text" value="0"/>
Lead	<input type="text" value="2"/>
Mercury	<input type="text" value="0"/>
Arsenic	<input type="text" value="3"/>
Lithium	<input type="text" value="70"/>
Molybdenum	<input type="text" value="8"/>
Strontium	<input type="text" value="1600"/>
Cadmium	<input type="text" value="-99999"/>

General Characteristics

Suspended Solid	<input type="text" value="-99999"/>
TDS Determined	<input type="text" value="1210"/>
TDS Calculated	<input type="text" value="1290"/>
Hardness	<input type="text" value="740"/>
NCH	<input type="text" value="140"/>
ALK as CaCO3	<input type="text" value="-99999"/>
SAR	<input type="text" value="2.7"/>
RSC	<input type="text" value="0"/>
Percent NA	<input type="text" value="33"/>

EPM

Cations		Anions	
Ca	<input type="text" value="8.98"/>	HCO3	<input type="text" value="11.95"/>
Mg	<input type="text" value="5.84"/>	CO3	<input type="text" value="0"/>
Na	<input type="text" value="7.4"/>	SO4	<input type="text" value="9.58"/>
K	<input type="text" value="0.28"/>	Cl	<input type="text" value="0.25"/>
		F	<input type="text" value="0.02"/>
TOT	<input type="text" value="22.5"/>	NO3	<input type="text" value="0"/>
		CH	<input type="text" value="-99999"/>
		TOT	<input type="text" value="21.8"/>

Color

Date Started

Date Ended

Remarks

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

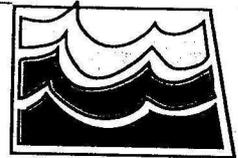
Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Chemistry

1 of 5

Location

15210301BBB1



Lab ID	NDSWC Lab	<input checked="" type="checkbox"/> Verified
Surface		Sample Source WC
Date Sampled	07/19/01	Sampling Method A
Time Sampled	15:10:00	Stage -99999
Pump Time	300	Surface Depth 0
Yield	2	Downhole Temp -99999
Water Level	6.7	Dissolved O2 -99999
Total Evacuated		Field Conduct 1480
		Field pH -99999
		Field Temp -99999
		Lab Conduct 1820
		Lab pH 7.74

Major Cations and Anions

Silica	-99999
Calcium	200
Magnesium	69
Potassium	11
Sodium	170
Flouride	0.3
Bicarbonate	811
Carbonate	0
Sulfate	450
Chloride	8.5
Nitrate	0.2
Hydroxide	-99999
Phosphate	-99999
Boron	-99999
Iron	0.05
Manganese	2.2

Trace Elements

Selenium	-99999
Lead	-99999
Mercury	-99999
Arsenic	-99999
Lithium	-99999
Molybdenum	-99999
Strontium	-99999
Cadmium	-99999

General Characteristics

Suspended Solid	-99999
TDS Determined	1320
TDS Calculated	1310
Hardness	780
NCH	120
ALK as CaCO3	-99999
SAR	2.7
RSC	0
Percent NA	32

EPM

Cations		Anions	
Ca	9.98	HCO3	13.29
Mg	5.68	CO3	0
Na	7.4	SO4	9.37
K	0.28	Cl	0.24
		F	0.02
TOT	23.34	NO3	0
		CH	-99999
		TOT	22.92

Color	1
Date Started	07/27/01
Date Ended	08/02/01

Remarks

Percent Diff 0.91

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source NDHD Lab

NO3 Samp Method Cadmium Reductio

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

152-103-01BBB2

NDSWC 8005

Date Completed:	06/23/1971	Purpose:	Observation Well
L.S. Elevation (ft):	1861.19	Well Type:	1.25in. - PVC
Depth Drilled (ft):	40	Aquifer:	Trenton
Screen Int. (ft.):	22-25	Data Source:	

Completion Info:

Remarks: SOUTH WELL

Lithologic Log

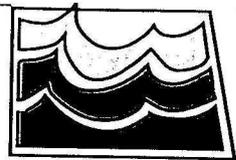
Depth (ft)	Unit	Description
0-1	TOPSOIL	Silty, clayey, sandy, brown
1-14	CLAY	Very silty, sandy, dark yellowish brown, slightly cohesive, plastic, oxidized (alluvium)
14-40	SAND	Very fine- to very coarse-grained (mostly medium-grained), subangular to subrounded, well-sorted, mostly quartz, some siliceous rock fragments and lignite

Chemistry

1 of 2

Location

15210301BBB2



Lab ID Verified

Surface Sample Source

Date Sampled Sampling Method Field Conduct

Time Sampled Stage Field pH

Pump Time Surface Depth Field Temp

Yield Downhole Temp Lab Conduct

Water Level Dissolved O2 Lab pH

Total Evacuated

Major Cations and Anions

Silica	<input type="text" value="18"/>
Calcium	<input type="text" value="138"/>
Magnesium	<input type="text" value="53"/>
Potassium	<input type="text" value="6.1"/>
Sodium	<input type="text" value="114"/>
Flouride	<input type="text" value="1"/>
Bicarbonate	<input type="text" value="680"/>
Carbonate	<input type="text" value="0"/>
Sulfate	<input type="text" value="240"/>
Chloride	<input type="text" value="5.1"/>
Nitrate	<input type="text" value="1.4"/>
Hydroxide	<input type="text" value="-99999"/>
Phosphate	<input type="text" value="-99999"/>
Boron	<input type="text" value="0"/>
Iron	<input type="text" value="1.2"/>
Manganese	<input type="text" value="0.42"/>

Trace Elements

Selenium	<input type="text" value="-99999"/>
Lead	<input type="text" value="-99999"/>
Mercury	<input type="text" value="-99999"/>
Arsenic	<input type="text" value="-99999"/>
Lithium	<input type="text" value="-99999"/>
Molybdenum	<input type="text" value="-99999"/>
Strontium	<input type="text" value="-99999"/>
Cadmium	<input type="text" value="-99999"/>

General Characteristics

Suspended Solid	<input type="text" value="-99999"/>
TDS Determined	<input type="text" value="923"/>
TDS Calculated	<input type="text" value="913"/>
Hardness	<input type="text" value="562"/>
NCH	<input type="text" value="4"/>
ALK as CaCO3	<input type="text" value="-99999"/>
SAR	<input type="text" value="2.1"/>
RSC	<input type="text" value="-99999"/>
Percent NA	<input type="text" value="30"/>

EPM

Cations		Anions	
Ca	<input type="text" value="6.89"/>	HCO3	<input type="text" value="11.15"/>
Mg	<input type="text" value="4.36"/>	CO3	<input type="text" value="0"/>
Na	<input type="text" value="4.96"/>	SO4	<input type="text" value="5"/>
K	<input type="text" value="0.16"/>	Cl	<input type="text" value="0.14"/>
		F	<input type="text" value="0.05"/>
		NO3	<input type="text" value="0.02"/>
TOT	<input type="text" value="16.37"/>	CH	<input type="text" value="-99999"/>
		TOT	<input type="text" value="16.36"/>

Color
 Date Started
 Date Ended

Remarks

W

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

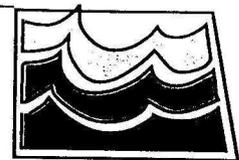
Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Chemistry

1 of 2

Location

15210301BBB2



Lab ID	NDSWC Lab			<input checked="" type="checkbox"/> Verified	
Surface		Sample Source	WC		
Date Sampled	07/18/01	Sampling Method	A	Field Conduct	1160
Time Sampled	15:30:00	Stage	-99999	Field pH	-99999
Pump Time	100	Surface Depth	0	Field Temp	-99999
Yield	5	Downhole Temp	-99999	Lab Conduct	1480
Water Level	7.66	Dissolved O2	-99999	Lab pH	7.71
Total Evacuated					

Major Cations and Anions

Silica	-99999
Calcium	160
Magnesium	57
Potassium	6.9
Sodium	110
Flouride	0.2
Bicarbonate	839
Carbonate	0
Sulfate	180
Chloride	23
Nitrate	0.1
Hydroxide	-99999
Phosphate	-99999
Boron	-99999
Iron	6.4
Manganese	2.2

Trace Elements

Selenium	-99999
Lead	-99999
Mercury	-99999
Arsenic	-99999
Lithium	-99999
Molybdenum	-99999
Strontium	-99999
Cadmium	-99999

General Characteristics

Suspended Solid	-99999
TDS Determined	976
TDS Calculated	959
Hardness	630
NCH	0
ALK as CaCO3	-99999
SAR	1.9
RSC	1
Percent NA	27

EPM

Cations		Anions	
Ca	7.98	HCO3	13.75
Mg	4.69	CO3	0
Na	4.79	SO4	3.75
K	0.18	Cl	0.65
		F	0.01
TOT	17.64	NO3	0
		CH	-99999
		TOT	18.16

Color

Date Started

Date Ended

Remarks

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

152-103-01CBA

NDSWC 8006

Date Completed:	06/24/1971	Purpose:	Observation Well - Destroyed
L.S. Elevation (ft):	1860	Well Type:	1.25in. - PVC
Depth Drilled (ft):	60	Aquifer:	Trenton
Screen Int. (ft.):	37-40	Data Source:	

Completion Info:

Remarks:

Lithologic Log

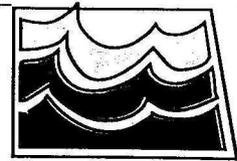
<u>Depth (ft)</u>	<u>Unit</u>	<u>Description</u>
0-1	TOPSOIL	Silty, clayey, sandy, yellowish brown
1-5	CLAY	Very silty, sandy, dark yellowish brown, slightly cohesive, plastic, oxidized (alluvium)
5-35	SAND	Slightly clayey, very fine- to coarse-grained (mostly fine- to medium-grained), subrounded, well- sorted, mostly quartz and siliceous rock fragments, scoriaceous, lignitic
35-40	GRAVEL	Slightly to moderately sandy, fine to coarse (mostly medium to coarse), subangular to well- rounded, moderately well-sorted, mostly brownish western silicates, some carbonates and shale, scoriaceous, very lignitic
40-49	SAND	Moderately gravelly, stratified, fine- to very coarse-grained, mostly coarse-grained, subrounded, moderately well-sorted, mostly quartz and siliceous rock fragments, lignitic
49-60	SHALE	Clayey, and siltstone, slightly sandy, bedded, medium light gray, highly calcareous, occasional brownish concretions, moderately indurated (Fort Union Group)

Chemistry

1 of 1

Location

15210301CBA



Lab ID	<input type="text"/>	<input checked="" type="checkbox"/> Verified
Surface	<input type="text"/>	Sample Source <input type="text" value="WC"/>
Date Sampled	<input type="text" value="06/29/71"/>	Sampling Method <input type="text"/>
Time Sampled	<input type="text" value="00:00:00"/>	Stage <input type="text" value="-99999"/>
Pump Time	<input type="text" value="360"/>	Surface Depth <input type="text" value="0"/>
Yield	<input type="text" value="7"/>	Downhole Temp <input type="text" value="-99999"/>
Water Level	<input type="text" value="-99999"/>	Dissolved O2 <input type="text" value="-99999"/>
Total Evacuated	<input type="text"/>	Field Conduct <input type="text" value="1880"/>
		Field pH <input type="text" value="-99999"/>
		Field Temp <input type="text" value="8"/>
		Lab Conduct <input type="text" value="1760"/>
		Lab pH <input type="text" value="7.5"/>

Major Cations and Anions	
Silica	<input type="text" value="20"/>
Calcium	<input type="text" value="156"/>
Magnesium	<input type="text" value="73"/>
Potassium	<input type="text" value="6.6"/>
Sodium	<input type="text" value="176"/>
Flouride	<input type="text" value="1"/>
Bicarbonate	<input type="text" value="779"/>
Carbonate	<input type="text" value="0"/>
Sulfate	<input type="text" value="398"/>
Chloride	<input type="text" value="6.5"/>
Nitrate	<input type="text" value="1"/>
Hydroxide	<input type="text" value="-99999"/>
Phosphate	<input type="text" value="-99999"/>
Boron	<input type="text" value="0"/>
Iron	<input type="text" value="14"/>
Manganese	<input type="text" value="0.55"/>

Trace Elements	
Selenium	<input type="text" value="-99999"/>
Lead	<input type="text" value="-99999"/>
Mercury	<input type="text" value="-99999"/>
Arsenic	<input type="text" value="-99999"/>
Lithium	<input type="text" value="-99999"/>
Molybdenum	<input type="text" value="-99999"/>
Strontium	<input type="text" value="-99999"/>
Cadmium	<input type="text" value="-99999"/>

General Characteristics	
Suspended Solid	<input type="text" value="-99999"/>
TDS Determined	<input type="text" value="1210"/>
TDS Calculated	<input type="text" value="1240"/>
Hardness	<input type="text" value="688"/>
NCH	<input type="text" value="49"/>
ALK as CaCO3	<input type="text" value="-99999"/>
SAR	<input type="text" value="2.9"/>
RSC	<input type="text" value="-99999"/>
Percent NA	<input type="text" value="35"/>

EPM			
Cations		Anions	
Ca	<input type="text" value="7.78"/>	HCO3	<input type="text" value="12.77"/>
Mg	<input type="text" value="6"/>	CO3	<input type="text" value="0"/>
Na	<input type="text" value="7.66"/>	SO4	<input type="text" value="8.29"/>
K	<input type="text" value="0.17"/>	Cl	<input type="text" value="0.18"/>
		F	<input type="text" value="0.05"/>
		NO3	<input type="text" value="0.02"/>
		CH	<input type="text" value="-99999"/>
TOT	<input type="text" value="21.61"/>	TOT	<input type="text" value="21.31"/>

Color	<input type="text" value="M"/>
Date Started	<input type="text" value="07/30/71"/>
Date Ended	<input type="text" value="08/31/71"/>

Remarks
<input type="text" value="W"/>

Percent Diff	<input type="text" value="-99999"/>
Nitrate Info	
<input type="checkbox"/> NO3 Sample Chilled	
NO3 Samp Source	<input type="text" value="Unknown"/>
NO3 Samp Method	<input type="text" value="Unknown"/>
Nitrate Remarks	<input type="text"/>

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

152-103-01CCB1

NDSWC 2

Date Completed:	06/18/1968	Purpose:	Observation Well - Plugged
L.S. Elevation (ft):	1861.4	Well Type:	1.25in. - Steel
Depth Drilled (ft):	58	Aquifer:	Trenton
Screen Int. (ft.):	41-44	Data Source:	

Completion Info:

Remarks:

Lithologic Log

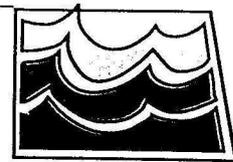
<u>Depth (ft)</u>	<u>Unit</u>	<u>Description</u>
0-7	CLAY	Olive-gray, soft
7-35	SILT	Dark gray, small amount of fine sand, grading to fine to medium sand about 35 ft.
35-41	SAND	Fine to medium, moderately sorted, some silt, subangular
41-51	GRAVEL	Fine to coarse, moderately sorted, subangular to subrounded
51-58	CLAY	Very silty, black flakes (possibly lignite), light bluish gray, ball-shaped (Tongue River Formation)

Chemistry

1 of 3

Location

15210301CCB1



Lab ID				<input checked="" type="checkbox"/> Verified	
Surface		Sample Source	WC		
Date Sampled	06/19/68	Sampling Method		Field Conduct	-99999
Time Sampled	00:00:00	Stage	-99999	Field pH	-99999
Pump Time	390	Surface Depth	0	Field Temp	-99999
Yield	7	Downhole Temp	-99999	Lab Conduct	2560
Water Level	-99999	Dissolved O2	-99999	Lab pH	7.8
Total Evacuated					

Major Cations and Anions	
Silica	22
Calcium	252
Magnesium	97
Potassium	9.8
Sodium	268
Flouride	0.2
Bicarbonate	867
Carbonate	0
Sulfate	874
Chloride	25
Nitrate	1
Hydroxide	-99999
Phosphate	-99999
Boron	0.15
Iron	10
Manganese	0.36

Trace Elements	
Selenium	-99999
Lead	-99999
Mercury	-99999
Arsenic	-99999
Lithium	-99999
Molybdenum	-99999
Strontium	-99999
Cadmium	-99999

General Characteristics	
Suspended Solid	-99999
TDS Determined	2000
TDS Calculated	1990
Hardness	1030
NCH	319
ALK as CaCO3	-99999
SAR	3.6
RSC	-99999
Percent NA	36

EPM			
Cations		Anions	
Ca	12.57	HCO3	14.21
Mg	7.98	CO3	0
Na	11.66	SO4	18.2
K	0.25	Cl	0.71
		F	0.01
TOT	32.46	NO3	0.02
		CH	-99999
		TOT	33.15

Color	M
Date Started	07/08/68
Date Ended	07/15/68

Remarks

W

Percent Diff	1
Nitrate Info	
<input type="checkbox"/> NO3 Sample Chilled	
NO3 Samp Source	Unknown
NO3 Samp Method	Unknown
Nitrate Remarks	

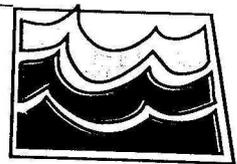
Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Chemistry

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Location

15210301CCB1



Lab ID Verified

Surface Sample Source

Date Sampled Sampling Method

Time Sampled Stage

Pump Time Surface Depth Field Conduct

Yield Downhole Temp Field pH

Water Level Dissolved O2 Field Temp

Total Evacuated Lab Conduct

Lab pH

Major Cations and Anions

Silica	<input type="text" value="21"/>
Calcium	<input type="text" value="259"/>
Magnesium	<input type="text" value="117"/>
Potassium	<input type="text" value="9.4"/>
Sodium	<input type="text" value="286"/>
Flouride	<input type="text" value="0.3"/>
Bicarbonate	<input type="text" value="860"/>
Carbonate	<input type="text" value="0"/>
Sulfate	<input type="text" value="958"/>
Chloride	<input type="text" value="27"/>
Nitrate	<input type="text" value="1.4"/>
Hydroxide	<input type="text" value="-99999"/>
Phosphate	<input type="text" value="-99999"/>
Boron	<input type="text" value="0.07"/>
Iron	<input type="text" value="12"/>
Manganese	<input type="text" value="0.37"/>

Trace Elements

Selenium	<input type="text" value="-99999"/>
Lead	<input type="text" value="-99999"/>
Mercury	<input type="text" value="-99999"/>
Arsenic	<input type="text" value="-99999"/>
Lithium	<input type="text" value="-99999"/>
Molybdenum	<input type="text" value="-99999"/>
Strontium	<input type="text" value="-99999"/>
Cadmium	<input type="text" value="-99999"/>

General Characteristics

Suspended Solid	<input type="text" value="-99999"/>
TDS Determined	<input type="text" value="2170"/>
TDS Calculated	<input type="text" value="2120"/>
Hardness	<input type="text" value="1130"/>
NCH	<input type="text" value="424"/>
ALK as CaCO3	<input type="text" value="-99999"/>
SAR	<input type="text" value="3.7"/>
RSC	<input type="text" value="-99999"/>
Percent NA	<input type="text" value="35"/>

EPM

Cations		Anions	
Ca	<input type="text" value="12.92"/>	HCO3	<input type="text" value="14.1"/>
Mg	<input type="text" value="9.62"/>	CO3	<input type="text" value="0"/>
Na	<input type="text" value="12.44"/>	SO4	<input type="text" value="19.95"/>
K	<input type="text" value="0.24"/>	Cl	<input type="text" value="0.76"/>
		F	<input type="text" value="0.02"/>
		NO3	<input type="text" value="0.02"/>
TOT	<input type="text" value="35.22"/>	CH	<input type="text" value="-99999"/>
		TOT	<input type="text" value="34.85"/>

Color

Date Started

Date Ended

Remarks

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

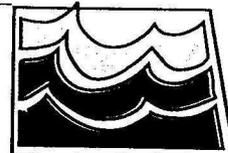
Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Chemistry

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Location

15210301CCB1



Lab ID	<input type="text"/>	<input checked="" type="checkbox"/> Verified
Surface	<input type="text"/>	Sample Source <input type="text" value="WC"/>
Date Sampled	<input type="text" value="08/10/82"/>	Sampling Method <input type="text" value="A"/> Field Conduct <input type="text" value="2900"/>
Time Sampled	<input type="text" value="14:50:00"/>	Stage <input type="text" value="-99999"/> Field pH <input type="text" value="-99999"/>
Pump Time	<input type="text" value="20"/>	Surface Depth <input type="text" value="0"/> Field Temp <input type="text" value="9.5"/>
Yield	<input type="text"/>	Downhole Temp <input type="text" value="-99999"/> Lab Conduct <input type="text" value="2410"/>
Water Level	<input type="text" value="-99999"/>	Dissolved O2 <input type="text" value="-99999"/> Lab pH <input type="text" value="8.1"/>
Total Evacuated	<input type="text"/>	

Major Cations and Anions

Silica	<input type="text" value="23"/>
Calcium	<input type="text" value="320"/>
Magnesium	<input type="text" value="130"/>
Potassium	<input type="text" value="14"/>
Sodium	<input type="text" value="290"/>
Flouride	<input type="text" value="0.3"/>
Bicarbonate	<input type="text" value="356"/>
Carbonate	<input type="text" value="0"/>
Sulfate	<input type="text" value="1000"/>
Chloride	<input type="text" value="32"/>
Nitrate	<input type="text" value="1"/>
Hydroxide	<input type="text" value="-99999"/>
Phosphate	<input type="text" value="-99999"/>
Boron	<input type="text" value="0.13"/>
Iron	<input type="text" value="2.5"/>
Manganese	<input type="text" value="0.95"/>

Trace Elements

Selenium	<input type="text" value="-99999"/>
Lead	<input type="text" value="-99999"/>
Mercury	<input type="text" value="-99999"/>
Arsenic	<input type="text" value="-99999"/>
Lithium	<input type="text" value="-99999"/>
Molybdenum	<input type="text" value="-99999"/>
Strontium	<input type="text" value="-99999"/>
Cadmium	<input type="text" value="-99999"/>

General Characteristics

Suspended Solid	<input type="text" value="-99999"/>
TDS Determined	<input type="text" value="2140"/>
TDS Calculated	<input type="text" value="1990"/>
Hardness	<input type="text" value="1300"/>
NCH	<input type="text" value="1000"/>
ALK as CaCO3	<input type="text" value="-99999"/>
SAR	<input type="text" value="3.5"/>
RSC	<input type="text" value="0"/>
Percent NA	<input type="text" value="32"/>

EPM

Cations		Anions	
Ca	<input type="text" value="15.97"/>	HCO3	<input type="text" value="5.83"/>
Mg	<input type="text" value="10.69"/>	CO3	<input type="text" value="0"/>
Na	<input type="text" value="12.62"/>	SO4	<input type="text" value="20.82"/>
K	<input type="text" value="0.36"/>	Cl	<input type="text" value="0.9"/>
		F	<input type="text" value="0.02"/>
TOT	<input type="text" value="39.64"/>	NO3	<input type="text" value="0.02"/>
		CH	<input type="text" value="-99999"/>
		TOT	<input type="text" value="27.59"/>

Color

Date Started

Date Ended

Remarks

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

152-103-01DDA

Roger Bearce

Date Completed: 11/05/1983
L.S. Elevation (ft): N/A
Depth Drilled (ft): 105
Screen Int. (ft.): 95-105

Purpose: Domestic Well
Well Type: 5in. - PVC
Aquifer: Trenton
Data Source:

Completion Info:

Remarks:

Lithologic Log

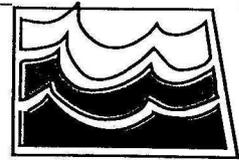
Depth (ft)	Unit	Description
0-7	CLAY	sandy
7-17	SAND	
17-19	CLAY	
19-35	SAND	
35-42	SAND & GRAVEL	
42-47	SAND	
47-63	SAND & GRAVEL	
63-70	SAND	
70-82	GRAVEL	
82-82.5	LIGNITE	
82.5-86	SAND	
86-105	GRAVEL	

Chemistry

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Location

15210301DDA



Lab ID	NDSWC Lab			<input checked="" type="checkbox"/> Verified	
Surface		Sample Source	WC		
Date Sampled	07/18/01	Sampling Method		Field Conduct	1790
Time Sampled	16:40:00	Stage	-99999	Field pH	-99999
Pump Time	3	Surface Depth	0	Field Temp	-99999
Yield	15	Downhole Temp	-99999	Lab Conduct	2350
Water Level	-99999	Dissolved O2	-99999	Lab pH	7.51
Total Evacuated					

Major Cations and Anions	
Silica	-99999
Calcium	230
Magnesium	85
Potassium	15
Sodium	230
Flouride	0.3
Bicarbonate	1040
Carbonate	0
Sulfate	570
Chloride	31
Nitrate	0.1
Hydroxide	-99999
Phosphate	-99999
Boron	-99999
Iron	10
Manganese	1.4

Trace Elements	
Selenium	-99999
Lead	-99999
Mercury	-99999
Arsenic	-99999
Lithium	-99999
Molybdenum	-99999
Strontium	-99999
Cadmium	-99999

General Characteristics	
Suspended Solid	-99999
TDS Determined	1720
TDS Calculated	1680
Hardness	920
NCH	71
ALK as CaCO3	-99999
SAR	3.3
RSC	0
Percent NA	35

EPM			
	Cations		Anions
Ca	11.48	HCO3	17.05
Mg	6.99	CO3	0
Na	10.01	SO4	11.87
K	0.38	Cl	0.87
		F	0.02
TOT	28.86	NO3	0
		CH	-99999
		TOT	29.81

Color

Date Started

Date Ended

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Date Completed:	06/29/1971	Purpose:	Observation Well - Destroyed
L.S. Elevation (ft):	1860	Well Type:	1.25in. - ABS
Depth Drilled (ft):	80	Aquifer:	Trenton
Screen Int. (ft.):	37-40	Data Source:	

Completion Info:

Remarks: Located on north side of road.

Lithologic Log

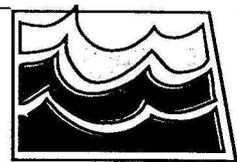
Depth (ft)	Unit	Description
0-1	TOPSOIL	Silty, sandy, clayey, brown
1-14	CLAY	Very silty, sandy, dark yellowish brown, slightly cohesive, plastic, oxidized (alluvium)
14-19	CLAY	Same as above, only olive-gray (alluvium)
19-40	SAND	Very fine- to medium-grained (mostly fine- to medium-grained), subrounded, well-sorted, mostly quartz, lignitic, scoriaceous
40-44	GRAVEL	Sandy, fine to medium, subangular to well-rounded, fair sorting, mostly brownish western silicates, lignitic
44-70	SAND	Occasional thin silty clay lenses, fine- to very coarse-grained, subrounded, well-sorted, mostly quartz and siliceous rock fragments, lignitic
70-80	SHALE	Moderately clayey, sandy, medium light gray with brownish gray mottling, moderately indurated, highly calcareous, occasional thin lignite stringers (Fort Union Group)

Chemistry

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Location

15210302ACA



Verified

Lab ID		Sample Source	WC
Surface			
Date Sampled	06/30/71	Sampling Method	
Time Sampled	00:00:00	Stage	-99999
Pump Time	420	Surface Depth	0
Yield	0.5	Downhole Temp	-99999
Water Level	-99999	Dissolved O2	-99999
Total Evacuated		Field Conduct	1325
		Field pH	-99999
		Field Temp	9.5
		Lab Conduct	1210
		Lab pH	7.6

Major Cations and Anions

Silica	18
Calcium	120
Magnesium	33
Potassium	6.9
Sodium	112
Flouride	1
Bicarbonate	506
Carbonate	0
Sulfate	251
Chloride	8
Nitrate	1
Hydroxide	-99999
Phosphate	-99999
Boron	0.1
Iron	3.8
Manganese	0.2

Trace Elements

Selenium	-99999
Lead	-99999
Mercury	-99999
Arsenic	-99999
Lithium	-99999
Molybdenum	-99999
Strontium	-99999
Cadmium	-99999

General Characteristics

Suspended Solid	-99999
TDS Determined	839
TDS Calculated	804
Hardness	437
NCH	22
ALK as CaCO3	-99999
SAR	2.3
RSC	-99999
Percent NA	35

EPM

Cations		Anions	
Ca	5.99	HCO3	8.29
Mg	2.71	CO3	0
Na	4.87	SO4	5.23
K	0.18	Cl	0.23
		F	0.05
		NO3	0.02
		OH	-99999
TOT	13.75	TOT	13.82

Color

Date Started

Date Ended

Remarks

W

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Date Completed:	06/29/1971	Purpose:	Observation Well - Destroyed
L.S. Elevation (ft):	1860	Well Type:	1.25in. - ABS
Depth Drilled (ft):	60	Aquifer:	Trenton
Screen Int. (ft.):	27-30	Data Source:	

Completion Info:

Remarks: On farmsted, south of north shelterbelt.

Lithologic Log

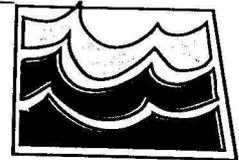
<u>Depth (ft)</u>	<u>Unit</u>	<u>Description</u>
0-1	TOPSOIL	Silty, sandy, clayey, brown
1-16	CLAY	Very silty, sandy, dark yellowish brown, slightly cohesive, plastic, oxidized (alluvium)
16-19	CLAY	Same as above, only olive-gray (alluvium)
19-38	SAND	Very fine- to medium-grained, subrounded, well- sorted, mostly quartz, lignitic
38-47	CLAY	Very silty, olive-gray, slightly to moderately plastic, cohesive, calcareous, laminated (alluvium)
47-50	SAND	Clayey, very fine- to fine-grained, subrounded, moderately well -sorted, "dirty-looking" samples
50-53	LIGNITE	Black, hard, brittle, not fractured, no water loss (Fort Union Group)
53-60	SHALE	Moderately clayey, medium light gray with brownish gray mottling, moderately indurated, highly calcareous (Fort Union Group)

Chemistry

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Location

15210302CCA



Lab ID	<input type="text"/>	<input checked="" type="checkbox"/> Verified
Surface	<input type="text"/>	Sample Source <input type="text" value="WC"/>
Date Sampled	<input type="text" value="07/01/71"/>	Sampling Method <input type="text"/>
Time Sampled	<input type="text" value="00:00:00"/>	Stage <input type="text" value="-99999"/>
Pump Time	<input type="text" value="330"/>	Surface Depth <input type="text" value="0"/>
Yield	<input type="text" value="5.5"/>	Downhole Temp <input type="text" value="-99999"/>
Water Level	<input type="text" value="-99999"/>	Dissolved O2 <input type="text" value="-99999"/>
Total Evacuated	<input type="text"/>	Field Conduct <input type="text" value="1410"/>
		Field pH <input type="text" value="-99999"/>
		Field Temp <input type="text" value="8.5"/>
		Lab Conduct <input type="text" value="1380"/>
		Lab pH <input type="text" value="7.7"/>

Major Cations and Anions

Silica	<input type="text" value="18"/>
Calcium	<input type="text" value="137"/>
Magnesium	<input type="text" value="43"/>
Potassium	<input type="text" value="5.4"/>
Sodium	<input type="text" value="127"/>
Flouride	<input type="text" value="1.1"/>
Bicarbonate	<input type="text" value="533"/>
Carbonate	<input type="text" value="0"/>
Sulfate	<input type="text" value="341"/>
Chloride	<input type="text" value="11"/>
Nitrate	<input type="text" value="0.1"/>
Hydroxide	<input type="text" value="-99999"/>
Phosphate	<input type="text" value="-99999"/>
Boron	<input type="text" value="0.21"/>
Iron	<input type="text" value="6"/>
Manganese	<input type="text" value="1.7"/>

Trace Elements

Selenium	<input type="text" value="-99999"/>
Lead	<input type="text" value="-99999"/>
Mercury	<input type="text" value="-99999"/>
Arsenic	<input type="text" value="-99999"/>
Lithium	<input type="text" value="-99999"/>
Molybdenum	<input type="text" value="-99999"/>
Strontium	<input type="text" value="-99999"/>
Cadmium	<input type="text" value="-99999"/>

General Characteristics

Suspended Solid	<input type="text" value="-99999"/>
TDS Determined	<input type="text" value="979"/>
TDS Calculated	<input type="text" value="955"/>
Hardness	<input type="text" value="521"/>
NCH	<input type="text" value="84"/>
ALK as CaCO3	<input type="text" value="-99999"/>
SAR	<input type="text" value="2.4"/>
RSC	<input type="text" value="-99999"/>
Percent NA	<input type="text" value="34"/>

EPM

	Cations	Anions
Ca	<input type="text" value="6.84"/>	HCO3 <input type="text" value="8.74"/>
Mg	<input type="text" value="3.54"/>	CO3 <input type="text" value="0"/>
Na	<input type="text" value="5.52"/>	SO4 <input type="text" value="7.1"/>
K	<input type="text" value="0.14"/>	Cl <input type="text" value="0.31"/>
		F <input type="text" value="0.06"/>
TOT	<input type="text" value="16.04"/>	NO3 <input type="text" value="0"/>
		CH <input type="text" value="-99999"/>
		TOT <input type="text" value="16.21"/>

Color

Date Started

Date Ended

Remarks

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

152-103-03ABC1

NDSWC 8015

Date Completed:	06/29/1971	Purpose:	Observation Well - Destroyed
L.S. Elevation (ft):	1863	Well Type:	1.25in. - ABS
Depth Drilled (ft):	80	Aquifer:	Trenton
Screen Int. (ft.):	52-55	Data Source:	

Completion Info:

Remarks: West well.

Lithologic Log

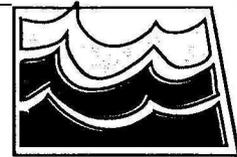
<u>Depth (ft)</u>	<u>Unit</u>	<u>Description</u>
0-1	TOPSOIL	Silty, sandy, clayey, brown
1-12	CLAY	Very silty, sandy, dark yellowish brown, slightly cohesive, plastic, oxidized (alluvium)
12-36	SAND	Very fine- to medium-grained, subrounded, well- sorted, a few thin clay lenses, mostly quartz and siliceous rock fragments, lignitic
36-45	CLAY	Occasional sand lenses, very sandy, silty, medium gray, slightly cohesive, plastic, calcareous (alluvium)
45-56	GRAVEL	Sandy, fine to coarse (mostly medium to coarse), subangular to rounded, fair sorting, mostly brownish western siliceous rocks, some shale and carbonates, moderate amount of detrital lignite
56-80	SHALE	Clayey, moderately sandy to sandy, medium light gray to light gray, occasional thin lignite stringers, moderately indurated, highly calcareous (Fort Union Group)

Chemistry

1 of 1

Location

15210303ABC1



Verified

Lab ID

Surface

Date Sampled

Time Sampled

Pump Time

Yield

Water Level

Total Evacuated

Sample Source

Sampling Method

Stage

Surface Depth

Downhole Temp

Dissolved O2

Field Conduct

Field pH

Field Temp

Lab Conduct

Lab pH

Major Cations and Anions

Silica	<input type="text" value="22"/>
Calcium	<input type="text" value="104"/>
Magnesium	<input type="text" value="36"/>
Potassium	<input type="text" value="6.8"/>
Sodium	<input type="text" value="264"/>
Flouride	<input type="text" value="0.2"/>
Bicarbonate	<input type="text" value="841"/>
Carbonate	<input type="text" value="0"/>
Sulfate	<input type="text" value="278"/>
Chloride	<input type="text" value="13"/>
Nitrate	<input type="text" value="0"/>
Hydroxide	<input type="text" value="-99999"/>
Phosphate	<input type="text" value="-99999"/>
Boron	<input type="text" value="0"/>
Iron	<input type="text" value="6.4"/>
Manganese	<input type="text" value="0.98"/>

Trace Elements

Selenium	<input type="text" value="-99999"/>
Lead	<input type="text" value="-99999"/>
Mercury	<input type="text" value="-99999"/>
Arsenic	<input type="text" value="-99999"/>
Lithium	<input type="text" value="-99999"/>
Molybdenum	<input type="text" value="-99999"/>
Strontium	<input type="text" value="-99999"/>
Cadmium	<input type="text" value="-99999"/>

General Characteristics

Suspended Solid	<input type="text" value="-99999"/>
TDS Determined	<input type="text" value="1170"/>
TDS Calculated	<input type="text" value="1150"/>
Hardness	<input type="text" value="406"/>
NCH	<input type="text" value="0"/>
ALK as CaCO3	<input type="text" value="-99999"/>
SAR	<input type="text" value="5.7"/>
RSC	<input type="text" value="-99999"/>
Percent NA	<input type="text" value="58"/>

EPM

Cations		Anions	
Ca	<input type="text" value="5.19"/>	HCO3	<input type="text" value="13.78"/>
Mg	<input type="text" value="2.96"/>	CO3	<input type="text" value="0"/>
Na	<input type="text" value="11.48"/>	SO4	<input type="text" value="5.79"/>
K	<input type="text" value="0.17"/>	Cl	<input type="text" value="0.37"/>
		F	<input type="text" value="0.01"/>
		NO3	<input type="text" value="0"/>
TOT	<input type="text" value="19.8"/>	CH	<input type="text" value="-99999"/>
		TOT	<input type="text" value="19.95"/>

Color

Date Started

Date Ended

Remarks

W

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

152-103-03ABC2

NDSWC 8015A

Date Completed:	06/29/1971	Purpose:	Observation Well - Destroyed
L.S. Elevation (ft):	1863	Well Type:	1.25in. - ABS
Depth Drilled (ft):	40	Aquifer:	Trenton
Screen Int. (ft.):	17-20	Data Source:	

Completion Info:

Remarks:

Lithologic Log

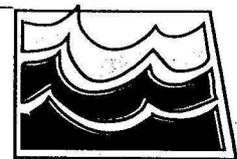
<u>Depth (ft)</u>	<u>Unit</u>	<u>Description</u>
0-1	TOPSOIL	Silty, black
1-12	CLAY	Yellowish brown
12-33	SAND	Fine to medium with a little coal
33-38	SAND	Fine to medium with clay layers, a little coal
38-40	CLAY	Silty, olive-gray

Chemistry

1 of 1

Location

15210303ABC2



Lab ID	<input type="text"/>	<input checked="" type="checkbox"/> Verified	
Surface	<input type="text"/>	Sample Source <input type="text" value="WC"/>	
Date Sampled	<input type="text" value="06/30/71"/>	Sampling Method <input type="text"/>	
Time Sampled	<input type="text" value="00:00:00"/>	Field Conduct	<input type="text" value="685"/>
Pump Time	<input type="text" value="300"/>	Stage	<input type="text" value="-99999"/>
Yield	<input type="text" value="1.5"/>	Surface Depth	<input type="text" value="0"/>
Water Level	<input type="text" value="-99999"/>	Downhole Temp	<input type="text" value="-99999"/>
Total Evacuated	<input type="text"/>	Dissolved O2	<input type="text" value="-99999"/>
		Field pH	<input type="text" value="-99999"/>
		Field Temp	<input type="text" value="7.5"/>
		Lab Conduct	<input type="text" value="727"/>
		Lab pH	<input type="text" value="7.9"/>

Major Cations and Anions	
Silica	<input type="text" value="14"/>
Calcium	<input type="text" value="68"/>
Magnesium	<input type="text" value="24"/>
Potassium	<input type="text" value="2.5"/>
Sodium	<input type="text" value="43"/>
Flouride	<input type="text" value="1.2"/>
Bicarbonate	<input type="text" value="307"/>
Carbonate	<input type="text" value="0"/>
Sulfate	<input type="text" value="101"/>
Chloride	<input type="text" value="7.5"/>
Nitrate	<input type="text" value="1"/>
Hydroxide	<input type="text" value="-99999"/>
Phosphate	<input type="text" value="-99999"/>
Boron	<input type="text" value="0"/>
Iron	<input type="text" value="2.8"/>
Manganese	<input type="text" value="0.03"/>

Trace Elements	
Selenium	<input type="text" value="-99999"/>
Lead	<input type="text" value="-99999"/>
Mercury	<input type="text" value="-99999"/>
Arsenic	<input type="text" value="-99999"/>
Lithium	<input type="text" value="-99999"/>
Molybdenum	<input type="text" value="-99999"/>
Strontium	<input type="text" value="-99999"/>
Cadmium	<input type="text" value="-99999"/>

General Characteristics	
Suspended Solid	<input type="text" value="-99999"/>
TDS Determined	<input type="text" value="394"/>
TDS Calculated	<input type="text" value="416"/>
Hardness	<input type="text" value="268"/>
NCH	<input type="text" value="16"/>
ALK as CaCO3	<input type="text" value="-99999"/>
SAR	<input type="text" value="1.1"/>
RSC	<input type="text" value="-99999"/>
Percent NA	<input type="text" value="26"/>

EPM			
	Cations		Anions
Ca	<input type="text" value="3.39"/>	HCO3	<input type="text" value="5.03"/>
Mg	<input type="text" value="1.97"/>	CO3	<input type="text" value="0"/>
Na	<input type="text" value="1.87"/>	SO4	<input type="text" value="2.1"/>
K	<input type="text" value="0.06"/>	Cl	<input type="text" value="0.21"/>
		F	<input type="text" value="0.06"/>
TOT	<input type="text" value="7.29"/>	NO3	<input type="text" value="0.02"/>
		CH	<input type="text" value="-99999"/>
		TOT	<input type="text" value="7.42"/>

Color	<input type="text" value="M"/>
Date Started	<input type="text" value="07/30/71"/>
Date Ended	<input type="text" value="08/18/71"/>

Remarks

W

Percent Diff	<input type="text" value="-99999"/>
Nitrate Info	
<input type="checkbox"/> NO3 Sample Chilled	
NO3 Samp Source	<input type="text" value="Unknown"/>
NO3 Samp Method	<input type="text" value="Unknown"/>
Nitrate Remarks	<input type="text"/>

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

152-103-05BCB

Lester Larson

Date Completed:	05/25/1984	Purpose:	Domestic Well
L.S. Elevation (ft):	N/A	Well Type:	0in. - PVC
Depth Drilled (ft):	80	Aquifer:	Trenton
Screen Int. (ft.):	60-80	Data Source:	Northland Drillers

Completion Info:

Remarks: Slotted Casing from 60-80

Lithologic Log

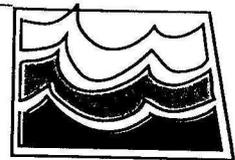
<u>Depth (ft)</u>	<u>Unit</u>	<u>Description</u>
0-2	TOPSOIL	
2-26	SAND	
26-41	CLAY	
41-65	SAND	
65-80	SAND & GRAVEL	

Chemistry

1 of 1

Location

15210305BCB



Lab ID	NDSWC Lab			<input checked="" type="checkbox"/> Verified	
Surface		Sample Source	WC		
Date Sampled	07/19/01	Sampling Method		Field Conduct	4030
Time Sampled	08:45:00	Stage	-99999	Field pH	-99999
Pump Time	2	Surface Depth	0	Field Temp	-99999
Yield	10	Downhole Temp	-99999	Lab Conduct	5270
Water Level	-99999	Dissolved O2	-99999	Lab pH	7.25
Total Evacuated					

Major Cations and Anions	
Silica	-99999
Calcium	300
Magnesium	100
Potassium	17
Sodium	970
Flouride	0.2
Bicarbonate	1170
Carbonate	0
Sulfate	2200
Chloride	15
Nitrate	59
Hydroxide	-99999
Phosphate	-99999
Boron	-99999
Iron	0.06
Manganese	1.3

Trace Elements	
Selenium	-99999
Lead	-99999
Mercury	-99999
Arsenic	-99999
Lithium	-99999
Molybdenum	-99999
Strontium	-99999
Cadmium	-99999

General Characteristics	
Suspended Solid	-99999
TDS Determined	4310
TDS Calculated	4240
Hardness	1200
NCH	200
ALK as CaCO3	-99999
SAR	12
RSC	0
Percent NA	64

EPM			
Cations		Anions	
Ca	14.97	HCO3	19.18
Mg	8.23	CO3	0
Na	42.2	SO4	45.8
K	0.43	Cl	0.42
		F	0.01
		NO3	0.95
TOT	65.83	OH	-99999
		TOT	66.36

Color

Date Started

Date Ended

Remarks

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

152-103-06DDA

Ed Larson

Date Completed: 09/14/1979
L.S. Elevation (ft): N/A
Depth Drilled (ft): 63
Screen Int. (ft.): 57-63

Purpose: Domestic Well
Well Type: 4in. - PVC
Aquifer: Trenton
Data Source:

Completion Info:

Remarks:

Lithologic Log

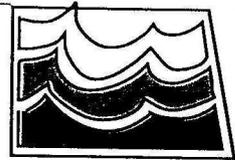
<u>Depth (ft)</u>	<u>Unit</u>	<u>Description</u>
0-1	TOPSOIL	
0-0		
1-12	CLAY	sandy
12-32	CLAY	blue
32-52	CLAY	sandy
52-63	SAND & GRAVEL	

Chemistry

1 of 1

Location

15210306DDA



Lab ID	NDSWC Lab	<input checked="" type="checkbox"/> Verified	
Surface		Sample Source WC	
Date Sampled	07/19/01	Sampling Method	
Time Sampled	08:05:00	Stage	-99999
Pump Time	2	Surface Depth	0
Yield	10	Downhole Temp	-99999
Water Level	-99999	Dissolved O2	-99999
Total Evacuated		Field Conduct	4350
		Field pH	-99999
		Field Temp	-99999
		Lab Conduct	5800
		Lab pH	7.62

Major Cations and Anions

Silica	-99999
Calcium	220
Magnesium	90
Potassium	19
Sodium	1200
Flouride	0.3
Bicarbonate	902
Carbonate	0
Sulfate	2500
Chloride	23
Nitrate	120
Hydroxide	-99999
Phosphate	-99999
Boron	-99999
Iron	0.05
Manganese	0.01

Trace Elements

Selenium	-99999
Lead	-99999
Mercury	-99999
Arsenic	-99999
Lithium	-99999
Molybdenum	-99999
Strontium	-99999
Cadmium	-99999

General Characteristics

Suspended Solid	-99999
TDS Determined	4730
TDS Calculated	4620
Hardness	920
NCH	180
ALK as CaCO3	-99999
SAR	17
RSC	0
Percent NA	73

EPM

Cations		Anions	
Ca	10.98	HCO3	14.78
Mg	7.4	CO3	0
Na	52.2	SO4	52.05
K	0.49	Cl	0.65
		F	0.02
TOT	71.07	NO3	1.94
		CH	-99999
		TOT	69.44

Color

Date Started

Date Ended

Remarks

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

152-103-07ADD

Gerald Selby

Date Completed: 06/27/1972
L.S. Elevation (ft): N/A
Depth Drilled (ft): 54
Screen Int. (ft.): 51-54

Purpose: Domestic Well
Well Type: 4in. - PVC
Aquifer: Trenton
Data Source:

Completion Info:

Remarks:

Lithologic Log

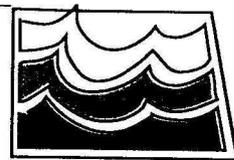
<u>Depth (ft)</u>	<u>Unit</u>	<u>Description</u>
0-2	TOPSOIL	
2-49	CLAY	
49-54	SAND & GRAVEL	

Chemistry

1 of 1

Location

15210307ADD



Lab ID	NDSWC Lab	<input checked="" type="checkbox"/> Verified		
Surface		Sample Source WC		
Date Sampled	07/19/01	Sampling Method	Field Conduct	720
Time Sampled	13:45:00	Stage	Field pH	-99999
Pump Time	2	Surface Depth	Field Temp	-99999
Yield	10	Downhole Temp	Lab Conduct	888
Water Level	-99999	Dissolved O2	Lab pH	7.81
Total Evacuated				

Major Cations and Anions	
Silica	-99999
Calcium	69
Magnesium	31
Potassium	7.2
Sodium	80
Flouride	0.6
Bicarbonate	323
Carbonate	0
Sulfate	190
Chloride	14
Nitrate	0.1
Hydroxide	-99999
Phosphate	-99999
Boron	-99999
Iron	1.1
Manganese	0.97

Trace Elements	
Selenium	-99999
Lead	-99999
Mercury	-99999
Arsenic	-99999
Lithium	-99999
Molybdenum	-99999
Strontium	-99999
Cadmium	-99999

General Characteristics	
Suspended Solid	-99999
TDS Determined	599
TDS Calculated	553
Hardness	300
NCH	35
ALK as CaCO3	-99999
SAR	2
RSC	0
Percent NA	36

EPM			
	Cations		Anions
Ca	3.44	HCO3	5.29
Mg	2.55	CO3	0
Na	3.48	SO4	3.96
K	0.18	Cl	0.39
		F	0.03
TOT	9.65	NO3	0
		OH	-99999
		TOT	9.67

Color

Date Started

Date Ended

Remarks

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

152-103-07DDD1

NDSWC 2349

Date Completed:	06/14/1965	Purpose:	Observation Well
L.S. Elevation (ft):	1865.85	Well Type:	1.25in. - ABS
Depth Drilled (ft):	199.5	Aquifer:	Trenton
Screen Int. (ft.):	151-154	Data Source:	

Completion Info:

Remarks: SOUTH WELL (NORTH WELL WAS DESTROYED)

Lithologic Log

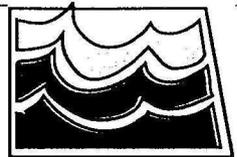
<u>Depth (ft)</u>	<u>Unit</u>	<u>Description</u>
0-1	SOIL	Black
1-12	CLAY	Dark yellowish brown, silty, slightly calcareous, oxidized
12-17	CLAY	Dark greenish gray, (color change from above is gradational), silty
17-34	SAND	Fine, moderately well-sorted, angular to rounded
34-46	GRAVEL	Sandy, poorly sorted, angular to rounded
46-95	CLAY	Olive-gray to light olive-gray, silty and sandy, (probably some interbedded sand lenses); contains lignite
95-144	CLAY	Greenish gray, sandy; contains lignite
144-156	GRAVEL	Fine to coarse, poorly sorted, angular
156-164	LIGNITE	Black (Fort Union Group)
164-200	CLAY	Light olive-gray, silty, calcareous (Fort Union Group)

Chemistry

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Location

15210307DDD1



Lab ID

Verified

Surface

Sample Source **WC**

Date Sampled

Sampling Method

Field Conduct

Time Sampled

Stage

Field pH

Pump Time

Surface Depth

Field Temp

Yield

Downhole Temp

Lab Conduct

Water Level

Dissolved O2

Lab pH

Total Evacuated

Major Cations and Anions

Silica	<input type="text" value="28"/>
Calcium	<input type="text" value="149"/>
Magnesium	<input type="text" value="28"/>
Potassium	<input type="text" value="12"/>
Sodium	<input type="text" value="157"/>
Flouride	<input type="text" value="0.4"/>
Bicarbonate	<input type="text" value="682"/>
Carbonate	<input type="text" value="0"/>
Sulfate	<input type="text" value="256"/>
Chloride	<input type="text" value="9.5"/>
Nitrate	<input type="text" value="2.2"/>
Hydroxide	<input type="text" value="-99999"/>
Phosphate	<input type="text" value="-99999"/>
Boron	<input type="text" value="0.44"/>
Iron	<input type="text" value="2.7"/>
Manganese	<input type="text" value="-99999"/>

Trace Elements

Selenium	<input type="text" value="-99999"/>
Lead	<input type="text" value="-99999"/>
Mercury	<input type="text" value="-99999"/>
Arsenic	<input type="text" value="-99999"/>
Lithium	<input type="text" value="-99999"/>
Molybdenum	<input type="text" value="-99999"/>
Strontium	<input type="text" value="-99999"/>
Cadmium	<input type="text" value="-99999"/>

General Characteristics

Suspended Solid	<input type="text" value="-99999"/>
TDS Determined	<input type="text" value="970"/>
TDS Calculated	<input type="text" value="979"/>
Hardness	<input type="text" value="486"/>
NCH	<input type="text" value="0"/>
ALK as CaCO3	<input type="text" value="-99999"/>
SAR	<input type="text" value="3.1"/>
RSC	<input type="text" value="-99999"/>
Percent NA	<input type="text" value="37"/>

EPM

	Cations		Anions
Ca	<input type="text" value="7.44"/>	HCO3	<input type="text" value="11.18"/>
Mg	<input type="text" value="2.3"/>	CO3	<input type="text" value="0"/>
Na	<input type="text" value="6.83"/>	SO4	<input type="text" value="5.33"/>
K	<input type="text" value="0.31"/>	Cl	<input type="text" value="0.27"/>
		F	<input type="text" value="0.02"/>
TOT	<input type="text" value="16.88"/>	NO3	<input type="text" value="0.04"/>
		CH	<input type="text" value="-99999"/>
		TOT	<input type="text" value="16.84"/>

Color

Date Started

Date Ended

Remarks

W

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Chemistry

1 of 5

Location

15210307DDD1



Lab ID	<input type="text"/>			<input checked="" type="checkbox"/> Verified	
Surface	<input type="text"/>	Sample Source	WC		
Date Sampled	07/02/71	Sampling Method	<input type="text"/>	Field Conduct	1100
Time Sampled	00:00:00	Stage	-99999	Field pH	-99999
Pump Time	-99999	Surface Depth	0	Field Temp	8
Yield	2.5	Downhole Temp	-99999	Lab Conduct	1370
Water Level	-99999	Dissolved O2	-99999	Lab pH	7.6
Total Evacuated	<input type="text"/>				

Major Cations and Anions	
Silica	31
Calcium	111
Magnesium	50
Potassium	9.2
Sodium	154
Flouride	0.5
Bicarbonate	672
Carbonate	0
Sulfate	222
Chloride	10
Nitrate	2.7
Hydroxide	-99999
Phosphate	-99999
Boron	0.17
Iron	4.5
Manganese	0.07

Trace Elements	
Selenium	-99999
Lead	-99999
Mercury	-99999
Arsenic	-99999
Lithium	-99999
Molybdenum	-99999
Strontium	-99999
Cadmium	-99999

General Characteristics	
Suspended Solid	-99999
TDS Determined	953
TDS Calculated	926
Hardness	482
NCH	0
ALK as CaCO3	-99999
SAR	3
RSC	-99999
Percent NA	40

EPM			
	Cations		Anions
Ca	5.54	HCO3	11.01
Mg	4.11	CO3	0
Na	6.7	SO4	4.62
K	0.24	Cl	0.28
		F	0.03
		NO3	0.04
TOT	16.59	OH	-99999
		TOT	15.98

Color	M
Date Started	08/09/71
Date Ended	08/19/71

Remarks
W

Percent Diff -99999

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

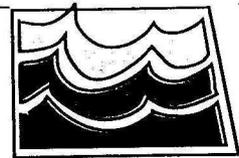
Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Chemistry

1 of 5

Location

15210307DDD1



Verified

Lab ID

Surface

Sample Source WC

Date Sampled

08/11/82

Sampling Method

A

Field Conduct

1390

Time Sampled

08:20:00

Stage

-99999

Field pH

-99999

Pump Time

20

Surface Depth

0

Field Temp

9

Yield

Downhole Temp

-99999

Lab Conduct

1330

Water Level

-99999

Dissolved O2

-99999

Lab pH

8

Total Evacuated

Major Cations and Anions

Silica	29
Calcium	120
Magnesium	43
Potassium	12
Sodium	150
Flouride	0.6
Bicarbonate	657
Carbonate	0
Sulfate	200
Chloride	10
Nitrate	1
Hydroxide	-99999
Phosphate	-99999
Boron	0.14
Iron	1.7
Manganese	0.27

Trace Elements

Selenium	-99999
Lead	-99999
Mercury	-99999
Arsenic	-99999
Lithium	-99999
Molybdenum	-99999
Strontium	-99999
Cadmium	-99999

General Characteristics

Suspended Solid	-99999
TDS Determined	878
TDS Calculated	892
Hardness	480
NCH	0
ALK as CaCO3	-99999
SAR	3
RSC	1
Percent NA	40

EPM

Cations		Anions	
Ca	5.99	HCO3	10.77
Mg	3.54	CO3	0
Na	6.53	SO4	4.16
K	0.31	Cl	0.28
		F	0.03
		NO3	0.02
		CH	-99999
TOT	16.37	TOT	15.26

Color

1

Date Started

09/29/82

Date Ended

10/29/82

Remarks

W

Percent Diff

3.57

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

Unknown

NO3 Samp Method

Unknown

Nitrate Remarks

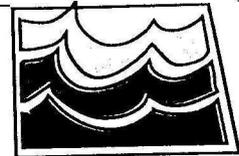
Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Chemistry

1 of 5

Location

15210307DDD1



Verified

Lab ID NDSWC Lab

Surface

Sample Source UG

Date Sampled 08/23/93

Sampling Method A

Field Conduct 1480

Time Sampled 15:33:00

Stage -99999

Field pH 7.73

Pump Time -99999

Surface Depth 0

Field Temp -99999

Yield

Downhole Temp -99999

Lab Conduct 1390

Water Level -99999

Dissolved O2 -99999

Lab pH 7.9

Total Evacuated

Major Cations and Anions

Silica	30
Calcium	120
Magnesium	49
Potassium	11
Sodium	160
Flouride	0.4
Bicarbonate	692
Carbonate	0
Sulfate	250
Chloride	13
Nitrate	5.4
Hydroxide	-99999
Phosphate	-99999
Boron	0.17
Iron	0.02
Manganese	0.12

Trace Elements

Selenium	0
Lead	0
Mercury	0
Arsenic	1
Lithium	50
Molybdenum	3
Strontium	1300
Cadmium	-99999

General Characteristics

Suspended Solid	-99999
TDS Determined	927
TDS Calculated	980
Hardness	500
NCH	0
ALK as CaCO3	-99999
SAR	3.1
RSC	1
Percent NA	40

EPM

Cations		Anions	
Ca	5.99	HCO3	11.34
Mg	4.03	CO3	0
Na	6.96	SO4	5.21
K	0.28	Cl	0.37
		F	0.02
		NO3	0.09
		CH	-99999
TOT	17.26	TOT	17.03

Color A
 Date Started 09/17/93
 Date Ended 12/30/93

Remarks

Percent Diff 0.67

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source Unknown

NO3 Samp Method Unknown

Nitrate Remarks

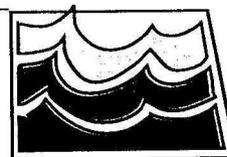
Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Chemistry

1 of 5

Location

15210307DDD1



Verified

Lab ID: NDSWC Lab
 Surface:
 Date Sampled: 07/17/01
 Time Sampled: 17:35:00
 Pump Time: 30
 Yield: 2
 Water Level: 5.93
 Total Evacuated:

Sample Source: WC
 Sampling Method: A
 Stage: -99999
 Surface Depth: 0
 Downhole Temp: -99999
 Dissolved O2: -99999

Field Conduct: 1335
 Field pH: -99999
 Field Temp: -99999
 Lab Conduct: 1540
 Lab pH: 7.81

Major Cations and Anions

Silica: -99999
 Calcium: 140
 Magnesium: 46
 Potassium: 10
 Sodium: 180
 Flouride: 0.6
 Bicarbonate: 824
 Carbonate: 0
 Sulfate: 230
 Chloride: 14
 Nitrate: 0.1
 Hydroxide: -99999
 Phosphate: -99999
 Boron: -99999
 Iron: 0.57
 Manganese: 0.26

Trace Elements

Selenium: -99999
 Lead: -99999
 Mercury: -99999
 Arsenic: -99999
 Lithium: -99999
 Molybdenum: -99999
 Strontium: -99999
 Cadmium: -99999

General Characteristics

Suspended Solid: -99999
 TDS Determined: 1040
 TDS Calculated: 1030
 Hardness: 540
 NCH: 0
 ALK as CaCO3: -99999
 SAR: 3.4
 RSC: 3
 Percent NA: 42

EPM

Cations		Anions	
Ca	6.99	HCO3	13.51
Mg	3.78	CO3	0
Na	7.83	SO4	4.79
K	0.26	Cl	0.39
		F	0.03
		NO3	0
		CH	-99999
TOT	18.86	TOT	18.72

Color: 1
 Date Started: 07/24/01
 Date Ended: 08/03/01

Remarks

Percent Diff: 0.37

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source: NDHD Lab

NO3 Samp Method: Cadmium Reductio

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

152-103-07DDD2

NDSWC 8018

Date Completed:	06/30/1971	Purpose:	Observation Well - Destroyed
L.S. Elevation (ft):	1871	Well Type:	1.25in. - ABS
Depth Drilled (ft):	40	Aquifer:	Trenton
Screen Int. (ft.):	32-35	Data Source:	

Completion Info:

Remarks: NORTH WELL

Lithologic Log

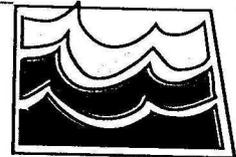
<u>Depth (ft)</u>	<u>Unit</u>	<u>Description</u>
0-1	TOPSOIL	Silty, sandy, clayey, dark brown
1-13	CLAY	Very silty, sandy, dark yellowish brown, slightly cohesive, plastic, oxidized (alluvium)
13-27	CLAY	Same as above, only olive-gray (alluvium)
27-40	SAND	Slightly to moderately gravelly, fine- to coarse-grained, subrounded, moderately well-sorted, mostly quartz, lignitic

Chemistry

1 of 1

Location

15210307DDD2



Lab ID	<input type="text"/>	<input checked="" type="checkbox"/> Verified
Surface	<input type="text"/>	Sample Source <input type="text" value="WC"/>
Date Sampled	<input type="text" value="07/02/71"/>	Sampling Method <input type="text"/>
Time Sampled	<input type="text" value="00:00:00"/>	Stage <input type="text" value="-99999"/>
Pump Time	<input type="text" value="360"/>	Surface Depth <input type="text" value="0"/>
Yield	<input type="text" value="6.5"/>	Downhole Temp <input type="text" value="-99999"/>
Water Level	<input type="text" value="-99999"/>	Dissolved O2 <input type="text" value="-99999"/>
Total Evacuated	<input type="text"/>	Field Conduct <input type="text" value="2010"/>
		Field pH <input type="text" value="-99999"/>
		Field Temp <input type="text" value="7"/>
		Lab Conduct <input type="text" value="1920"/>
		Lab pH <input type="text" value="7.4"/>

Major Cations and Anions

Silica	<input type="text" value="18"/>
Calcium	<input type="text" value="177"/>
Magnesium	<input type="text" value="71"/>
Potassium	<input type="text" value="8.9"/>
Sodium	<input type="text" value="200"/>
Flouride	<input type="text" value="0.3"/>
Bicarbonate	<input type="text" value="798"/>
Carbonate	<input type="text" value="0"/>
Sulfate	<input type="text" value="476"/>
Chloride	<input type="text" value="19"/>
Nitrate	<input type="text" value="2.2"/>
Hydroxide	<input type="text" value="-99999"/>
Phosphate	<input type="text" value="-99999"/>
Boron	<input type="text" value="0.21"/>
Iron	<input type="text" value="6.8"/>
Manganese	<input type="text" value="0.3"/>

Trace Elements

Selenium	<input type="text" value="-99999"/>
Lead	<input type="text" value="-99999"/>
Mercury	<input type="text" value="-99999"/>
Arsenic	<input type="text" value="-99999"/>
Lithium	<input type="text" value="-99999"/>
Molybdenum	<input type="text" value="-99999"/>
Strontium	<input type="text" value="-99999"/>
Cadmium	<input type="text" value="-99999"/>

General Characteristics

Suspended Solid	<input type="text" value="-99999"/>
TDS Determined	<input type="text" value="1390"/>
TDS Calculated	<input type="text" value="1370"/>
Hardness	<input type="text" value="734"/>
NCH	<input type="text" value="80"/>
ALK as CaCO3	<input type="text" value="-99999"/>
SAR	<input type="text" value="3.2"/>
RSC	<input type="text" value="-99999"/>
Percent NA	<input type="text" value="37"/>

EPM

	Cations	Anions
Ca	<input type="text" value="8.83"/>	HCO3 <input type="text" value="13.08"/>
Mg	<input type="text" value="5.84"/>	CO3 <input type="text" value="0"/>
Na	<input type="text" value="8.7"/>	SO4 <input type="text" value="9.91"/>
K	<input type="text" value="0.23"/>	Cl <input type="text" value="0.54"/>
		F <input type="text" value="0.02"/>
TOT	<input type="text" value="23.6"/>	NO3 <input type="text" value="0.04"/>
		CH <input type="text" value="-99999"/>
		TOT <input type="text" value="23.59"/>

Color

Date Started

Date Ended

Remarks

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Date Completed:	05/19/1965	Purpose:	Observation Well - Destroyed
L.S. Elevation (ft):	1901	Well Type:	1.25in. - ABS
Depth Drilled (ft):	220.5	Aquifer:	Trenton
Screen Int. (ft.):	135-138	Data Source:	

Completion Info:

Remarks: DESTROYED 1975

Lithologic Log

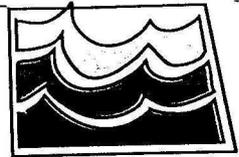
Depth (ft)	Unit	Description
0-1	SOIL	Black
1-53	CLAY	Dusky yellow, silty, calcareous, much fine lignite
53-76	GRAVEL	Sandy, poorly sorted, angular
76-83	SAND	Very fine, or silt (no sample)
83-99	GRAVEL	Sandy, poorly sorted, maximum size 40 millimeter
99-110	SAND	Fine to coarse, poorly sorted, much lignite
110-115	GRAVEL	Sandy, poorly sorted, subrounded to rounded, predominant size about 10 millimeters
115-126	CLAY	Olive-black, sandy; color due to abundant lignite particles
126-137	GRAVEL	Sandy, poorly sorted; size ranged from about 0.25 to 12 millimeters, predominant sizes are 1 and 10 millimeters
137-148	CLAY	Olive-gray to greenish gray, sandy and silty, calcareous
148-173	SAND	Fine to coarse, poorly sorted, angular
173-178	GRAVEL	Fine, much lignite
178-220	CLAY	Light gray to brownish gray, sandy and silty (Fort Union Group)

Chemistry

1 of 2

Location

15210308BBB



Verified

Lab ID

Surface

Sample Source WC

Date Sampled

06/14/65

Sampling Method

Field Conduct

-99999

Time Sampled

00:00:00

Stage

-99999

Field pH

-99999

Pump Time

-99999

Surface Depth

0

Field Temp

8.9

Yield

Downhole Temp

-99999

Lab Conduct

2150

Water Level

-99999

Dissolved O2

-99999

Lab pH

8

Total Evacuated

Major Cations and Anions

Silica	25
Calcium	188
Magnesium	45
Potassium	15
Sodium	295
Flouride	0.3
Bicarbonate	598
Carbonate	0
Sulfate	770
Chloride	6.8
Nitrate	0.4
Hydroxide	-99999
Phosphate	-99999
Boron	0.34
Iron	10
Manganese	-99999

Trace Elements

Selenium	-99999
Lead	-99999
Mercury	-99999
Arsenic	-99999
Lithium	-99999
Molybdenum	-99999
Strontium	-99999
Cadmium	-99999

General Characteristics

Suspended Solid	-99999
TDS Determined	1690
TDS Calculated	1650
Hardness	653
NCH	163
ALK as CaCO3	-99999
SAR	5
RSC	-99999
Percent NA	49

EPM

Cations		Anions	
Ca	9.38	HCO3	9.8
Mg	3.7	CO3	0
Na	12.83	SO4	16.03
K	0.38	Cl	0.19
		F	0.02
		NO3	0.01
		CH	-99999
TOT	26.29	TOT	26.05

Color

Date Started 07/06/65

Date Ended 07/23/65

Remarks

W

Percent Diff 0.46

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source Unknown

NO3 Samp Method Unknown

Nitrate Remarks

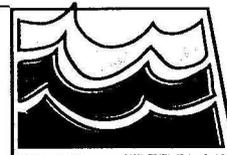
Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Chemistry

1 of 2

Location

15210308BBB



Verified

Lab ID

Surface

Sample Source WC

Date Sampled

07/02/71

Sampling Method

Field Conduct

2330

Time Sampled

00:00:00

Stage

-99999

Field pH

-99999

Pump Time

30

Surface Depth

0

Field Temp

8

Yield

3.5

Downhole Temp

-99999

Lab Conduct

2280

Water Level

-99999

Dissolved O2

-99999

Lab pH

7.8

Total Evacuated

Major Cations and Anions

Silica	28
Calcium	167
Magnesium	70
Potassium	12
Sodium	290
Flouride	0.4
Bicarbonate	603
Carbonate	0
Sulfate	800
Chloride	12
Nitrate	1
Hydroxide	-99999
Phosphate	-99999
Boron	0.24
Iron	8.2
Manganese	0.52

Trace Elements

Selenium	-99999
Lead	-99999
Mercury	-99999
Arsenic	-99999
Lithium	-99999
Molybdenum	-99999
Strontium	-99999
Cadmium	-99999

General Characteristics

Suspended Solid	-99999
TDS Determined	1710
TDS Calculated	1690
Hardness	704
NCH	210
ALK as CaCO3	-99999
SAR	4.8
RSC	-99999
Percent NA	47

EPM

Cations		Anions	
Ca	8.33	HCO3	9.88
Mg	5.76	CO3	0
Na	12.62	SO4	16.66
K	0.31	Cl	0.34
		F	0.02
		NO3	0.02
		CH	-99999
TOT	27.02	TOT	26.92

Color

A

Date Started

08/03/71

Date Ended

08/11/71

Remarks

W

Percent Diff -99999

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

Unknown

NO3 Samp Method

Unknown

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Date Completed:	07/02/1971	Purpose:	Observation Well - Destroyed
L.S. Elevation (ft):	1863	Well Type:	1.25in. - ABS
Depth Drilled (ft):	200	Aquifer:	Trenton
Screen Int. (ft.):	157-163	Data Source:	

Completion Info:

Remarks: East side of n-s irr. ditch. East of road.

Lithologic Log

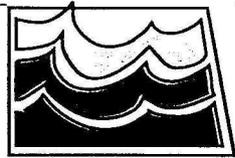
Depth (ft)	Unit	Description
0-1	TOPSOIL	Silty, sandy, clayey, brown
1-16	CLAY	Very silty, sandy, dark yellowish brown, slightly cohesive, plastic, oxidized (alluvium)
16-19	CLAY	Same as above, only olive-gray (alluvium)
19-31	SAND	Very fine- to medium-grained, subrounded, moderately well-sorted, mostly quartz and siliceous rock fragments, some shale, lignitic
31-45	GRAVEL	Moderately sandy, fine to coarse, subangular to rounded, fair sorting, predominantly brownish western siliceous rocks, some shale, carbonates, scoria and lignite
45-51	CLAY	Moderately silty, sandy, medium gray, light olive-gray laminae, moderately indurated, slightly plastic, highly calcareous (alluvium)
51-58	SAND	Occasional thin clay lenses, very fine- to coarse-grained (Mostly fine- to medium-grained), subangular to rounded, moderately well-sorted, mostly quartz, lignitic
58-88	CLAY	Very silty, sandy, medium gray with light olive-gray laminae, cohesive, moderately plastic, highly calcareous (alluvium)
88-94	GRAVEL	Sandy, fine to coarse, angular to well-rounded, fair to poor sorting, mostly brownish western siliceous rocks and shale, some lignite
94-138	SAND	Moderately clayey, fine- to medium-grained, subangular to rounded, moderately well-sorted, predominantly quartz, very lignitic, gravel caving from above occasional thin gravel layers, clay occurs as thin lenses and probably as matrix material (dirty-looking samples)
138-180	GRAVEL AND COBBLES	Sandy, clayey, fine to coarse, angular to well-rounded, mostly brownish western siliceous rocks, some shale, much lignite
180-200	SHALE	Clayey, slightly and, medium light gray with dark brownish gray bedding, occasional thin lignite stringers, moderately indurated, slightly to moderately calcareous (Fort Union Group)

Chemistry

1 of 1

Location

15210308CBC1



Verified

Lab ID

Surface

Sample Source WC

Date Sampled 07/14/71

Sampling Method

Field Conduct 1280

Time Sampled 00:00:00

Stage -99999

Field pH -99999

Pump Time 390

Surface Depth 0

Field Temp 8

Yield

Downhole Temp -99999

Lab Conduct 1280

Water Level -99999

Dissolved O2 -99999

Lab pH 7.7

Total Evacuated

Major Cations and Anions

Silica	30
Calcium	124
Magnesium	46
Potassium	7.5
Sodium	115
Flouride	0.6
Bicarbonate	574
Carbonate	0
Sulfate	248
Chloride	12
Nitrate	0
Hydroxide	-99999
Phosphate	-99999
Boron	0
Iron	0
Manganese	0.3

Trace Elements

Selenium	-99999
Lead	-99999
Mercury	-99999
Arsenic	-99999
Lithium	-99999
Molybdenum	-99999
Strontium	-99999
Cadmium	-99999

General Characteristics

Suspended Solid	-99999
TDS Determined	889
TDS Calculated	866
Hardness	501
NCH	30
ALK as CaCO3	-99999
SAR	2.2
RSC	-99999
Percent NA	33

EPM

Cations		Anions	
Ca	6.19	HCO3	9.41
Mg	3.78	CO3	0
Na	5	SO4	5.16
K	0.19	Cl	0.34
		F	0.03
		NO3	0
TOT	15.16	OH	-99999
		TOT	14.94

Color 1
 Date Started 08/12/71
 Date Ended 08/23/71

Remarks

W

Percent Diff -99999

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source Unknown

NO3 Samp Method Unknown

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

152-103-08CBC2

NDSWC 8020A

Date Completed:	07/13/1971	Purpose:	Observation Well - Destroyed
L.S. Elevation (ft):	1863	Well Type:	1.25in. - ABS
Depth Drilled (ft):	40	Aquifer:	Trenton
Screen Int. (ft.):	28-31	Data Source:	

Completion Info:

Remarks:

Lithologic Log

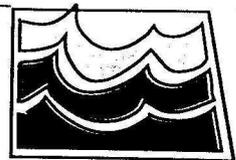
<u>Depth (ft)</u>	<u>Unit</u>	<u>Description</u>
0-1	TOPSOIL	
1-16	CLAY	Silty, yellowish brown
16-19	CLAY	Silty, olive-gray
19-31	SAND	Fine to medium with a little coal
31-40	GRAVEL	Fine, medium to coarse, with sand layers and a little coal

Chemistry

1 of 1

Location

15210308CBC2



Lab ID	<input type="text"/>	<input checked="" type="checkbox"/> Verified
Surface	<input type="text"/>	Sample Source <input type="text" value="WC"/>
Date Sampled	<input type="text" value="07/14/71"/>	Sampling Method <input type="text"/>
Time Sampled	<input type="text" value="00:00:00"/>	Field Conduct <input type="text" value="1120"/>
Pump Time	<input type="text" value="390"/>	Stage <input type="text" value="-99999"/>
Yield	<input type="text"/>	Surface Depth <input type="text" value="0"/>
Water Level	<input type="text" value="-99999"/>	Downhole Temp <input type="text" value="-99999"/>
Total Evacuated	<input type="text"/>	Dissolved O2 <input type="text" value="-99999"/>
		Field pH <input type="text" value="-99999"/>
		Field Temp <input type="text" value="9"/>
		Lab Conduct <input type="text" value="1110"/>
		Lab pH <input type="text" value="7.7"/>

Major Cations and Anions

Silica	<input type="text" value="17"/>
Calcium	<input type="text" value="134"/>
Magnesium	<input type="text" value="45"/>
Potassium	<input type="text" value="4.2"/>
Sodium	<input type="text" value="63"/>
Flouride	<input type="text" value="0.2"/>
Bicarbonate	<input type="text" value="541"/>
Carbonate	<input type="text" value="0"/>
Sulfate	<input type="text" value="180"/>
Chloride	<input type="text" value="8.6"/>
Nitrate	<input type="text" value="3.5"/>
Hydroxide	<input type="text" value="-99999"/>
Phosphate	<input type="text" value="-99999"/>
Boron	<input type="text" value="0.03"/>
Iron	<input type="text" value="0"/>
Manganese	<input type="text" value="1.4"/>

Trace Elements

Selenium	<input type="text" value="-99999"/>
Lead	<input type="text" value="-99999"/>
Mercury	<input type="text" value="-99999"/>
Arsenic	<input type="text" value="-99999"/>
Lithium	<input type="text" value="-99999"/>
Molybdenum	<input type="text" value="-99999"/>
Strontium	<input type="text" value="-99999"/>
Cadmium	<input type="text" value="-99999"/>

General Characteristics

Suspended Solid	<input type="text" value="-99999"/>
TDS Determined	<input type="text" value="756"/>
TDS Calculated	<input type="text" value="724"/>
Hardness	<input type="text" value="522"/>
NCH	<input type="text" value="78"/>
ALK as CaCO3	<input type="text" value="-99999"/>
SAR	<input type="text" value="1.2"/>
RSC	<input type="text" value="-99999"/>
Percent NA	<input type="text" value="21"/>

EPM

	Cations	Anions
Ca	<input type="text" value="6.69"/>	HCO3 <input type="text" value="8.87"/>
Mg	<input type="text" value="3.7"/>	CO3 <input type="text" value="0"/>
Na	<input type="text" value="2.74"/>	SO4 <input type="text" value="3.75"/>
K	<input type="text" value="0.11"/>	Cl <input type="text" value="0.24"/>
TOT	<input type="text" value="13.24"/>	F <input type="text" value="0.01"/>
		NO3 <input type="text" value="0.06"/>
		CH <input type="text" value="-99999"/>
		TOT <input type="text" value="12.93"/>

Color

Date Started

Date Ended

Remarks

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Date Completed:	07/14/1971	Purpose:	Observation Well - Destroyed
L.S. Elevation (ft):	1863	Well Type:	1.25in. - ABS
Depth Drilled (ft):	40	Aquifer:	Trenton
Screen Int. (ft.):	27-30	Data Source:	

Completion Info:

Remarks: North ditch.

Lithologic Log

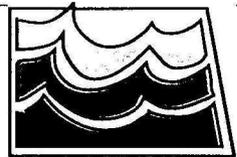
<u>Depth (ft)</u>	<u>Unit</u>	<u>Description</u>
0-1	TOPSOIL	Silty, sandy, clayey, brown
1-15	CLAY	Very silty, sandy, dark yellowish brown, slightly cohesive, plastic, oxidized (alluvium)
15-21	CLAY	Same as above, only olive-gray (alluvium)
21-40	SAND	Very fine- to medium-grained, subrounded, well- sorted, mostly quartz, lignitic, shaley

Chemistry

1 of 1

Location

15210308CDB



Lab ID

Verified

Surface

Sample Source

Date Sampled

Sampling Method

Field Conduct

Time Sampled

Stage

Field pH

Pump Time

Surface Depth

Field Temp

Yield

Downhole Temp

Lab Conduct

Water Level

Dissolved O2

Lab pH

Total Evacuated

Major Cations and Anions

Silica	18
Calcium	127
Magnesium	48
Potassium	6.3
Sodium	124
Flouride	0.3
Bicarbonate	614
Carbonate	0
Sulfate	245
Chloride	11
Nitrate	0.3
Hydroxide	-99999
Phosphate	-99999
Boron	0.1
Iron	0.9
Manganese	1.3

Trace Elements

Selenium	-99999
Lead	-99999
Mercury	-99999
Arsenic	-99999
Lithium	-99999
Molybdenum	-99999
Strontium	-99999
Cadmium	-99999

General Characteristics

Suspended Solid	-99999
TDS Determined	939
TDS Calculated	884
Hardness	514
NCH	11
ALK as CaCO3	-99999
SAR	2.4
RSC	-99999
Percent NA	34

EPM

Cations		Anions	
Ca	6.34	HCO3	10.06
Mg	3.95	CO3	0
Na	5.39	SO4	5.1
K	0.16	Cl	0.31
		F	0.02
TOT	15.84	NO3	0
		CH	-99999
		TOT	15.49

Color

Date Started

Date Ended

Remarks

W

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Date Completed:	06/30/1971	Purpose:	Observation Well
L.S. Elevation (ft):	1873.8	Well Type:	1.25in. - ABS
Depth Drilled (ft):	110	Aquifer:	Trenton
Screen Int. (ft.):	90-93	Data Source:	

Completion Info:

Remarks: North well

Lithologic Log

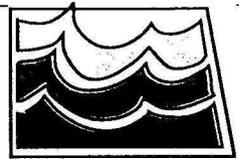
Depth (ft)	Unit	Description
0-1	TOPSOIL	Sandy, silty, clayey, dark brown
1-19	CLAY	Very silty, slightly to moderately sandy, dark yellowish brown, slightly cohesive, plastic, oxidized (alluvium)
19-26	CLAY	Same as above, only olive-gray (alluvium)
26-35	SAND	Very fine- to medium-grained, subrounded, moderately well-sorted, mostly quartz and siliceous rock fragments, lignitic
35-54	GRAVEL	Moderately sandy, fine to coarse (mostly fine to medium), subangular to rounded, fair sorting, mostly brownish western siliceous rocks, some shale, carbonates, scoria and lignite
54-59	SAND	Fine- to coarse-grained, subrounded, moderately well-sorted, mostly quartz, lignitic
59-63	GRAVEL	Very sandy, fine to medium, angular to well-rounded, fair sorting, predominantly brownish western silicates, lignitic
63-72	SAND	Slightly clayey, fine- to coarse-grained, subangular to rounded, predominantly quartz and siliceous rock fragments, lignitic
72-76	CLAY	Very silty, medium gray, laminated, moderately cohesive, plastic, highly calcareous (alluvium)
76-92	SAND	Slightly clayey, very fine- to coarse-grained (mostly medium-grained), subrounded, moderately well-sorted, mostly quartz, much detrital lignite
92-95	GRAVEL	Cobbles, sandy, fine to coarse, angular to well-rounded, poorly sorted, predominantly western siliceous rocks
95-110	SHALE	Moderately clayey, medium light gray with occasional brownish gray mottling and concretions, moderately indurated, highly calcareous, a few thin lignite stringers (Fort Union Group)

Chemistry

1 of 2

Location

15210309ABB1



Lab ID	<input type="text"/>	<input checked="" type="checkbox"/> Verified
Surface	<input type="text"/>	Sample Source <input type="text" value="WC"/>
Date Sampled	<input type="text" value="07/02/71"/>	Sampling Method <input type="text"/>
Time Sampled	<input type="text" value="00:00:00"/>	Stage <input type="text" value="-99999"/>
Pump Time	<input type="text" value="480"/>	Surface Depth <input type="text" value="0"/>
Yield	<input type="text" value="3.5"/>	Downhole Temp <input type="text" value="-99999"/>
Water Level	<input type="text" value="-99999"/>	Dissolved O2 <input type="text" value="-99999"/>
Total Evacuated	<input type="text"/>	Field Conduct <input type="text" value="1240"/>
		Field pH <input type="text" value="-99999"/>
		Field Temp <input type="text" value="8"/>
		Lab Conduct <input type="text" value="1220"/>
		Lab pH <input type="text" value="7.7"/>

Major Cations and Anions

Silica	<input type="text" value="30"/>
Calcium	<input type="text" value="70"/>
Magnesium	<input type="text" value="23"/>
Potassium	<input type="text" value="7.2"/>
Sodium	<input type="text" value="188"/>
Flouride	<input type="text" value="0.6"/>
Bicarbonate	<input type="text" value="504"/>
Carbonate	<input type="text" value="0"/>
Sulfate	<input type="text" value="235"/>
Chloride	<input type="text" value="6.7"/>
Nitrate	<input type="text" value="0"/>
Hydroxide	<input type="text" value="-99999"/>
Phosphate	<input type="text" value="-99999"/>
Boron	<input type="text" value="0.83"/>
Iron	<input type="text" value="2.4"/>
Manganese	<input type="text" value="0.22"/>

Trace Elements

Selenium	<input type="text" value="-99999"/>
Lead	<input type="text" value="-99999"/>
Mercury	<input type="text" value="-99999"/>
Arsenic	<input type="text" value="-99999"/>
Lithium	<input type="text" value="-99999"/>
Molybdenum	<input type="text" value="-99999"/>
Strontium	<input type="text" value="-99999"/>
Cadmium	<input type="text" value="-99999"/>

General Characteristics

Suspended Solid	<input type="text" value="-99999"/>
TDS Determined	<input type="text" value="885"/>
TDS Calculated	<input type="text" value="812"/>
Hardness	<input type="text" value="269"/>
NCH	<input type="text" value="0"/>
ALK as CaCO3	<input type="text" value="-99999"/>
SAR	<input type="text" value="5"/>
RSC	<input type="text" value="-99999"/>
Percent NA	<input type="text" value="60"/>

EPM

Cations		Anions	
Ca	<input type="text" value="3.49"/>	HCO3	<input type="text" value="8.26"/>
Mg	<input type="text" value="1.89"/>	CO3	<input type="text" value="0"/>
Na	<input type="text" value="8.18"/>	SO4	<input type="text" value="4.89"/>
K	<input type="text" value="0.18"/>	Cl	<input type="text" value="0.19"/>
		F	<input type="text" value="0.03"/>
		NO3	<input type="text" value="0"/>
		CH	<input type="text" value="-99999"/>
TOT	<input type="text" value="13.74"/>	TOT	<input type="text" value="13.37"/>

Color

Date Started

Date Ended

Remarks

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

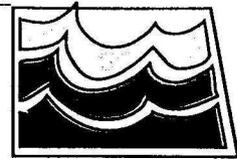
Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Chemistry

1 of 2

Location

15210309ABB1



Lab ID	NDSWC Lab	<input checked="" type="checkbox"/> Verified
Surface		Sample Source WC
Date Sampled	07/17/01	Sampling Method A
Time Sampled	19:30:00	Stage -99999
Pump Time	45	Surface Depth 0
Yield	2	Field Conduct 1615
Water Level	18.49	Field pH -99999
Total Evacuated		Field Temp -99999
		Downhole Temp -99999
		Lab Conduct 1960
		Dissolved O2 -99999
		Lab pH 7.79

Major Cations and Anions

Silica	-99999
Calcium	160
Magnesium	48
Potassium	12
Sodium	220
Flouride	0.5
Bicarbonate	499
Carbonate	0
Sulfate	710
Chloride	7.6
Nitrate	0.1
Hydroxide	-99999
Phosphate	-99999
Boron	-99999
Iron	4.4
Manganese	0.58

Trace Elements

Selenium	-99999
Lead	-99999
Mercury	-99999
Arsenic	-99999
Lithium	-99999
Molybdenum	-99999
Strontium	-99999
Cadmium	-99999

General Characteristics

Suspended Solid	-99999
TDS Determined	1480
TDS Calculated	1410
Hardness	600
NCH	190
ALK as CaCO3	-99999
SAR	3.9
RSC	0
Percent NA	44

EPM

Cations		Anions	
Ca	7.98	HCO3	8.18
Mg	3.95	CO3	0
Na	9.57	SO4	14.78
K	0.31	Cl	0.21
		F	0.03
TOT	21.81	NO3	0
		CH	-99999
		TOT	23.2

Color

Date Started

Date Ended

Remarks

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

152-103-09ABB2

NDSWC 8017A

Date Completed:	06/30/1971	Purpose:	Observation Well
L.S. Elevation (ft):	1873.92	Well Type:	1.25in. - ABS
Depth Drilled (ft):	40	Aquifer:	Trenton
Screen Int. (ft.):	27-30	Data Source:	

Completion Info:

Remarks: South well

Lithologic Log

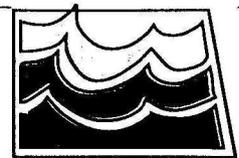
<u>Depth (ft)</u>	<u>Unit</u>	<u>Description</u>
0-1	TOPSOIL	Silty, black
1-19	CLAY	Silty, yellowish brown
19-26	CLAY	Silty, olive-gray
26-35	SAND	Fine to medium with a little clay
35-40	GRAVEL	Fine, medium to coarse-It's about 1/4 in. with a little coal and clay

Chemistry

1 of 2

Location

15210309ABB2



Lab ID	<input type="text"/>			<input checked="" type="checkbox"/> Verified	
Surface	<input type="text"/>	Sample Source	WC		
Date Sampled	07/02/71	Sampling Method	<input type="text"/>	Field Conduct	1140
Time Sampled	00:00:00	Stage	-99999	Field pH	-99999
Pump Time	480	Surface Depth	0	Field Temp	8
Yield	1.5	Downhole Temp	-99999	Lab Conduct	1130
Water Level	-99999	Dissolved O2	-99999	Lab pH	7.8
Total Evacuated	<input type="text"/>				

Major Cations and Anions

Silica	24
Calcium	61
Magnesium	23
Potassium	5.6
Sodium	173
Flouride	0.6
Bicarbonate	494
Carbonate	0
Sulfate	205
Chloride	8.6
Nitrate	0
Hydroxide	-99999
Phosphate	-99999
Boron	0.24
Iron	0.92
Manganese	0.32

Trace Elements

Selenium	-99999
Lead	-99999
Mercury	-99999
Arsenic	-99999
Lithium	-99999
Molybdenum	-99999
Strontium	-99999
Cadmium	-99999

General Characteristics

Suspended Solid	-99999
TDS Determined	772
TDS Calculated	745
Hardness	248
NCH	0
ALK as CaCO3	-99999
SAR	4.8
RSC	-99999
Percent NA	60

EPM

Cations		Anions	
Ca	3.04	HCO3	8.1
Mg	1.89	CO3	0
Na	7.53	SO4	4.27
K	0.14	Cl	0.24
		F	0.03
TOT	12.6	NO3	0
		CH	-99999
		TOT	12.64

Color

Date Started

Date Ended

Remarks

W

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

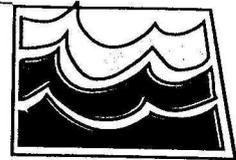
Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Chemistry

1 of 2

Location

15210309ABB2



Lab ID Verified
 Surface
 Date Sampled
 Time Sampled
 Pump Time
 Yield
 Water Level
 Total Evacuated

Sample Source

Sampling Method Field Conduct
 Stage Field pH
 Surface Depth Field Temp
 Downhole Temp Lab Conduct
 Dissolved O2 Lab pH

Major Cations and Anions

Silica
 Calcium
 Magnesium
 Potassium
 Sodium
 Flouride
 Bicarbonate
 Carbonate
 Sulfate
 Chloride
 Nitrate
 Hydroxide
 Phosphate
 Boron
 Iron
 Manganese

Trace Elements

Selenium
 Lead
 Mercury
 Arsenic
 Lithium
 Molybdenum
 Strontium
 Cadmium

General Characteristics

Suspended Solid
 TDS Determined
 TDS Calculated
 Hardness
 NCH
 ALK as CaCO3
 SAR
 RSC
 Percent NA

EPM

Cations		Anions	
Ca	<input type="text" value="4.49"/>	HCO3	<input type="text" value="8.6"/>
Mg	<input type="text" value="3.04"/>	CO3	<input type="text" value="0"/>
Na	<input type="text" value="8.27"/>	SO4	<input type="text" value="7.91"/>
K	<input type="text" value="0.19"/>	Cl	<input type="text" value="0.42"/>
		F	<input type="text" value="0.03"/>
TOT	<input type="text" value="15.99"/>	NO3	<input type="text" value="0"/>
		CH	<input type="text" value="-99999"/>
		TOT	<input type="text" value="16.96"/>

Color
 Date Started
 Date Ended

Remarks

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

152-103-11AAD

NDSWC 8011

Date Completed:	06/28/1971	Purpose:	Observation Well - Plugged
L.S. Elevation (ft):	1863	Well Type:	1.25in. - ABS
Depth Drilled (ft):	80	Aquifer:	Trenton
Screen Int. (ft.):	37-40	Data Source:	

Completion Info:

Remarks: On farmstead, East of shelterbelt.

Lithologic Log

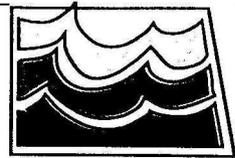
<u>Depth (ft)</u>	<u>Unit</u>	<u>Description</u>
0-1	TOPSOIL	Sandy, silty, clayey, brown
1-16	CLAY	Very silty, sandy, dark yellowish brown, slightly cohesive, plastic, oxidized (alluvium)
16-35	SAND	Slightly clayey, very fine- to medium-grained, subrounded, moderately well-sorted, mostly quartz and siliceous rock fragments, lignitic
35-50	SAND	Interbedded with gravel layers, slightly clayey, fine- to very coarse-grained, subangular to rounded, fair sorting, mostly quartz, lignitic
50-57	GRAVEL	Very clayey, moderately sandy, cobbles, fine to coarse (mostly medium to coarse), subangular to well-rounded, mostly brownish western siliceous rocks, lignitic, some shale and carbonates
57-80	SHALE	Moderately clayey, slightly sandy, medium light gray, moderately indurated, highly calcareous, occasional brownish concretions (Fort Union Group)

Chemistry

1 of 1

Location

15210311AAD



Lab ID	<input type="text"/>	<input checked="" type="checkbox"/> Verified	
Surface	<input type="text"/>	Sample Source <input type="text" value="WC"/>	
Date Sampled	<input type="text" value="06/30/71"/>	Sampling Method <input type="text"/>	
Time Sampled	<input type="text" value="00:00:00"/>	Field Conduct	<input type="text" value="2900"/>
Pump Time	<input type="text" value="360"/>	Stage	<input type="text" value="-99999"/>
Yield	<input type="text" value="3.5"/>	Surface Depth	<input type="text" value="0"/>
Water Level	<input type="text" value="-99999"/>	Field pH	<input type="text" value="-99999"/>
Total Evacuated	<input type="text"/>	Field Temp	<input type="text" value="7.5"/>
		Downhole Temp	<input type="text" value="-99999"/>
		Lab Conduct	<input type="text" value="2740"/>
		Dissolved O2	<input type="text" value="-99999"/>
		Lab pH	<input type="text" value="7.6"/>

Silica	<input type="text" value="20"/>
Calcium	<input type="text" value="237"/>
Magnesium	<input type="text" value="96"/>
Potassium	<input type="text" value="8.7"/>
Sodium	<input type="text" value="324"/>
Flouride	<input type="text" value="0.2"/>
Bicarbonate	<input type="text" value="773"/>
Carbonate	<input type="text" value="0"/>
Sulfate	<input type="text" value="995"/>
Chloride	<input type="text" value="32"/>
Nitrate	<input type="text" value="6.8"/>
Hydroxide	<input type="text" value="-99999"/>
Phosphate	<input type="text" value="-99999"/>
Boron	<input type="text" value="0"/>
Iron	<input type="text" value="14"/>
Manganese	<input type="text" value="0.48"/>

Selenium	<input type="text" value="-99999"/>
Lead	<input type="text" value="-99999"/>
Mercury	<input type="text" value="-99999"/>
Arsenic	<input type="text" value="-99999"/>
Lithium	<input type="text" value="-99999"/>
Molybdenum	<input type="text" value="-99999"/>
Strontium	<input type="text" value="-99999"/>
Cadmium	<input type="text" value="-99999"/>

Suspended Solid	<input type="text" value="-99999"/>
TDS Determined	<input type="text" value="2170"/>
TDS Calculated	<input type="text" value="2120"/>
Hardness	<input type="text" value="989"/>
NCH	<input type="text" value="355"/>
ALK as CaCO3	<input type="text" value="-99999"/>
SAR	<input type="text" value="4.5"/>
RSC	<input type="text" value="-99999"/>
Percent NA	<input type="text" value="41"/>

Cations		Anions	
Ca	<input type="text" value="11.83"/>	HCO3	<input type="text" value="12.67"/>
Mg	<input type="text" value="7.9"/>	CO3	<input type="text" value="0"/>
Na	<input type="text" value="14.09"/>	SO4	<input type="text" value="20.72"/>
K	<input type="text" value="0.22"/>	Cl	<input type="text" value="0.9"/>
		F	<input type="text" value="0.01"/>
TOT	<input type="text" value="34.04"/>	NO3	<input type="text" value="0.11"/>
		CH	<input type="text" value="-99999"/>
		TOT	<input type="text" value="34.41"/>

Color

Date Started

Date Ended

Remarks

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

152-103-11ADA

David Hoffman

Date Completed: 09/01/1983
L.S. Elevation (ft): N/A
Depth Drilled (ft): 81
Screen Int. (ft.): 71-81

Purpose: Domestic Well
Well Type: 5in. - PVC
Aquifer: Trenton
Data Source:

Completion Info:

Remarks:

Lithologic Log

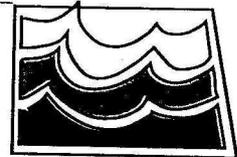
<u>Depth (ft)</u>	<u>Unit</u>	<u>Description</u>
0-2	TOPSOIL	
2-18	CLAY	sandy
18-50	SAND & GRAVEL	
50-57	CLAY	
57-70	CLAY	blue
70-81	GRAVEL	

Chemistry

1 of 1

Location

15210311ADA



Lab ID	NDSWC Lab	<input checked="" type="checkbox"/> Verified			
Surface		Sample Source WC			
Date Sampled	07/18/01	Sampling Method			
Time Sampled	19:10:00	Stage	-99999	Field Conduct	2420
Pump Time	3	Surface Depth	0	Field pH	-99999
Yield	15	Downhole Temp	-99999	Field Temp	-99999
Water Level	-99999	Dissolved O2	-99999	Lab Conduct	3110
Total Evacuated				Lab pH	7.34

Major Cations and Anions

Silica	-99999
Calcium	220
Magnesium	87
Potassium	12
Sodium	450
Flouride	0.4
Bicarbonate	812
Carbonate	0
Sulfate	1000
Chloride	57
Nitrate	0.1
Hydroxide	-99999
Phosphate	-99999
Boron	-99999
Iron	7.9
Manganese	0.9

Trace Elements

Selenium	-99999
Lead	-99999
Mercury	-99999
Arsenic	-99999
Lithium	-99999
Molybdenum	-99999
Strontium	-99999
Cadmium	-99999

General Characteristics

Suspended Solid	-99999
TDS Determined	2370
TDS Calculated	2240
Hardness	910
NCH	240
ALK as CaCO3	-99999
SAR	6.5
RSC	0
Percent NA	51

EPM

Cations		Anions	
Ca	10.98	HCO3	13.31
Mg	7.16	CO3	0
Na	19.58	SO4	20.82
K	0.31	Cl	1.61
		F	0.02
		NO3	0
TOT	38.03	CH	-99999
		TOT	35.76

Color	1
Date Started	07/25/01
Date Ended	08/03/01

Remarks

Percent Diff 3.08

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source NDHD Lab

NO3 Samp Method Cadmium Reductio

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Date Completed:	06/24/1971	Purpose:	Observation Well - Destroyed
L.S. Elevation (ft):	1870	Well Type:	1.25in. - ABS
Depth Drilled (ft):	140	Aquifer:	Trenton
Screen Int. (ft.):	97-103	Data Source:	

Completion Info:

Remarks: East well

Lithologic Log

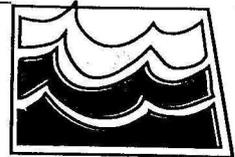
Depth (ft)	Unit	Description
0-1	TOPSOIL	Silty, sandy, clayey, dark brown
1-13	CLAY	Very silty, sandy, dark yellowish brown, slightly cohesive, plastic, oxidized (alluvium)
13-40	SAND	Slightly clayey, very fine- to medium-grained, subrounded, well-sorted, predominantly quartz and siliceous rock fragments, lignitic, scoriaceous
40-50	SAND	Same as above, only with occasional gravel layers, much detrital lignite, gravel fraction is fine to coarse
50-68	SAND	Very fine- to coarse-grained, subangular to subrounded, moderately well-sorted, mostly quartz and siliceous rock fragments, lignitic
68-73	CLAY	Very silty, medium gray, moderately cohesive, plastic, laminated, calcareous (alluvium)
73-92	SAND	Very clayey, very fine- to medium-grained, subangular to subrounded, fair sorting, "dirty-looking samples"
92-124	GRAVEL	Moderately sandy, slightly clayey, fine to coarse (mostly medium to coarse), subangular to well- rounded, fair sorting, mostly brownish western silicates, some shale, carbonates, sandstone and lignite
124-129	SAND	Medium- to coarse-grained, subrounded, moderately well-sorted, mostly quartz, lignitic, poor samples
129-132	COBBLES AND GRAVEL	(Fine to coarse), predominantly brownish western siliceous rocks
132-140	SHALE	Clayey, medium light gray with occasional brownish gray mottling, moderately indurated, a few thin lignite stringers, calcareous (Fort Union Group)

Chemistry

1 of 1

Location

15210312AAB1



Lab ID	<input type="text"/>	<input checked="" type="checkbox"/> Verified	
Surface	<input type="text"/>	Sample Source <input type="text" value="WC"/>	
Date Sampled	<input type="text" value="06/28/71"/>	Sampling Method <input type="text"/>	
Time Sampled	<input type="text" value="00:00:00"/>	Field Conduct	<input type="text" value="2625"/>
Pump Time	<input type="text" value="540"/>	Stage	<input type="text" value="-99999"/>
Yield	<input type="text" value="7"/>	Surface Depth	<input type="text" value="0"/>
Water Level	<input type="text" value="-99999"/>	Field pH	<input type="text" value="-99999"/>
Total Evacuated	<input type="text"/>	Downhole Temp	<input type="text" value="-99999"/>
		Dissolved O2	<input type="text" value="-99999"/>
		Field Temp	<input type="text" value="9"/>
		Lab Conduct	<input type="text" value="2350"/>
		Lab pH	<input type="text" value="7.5"/>

Major Cations and Anions

Silica	<input type="text" value="29"/>
Calcium	<input type="text" value="180"/>
Magnesium	<input type="text" value="84"/>
Potassium	<input type="text" value="12"/>
Sodium	<input type="text" value="288"/>
Flouride	<input type="text" value="0.3"/>
Bicarbonate	<input type="text" value="930"/>
Carbonate	<input type="text" value="0"/>
Sulfate	<input type="text" value="603"/>
Chloride	<input type="text" value="25"/>
Nitrate	<input type="text" value="0.6"/>
Hydroxide	<input type="text" value="-99999"/>
Phosphate	<input type="text" value="-99999"/>
Boron	<input type="text" value="0.1"/>
Iron	<input type="text" value="6.4"/>
Manganese	<input type="text" value="0.24"/>

Trace Elements

Selenium	<input type="text" value="-99999"/>
Lead	<input type="text" value="-99999"/>
Mercury	<input type="text" value="-99999"/>
Arsenic	<input type="text" value="-99999"/>
Lithium	<input type="text" value="-99999"/>
Molybdenum	<input type="text" value="-99999"/>
Strontium	<input type="text" value="-99999"/>
Cadmium	<input type="text" value="-99999"/>

General Characteristics

Suspended Solid	<input type="text" value="-99999"/>
TDS Determined	<input type="text" value="1630"/>
TDS Calculated	<input type="text" value="1690"/>
Hardness	<input type="text" value="796"/>
NCH	<input type="text" value="33"/>
ALK as CaCO3	<input type="text" value="-99999"/>
SAR	<input type="text" value="4.4"/>
RSC	<input type="text" value="-99999"/>
Percent NA	<input type="text" value="44"/>

EPM

Cations		Anions	
Ca	<input type="text" value="8.98"/>	HCO3	<input type="text" value="15.24"/>
Mg	<input type="text" value="6.91"/>	CO3	<input type="text" value="0"/>
Na	<input type="text" value="12.53"/>	SO4	<input type="text" value="12.55"/>
K	<input type="text" value="0.31"/>	Cl	<input type="text" value="0.71"/>
		F	<input type="text" value="0.02"/>
		NO3	<input type="text" value="0.01"/>
TOT	<input type="text" value="28.73"/>	CH	<input type="text" value="-99999"/>
		TOT	<input type="text" value="28.53"/>

Color

Date Started

Date Ended

Remarks

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

152-103-12AAB2

NDSWC 8009A

Date Completed: 06/24/1971
L.S. Elevation (ft): 1870
Depth Drilled (ft): 60
Screen Int. (ft.): 37-40

Purpose: Observation Well - Destroyed
Well Type: 1.25in. - ABS
Aquifer: Trenton
Data Source:

Completion Info:

Remarks: West well

Lithologic Log

Depth (ft) Unit Description

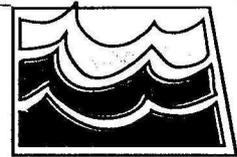
See log for NDSWC 8009 (152-103-12AAB1)

Chemistry

1 of 1

Location

15210312AAB2



Lab ID	<input type="text"/>	<input checked="" type="checkbox"/> Verified
Surface	<input type="text"/>	Sample Source <input type="text" value="WC"/>
Date Sampled	<input type="text" value="06/28/71"/>	Sampling Method <input type="text"/>
Time Sampled	<input type="text" value="00:00:00"/>	Field Conduct <input type="text" value="830"/>
Pump Time	<input type="text" value="540"/>	Stage <input type="text" value="-99999"/>
Yield	<input type="text" value="10"/>	Surface Depth <input type="text" value="0"/>
Water Level	<input type="text" value="-99999"/>	Field pH <input type="text" value="-99999"/>
Total Evacuated	<input type="text"/>	Downhole Temp <input type="text" value="-99999"/>
		Field Temp <input type="text" value="14"/>
		Lab Conduct <input type="text" value="789"/>
		Dissolved O2 <input type="text" value="-99999"/>
		Lab pH <input type="text" value="7.7"/>

Major Cations and Anions

Silica	<input type="text" value="22"/>
Calcium	<input type="text" value="35"/>
Magnesium	<input type="text" value="56"/>
Potassium	<input type="text" value="4.3"/>
Sodium	<input type="text" value="51"/>
Flouride	<input type="text" value="0.5"/>
Bicarbonate	<input type="text" value="307"/>
Carbonate	<input type="text" value="0"/>
Sulfate	<input type="text" value="168"/>
Chloride	<input type="text" value="8.2"/>
Nitrate	<input type="text" value="0"/>
Hydroxide	<input type="text" value="-99999"/>
Phosphate	<input type="text" value="-99999"/>
Boron	<input type="text" value="0.1"/>
Iron	<input type="text" value="3.4"/>
Manganese	<input type="text" value="0.98"/>

Trace Elements

Selenium	<input type="text" value="-99999"/>
Lead	<input type="text" value="-99999"/>
Mercury	<input type="text" value="-99999"/>
Arsenic	<input type="text" value="-99999"/>
Lithium	<input type="text" value="-99999"/>
Molybdenum	<input type="text" value="-99999"/>
Strontium	<input type="text" value="-99999"/>
Cadmium	<input type="text" value="-99999"/>

General Characteristics

Suspended Solid	<input type="text" value="-99999"/>
TDS Determined	<input type="text" value="526"/>
TDS Calculated	<input type="text" value="500"/>
Hardness	<input type="text" value="320"/>
NCH	<input type="text" value="68"/>
ALK as CaCO3	<input type="text" value="-99999"/>
SAR	<input type="text" value="1.2"/>
RSC	<input type="text" value="-99999"/>
Percent NA	<input type="text" value="25"/>

EPM

Cations		Anions	
Ca	<input type="text" value="1.75"/>	HCO3	<input type="text" value="5.03"/>
Mg	<input type="text" value="4.61"/>	CO3	<input type="text" value="0"/>
Na	<input type="text" value="2.22"/>	SO4	<input type="text" value="3.5"/>
K	<input type="text" value="0.11"/>	Cl	<input type="text" value="0.23"/>
		F	<input type="text" value="0.03"/>
TOT	<input type="text" value="8.69"/>	NO3	<input type="text" value="0"/>
		CH	<input type="text" value="-99999"/>
		TOT	<input type="text" value="8.79"/>

Color

Date Started

Date Ended

Remarks

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Date Completed:	06/24/1971	Purpose:	Observation Well
L.S. Elevation (ft):	1866.31	Well Type:	1.25in. - ABS
Depth Drilled (ft):	120	Aquifer:	Trenton
Screen Int. (ft.):	97-100	Data Source:	

Completion Info:

Remarks: West well

Lithologic Log

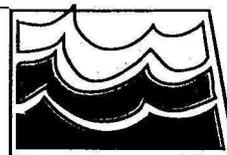
Depth (ft)	Unit	Description
0-1	TOPSOIL	Silty, clayey, sandy, yellowish brown
1-18	CLAY	Very silty, sandy, dark yellowish brown, slightly cohesive, plastic, oxidized (alluvium)
18-26	CLAY	Very sandy, silty, olive-gray, slightly cohesive, plastic, cohesive (alluvium)
26-49	SAND	Moderately clayey, very fine- to medium-grained, subrounded, well-sorted, mostly quartz and siliceous rock fragments, lignitic, scoriaceous
49-59	GRAVEL	Interbedded with thin clay lenses, probably some matrix clay, moderately sandy, fine to coarse (mostly medium), angular to well-rounded, fair sorting, mostly western siliceous rocks, some shale and carbonates, much detrital lignite
59-90	SAND	Clayey, very fine- to coarse-grained (mostly fine- to medium-grained), clay occurs as lenses and probably as matrix material, subrounded, moderately well-sorted, mostly quartz and siliceous rock fragments, very lignitic
90-112	GRAVEL	Slightly clayey, fine to coarse (mostly medium to coarse), angular to well-rounded, fair sorting, predominantly brownish western silicates, some shale, carbonates and lignite
112-120	SHALE	Clayey, slightly sandy, medium light gray with brownish gray mottling, highly calcareous, moderately indurated (Fort Union Group)

Chemistry

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Location

15210312CCC1



Lab ID	<input type="text"/>	<input checked="" type="checkbox"/> Verified
Surface	<input type="text"/>	Sample Source <input type="text" value="WC"/>
Date Sampled	<input type="text" value="06/29/71"/>	Sampling Method <input type="text"/>
Time Sampled	<input type="text" value="00:00:00"/>	Field Conduct <input type="text" value="1970"/>
Pump Time	<input type="text" value="420"/>	Stage <input type="text" value="-99999"/>
Yield	<input type="text" value="7"/>	Surface Depth <input type="text" value="0"/>
Water Level	<input type="text" value="-99999"/>	Downhole Temp <input type="text" value="-99999"/>
Total Evacuated	<input type="text"/>	Dissolved O2 <input type="text" value="-99999"/>
		Field pH <input type="text" value="-99999"/>
		Field Temp <input type="text" value="9"/>
		Lab Conduct <input type="text" value="1870"/>
		Lab pH <input type="text" value="7.7"/>

Major Cations and Anions

Silica	<input type="text" value="30"/>
Calcium	<input type="text" value="174"/>
Magnesium	<input type="text" value="75"/>
Potassium	<input type="text" value="13"/>
Sodium	<input type="text" value="183"/>
Flouride	<input type="text" value="0.3"/>
Bicarbonate	<input type="text" value="744"/>
Carbonate	<input type="text" value="0"/>
Sulfate	<input type="text" value="471"/>
Chloride	<input type="text" value="20"/>
Nitrate	<input type="text" value="1.5"/>
Hydroxide	<input type="text" value="-99999"/>
Phosphate	<input type="text" value="-99999"/>
Boron	<input type="text" value="0.21"/>
Iron	<input type="text" value="6.3"/>
Manganese	<input type="text" value="0.36"/>

Trace Elements

Selenium	<input type="text" value="-99999"/>
Lead	<input type="text" value="-99999"/>
Mercury	<input type="text" value="-99999"/>
Arsenic	<input type="text" value="-99999"/>
Lithium	<input type="text" value="-99999"/>
Molybdenum	<input type="text" value="-99999"/>
Strontium	<input type="text" value="-99999"/>
Cadmium	<input type="text" value="-99999"/>

General Characteristics

Suspended Solid	<input type="text" value="-99999"/>
TDS Determined	<input type="text" value="1330"/>
TDS Calculated	<input type="text" value="1340"/>
Hardness	<input type="text" value="741"/>
NCH	<input type="text" value="131"/>
ALK as CaCO3	<input type="text" value="-99999"/>
SAR	<input type="text" value="2.9"/>
RSC	<input type="text" value="-99999"/>
Percent NA	<input type="text" value="34"/>

EPM

Cations		Anions	
Ca	<input type="text" value="8.68"/>	HCO3	<input type="text" value="12.19"/>
Mg	<input type="text" value="6.17"/>	CO3	<input type="text" value="0"/>
Na	<input type="text" value="7.96"/>	SO4	<input type="text" value="9.81"/>
K	<input type="text" value="0.33"/>	Cl	<input type="text" value="0.56"/>
		F	<input type="text" value="0.02"/>
TOT	<input type="text" value="23.14"/>	NO3	<input type="text" value="0.02"/>
		CH	<input type="text" value="-99999"/>
		TOT	<input type="text" value="22.6"/>

Color

Date Started

Date Ended

Remarks

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

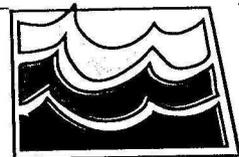
Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Chemistry

1 of 2

Location

15210312CCC1



Verified

Lab ID: NDSWC Lab
 Surface:
 Date Sampled: 07/18/01
 Time Sampled: 17:00:00
 Pump Time: 40
 Yield: 2
 Water Level: 12.56
 Total Evacuated:

Sample Source: WC
 Sampling Method: A
 Stage: -99999
 Surface Depth: 0
 Downhole Temp: -99999
 Dissolved O2: -99999

Field Conduct: 1220
 Field pH: -99999
 Field Temp: -99999
 Lab Conduct: 1470
 Lab pH: 7.87

Major Cations and Anions

Silica: -99999
 Calcium: 140
 Magnesium: 53
 Potassium: 12
 Sodium: 140
 Flouride: 0.4
 Bicarbonate: 686
 Carbonate: 0
 Sulfate: 280
 Chloride: 8.5
 Nitrate: 0.1
 Hydroxide: -99999
 Phosphate: -99999
 Boron: -99999
 Iron: 0.33
 Manganese: 0.71

Trace Elements

Selenium: -99999
 Lead: -99999
 Mercury: -99999
 Arsenic: -99999
 Lithium: -99999
 Molybdenum: -99999
 Strontium: -99999
 Cadmium: -99999

General Characteristics

Suspended Solid: -99999
 TDS Determined: 1020
 TDS Calculated: 972
 Hardness: 570
 NCH: 6
 ALK as CaCO3: -99999
 SAR: 2.5
 RSC: 0
 Percent NA: 34

EPM

Cations		Anions	
Ca	<input type="text"/> 6.99	HCO3	<input type="text"/> 11.24
Mg	<input type="text"/> 4.36	CO3	<input type="text"/> 0
Na	<input type="text"/> 6.09	SO4	<input type="text"/> 5.83
K	<input type="text"/> 0.31	Cl	<input type="text"/> 0.24
		F	<input type="text"/> 0.02
TOT	<input type="text"/> 17.75	NO3	<input type="text"/> 0
		CH	<input type="text"/> -99999
		TOT	<input type="text"/> 17.33

Color: 1
 Date Started: 07/26/01
 Date Ended: 08/03/01

Remarks

Percent Diff: 1.2

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source: NDHD Lab

NO3 Samp Method: Cadmium Reductio

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

152-103-12CCC2

NDSWC 8008A

Date Completed:	07/01/1971	Purpose:	Observation Well
L.S. Elevation (ft):	1866.54	Well Type:	6in. - PVC
Depth Drilled (ft):	60	Aquifer:	Trenton
Screen Int. (ft.):	49-54	Data Source:	

Completion Info:

Remarks: East well

Lithologic Log

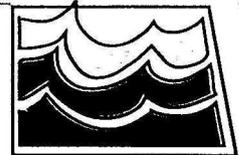
<u>Depth (ft)</u>	<u>Unit</u>	<u>Description</u>
0-1	TOPSOIL	Silty, black
1-18	CLAY	Silty, yellowish brown
18-26	CLAY	Sandy, silty, olive-gray, with sand layers
26-49	SAND	Fine to medium
49-58	GRAVEL	Fine to medium-It's about 1/4 clay, with sand layers and a little coal
58-60	SAND	Fine to medium with a little coal and clay

Chemistry

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Location

15210312CCC2



Lab ID

Verified

Surface

Sample Source

Date Sampled

Sampling Method

Field Conduct

Time Sampled

Stage

Field pH

Pump Time

Surface Depth

Field Temp

Yield

Downhole Temp

Lab Conduct

Water Level

Dissolved O2

Lab pH

Total Evacuated

Major Cations and Anions

Silica	23
Calcium	180
Magnesium	75
Potassium	9.3
Sodium	171
Flouride	0.3
Bicarbonate	807
Carbonate	0
Sulfate	414
Chloride	17
Nitrate	0.8
Hydroxide	-99999
Phosphate	-99999
Boron	0.17
Iron	8.1
Manganese	1.1

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

Trace Elements

Selenium	-99999
Lead	-99999
Mercury	-99999
Arsenic	-99999
Lithium	-99999
Molybdenum	-99999
Strontium	-99999
Cadmium	-99999

EPM

Cations		Anions	
Ca	8.98	HCO3	13.23
Mg	6.17	CO3	0
Na	7.44	SO4	8.62
K	0.24	Cl	0.48
		F	0.02
		NO3	0.01
		OH	-99999
TOT	22.83	TOT	22.36

General Characteristics

Suspended Solid	-99999
TDS Determined	1340
TDS Calculated	1300
Hardness	760
NCH	98
ALK as CaCO3	-99999
SAR	2.7
RSC	-99999
Percent NA	33

Color

Date Started

Date Ended

Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Date Completed:	06/28/1971	Purpose:	Observation Well - Destroyed
L.S. Elevation (ft):	1865	Well Type:	1.25in. - ABS
Depth Drilled (ft):	120	Aquifer:	Trenton
Screen Int. (ft.):	97-103	Data Source:	

Completion Info:

Remarks: West well-N. side of E-W Irr. ditch. W of main Irr ditch.

Lithologic Log

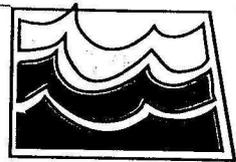
Depth (ft)	Unit	Description
0-1	TOPSOIL	Sandy, clayey, silty, brown
1-15	CLAY	Very silty, sandy, dark yellowish brown, slightly cohesive, plastic, oxidized (alluvium)
15-19	CLAY	Same as above, only olive-gray (alluvium)
19-35	SAND	Slightly clayey, very fine- to medium-grained, subrounded, moderately well-sorted, slightly oxidized, mostly quartz and siliceous rock fragments, lignitic
35-58	SAND	Interbedded with clay lenses and gravel layers, stratified, fine- to coarse-grained, subangular to rounded, fair sorting, mostly quartz and siliceous rock fragments, lignitic
58-70	CLAY	Slightly sandy, very silty, medium gray with light olive-gray laminations, slightly to moderately cohesive, plastic, highly calcareous, lignitic (alluvium)
70-95	SAND	Very clayey, fine- to medium-grained, subangular, fair sorting, mostly quartz, lignitic, "very dirty-looking samples"
95-100	GRAVEL	Fine to coarse, subrounded to rounded, fair sorting, mostly western silicates, lignitic
100-109	SAND	Occasional gravelly layers and clay lenses, fine to coarse, poorly sorted, lignitic
109-120	SHALE	Medium light gray, moderately indurated, calcareous, brownish concretions (Fort Union Group)

Chemistry

1 of 1

Location

15210312DAB1



Lab ID	<input type="text"/>	<input checked="" type="checkbox"/> Verified	
Surface	<input type="text"/>	Sample Source <input type="text" value="WC"/>	
Date Sampled	<input type="text" value="06/30/71"/>	Sampling Method <input type="text"/>	
Time Sampled	<input type="text" value="00:00:00"/>	Field Conduct	<input type="text" value="2250"/>
Pump Time	<input type="text" value="360"/>	Stage	<input type="text" value="-99999"/>
Yield	<input type="text" value="7"/>	Surface Depth	<input type="text" value="0"/>
Water Level	<input type="text" value="-99999"/>	Downhole Temp	<input type="text" value="-99999"/>
Total Evacuated	<input type="text"/>	Dissolved O2	<input type="text" value="-99999"/>
		Field pH	<input type="text" value="-99999"/>
		Field Temp	<input type="text" value="8.5"/>
		Lab Conduct	<input type="text" value="2160"/>
		Lab pH	<input type="text" value="7.8"/>

Major Cations and Anions

Silica	<input type="text" value="29"/>
Calcium	<input type="text" value="96"/>
Magnesium	<input type="text" value="47"/>
Potassium	<input type="text" value="7.7"/>
Sodium	<input type="text" value="361"/>
Flouride	<input type="text" value="0.3"/>
Bicarbonate	<input type="text" value="922"/>
Carbonate	<input type="text" value="0"/>
Sulfate	<input type="text" value="434"/>
Chloride	<input type="text" value="7.3"/>
Nitrate	<input type="text" value="1.5"/>
Hydroxide	<input type="text" value="-99999"/>
Phosphate	<input type="text" value="-99999"/>
Boron	<input type="text" value="0.52"/>
Iron	<input type="text" value="4.4"/>
Manganese	<input type="text" value="0.18"/>

Trace Elements

Selenium	<input type="text" value="-99999"/>
Lead	<input type="text" value="-99999"/>
Mercury	<input type="text" value="-99999"/>
Arsenic	<input type="text" value="-99999"/>
Lithium	<input type="text" value="-99999"/>
Molybdenum	<input type="text" value="-99999"/>
Strontium	<input type="text" value="-99999"/>
Cadmium	<input type="text" value="-99999"/>

General Characteristics

Suspended Solid	<input type="text" value="-99999"/>
TDS Determined	<input type="text" value="1360"/>
TDS Calculated	<input type="text" value="1440"/>
Hardness	<input type="text" value="434"/>
NCH	<input type="text" value="0"/>
ALK as CaCO3	<input type="text" value="-99999"/>
SAR	<input type="text" value="7.5"/>
RSC	<input type="text" value="-99999"/>
Percent NA	<input type="text" value="64"/>

EPM

Cations		Anions	
Ca	<input type="text" value="4.79"/>	HCO3	<input type="text" value="15.11"/>
Mg	<input type="text" value="3.87"/>	CO3	<input type="text" value="0"/>
Na	<input type="text" value="15.7"/>	SO4	<input type="text" value="9.04"/>
K	<input type="text" value="0.2"/>	Cl	<input type="text" value="0.21"/>
		F	<input type="text" value="0.02"/>
		NO3	<input type="text" value="0.02"/>
TOT	<input type="text" value="24.56"/>	CH	<input type="text" value="-99999"/>
		TOT	<input type="text" value="24.4"/>

Color

Date Started

Date Ended

Remarks

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

152-103-12DAB2

NDSWC 8010A

Date Completed: 06/28/1971
L.S. Elevation (ft): 1865
Depth Drilled (ft): 60
Screen Int. (ft.): 37-40

Purpose: Observation Well - Destroyed
Well Type: 1.25in. - ABS
Aquifer: Trenton
Data Source:

Completion Info:

Remarks: East well

Lithologic Log

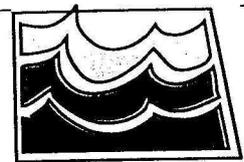
<u>Depth (ft)</u>	<u>Unit</u>	<u>Description</u>
0-1	TOPSOIL	Silty, black
1-15	CLAY	Silty, yellowish brown
15-19	CLAY	Silty, olive-gray
19-35	SAND	Fine to medium with a little coal
35-58	SAND	Fine to medium with gravel layers, coal layers, and clay layers
58-60	CLAY	Sandy, silty, olive-gray

Chemistry

1 of 1

Location

15210312DAB2



Verified

Lab ID

Surface

Sample Source **VC**

Date Sampled

06/30/71

Sampling Method

Field Conduct

1190

Time Sampled

00:00:00

Stage

-99999

Field pH

-99999

Pump Time

360

Surface Depth

0

Field Temp

10

Yield

4.5

Downhole Temp

-99999

Lab Conduct

1170

Water Level

-99999

Dissolved O2

-99999

Lab pH

7.8

Total Evacuated

Major Cations and Anions

Silica	17
Calcium	118
Magnesium	41
Potassium	5.8
Sodium	92
Flouride	0.3
Bicarbonate	510
Carbonate	0
Sulfate	224
Chloride	9.6
Nitrate	0
Hydroxide	-99999
Phosphate	-99999
Boron	0.14
Iron	5.6
Manganese	0.72

Trace Elements

Selenium	-99999
Lead	-99999
Mercury	-99999
Arsenic	-99999
Lithium	-99999
Molybdenum	-99999
Strontium	-99999
Cadmium	-99999

General Characteristics

Suspended Solid	-99999
TDS Determined	806
TDS Calculated	765
Hardness	464
NCH	46
ALK as CaCO3	-99999
SAR	1.9
RSC	-99999
Percent NA	30

EPM

Cations		Anions	
Ca	5.89	HCO3	8.36
Mg	3.37	CO3	0
Na	4	SO4	4.66
K	0.15	Cl	0.27
		F	0.02
		NO3	0
		CH	-99999
TOT	13.41	TOT	13.31

Color

M

Date Started

08/03/71

Date Ended

08/11/71

Remarks

W

Percent Diff

-99999

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

Unknown

NO3 Samp Method

Unknown

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

152-103-12DCC

NDSWC 3

Date Completed:	06/19/1968	Purpose:	Observation Well - Destroyed
L.S. Elevation (ft):	1868	Well Type:	1.25in. - Steel
Depth Drilled (ft):	73	Aquifer:	Trenton
Screen Int. (ft.):	61-64	Data Source:	

Completion Info:

Remarks:

Lithologic Log

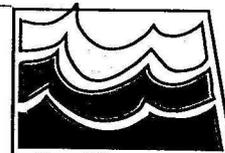
<u>Depth (ft)</u>	<u>Unit</u>	<u>Description</u>
0-15	CLAY	Slightly silty, yellowish brown, soft, becomes unoxidized after 7 ft. (olive-gray)
15-57	SAND	Very fine to fine, moderately well-sorted, angular, estimated 75% quartz, a few black flake (igneous or lignite) becoming a little coarser with depth
57-64	GRAVEL	Medium to very coarse, subangular to subrounded, some sand, porpheric rocks, chert, chalcedony, a few particles of quartz (western type gravel), bentonite between 58 ft. and 72 ft.
64-73	CLAY	Silty, very light gray, soft, poor sample return (Tongue River Formation?)

Chemistry

1 of 2

Location

15210312DCC



Lab ID	<input type="text"/>	<input checked="" type="checkbox"/> Verified
Surface	<input type="text"/>	Sample Source <input type="text" value="WC"/>
Date Sampled	<input type="text" value="06/20/68"/>	Sampling Method <input type="text"/>
Time Sampled	<input type="text" value="00:00:00"/>	Stage <input type="text" value="-99999"/>
Pump Time	<input type="text" value="720"/>	Surface Depth <input type="text" value="0"/>
Yield	<input type="text" value="5"/>	Downhole Temp <input type="text" value="-99999"/>
Water Level	<input type="text" value="13.77"/>	Dissolved O2 <input type="text" value="-99999"/>
Total Evacuated	<input type="text"/>	Field Conduct <input type="text" value="-99999"/>
		Field pH <input type="text" value="-99999"/>
		Field Temp <input type="text" value="14.4"/>
		Lab Conduct <input type="text" value="1140"/>
		Lab pH <input type="text" value="8"/>

Major Cations and Anions

Silica	<input type="text" value="20"/>
Calcium	<input type="text" value="115"/>
Magnesium	<input type="text" value="46"/>
Potassium	<input type="text" value="5.3"/>
Sodium	<input type="text" value="94"/>
Flouride	<input type="text" value="0.5"/>
Bicarbonate	<input type="text" value="524"/>
Carbonate	<input type="text" value="0"/>
Sulfate	<input type="text" value="225"/>
Chloride	<input type="text" value="12"/>
Nitrate	<input type="text" value="0"/>
Hydroxide	<input type="text" value="-99999"/>
Phosphate	<input type="text" value="-99999"/>
Boron	<input type="text" value="0.15"/>
Iron	<input type="text" value="2.1"/>
Manganese	<input type="text" value="0.95"/>

Trace Elements

Selenium	<input type="text" value="-99999"/>
Lead	<input type="text" value="-99999"/>
Mercury	<input type="text" value="-99999"/>
Arsenic	<input type="text" value="-99999"/>
Lithium	<input type="text" value="-99999"/>
Molybdenum	<input type="text" value="-99999"/>
Strontium	<input type="text" value="-99999"/>
Cadmium	<input type="text" value="-99999"/>

General Characteristics

Suspended Solid	<input type="text" value="-99999"/>
TDS Determined	<input type="text" value="760"/>
TDS Calculated	<input type="text" value="778"/>
Hardness	<input type="text" value="475"/>
NCH	<input type="text" value="45"/>
ALK as CaCO3	<input type="text" value="-99999"/>
SAR	<input type="text" value="1.9"/>
RSC	<input type="text" value="-99999"/>
Percent NA	<input type="text" value="30"/>

EPM

Cations		Anions	
Ca	<input type="text" value="5.74"/>	HCO3	<input type="text" value="8.59"/>
Mg	<input type="text" value="3.78"/>	CO3	<input type="text" value="0"/>
Na	<input type="text" value="4.09"/>	SO4	<input type="text" value="4.68"/>
K	<input type="text" value="0.14"/>	Cl	<input type="text" value="0.34"/>
		F	<input type="text" value="0.03"/>
		NO3	<input type="text" value="0"/>
TOT	<input type="text" value="13.75"/>	CH	<input type="text" value="-99999"/>
		TOT	<input type="text" value="13.64"/>

Color	<input type="text" value="A"/>
Date Started	<input type="text" value="07/08/68"/>
Date Ended	<input type="text" value="07/15/68"/>

Remarks

W

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

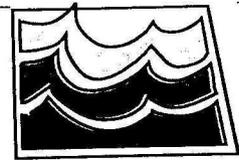
Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Chemistry

1 of 2

Location

15210312DCC



Verified

Lab ID

Surface

Sample Source WC

Date Sampled

07/13/71

Sampling Method

Field Conduct

950

Time Sampled

00:00:00

Stage

-99999

Field pH

-99999

Pump Time

2.5

Surface Depth

0

Field Temp

12

Yield

Downhole Temp

-99999

Lab Conduct

914

Water Level

-99999

Dissolved O2

-99999

Lab pH

7.8

Total Evacuated

Major Cations and Anions

Silica	20
Calcium	88
Magnesium	36
Potassium	4.7
Sodium	66
Flouride	0.5
Bicarbonate	365
Carbonate	0
Sulfate	194
Chloride	9.8
Nitrate	0
Hydroxide	-99999
Phosphate	-99999
Boron	0.07
Iron	3.7
Manganese	0.82

Trace Elements

Selenium	-99999
Lead	-99999
Mercury	-99999
Arsenic	-99999
Lithium	-99999
Molybdenum	-99999
Strontium	-99999
Cadmium	-99999

General Characteristics

Suspended Solid	-99999
TDS Determined	624
TDS Calculated	604
Hardness	370
NCH	71
ALK as CaCO3	-99999
SAR	1.5
RSC	-99999
Percent NA	28

EPM

Cations		Anions	
Ca	4.39	HCO3	5.98
Mg	2.96	CO3	0
Na	2.87	SO4	4.04
K	0.12	Cl	0.28
		F	0.03
TOT	10.34	NO3	0
		CH	-99999
		TOT	10.33

Color

1

Date Started

08/12/71

Date Ended

08/23/71

Remarks

W

Percent Diff

-99999

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

Unknown

NO3 Samp Method

Unknown

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Date Completed:	07/01/1971	Purpose:	Observation Well
L.S. Elevation (ft):	1865.57	Well Type:	4in. - PVC
Depth Drilled (ft):	70	Aquifer:	Trenton
Screen Int. (ft.):	48-53	Data Source:	

Completion Info:

Remarks: North ditch, west of approach.

Lithologic Log

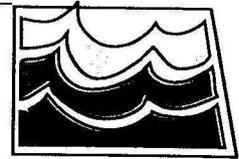
Depth (ft)	Unit	Description
0-1	TOPSOIL	Silty, clayey, sandy, dark brown
1-15	CLAY	Very silty, sandy, dark yellowish brown, slightly cohesive, plastic, oxidized (alluvium)
15-19	CLAY	Same as above, only olive-gray (alluvium)
19-40	SAND	Very fine- to coarse-grained (mostly fine- to medium-grained), subangular to subrounded, well-sorted, predominantly quartz and siliceous rock fragments, lignitic
40-55	GRAVEL	Slightly sandy, fine to coarse (some cobbled-sized material), subangular to well-rounded, fair to good sorting, mostly brownish western siliceous rocks, some shale, carbonates and lignite
55-70	SHALE	Moderately clayey, medium light gray with brownish gray concretions, moderately indurated, highly calcareous (Fort Union Group)

Chemistry

1 of 2

Location

15210317CAA



Lab ID Verified

Surface Sample Source

Date Sampled Sampling Method Field Conduct

Time Sampled Stage Field pH

Pump Time Surface Depth Field Temp

Yield Downhole Temp Lab Conduct

Water Level Dissolved O2 Lab pH

Total Evacuated

Major Cations and Anions

Silica	<input type="text" value="24"/>
Calcium	<input type="text" value="77"/>
Magnesium	<input type="text" value="27"/>
Potassium	<input type="text" value="5"/>
Sodium	<input type="text" value="66"/>
Flouride	<input type="text" value="0.4"/>
Bicarbonate	<input type="text" value="312"/>
Carbonate	<input type="text" value="0"/>
Sulfate	<input type="text" value="171"/>
Chloride	<input type="text" value="7.7"/>
Nitrate	<input type="text" value="1"/>
Hydroxide	<input type="text" value="-99999"/>
Phosphate	<input type="text" value="-99999"/>
Boron	<input type="text" value="0.38"/>
Iron	<input type="text" value="1.8"/>
Manganese	<input type="text" value="0.33"/>

Trace Elements

Selenium	<input type="text" value="-99999"/>
Lead	<input type="text" value="-99999"/>
Mercury	<input type="text" value="-99999"/>
Arsenic	<input type="text" value="-99999"/>
Lithium	<input type="text" value="-99999"/>
Molybdenum	<input type="text" value="-99999"/>
Strontium	<input type="text" value="-99999"/>
Cadmium	<input type="text" value="-99999"/>

General Characteristics

Suspended Solid	<input type="text" value="-99999"/>
TDS Determined	<input type="text" value="555"/>
TDS Calculated	<input type="text" value="536"/>
Hardness	<input type="text" value="304"/>
NCH	<input type="text" value="48"/>
ALK as CaCO3	<input type="text" value="-99999"/>
SAR	<input type="text" value="1.6"/>
RSC	<input type="text" value="-99999"/>
Percent NA	<input type="text" value="32"/>

EPM

Cations		Anions	
Ca	<input type="text" value="3.84"/>	HCO3	<input type="text" value="5.11"/>
Mg	<input type="text" value="2.22"/>	CO3	<input type="text" value="0"/>
Na	<input type="text" value="2.87"/>	SO4	<input type="text" value="3.56"/>
K	<input type="text" value="0.13"/>	Cl	<input type="text" value="0.22"/>
		F	<input type="text" value="0.02"/>
TOT	<input type="text" value="9.06"/>	NO3	<input type="text" value="0.02"/>
		CH	<input type="text" value="-99999"/>
		TOT	<input type="text" value="8.93"/>

Color
 Date Started
 Date Ended

Remarks

W

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

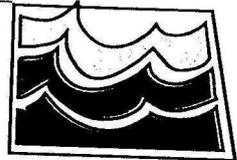
Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Chemistry

1 of 2

Location

15210317CAA



Lab ID	NDSWC Lab	<input checked="" type="checkbox"/> Verified
Surface		Sample Source WC
Date Sampled	07/17/01	Sampling Method C
Time Sampled	16:50:00	Stage -99999
Pump Time	30	Surface Depth 0
Yield	4	Downhole Temp -99999
Water Level	5.76	Dissolved O2 -99999
Total Evacuated		Field Conduct 610
		Field pH -99999
		Field Temp -99999
		Lab Conduct 717
		Lab pH 7.3

Major Cations and Anions

Silica	-99999
Calcium	67
Magnesium	22
Potassium	5.1
Sodium	50
Flouride	0.5
Bicarbonate	275
Carbonate	0
Sulfate	140
Chloride	13
Nitrate	0.1
Hydroxide	-99999
Phosphate	-99999
Boron	-99999
Iron	2.7
Manganese	0.43

Trace Elements

Selenium	-99999
Lead	-99999
Mercury	-99999
Arsenic	-99999
Lithium	-99999
Molybdenum	-99999
Strontium	-99999
Cadmium	-99999

General Characteristics

Suspended Solid	-99999
TDS Determined	450
TDS Calculated	436
Hardness	260
NCH	32
ALK as CaCO3	-99999
SAR	1.4
RSC	0
Percent NA	29

EPM

Cations		Anions	
Ca	3.34	HCO3	4.51
Mg	1.81	CO3	0
Na	2.18	SO4	2.91
K	0.13	Cl	0.37
		F	0.03
TOT	7.46	NO3	0
		CH	-99999
		TOT	7.82

Color

Date Started

Date Ended

Remarks

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

152-103-18CBB

David Bratten

Date Completed:	04/03/1983	Purpose:	Domestic Well
L.S. Elevation (ft):	N/A	Well Type:	5in. - PVC
Depth Drilled (ft):	60	Aquifer:	Trenton
Screen Int. (ft.):	40-60	Data Source:	Northland Drilling

Completion Info:

Remarks:

Lithologic Log

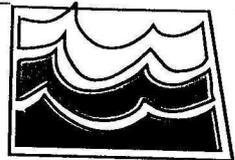
<u>Depth (ft)</u>	<u>Unit</u>	<u>Description</u>
0-10	CLAY	
10-60	SAND	very fine

Chemistry

1 of 1

Location

15210318CBB



Lab ID	NDSWC Lab	<input checked="" type="checkbox"/> Verified			
Surface		Sample Source WC			
Date Sampled	07/19/01	Sampling Method			
Time Sampled	9:30:0	Stage	-99999	Field Conduct	688
Pump Time	4	Surface Depth	0	Field pH	-99999
Yield	10	Downhole Temp	-99999	Field Temp	-99999
Water Level	-99999	Dissolved O2	-99999	Lab Conduct	842
Total Evacuated				Lab pH	7.21

Major Cations and Anions

Silica	-99999
Calcium	78
Magnesium	30
Potassium	4
Sodium	59
Flouride	0.5
Bicarbonate	363
Carbonate	0
Sulfate	150
Chloride	14
Nitrate	0.1
Hydroxide	-99999
Phosphate	-99999
Boron	-99999
Iron	2.1
Manganese	0.65

Trace Elements

Selenium	-99999
Lead	-99999
Mercury	-99999
Arsenic	-99999
Lithium	-99999
Molybdenum	-99999
Strontium	-99999
Cadmium	-99999

General Characteristics

Suspended Solid	-99999
TDS Determined	548
TDS Calculated	517
Hardness	320
NCH	21
ALK as CaCO3	-99999
SAR	1.4
RSC	0
Percent NA	28

EPM

Cations		Anions	
Ca	3.89	HCO3	5.95
Mg	2.47	CO3	0
Na	2.57	SO4	3.12
K	0.1	Cl	0.39
		F	0.03
TOT	9.03	NO3	0
		CH	-99999
		TOT	9.49

Color

Date Started

Date Ended

Remarks

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Date Completed:	07/14/1971	Purpose:	Observation Well - Destroyed
L.S. Elevation (ft):	1870	Well Type:	1.25in. - ABS
Depth Drilled (ft):	120	Aquifer:	Trenton
Screen Int. (ft.):	72-78	Data Source:	

Completion Info:

Remarks: E. of aband. foundation-W. of road.

Lithologic Log

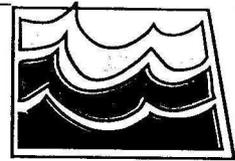
Depth (ft)	Unit	Description
0-1	TOPSOIL	Silty, clayey, sandy, brown
1-15	CLAY	Very silty, sandy, dark yellowish brown, slightly cohesive, plastic, oxidized (alluvium)
15-26	CLAY	Same as above, only olive-gray, (alluvium)
26-40	SAND	Very fine- to medium-grained, mostly fine- to medium-grained, subrounded, well-sorted, mostly quartz and shale, lignitic
40-74	SAND	Moderately gravelly, a few thin clay lenses, fine- to coarse-grained (mostly fine- to medium-grained), subangular to subrounded moderately well-sorted, much detrital lignite
74-80	GRAVEL	Slightly sandy, fine to coarse (mostly medium to coarse), subangular to well-rounded, fair sorting, mostly brownish western siliceous rocks, some locally derived siltstone, sandstone, and shale, much detrital lignite
80-96	CLAY	Very to extremely silty, medium dark gray, slightly cohesive, highly plastic, highly calcareous (alluvium)
96-106	GRAVEL	Slightly sandy, fine to coarse (some cobble-sized material), fair to poorly sorted, angular to well-rounded, predominantly brownish western siliceous rocks, some locally derived siltstone, sandstone and shale, lignitic
106-120	SHALE	(Occasional very thin lignite stringers), moderately clayey, medium light gray with brownish gray mottling, moderately indurated, highly calcareous (Fort Union Group)

Chemistry

1 of 1

Location

15210319ADA



Lab ID	<input type="text"/>	<input checked="" type="checkbox"/> Verified	
Surface	<input type="text"/>	Sample Source <input type="text" value="WC"/>	
Date Sampled	<input type="text" value="07/16/71"/>	Sampling Method <input type="text"/>	
Time Sampled	<input type="text" value="00:00:00"/>	Field Conduct	<input type="text" value="2970"/>
Pump Time	<input type="text" value="420"/>	Stage	<input type="text" value="-99999"/>
Yield	<input type="text"/>	Surface Depth	<input type="text" value="0"/>
Water Level	<input type="text" value="-99999"/>	Downhole Temp	<input type="text" value="-99999"/>
Total Evacuated	<input type="text"/>	Dissolved O2	<input type="text" value="-99999"/>
		Field pH	<input type="text" value="-99999"/>
		Field Temp	<input type="text" value="8"/>
		Lab Conduct	<input type="text" value="2740"/>
		Lab pH	<input type="text" value="7.3"/>

Major Cations and Anions	
Silica	<input type="text" value="24"/>
Calcium	<input type="text" value="284"/>
Magnesium	<input type="text" value="97"/>
Potassium	<input type="text" value="11"/>
Sodium	<input type="text" value="282"/>
Flouride	<input type="text" value="0.2"/>
Bicarbonate	<input type="text" value="784"/>
Carbonate	<input type="text" value="0"/>
Sulfate	<input type="text" value="1030"/>
Chloride	<input type="text" value="28"/>
Nitrate	<input type="text" value="8"/>
Hydroxide	<input type="text" value="-99999"/>
Phosphate	<input type="text" value="-99999"/>
Boron	<input type="text" value="0.21"/>
Iron	<input type="text" value="7.6"/>
Manganese	<input type="text" value="0.13"/>

Trace Elements	
Selenium	<input type="text" value="-99999"/>
Lead	<input type="text" value="-99999"/>
Mercury	<input type="text" value="-99999"/>
Arsenic	<input type="text" value="-99999"/>
Lithium	<input type="text" value="-99999"/>
Molybdenum	<input type="text" value="-99999"/>
Strontium	<input type="text" value="-99999"/>
Cadmium	<input type="text" value="-99999"/>

General Characteristics	
Suspended Solid	<input type="text" value="-99999"/>
TDS Determined	<input type="text" value="2170"/>
TDS Calculated	<input type="text" value="2160"/>
Hardness	<input type="text" value="1110"/>
NCH	<input type="text" value="467"/>
ALK as CaCO3	<input type="text" value="-99999"/>
SAR	<input type="text" value="3.7"/>
RSC	<input type="text" value="-99999"/>
Percent NA	<input type="text" value="35"/>

EPM			
Cations		Anions	
Ca	<input type="text" value="14.17"/>	HCO3	<input type="text" value="12.85"/>
Mg	<input type="text" value="7.98"/>	CO3	<input type="text" value="0"/>
Na	<input type="text" value="12.27"/>	SO4	<input type="text" value="21.44"/>
K	<input type="text" value="0.28"/>	Cl	<input type="text" value="0.79"/>
		F	<input type="text" value="0.01"/>
TOT	<input type="text" value="34.7"/>	NO3	<input type="text" value="0.13"/>
		CH	<input type="text" value="-99999"/>
		TOT	<input type="text" value="35.22"/>

Color	<input type="text" value="M"/>
Date Started	<input type="text" value="08/24/71"/>
Date Ended	<input type="text" value="08/30/71"/>

Remarks
<input type="text" value="W"/>

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

152-103-19CCB

Jim Gannaway

Date Completed:	02/16/1983	Purpose:	Domestic Well
L.S. Elevation (ft):	N/A	Well Type:	5in. - PVC
Depth Drilled (ft):	50	Aquifer:	Trenton
Screen Int. (ft.):	40-50	Data Source:	

Completion Info:

Remarks:

Lithologic Log

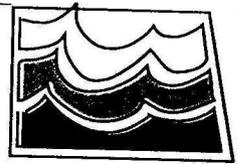
<u>Depth (ft)</u>	<u>Unit</u>	<u>Description</u>
0-10	CLAY	
10-50	SAND	

Chemistry

1 of 1

Location

15210319CCB



Lab ID	NDSWC Lab		<input checked="" type="checkbox"/> Verified
Surface		Sample Source	WC
Date Sampled	07/17/01	Sampling Method	
Time Sampled	15:45:00	Stage	-99999
Pump Time	2	Surface Depth	0
Yield	15	Downhole Temp	-99999
Water Level	-99999	Dissolved O2	-99999
Total Evacuated		Field Conduct	1404
		Field pH	-99999
		Field Temp	-99999
		Lab Conduct	1620
		Lab pH	7.14

Major Cations and Anions

Silica	-99999
Calcium	180
Magnesium	64
Potassium	8.6
Sodium	79
Flouride	0.3
Bicarbonate	606
Carbonate	0
Sulfate	200
Chloride	150
Nitrate	0.1
Hydroxide	-99999
Phosphate	-99999
Boron	-99999
Iron	9.2
Manganese	2.1

Trace Elements

Selenium	-99999
Lead	-99999
Mercury	-99999
Arsenic	-99999
Lithium	-99999
Molybdenum	-99999
Strontium	-99999
Cadmium	-99999

General Characteristics

Suspended Solid	-99999
TDS Determined	1060
TDS Calculated	992
Hardness	710
NCH	220
ALK as CaCO3	-99999
SAR	1.3
RSC	0
Percent NA	19

EPM

Cations		Anions	
Ca	8.98	HCO3	9.93
Mg	5.26	CO3	0
Na	3.44	SO4	4.16
K	0.22	Cl	4.23
		F	0.02
TOT	17.9	NO3	0
		CH	-99999
		TOT	18.34

Color

Date Started

Date Ended

Remarks

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Date Completed:	07/13/1971	Purpose:	Observation Well
L.S. Elevation (ft):	1870.18	Well Type:	1.25in. - ABS
Depth Drilled (ft):	120	Aquifer:	Trenton
Screen Int. (ft.):	97-103	Data Source:	

Completion Info:

Remarks: N. of prarie trail, N. of Irr. ditch.

Lithologic Log

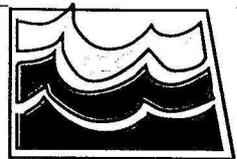
Depth (ft)	Unit	Description
0-1	TOPSOIL	Silty, sandy, clayey, brown
1-9	CLAY	Very silty, sandy, dark yellowish brown, slightly cohesive, plastic, oxidized (alluvium)
9-60	SAND	Very fine- to medium-grained, subrounded, well-sorted, predominantly quartz, much lignite, shaley
60-72	CLAY	Very silty, sandy, olive-gray, slightly cohesive, highly plastic, calcareous (alluvium)
72-78	GRAVEL	Sandy, fine to medium, angular to rounded, fair sorting, mostly western siliceous rocks, lignitic
78-90	CLAY	Very silty, occasional thin sand lenses, olive-gray, slightly cohesive, plastic, highly calcareous (alluvium)
90-114	GRAVEL	Slightly sandy, fine to coarse (some cobble-sized material), subangular to rounded, fair sorting, predominantly brownish western siliceous rocks, some locally derived siltstone, sandstone and shale, lignitic
114-120	SHALE	Clayey, slightly sandy, medium light gray with brownish gray concretions and mottling, highly calcareous, moderately indurated (Fort Union Group)

Chemistry

1 of 2

Location

15210319CCC



Lab ID	<input type="text"/>	<input checked="" type="checkbox"/> Verified	
Surface	<input type="text"/>	Sample Source <input type="text" value="WC"/>	
Date Sampled	<input type="text" value="07/14/71"/>	Sampling Method <input type="text"/>	
Time Sampled	<input type="text" value="00:00:00"/>	Field Conduct	<input type="text" value="-99999"/>
Pump Time	<input type="text" value="390"/>	Stage	<input type="text" value="-99999"/>
Yield	<input type="text"/>	Surface Depth	<input type="text" value="0"/>
Water Level	<input type="text" value="-99999"/>	Downhole Temp	<input type="text" value="-99999"/>
Total Evacuated	<input type="text"/>	Dissolved O2	<input type="text" value="-99999"/>
		Field pH	<input type="text" value="-99999"/>
		Field Temp	<input type="text" value="12"/>
		Lab Conduct	<input type="text" value="1480"/>
		Lab pH	<input type="text" value="7.5"/>

Major Cations and Anions

Silica	<input type="text" value="30"/>
Calcium	<input type="text" value="117"/>
Magnesium	<input type="text" value="56"/>
Potassium	<input type="text" value="12"/>
Sodium	<input type="text" value="150"/>
Flouride	<input type="text" value="0.4"/>
Bicarbonate	<input type="text" value="666"/>
Carbonate	<input type="text" value="0"/>
Sulfate	<input type="text" value="275"/>
Chloride	<input type="text" value="12"/>
Nitrate	<input type="text" value="5.8"/>
Hydroxide	<input type="text" value="-99999"/>
Phosphate	<input type="text" value="-99999"/>
Boron	<input type="text" value="0.35"/>
Iron	<input type="text" value="0.54"/>
Manganese	<input type="text" value="0.03"/>

Trace Elements

Selenium	<input type="text" value="-99999"/>
Lead	<input type="text" value="-99999"/>
Mercury	<input type="text" value="-99999"/>
Arsenic	<input type="text" value="-99999"/>
Lithium	<input type="text" value="-99999"/>
Molybdenum	<input type="text" value="-99999"/>
Strontium	<input type="text" value="-99999"/>
Cadmium	<input type="text" value="-99999"/>

General Characteristics

Suspended Solid	<input type="text" value="-99999"/>
TDS Determined	<input type="text" value="971"/>
TDS Calculated	<input type="text" value="987"/>
Hardness	<input type="text" value="522"/>
NCH	<input type="text" value="0"/>
ALK as CaCO3	<input type="text" value="-99999"/>
SAR	<input type="text" value="2.9"/>
RSC	<input type="text" value="-99999"/>
Percent NA	<input type="text" value="38"/>

EPM

Cations		Anions	
Ca	<input type="text" value="5.84"/>	HCO3	<input type="text" value="10.92"/>
Mg	<input type="text" value="4.61"/>	CO3	<input type="text" value="0"/>
Na	<input type="text" value="6.53"/>	SO4	<input type="text" value="5.73"/>
K	<input type="text" value="0.31"/>	Cl	<input type="text" value="0.34"/>
		F	<input type="text" value="0.02"/>
TOT	<input type="text" value="17.29"/>	NO3	<input type="text" value="0.09"/>
		CH	<input type="text" value="-99999"/>
		TOT	<input type="text" value="17.1"/>

Color

Date Started

Date Ended

Remarks

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

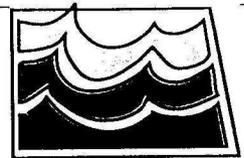
Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Chemistry

1 of 2

Location

15210319CCC



Verified

Lab ID
 Surface
 Date Sampled
 Time Sampled
 Pump Time
 Yield
 Water Level
 Total Evacuated

Sample Source
 Sampling Method
 Stage
 Surface Depth
 Downhole Temp
 Dissolved O2

Field Conduct
 Field pH
 Field Temp
 Lab Conduct
 Lab pH

Major Cations and Anions

Silica
 Calcium
 Magnesium
 Potassium
 Sodium
 Flouride
 Bicarbonate
 Carbonate
 Sulfate
 Chloride
 Nitrate
 Hydroxide
 Phosphate
 Boron
 Iron
 Manganese

Trace Elements

Selenium
 Lead
 Mercury
 Arsenic
 Lithium
 Molybdenum
 Strontium
 Cadmium

General Characteristics

Suspended Solid
 TDS Determined
 TDS Calculated
 Hardness
 NCH
 ALK as CaCO3
 SAR
 RSC
 Percent NA

EPM

Cations		Anions	
Ca	<input type="text" value="6.49"/>	HCO3	<input type="text" value="10.72"/>
Mg	<input type="text" value="5.26"/>	CO3	<input type="text" value="0"/>
Na	<input type="text" value="6.53"/>	SO4	<input type="text" value="6.25"/>
K	<input type="text" value="0.41"/>	Cl	<input type="text" value="1.61"/>
		F	<input type="text" value="0.02"/>
TOT	<input type="text" value="18.69"/>	NO3	<input type="text" value="0.01"/>
		CH	<input type="text" value="-99999"/>
		TOT	<input type="text" value="18.61"/>

Color
 Date Started
 Date Ended

Remarks

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

152-103-20ACD1

Donald Rider

Date Completed: 0/0
L.S. Elevation (ft): N/A
Depth Drilled (ft): 60
Screen Int. (ft.): 52-60

Purpose: Domestic Well
Well Type: 4in. - PVC
Aquifer: Trenton
Data Source:

Completion Info:

Remarks:

Lithologic Log

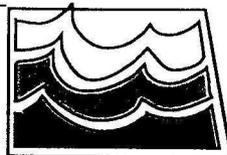
<u>Depth (ft)</u>	<u>Unit</u>	<u>Description</u>
0-20	SAND	silty
20-40	SAND	fine
40-50	SAND	fine, silty
50-60	SAND & GRAVEL	

Chemistry

1 of 1

Location

15210320ACD1



Lab ID	NDSWC Lab	<input checked="" type="checkbox"/> Verified
Surface		Sample Source WC
Date Sampled	07/19/01	Sampling Method
Time Sampled	12:20:00	Stage
Pump Time	2	Surface Depth
Yield	10	Downhole Temp
Water Level	-99999	Dissolved O2
Total Evacuated		Field Conduct
		Field pH
		Field Temp
		Lab Conduct
		Lab pH

Major Cations and Anions

Silica	-99999
Calcium	210
Magnesium	84
Potassium	11
Sodium	180
Flouride	0.3
Bicarbonate	909
Carbonate	0
Sulfate	520
Chloride	43
Nitrate	0.1
Hydroxide	-99999
Phosphate	-99999
Boron	-99999
Iron	10
Manganese	1.5

Trace Elements

Selenium	-99999
Lead	-99999
Mercury	-99999
Arsenic	-99999
Lithium	-99999
Molybdenum	-99999
Strontium	-99999
Cadmium	-99999

General Characteristics

Suspended Solid	-99999
TDS Determined	1560
TDS Calculated	1510
Hardness	870
NCH	120
ALK as CaCO3	-99999
SAR	2.6
RSC	0
Percent NA	31

EPM

Cations		Anions	
Ca	10.48	HCO3	14.9
Mg	6.91	CO3	0
Na	7.83	SO4	10.83
K	0.28	Cl	1.21
		F	0.02
		NO3	0
		CH	-99999
TOT	25.5	TOT	26.96

Color

Date Started

Date Ended

Remarks

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

152-103-20ACD2

Don Rider

Date Completed: 06/03/1989
L.S. Elevation (ft): N/A
Depth Drilled (ft): 62
Screen Int. (ft.): 56-60

Purpose: Domestic Well
Well Type: 5in. - PVC
Aquifer: Trenton
Data Source:

Completion Info:

Remarks:

Lithologic Log

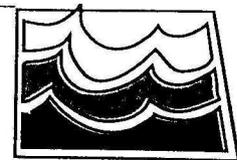
<u>Depth (ft)</u>	<u>Unit</u>	<u>Description</u>
0-16	CLAY	sandy, brown
16-17	SAND	brown
17-18	CLAY	sandy, brown
18-30	SAND	brown
30-31	CLAY	gray
31-54	SAND	blue
54-62	GRAVEL	

Chemistry

1 of 1

Location

15210320ACD2



Lab ID	NDSWC Lab	<input checked="" type="checkbox"/> Verified	
Surface		Sample Source WC	
Date Sampled	07/19/01	Sampling Method	
Time Sampled	12:45:00	Stage	-99999
Pump Time	2	Surface Depth	0
Yield	10	Downhole Temp	-99999
Water Level	-99999	Dissolved O2	-99999
Total Evacuated		Field Conduct	1800
		Field pH	-99999
		Field Temp	-99999
		Lab Conduct	2370
		Lab pH	7.57

Major Cations and Anions

Silica	-99999
Calcium	240
Magnesium	94
Potassium	12
Sodium	200
Flouride	0.3
Bicarbonate	1040
Carbonate	0
Sulfate	620
Chloride	25
Nitrate	0.1
Hydroxide	-99999
Phosphate	-99999
Boron	-99999
Iron	10
Manganese	1.5

Trace Elements

Selenium	-99999
Lead	-99999
Mercury	-99999
Arsenic	-99999
Lithium	-99999
Molybdenum	-99999
Strontium	-99999
Cadmium	-99999

General Characteristics

Suspended Solid	-99999
TDS Determined	1780
TDS Calculated	1710
Hardness	990
NCH	130
ALK as CaCO3	-99999
SAR	2.8
RSC	0
Percent NA	30

EPM

Cations		Anions	
Ca	11.98	HCO3	17.05
Mg	7.73	CO3	0
Na	8.7	SO4	12.91
K	0.31	Cl	0.71
		F	0.02
		NO3	0
TOT	28.72	CH	-99999
		TOT	30.69

Color

Date Started 07/27/01

Date Ended 08/02/01

Remarks

Percent Diff 3.32

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source NDHD Lab

NO3 Samp Method Cadmium Reductio

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Date Completed:	09/06/2001	Purpose:	Observation Well
L.S. Elevation (ft):	1865.57	Well Type:	2in. - PVC
Depth Drilled (ft):	120	Aquifer:	Trenton
Screen Int. (ft.):	100-105	Data Source:	Bob Shaver

Completion Info:

Remarks: North Well

Lithologic Log

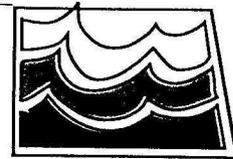
Depth (ft)	Unit	Description
0-16	SAND	vey fine to fine, yellow brown, oxidized, drills smooth
16-18	SAND	as above, gray black, unoxidized
18-19	CLAY	silty, light gray, poor recovery
19-39	SAND	very fine to fine, gray black, caving, taking water, mixed 1 bag of mud @ 35 feet
39-57	SAND	very fine to very coarse, predom. fine to medium, very slightly gravelly, <1/2 inch in diameter, lots of detrital lignite fragments, comprised of western silicates, scoria, quartz, claystones, siltstones, subangular to well rounded
57-58	SAND & GRAVEL	sand is very fine to very coarse, predom. coarse to very coarse, slightly gravelly up to about 1/2 inch in diameter, composition as above, subangular to well rounded, slight bit chatter, caving, takes water
58-70	CLAY	silty, gray, soft, drills smooth, good recovery, mixed 1 bag mud @ 60 feet
70-95	SAND & GRAVEL	drilling mud very thick, most sand in suspension, gravel up to about 1 inch in diameter, mostly 1/4 to 1 inch in diameter, caving, takes water, composition as above, moderate bit chatter, mixed 2 bags mud @ 70 feet
95-105	GRAVEL	very coarse section, gravel up to 2 inch diameter, mostly 1/4 to 1 inch in diameter, very strong bit chatter, composition as above, subangular to well rounded, mixed 1 bag mud @ 90 feet and 1 bag mud @ 95 feet, takes lots of water, caving
105-120	CLAY	silty, to silt, clayey, slightly sandy, soft, cohesive, gray, from 106 to 106.5 feet hard, brittle claystone? layer creating strong bit chatter, otherwise smooth drilling, bedrock (Fort Union Group)

Chemistry

1 of 1

Location

15210320ADC1



Lab ID	NDSWC Lab	<input checked="" type="checkbox"/> Verified
Surface		Sample Source WC
Date Sampled	10/04/01	Sampling Method A
Time Sampled	08:40:00	Stage -99999
Pump Time	35	Surface Depth 0
Yield	3	Downhole Temp -99999
Water Level	9.3	Dissolved O2 -99999
Total Evacuated		Field Conduct 2200
		Field pH 6.89
		Field Temp -99999
		Lab Conduct 2410
		Lab pH 7.55

Major Cations and Anions	
Silica	-99999
Calcium	250
Magnesium	96
Potassium	17
Sodium	240
Flouride	0.3
Bicarbonate	962
Carbonate	0
Sulfate	730
Chloride	26
Nitrate	0.1
Hydroxide	-99999
Phosphate	-99999
Boron	-99999
Iron	1.6
Manganese	1.5

Trace Elements	
Selenium	3
Lead	2
Mercury	0
Arsenic	7
Lithium	100
Molybdenum	3
Strontium	2800
Cadmium	-99999

General Characteristics	
Suspended Solid	-99999
TDS Determined	1640
TDS Calculated	1840
Hardness	1000
NCH	230
ALK as CaCO3	-99999
SAR	3.3
RSC	0
Percent NA	33

EPM			
Cations		Anions	
Ca	12.48	HCO3	15.77
Mg	7.9	CO3	0
Na	10.44	SO4	15.2
K	0.43	Cl	0.73
		F	0.02
		NO3	0
		CH	-99999
		TOT	31.72
TOT	31.25		

Color	1
Date Started	10/09/01
Date Ended	02/14/02

Remarks

Percent Diff	0.75
Nitrate Info	
<input checked="" type="checkbox"/> NO3 Sample Chilled	
NO3 Samp Source	NDHD Lab
NO3 Samp Method	Cadmium Reductio
Nitrate Remarks	

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Date Completed:	09/06/2001	Purpose:	Observation Well
L.S. Elevation (ft):	1865.1	Well Type:	2in. - PVC
Depth Drilled (ft):	65	Aquifer:	Trenton
Screen Int. (ft.):	53-58	Data Source:	Bob Shaver

Completion Info:

Remarks: South Well

Lithologic Log

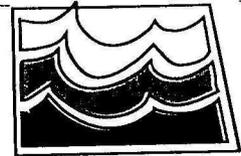
<u>Depth (ft)</u>	<u>Unit</u>	<u>Description</u>
0-16	SAND	very fine to fine, yellow brown, oxidized
16-44	SAND	as above, gray black, unoxidized, some medium to very coarse sand, some up to 1 inch diameter lignite fragments, probably stratified sequence, no bit chatter, drills smooth
44-58	SAND & GRAVEL	sand is very fine to very coarse, predom. medium to coarse, <10 % gravel up to about 1/2 inch diameter, comprised of lignite, quartz, western silicates, siltstones, claystones, subangular to well rounded, taking water, caving, stratified sequence, mixed 2 bags of mud between 5 to 60 feet
58-65	CLAY	silty, gray, soft, good recovery

Chemistry

1 of 1

Location

15210320ADC2



Verified

Lab ID
 Surface
 Date Sampled
 Time Sampled
 Pump Time
 Yield
 Water Level
 Total Evacuated

Sample Source
 Sampling Method
 Stage
 Surface Depth
 Downhole Temp
 Dissolved O2

Field Conduct
 Field pH
 Field Temp
 Lab Conduct
 Lab pH

Major Cations and Anions

Silica
 Calcium
 Magnesium
 Potassium
 Sodium
 Flouride
 Bicarbonate
 Carbonate
 Sulfate
 Chloride
 Nitrate
 Hydroxide
 Phosphate
 Boron
 Iron
 Manganese

Trace Elements

Selenium
 Lead
 Mercury
 Arsenic
 Lithium
 Molybdenum
 Strontium
 Cadmium

General Characteristics

Suspended Solid
 TDS Determined
 TDS Calculated
 Hardness
 NCH
 ALK as CaCO3
 SAR
 RSC
 Percent NA

EPM

Cations		Anions	
Ca	<input type="text" value="7.49"/>	HCO3	<input type="text" value="13.33"/>
Mg	<input type="text" value="4.61"/>	CO3	<input type="text" value="0"/>
Na	<input type="text" value="6.53"/>	SO4	<input type="text" value="5.62"/>
K	<input type="text" value="0.28"/>	Cl	<input type="text" value="0.31"/>
		F	<input type="text" value="0.02"/>
TOT	<input type="text" value="18.91"/>	NO3	<input type="text" value="0"/>
		CH	<input type="text" value="-99999"/>
		TOT	<input type="text" value="19.28"/>

Color
 Date Started
 Date Ended

Remarks

Percent Diff

Nitrate Info

NO3 Sample Chilled
 NO3 Samp Source
 NO3 Samp Method
 Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Date Completed:	09/07/2001	Purpose:	Observation Well
L.S. Elevation (ft):	1869.21	Well Type:	2in. - PVC
Depth Drilled (ft):	120	Aquifer:	Trenton
Screen Int. (ft.):	90-95	Data Source:	Bob Shaver

Completion Info:

Remarks: East Well

Lithologic Log

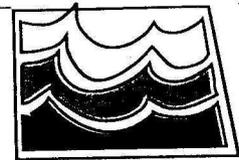
Depth (ft)	Unit	Description
0-15	CLAY	silty and silt, clayey, some very fine sand layers, yellow brown, oxidized, soft
15-18	SAND	very fine to fine, lots of lignite grains, drills smooth and fast, yellow stained, oxidized
18-54	SAND	as above, gray, unoxidized, some small <1/4 inch diameter lignite fragments
54-70	SAND	very fine to very coarse, predom. coarse, slightly gravelly up to about 1/4 to 1/2 inch in diameter, comprised of western silicates, siltstones, mudstones, quartz, lignite, subangular to well rounded, caving, takes water, mixed 1 bag mud @ 55 feet
70-120	SAND & GRAVEL	mixed 20 bags of mud from 70 to 120 feet, mud very thick, very hard drilling, strong bitchatter, caves bably, took 3, 1500 gallon loads of water, probably mostly gravel up to about 1 inch in diameter, some lignite fragments up to about 3 inches in diameter, subangular to well rounded, stratified sequence, comprised of western silicates (flint, chert, granites, diorites), quartz, siltstones, claystones, scoria and lignite, reamed hole with 6 1/4 inch bit, could not drill deeper and keep hole open

Chemistry

1 of 1

Location

15210320CCC1



Verified

Lab ID
 Surface
 Date Sampled
 Time Sampled
 Pump Time
 Yield
 Water Level
 Total Evacuated

Sample Source
 Sampling Method
 Stage
 Surface Depth
 Downhole Temp
 Dissolved O2

Field Conduct
 Field pH
 Field Temp
 Lab Conduct
 Lab pH

Major Cations and Anions

Silica
 Calcium
 Magnesium
 Potassium
 Sodium
 Flouride
 Bicarbonate
 Carbonate
 Sulfate
 Chloride
 Nitrate
 Hydroxide
 Phosphate
 Boron
 Iron
 Manganese

Trace Elements

Selenium
 Lead
 Mercury
 Arsenic
 Lithium
 Molybdenum
 Strontium
 Cadmium

General Characteristics

Suspended Solid
 TDS Determined
 TDS Calculated
 Hardness
 NCH
 ALK as CaCO3
 SAR
 RSC
 Percent NA

EPM

Cations		Anions	
Ca	<input type="text" value="9.98"/>	HCO3	<input type="text" value="15.18"/>
Mg	<input type="text" value="6.66"/>	CO3	<input type="text" value="0"/>
Na	<input type="text" value="10.44"/>	SO4	<input type="text" value="10.62"/>
K	<input type="text" value="0.36"/>	Cl	<input type="text" value="0.54"/>
		F	<input type="text" value="0.02"/>
TOT	<input type="text" value="27.44"/>	NO3	<input type="text" value="0"/>
		CH	<input type="text" value="-99999"/>
		TOT	<input type="text" value="26.36"/>

Percent Diff

Nitrate Info

NO3 Sample Chilled
 NO3 Samp Source
 NO3 Samp Method
 Nitrate Remarks

Color
 Date Started
 Date Ended

Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Date Completed:	09/10/2001	Purpose:	Observation Well
L.S. Elevation (ft):	1869.05	Well Type:	2in. - PVC
Depth Drilled (ft):	0	Aquifer:	Trenton
Screen Int. (ft.):	55-60	Data Source:	Bob Shaver

Completion Info:

Remarks: West Well

Lithologic Log

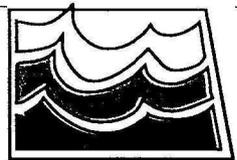
<u>Depth (ft)</u>	<u>Unit</u>	<u>Description</u>
0-14	CLAY	silty, soft, sticky, yellow brown, oxidized, drills smooth
14-24	SAND	very fine to fine, yellow brown, oxidized, drills smooth and fast, some detrital lignite fragments up to about 1/4 inch in diameter
24-48	SAND	as above, comprised in part of dark black lignite grains
48-61	SAND	very fine to very coarse, predom. medium to coarse, slightly gravelly, up to about 1/4 inch in diameter, subangular to well rounded, occs. slight bit chatter from detrital lignite fragments, comprised of western silicates, scoria, claystones, siltstones

Chemistry

1 of 1

Location

15210320CCC2



Lab ID	NDSWC Lab		<input checked="" type="checkbox"/> Verified
Surface		Sample Source	WC
Date Sampled	10/04/01	Sampling Method	A
Time Sampled	10:05:00	Stage	-99999
Pump Time	20	Surface Depth	0
Yield	3	Downhole Temp	-99999
Water Level	14.4	Dissolved O2	-99999
Total Evacuated		Field Conduct	746
		Field pH	7.38
		Field Temp	-99999
		Lab Conduct	690
		Lab pH	7.74

Silica	-99999
Calcium	66
Magnesium	22
Potassium	2.4
Sodium	51
Flouride	0.7
Bicarbonate	294
Carbonate	0
Sulfate	130
Chloride	9.4
Nitrate	0.1
Hydroxide	-99999
Phosphate	-99999
Boron	-99999
Iron	0.7
Manganese	0.66

Selenium	3
Lead	2
Mercury	0
Arsenic	10
Lithium	100
Molybdenum	4
Strontium	700
Cadmium	-99999

Suspended Solid	-99999
TDS Determined	441
TDS Calculated	428
Hardness	260
NCH	14
ALK as CaCO3	-99999
SAR	1.4
RSC	0
Percent NA	30

Cations		Anions	
Ca	3.29	HCO3	4.82
Mg	1.81	CO3	0
Na	2.22	SO4	2.71
K	0.06	Cl	0.27
		F	0.04
		NO3	0
		CH	-99999
TOT	7.38	TOT	7.84

Color

Date Started

Date Ended

Remarks

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Date Completed:	09/06/2001	Purpose:	Observation Well
L.S. Elevation (ft):	1870.63	Well Type:	2in. - PVC
Depth Drilled (ft):	117	Aquifer:	Trenton
Screen Int. (ft.):	107-112	Data Source:	Bob Shaver

Completion Info:

Remarks: East Well

Lithologic Log

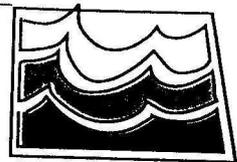
Depth (ft)	Unit	Description
0-16	CLAY	silty, slightly sandy, very fine sand, yellow brown, oxidized, soft, cohesive
16-24	CLAY	as above, interbedded with very fine to fine sand, yellow brown, oxidized
24-26	CLAY	as above, gray, unoxidized
26-46	SAND	very fine to fine, gray black, lots of detrital lignite grains, drills smooth and fast
46-49	CLAY	as above, gray, bit slowed, soft, cohesive
49-66	SAND & GRAVEL	sand is very fine to very coarse, predom. medium to coarse, slightly gravelly, up to about 3/4 inch in diameter, very slight bit chatter, drills as stratified, subangular to well rounded, comprised of western silicates, scoria, claystones, siltstones, quartz, lignite, caving, takes water, mixed 1 bag mud @ 60 feet
66-91	SAND	very fine to fine, good recovery, no bit chatter, drilled smoother
91-105	SAND & GRAVEL	most sand into suspension, , gravel up to about 1 inch (mostly 1/2 to 1 inch) in diameter, composition as above, light bit chatter, caving, takes water, mixed 1 bag of mud @ 100 feet
105-112	SAND & GRAVEL	much coarser section, very strong bit chatter, probably mostly gravel up to about 1 inch in diameter, composition as above, caving, takes water, mixed 2 bags of mud @ 105 feet
112-120	CLAY	silty, to silt, clayey, very slightly sandy, very fine sand, cohesive, moderately hard, gray, bedrock, (Fort Union Group)

Chemistry

1 of 1

Location

15210320DBC1



Lab ID	NDSWC Lab		<input checked="" type="checkbox"/> Verified
Surface		Sample Source	WC
Date Sampled	10/04/01	Sampling Method	A
Time Sampled	09:27:00	Stage	-99999
Pump Time	35	Surface Depth	0
Yield	3	Downhole Temp	-99999
Water Level	14.55	Dissolved O2	-99999
Total Evacuated		Field Conduct	2170
		Field pH	-99999
		Field Temp	-99999
		Lab Conduct	2390
		Lab pH	7.66

Major Cations and Anions

Silica	-99999
Calcium	240
Magnesium	96
Potassium	16
Sodium	230
Flouride	0.3
Bicarbonate	869
Carbonate	0
Sulfate	750
Chloride	30
Nitrate	0.1
Hydroxide	-99999
Phosphate	-99999
Boron	-99999
Iron	1.6
Manganese	1.1

Trace Elements

Selenium	3
Lead	2
Mercury	0
Arsenic	6
Lithium	100
Molybdenum	2
Strontium	2800
Cadmium	-99999

General Characteristics

Suspended Solid	-99999
TDS Determined	1650
TDS Calculated	1790
Hardness	990
NCH	280
ALK as CaCO3	-99999
SAR	3.2
RSC	0
Percent NA	33

EPM

Cations		Anions	
Ca	11.98	HCO3	14.24
Mg	7.9	CO3	0
Na	10.01	SO4	15.62
K	0.41	Cl	0.85
		F	0.02
		NO3	0
		OH	-99999
TOT	30.3	TOT	30.73

Color	M
Date Started	10/09/01
Date Ended	02/14/02

Remarks

Percent Diff 0.7

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source NDHD Lab

NO3 Samp Method Cadmium Reductio

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Date Completed:	09/07/2001	Purpose:	Observation Well
L.S. Elevation (ft):	1870.57	Well Type:	2in. - PVC
Depth Drilled (ft):	80	Aquifer:	Trenton
Screen Int. (ft.):	61-66	Data Source:	Bob Shaver

Completion Info:

Remarks: West Well

Lithologic Log

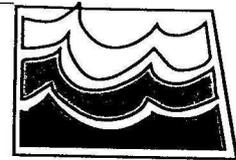
<u>Depth (ft)</u>	<u>Unit</u>	<u>Description</u>
0-17	CLAY	silty, to silt, clayey, some very fine sandy intervals, yellow brown, oxidized, soft, drills smooth
17-32	CLAY	as above, gray, unoxidized
32-46	SAND	very fine to medium, predom. fine, lots of dark black detrital lignite grains, some lignite fragments, 1 to 2% coarse to very coarse sand, comprised of western silicates, scoria, claystones, siltstones, probably thinly stratified, no bit chatter, drills smooth and fast
46-49	CLAY	silty, gray, soft, good recovery, bit slowed
49-52	SAND & GRAVEL	sand is very fine to very coarse, gravel up to about 1 inch in diameter, moderate bit chatter, comprised of western silicates, quartz, lignite, scoria, claystones, siltstones, subangular to well rounded, takes water
52-59	SAND	very fine to medium, as in 32 to 46 foot interval
59-80	SAND	very fine to very coarse, predom. coarse, slightly gravelly, occas. light bit chatter, coarse gravel washing from above, difficult to determine gravel texture, subangular to well rounded, composition as in 49 to 52 foot interval, takes water

Chemistry

1 of 1

Location

15210320DBC2



Lab ID	NDSWC Lab		<input checked="" type="checkbox"/> Verified
Surface		Sample Source	WC
Date Sampled	10/04/01	Sampling Method	A
Time Sampled	09:18:00	Stage	-99999
Pump Time	20	Surface Depth	0
Yield	4	Downhole Temp	-99999
Water Level	15.2	Dissolved O2	-99999
Total Evacuated		Field Conduct	2300
		Field pH	7.22
		Field Temp	-99999
		Lab Conduct	2570
		Lab pH	7.53

Major Cations and Anions

Silica	-99999
Calcium	310
Magnesium	110
Potassium	13
Sodium	210
Flouride	0.2
Bicarbonate	1020
Carbonate	0
Sulfate	840
Chloride	27
Nitrate	0.1
Hydroxide	-99999
Phosphate	-99999
Boron	-99999
Iron	6.7
Manganese	1.8

Trace Elements

Selenium	3
Lead	2
Mercury	0
Arsenic	2
Lithium	100
Molybdenum	2
Strontium	2900
Cadmium	-99999

General Characteristics

Suspended Solid	-99999
TDS Determined	1890
TDS Calculated	2020
Hardness	1200
NCH	390
ALK as CaCO3	-99999
SAR	2.6
RSC	0
Percent NA	27

EPM

Cations		Anions	
Ca	15.47	HCO3	16.72
Mg	9.05	CO3	0
Na	9.14	SO4	17.49
K	0.33	Cl	0.76
		F	0.01
TOT	33.99	NO3	0
		OH	-99999
		TOT	34.98

Color

Date Started

Date Ended

Remarks

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Date Completed:	09/05/2001	Purpose:	Observation Well
L.S. Elevation (ft):	1870.7	Well Type:	2in. - PVC
Depth Drilled (ft):	120	Aquifer:	Trenton
Screen Int. (ft.):	100-105	Data Source:	Bob Shaver

Completion Info:

Remarks: East Well

Lithologic Log

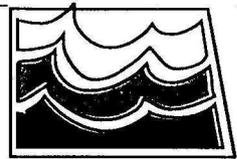
Depth (ft)	Unit	Description
0-5	SAND	very fine to fine, yellow brown
5-17	SAND	very fine to fine, silty, clayey, yellow brown, soft, moderately cohesive, drills smooth
17-23	CLAY	silty, gray, sticky, soft, unoxidized
23-47	SAND	very fine to medium, predom. fine, dark gray, lots of detrital lignite grains, takes water, drills smooth and fast, no bit chatter
47-57	SAND & GRAVEL	sand is very fine to very coarse (70-80%) and gravel (20 to 30%), up to 1/2 inch diameter, stratified sequence, comprised of scoria, quartz, western silicates, (chert and flint), lots of detrital lignite, claystones, siltstones, takes lots of water, subangular to well rounded, possibly some thin clay layers, mixed 1 bag mud @ 50 feet
57-60	CLAY	greenish gray to olive gray, soft, sticky, mixed 1 bag mud @ 60 feet
60-64	SAND	very fine to medium, dark gray, composition as above
64-72	CLAY	silty, olive gray to greenish gray, soft, sticky, good recovery
72-83	SAND	very fine to fine, most all into suspension, bit slipped faster and smooth, lots of detrital lignite grains
83-110	SAND & GRAVEL	drilling mud very thick, mixed 3 bags mud @ 90 feet, 1 bag mud @ 100 feet, 3 bags mud @ 105 feet, 3 bags mud @ 110 feet, ran out of water at 105 feet, most sand into suspension, good bit chatter, takes lots of water, gravel up to about 3/4 inch in diameter, mostly 1/4 to 1/2 inch diameter, subangular to well rounded, comprised of western silicates, claystones, siltstones, after about 100 feet, coarser section, strong bit chatter, caving, takes lots of water, lots of 3/4 to 1 inch diameter gravel
110-111	LIGNITE	bedrock (Fort Union Group)
111-114	CLAYSTONE	dark brown, and light gray clay, soft, good bit chatter on claystone, drills hard, bedrock, (Fort Union Group)
114-120	CLAYSTONE	light gray to gray, hard, brittle, good recovery, drills slow, bedrock, (Fort Union Group)

Chemistry

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Location

15210321BBC1



Lab ID	NDSWC Lab			<input checked="" type="checkbox"/> Verified	
Surface		Sample Source	WC		
Date Sampled	10/03/01	Sampling Method	A	Field Conduct	985
Time Sampled	19:10:00	Stage	-99999	Field pH	7.73
Pump Time	40	Surface Depth	0	Field Temp	-99999
Yield	3	Downhole Temp	-99999	Lab Conduct	1050
Water Level	13.2	Dissolved O2	-99999	Lab pH	8.09
Total Evacuated					

Major Cations and Anions

Silica	-99999
Calcium	90
Magnesium	35
Potassium	8.9
Sodium	100
Flouride	0.6
Bicarbonate	467
Carbonate	0
Sulfate	220
Chloride	9.9
Nitrate	0.1
Hydroxide	-99999
Phosphate	-99999
Boron	-99999
Iron	0.33
Manganese	0.49

Trace Elements

Selenium	3
Lead	2
Mercury	0
Arsenic	2
Lithium	100
Molybdenum	6
Strontium	1000
Cadmium	-99999

General Characteristics

Suspended Solid	-99999
TDS Determined	708
TDS Calculated	695
Hardness	370
NCH	0
ALK as CaCO3	-99999
SAR	2.3
RSC	0
Percent NA	36

EPM

Cations		Anions	
Ca	4.49	HCO3	7.65
Mg	2.88	CO3	0
Na	4.35	SO4	4.58
K	0.23	Cl	0.28
		F	0.03
TOT	11.95	NO3	0
		CH	-99999
		TOT	12.54

Color

Date Started

Date Ended

Remarks

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Date Completed:	09/06/2001	Purpose:	Observation Well
L.S. Elevation (ft):	1870.92	Well Type:	2in. - PVC
Depth Drilled (ft):	70	Aquifer:	Trenton
Screen Int. (ft.):	53-58	Data Source:	Bob Shaver

Completion Info:

Remarks: West Well

Lithologic Log

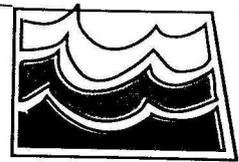
Depth (ft)	Unit	Description
0-5	SAND	very fine to fine, yellow brown, oxidized
5-18	SAND	very fine, silty, slightly clayey, slightly cohesive, very soft, yellow brown, drills smooth
18-22	SAND	very fine, silty, slightly clayey, light medium gray, soft, drills smooth
22-44	SAND	ver fine to medium, predom. fine, lots of dark black detrital lignite grains, drills very fast and smooth, no bit chatter
44-58	SAND & GRAVEL	sand is very fine to very coarse, predom. coarse, (70 - 80%), and gravel (20 - 30%) up to 1 inch diameter, mostly less than 1/2 inch diameter, stratified sequence, comprised of scoria, quartz, western silicates, lots of detrital shale, claystones, siltstones, takes lots of water, subangular to well rounded, occas. thin clay layers, good recovery, mixed 2 bags mud, caving, takes lots of water
58-70	CLAY	silty, soft, sticky, greenish gray to olive gray, drills slower and smooth

Chemistry

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Location

15210321BBC2



Lab ID	NDSWC Lab		<input checked="" type="checkbox"/> Verified
Surface		Sample Source	WC
Date Sampled	10/03/01	Sampling Method	A
Time Sampled	18:41:00	Stage	-99999
Pump Time	25	Surface Depth	0
Yield	3	Downhole Temp	-99999
Water Level	13.3	Dissolved O2	-99999
Total Evacuated		Field Conduct	877
		Field pH	7.66
		Field Temp	-99999
		Lab Conduct	917
		Lab pH	7.94

Major Cations and Anions

Silica	-99999
Calcium	98
Magnesium	36
Potassium	5.9
Sodium	59
Flouride	0.4
Bicarbonate	439
Carbonate	0
Sulfate	170
Chloride	9.9
Nitrate	0.1
Hydroxide	-99999
Phosphate	-99999
Boron	-99999
Iron	1.4
Manganese	0.81

Trace Elements

Selenium	3
Lead	2
Mercury	0
Arsenic	4
Lithium	100
Molybdenum	2
Strontium	980
Cadmium	-99999

General Characteristics

Suspended Solid	-99999
TDS Determined	611
TDS Calculated	598
Hardness	390
NCH	33
ALK as CaCO3	-99999
SAR	1.3
RSC	0
Percent NA	24

EPM

Cations		Anions	
Ca	4.89	HCO3	7.2
Mg	2.96	CO3	0
Na	2.57	SO4	3.54
K	0.15	Cl	0.28
		F	0.02
		NO3	0
TOT	10.57	CH	-99999
		TOT	11.04

Color

Date Started

Date Ended

Remarks

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

152-103-30AAB

Art Anderson

Date Completed: 09/12/1979
L.S. Elevation (ft): N/A
Depth Drilled (ft): 60
Screen Int. (ft.): 50-60

Purpose: Domestic Well
Well Type: 4in. - PVC
Aquifer: Trenton
Data Source:

Completion Info:

Remarks:

Lithologic Log

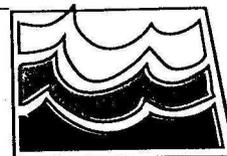
<u>Depth (ft)</u>	<u>Unit</u>	<u>Description</u>
0-1	TOPSOIL	
1-8	CLAY	sandy
8-60	SAND	coal streaks

Chemistry

1 of 1

Location

15210330AAB



Verified

Lab ID

Surface Sample Source

Date Sampled Sampling Method Field Conduct

Time Sampled Stage Field pH

Pump Time Surface Depth Field Temp

Yield Downhole Temp Lab Conduct

Water Level Dissolved O2 Lab pH

Total Evacuated

Major Cations and Anions

Silica	-99999
Calcium	190
Magnesium	71
Potassium	9.1
Sodium	210
Flouride	0.3
Bicarbonate	793
Carbonate	0
Sulfate	480
Chloride	44
Nitrate	0.2
Hydroxide	-99999
Phosphate	-99999
Boron	-99999
Iron	11
Manganese	2.2

Trace Elements

Selenium	-99999
Lead	-99999
Mercury	-99999
Arsenic	-99999
Lithium	-99999
Molybdenum	-99999
Strontium	-99999
Cadmium	-99999

General Characteristics

Suspended Solid	-99999
TDS Determined	1460
TDS Calculated	1410
Hardness	770
NCH	120
ALK as CaCO3	-99999
SAR	3.3
RSC	0
Percent NA	37

EPM

	Cations		Anions
Ca	9.48	HCO3	13
Mg	5.84	CO3	0
Na	9.14	SO4	9.99
K	0.23	Cl	1.24
		F	0.02
TOT	24.69	NO3	0
		CH	-99999
		TOT	24.25

Color
 Date Started
 Date Ended

Remarks

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Date Completed:	09/11/2001	Purpose:	Observation Well
L.S. Elevation (ft):	1871.46	Well Type:	2in. - PVC
Depth Drilled (ft):	116	Aquifer:	Trenton
Screen Int. (ft.):	91-96	Data Source:	Bob Shaver

Completion Info:

Remarks: East Well

Lithologic Log

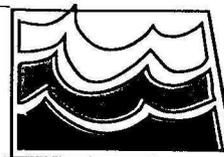
Depth (ft)	Unit	Description
0-10	CLAY	silty, yellow brown, soft, sticky, occas. silty, clayey, very fine sand layer, drills smooth, oxidized
10-17	SAND	very fine to fine, clayey, silty, very soft, gray, good recovery
17-29	SAND	very fine, clayey, silty, very soft, gray, good recovery
29-57	SAND	very fine to fine, after about 50 feet becomes medium to very coarse, very slightly gravelly, up to about 1/2 inch in diameter, comprised of western silicates, scoria, lignite, no bit chatter, drills smooth, taking water
57-59	CLAY	silty, gray, fair recovery, bit slowed, drilled smooth
59-86	SAND & GRAVEL	sand is very fine to very coarse, predom. medium, gravelly, taking water, caving, mixed 4 bags mud from 80 to 100 feet, mud very thick, much sand into suspension, lignite fragments up to about 1 inch in diameter, composition as above
86-116	SAND & GRAVEL	probably mostly gravel, hard drilling, caving badly, gravel up to about 1 inch in diameter, mostly 1/2 to 3/4 inch in diameter, subangular to well rounded, comprised of western silicates, scoria, siltstones, claystones, lignite
116-120	CLAY	silty, gray, moderately hard, drills slow and smooth, bedrock, (Fort Union Group)

Chemistry

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Location

15210330ABD1



Lab ID	NDSWC Lab	<input checked="" type="checkbox"/> Verified
Surface		Sample Source WC
Date Sampled	10/04/01	Sampling Method A
Time Sampled	11:03:00	Stage -99999
Pump Time	25	Surface Depth 0
Yield	3	Downhole Temp -99999
Water Level	15.8	Dissolved O2 -99999
Total Evacuated		Field Conduct 1906
		Field pH 7.25
		Field Temp -99999
		Lab Conduct 2140
		Lab pH 7.77

Silica	-99999
Calcium	170
Magnesium	75
Potassium	12
Sodium	240
Flouride	0.4
Bicarbonate	963
Carbonate	0
Sulfate	370
Chloride	100
Nitrate	0.1
Hydroxide	-99999
Phosphate	-99999
Boron	-99999
Iron	1.2
Manganese	0.7

Selenium	3
Lead	2
Mercury	0
Arsenic	7
Lithium	100
Molybdenum	3
Strontium	1780
Cadmium	-99999

Suspended Solid	-99999
TDS Determined	1330
TDS Calculated	1440
Hardness	730
NCH	0
ALK as CaCO3	-99999
SAR	3.9
RSC	1
Percent NA	41

Cations		Anions	
Ca	8.48	HCO3	15.78
Mg	6.17	CO3	0
Na	10.44	SO4	7.7
K	0.31	Cl	2.82
		F	0.02
TOT	25.4	NO3	0
		CH	-99999
		TOT	26.32

Color

Date Started

Date Ended

Remarks

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Date Completed:	09/11/2001	Purpose:	Observation Well
L.S. Elevation (ft):	1871.41	Well Type:	2in. - PVC
Depth Drilled (ft):	60	Aquifer:	Trenton
Screen Int. (ft.):	50-55	Data Source:	Bob Shaver

Completion Info:

Remarks: West Well

Lithologic Log

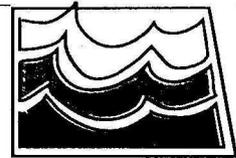
Depth (ft)	Unit	Description
0-10	CLAY	silty, yellow brown, oxidized, soft, sticky, occas. silty, clayey, very fine sand, drills smooth
10-17	SAND	very fine to fine, yellow brown, oxidized, drills smooth and fast
17-22	SAND	very fine, silty, clayey, soft, cohesive, gray, drills smooth
22-60	SAND	very fine to fine, after about 50 feet coarser section of medium to coarse sand, very slightly gravelly, up to about 1/2 inch in diameter, subangular to well rounded, comprised of western silicates, scoria, lignite, no bit chatter, drills smooth, taking water

Chemistry

1 of 1

Location

15210330ABD2



Lab ID	NDSWC Lab	<input checked="" type="checkbox"/> Verified	
Surface		Sample Source	WC
Date Sampled	10/04/01	Sampling Method	A
Time Sampled	10:53:00	Stage	-99999
Pump Time	20	Surface Depth	0
Yield	4	Downhole Temp	-99999
Water Level	15.35	Dissolved O2	-99999
Total Evacuated		Field Conduct	812
		Field pH	7.54
		Field Temp	-99999
		Lab Conduct	841
		Lab pH	7.71

Major Cations and Anions

Silica	-99999
Calcium	96
Magnesium	27
Potassium	2.9
Sodium	52
Flouride	0.7
Bicarbonate	385
Carbonate	0
Sulfate	150
Chloride	10
Nitrate	0.1
Hydroxide	-99999
Phosphate	-99999
Boron	-99999
Iron	2
Manganese	1

Trace Elements

Selenium	3
Lead	2
Mercury	0
Arsenic	16
Lithium	100
Molybdenum	2
Strontium	760
Cadmium	-99999

General Characteristics

Suspended Solid	-99999
TDS Determined	534
TDS Calculated	532
Hardness	350
NCH	35
ALK as CaCO3	-99999
SAR	1.2
RSC	0
Percent NA	24

EPM

Cations		Anions	
Ca	4.79	HCO3	6.31
Mg	2.22	CO3	0
Na	2.26	SO4	3.12
K	0.07	Cl	0.28
		F	0.04
TOT	9.34	NO3	0
		CH	-99999
		TOT	9.75

Color	1
Date Started	10/09/01
Date Ended	02/14/02

Remarks

Percent Diff 2.15

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source NDHD Lab

NO3 Samp Method Cadmium Reductio

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Date Completed:	09/11/2001	Purpose:	Observation Well
L.S. Elevation (ft):	1871.97	Well Type:	2in. - PVC
Depth Drilled (ft):	120	Aquifer:	Trenton
Screen Int. (ft.):	75-80	Data Source:	Bob Shaver

Completion Info:

Remarks:

Lithologic Log

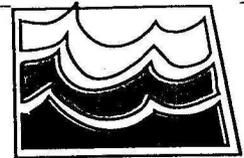
<u>Depth (ft)</u>	<u>Unit</u>	<u>Description</u>
0-18	CLAY	silty, pale yellow brown, soft, sticky, drills smooth, occas. angular scoria pebble, some clayey, silty, very fine sand intervals, oxidized
18-23	SAND	very fine to very coarse, predom. fine, some lignite fragments < 1/4 inch in diameter, drills smooth and fast, oxidized
23-68	SAND	very fine to very coarse, predom. fine, very slightly gravelly, occas. <1/4 inch diameter scoria, and lignite fragments, drills smooth and fast, unoxidized
68-80	SAND	very fine to very coarse, predom. coarse to very coarse, gravel up to about 1/2 inch in diamete, some interbedded thin clay layers, moderate bit chatter, taking water, caving, mixed 2 bags mud, comprised of western silicates, scoria, lignite, claystones, siltstones, subangular to well rounded
80-97	CLAY	silty, soft, gray, sticky, interbedded with very fine to fine sand, drills smooth, no bit chatter, bit slowed
97-100	CLAY	silty, gray, soft, drilled slower than 80 to 97 foot interval, probably bedrock, (Fort Union Group)
100-110	LIGNITE	strong bit chatter, severe loss of cication, mixed 7 bags of mud and used 1500 gallons of water, only lignite recovery, bedrock (Fort Union Group)
110-111	LIMESTONE	or dolomite layer, very strong bit chatter, small thin chips for recovery, bedrock (Fort Union Group)
111-120	CLAY	silty, gray, soft, drills smooth and slow, no bit chatter, bedrock (Fort Union Group)

Chemistry

1 of 1

Location

15210330BCA



Verified

Lab ID: NDSWC Lab
 Surface:
 Date Sampled: 10/04/01
 Time Sampled: 11:48:00
 Pump Time: 30
 Yield: 3
 Water Level: 19.95
 Total Evacuated:

Sample Source: WC
 Sampling Method: A
 Stage: -99999
 Surface Depth: 0
 Downhole Temp: -99999
 Dissolved O2: -99999

Field Conduct: 1250
 Field pH: 7.51
 Field Temp: -99999
 Lab Conduct: 1410
 Lab pH: 7.88

Major Cations and Anions

Silica: -99999
 Calcium: 100
 Magnesium: 44
 Potassium: 8.6
 Sodium: 150
 Flouride: 0.5
 Bicarbonate: 621
 Carbonate: 0
 Sulfate: 290
 Chloride: 18
 Nitrate: 0.1
 Hydroxide: -99999
 Phosphate: -99999
 Boron: -99999
 Iron: 1
 Manganese: 0.64

Trace Elements

Selenium: 3
 Lead: 2
 Mercury: 0
 Arsenic: 9
 Lithium: 100
 Molybdenum: 4
 Strontium: 1150
 Cadmium: -99999

General Characteristics

Suspended Solid: -99999
 TDS Determined: 868
 TDS Calculated: 919
 Hardness: 430
 NCH: 0
 ALK as CaCO3: -99999
 SAR: 3.2
 RSC: 2
 Percent NA: 43

EPM

Cations		Anions	
Ca	4.99	HCO3	10.18
Mg	3.62	CO3	0
Na	6.53	SO4	6.04
K	0.22	Cl	0.51
		F	0.03
TOT	15.36	NO3	0
		CH	-99999
		TOT	16.76

Color: A
 Date Started: 10/11/01
 Date Ended: 02/14/02

Remarks

Percent Diff: 4.36

Nitrate Info

NO3 Sample Chilled
 NO3 Samp Source: NDHD Lab
 NO3 Samp Method: Cadmium Reductid
 Nitrate Remarks:

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

152-104-01DDD

NDSWC 2342

Date Completed:	05/21/1965	Purpose:	Observation Well
L.S. Elevation (ft):	1940	Well Type:	1.25in. - ABS
Depth Drilled (ft):	116	Aquifer:	Trenton
Screen Int. (ft.):	66-76	Data Source:	

Completion Info:

Remarks:

Lithologic Log

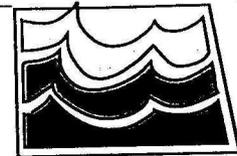
<u>Depth (ft)</u>	<u>Unit</u>	<u>Description</u>
0-1	SOIL	Black
1-41	CLAY	Moderate olive-brown to light olive-gray, silty and sandy, calcareous
41-61	SAND	Medium to coarse, moderately well sorted, angular to rounded
61-77	SAND	Gravelly, poorly sorted, angular to rounded
77-81	CLAY	Light olive-gray, silty, bentonitic, calcareous
81-98	GRAVEL	Moderately well sorted, subangular to subrounded
98-116	CLAY	Light olive-gray to brown, silty and sandy, (color depends on dispersed lignite in clay) (Fort Union Group)

Chemistry

1 of 1

Location

15210401DDD



Verified

Lab ID

Surface

Sample Source WC

Date Sampled

06/16/65

Sampling Method

Field Conduct -99999

Time Sampled

00:00:00

Stage

-99999

Field pH -99999

Pump Time

-99999

Surface Depth

0

Field Temp -99999

Yield

Downhole Temp

-99999

Lab Conduct 5760

Water Level

-99999

Dissolved O2

-99999

Lab pH 8

Total Evacuated

Major Cations and Anions

Silica	28
Calcium	189
Magnesium	43
Potassium	15
Sodium	1290
Flouride	0
Bicarbonate	1150
Carbonate	0
Sulfate	2430
Chloride	24
Nitrate	1.8
Hydroxide	-99999
Phosphate	-99999
Boron	0.5
Iron	24
Manganese	-99999

Trace Elements

Selenium	-99999
Lead	-99999
Mercury	-99999
Arsenic	-99999
Lithium	-99999
Molybdenum	-99999
Strontium	-99999
Cadmium	-99999

General Characteristics

Suspended Solid	-99999
TDS Determined	4650
TDS Calculated	4610
Hardness	650
NCH	0
ALK as CaCO3	-99999
SAR	22
RSC	-99999
Percent NA	81

EPM

Cations		Anions	
Ca	9.43	HCO3	18.85
Mg	3.54	CO3	0
Na	56.12	SO4	50.59
K	0.38	Cl	0.68
		F	0
TOT	69.47	NO3	0.03
		CH	-99999
		TOT	70.15

Color

Date Started 07/06/65

Date Ended 07/26/65

Remarks

W

Percent Diff -99999

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source Unknown

NO3 Samp Method Unknown

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

152-104-11ADD

NDSWC 2350

Date Completed:	06/15/1965	Purpose:	Observation Well - Destroyed
L.S. Elevation (ft):	1938	Well Type:	1.25in. - ABS
Depth Drilled (ft):	136.5	Aquifer:	Trenton
Screen Int. (ft.):	105-108	Data Source:	

Completion Info:

Remarks:

Lithologic Log

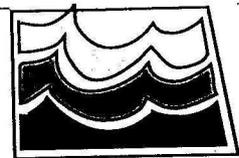
<u>Depth (ft)</u>	<u>Unit</u>	<u>Description</u>
0-42	CLAY	Dusky yellow to light olive-gray, silty, calcareous; locally sandy
42-51	SAND	Poorly sorted, angular to rounded, average size is 0.5 millimeter
51-54	CLAY	Dusky yellow to pale olive, calcareous
54-69	GRAVEL	Sandy, poorly; sorted, angular to rounded; average size is 2.5 millimeter
69-78	TILL	Moderate yellowish-brown, silty, oxidized
78-90	TILL	Olive-gray to dark greenish gray
90-107	GRAVEL	Poorly sorted, subangular to rounded; average size is 25 millimeters
107-136	CLAY	Light gray, silty

Chemistry

1 of 1

Location

15210411ADD



Verified

Lab ID
 Surface
 Date Sampled
 Time Sampled
 Pump Time
 Yield
 Water Level
 Total Evacuated

Sample Source
 Sampling Method
 Stage
 Surface Depth
 Downhole Temp
 Dissolved O2

Field Conduct
 Field pH
 Field Temp
 Lab Conduct
 Lab pH

Major Cations and Anions

Silica
 Calcium
 Magnesium
 Potassium
 Sodium
 Fluoride
 Bicarbonate
 Carbonate
 Sulfate
 Chloride
 Nitrate
 Hydroxide
 Phosphate
 Boron
 Iron
 Manganese

Trace Elements

Selenium
 Lead
 Mercury
 Arsenic
 Lithium
 Molybdenum
 Strontium
 Cadmium

General Characteristics

Suspended Solid
 TDS Determined
 TDS Calculated
 Hardness
 NCH
 ALK as CaCO3
 SAR
 RSC
 Percent NA

EPM

Cations		Anions	
Ca	<input type="text" value="14.97"/>	HCO3	<input type="text" value="15.11"/>
Mg	<input type="text" value="7.81"/>	CO3	<input type="text" value="0"/>
Na	<input type="text" value="40.67"/>	SO4	<input type="text" value="50.59"/>
K	<input type="text" value="0.54"/>	Cl	<input type="text" value="0.37"/>
		F	<input type="text" value="0"/>
TOT	<input type="text" value="63.99"/>	NO3	<input type="text" value="0.15"/>
		CH	<input type="text" value="-99999"/>
		TOT	<input type="text" value="66.22"/>

Color
 Date Started
 Date Ended

Remarks

W

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Date Completed:	07/14/1971	Purpose:	Observation Well - Destroyed
L.S. Elevation (ft):	1865	Well Type:	1.25in. - ABS
Depth Drilled (ft):	180	Aquifer:	Trenton
Screen Int. (ft.):	142-148	Data Source:	

Completion Info:

Remarks: North well

Lithologic Log

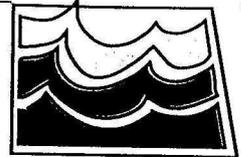
Depth (ft)	Unit	Description
0-0.5	TOPSOIL	Very sandy, silty, light brown
0.5-8	CLAY	Very silty, sandy, dark yellowish brown, slightly cohesive, plastic, calcareous (alluvium)
8-36	SAND	Slightly clayey, very fine- to medium-grained, subrounded, well-sorted, mostly quartz, lignitic, shaley
36-48	CLAY	Very silty, slightly sandy, olive-gray, slightly cohesive, highly plastic, highly calcareous (alluvium)
48-60	SAND	Fine- to medium-grained, moderately well-sorted, subangular to rounded, mostly quartz, much detrital lignite
60-65	GRAVEL	Clayey, fine to coarse, poorly sorted, mostly brownish western siliceous rocks, lignitic, scoriaceous
65-79	CLAY	Very silty, olive-gray to medium dark gray, slightly cohesive, highly plastic, occasional thin sand layers, much detrital lignite (alluvium)
79-84	GRAVEL	Sandy, clayey, silty, fine to medium, poorly sorted, subangular to rounded, mostly brownish western siliceous rocks, "dirty-looking samples"
84-120	CLAY	Very silty, occasional thin gravelly sand lenses and detrital lignite layers, medium dark gray, slightly cohesive, plastic, calcareous (alluvium)
120-126	SAND	Fine- to coarse-grained, well-sorted, mostly quartz, subrounded, much lignite, "clean-looking samples"
126-140	CLAY	Silty, medium dark gray to dark greenish gray, slightly indurated, highly calcareous, some detrital lignite (alluvium)
140-152	GRAVEL	Slightly sandy, fine to coarse, subangular to well-rounded, fair sorting, predominantly brownish western siliceous rocks, some locally derived siltstone, sandstone and shale, lignitic, some scoria
152-160	CLAY	(Detrital lignite lenses), silty, slightly sandy, medium dark gray to dark greenish gray, moderately indurated, highly calcareous (alluvium)
160-180	SHALE	Clayey, medium light gray with dark brownish gray mottling and small brownish concretions, moderately indurated, a few thin lignite stringers, highly calcareous (Fort Union Group)

Chemistry

1 of 1

Location

15210413AAD1



Lab ID	<input type="text"/>	<input checked="" type="checkbox"/> Verified
Surface	<input type="text"/>	Sample Source <input type="text" value="WC"/>
Date Sampled	<input type="text" value="07/15/71"/>	Sampling Method <input type="text"/>
Time Sampled	<input type="text" value="00:00:00"/>	Stage <input type="text" value="-99999"/>
Pump Time	<input type="text" value="360"/>	Surface Depth <input type="text" value="0"/>
Yield	<input type="text"/>	Downhole Temp <input type="text" value="-99999"/>
Water Level	<input type="text" value="-99999"/>	Dissolved O2 <input type="text" value="-99999"/>
Total Evacuated	<input type="text"/>	Field Conduct <input type="text" value="2020"/>
		Field pH <input type="text" value="-99999"/>
		Field Temp <input type="text" value="8"/>
		Lab Conduct <input type="text" value="1880"/>
		Lab pH <input type="text" value="7.4"/>

Major Cations and Anions

Silica	<input type="text" value="25"/>
Calcium	<input type="text" value="204"/>
Magnesium	<input type="text" value="71"/>
Potassium	<input type="text" value="8.1"/>
Sodium	<input type="text" value="164"/>
Flouride	<input type="text" value="0.6"/>
Bicarbonate	<input type="text" value="690"/>
Carbonate	<input type="text" value="0"/>
Sulfate	<input type="text" value="549"/>
Chloride	<input type="text" value="14"/>
Nitrate	<input type="text" value="3.4"/>
Hydroxide	<input type="text" value="-99999"/>
Phosphate	<input type="text" value="-99999"/>
Boron	<input type="text" value="0.28"/>
Iron	<input type="text" value="2.9"/>
Manganese	<input type="text" value="0.2"/>

Trace Elements

Selenium	<input type="text" value="-99999"/>
Lead	<input type="text" value="-99999"/>
Mercury	<input type="text" value="-99999"/>
Arsenic	<input type="text" value="-99999"/>
Lithium	<input type="text" value="-99999"/>
Molybdenum	<input type="text" value="-99999"/>
Strontium	<input type="text" value="-99999"/>
Cadmium	<input type="text" value="-99999"/>

General Characteristics

Suspended Solid	<input type="text" value="-99999"/>
TDS Determined	<input type="text" value="1370"/>
TDS Calculated	<input type="text" value="1380"/>
Hardness	<input type="text" value="801"/>
NCH	<input type="text" value="235"/>
ALK as CaCO3	<input type="text" value="-99999"/>
SAR	<input type="text" value="2.5"/>
RSC	<input type="text" value="-99999"/>
Percent NA	<input type="text" value="31"/>

EPM

Cations		Anions	
Ca	<input type="text" value="10.18"/>	HCO3	<input type="text" value="11.31"/>
Mg	<input type="text" value="5.84"/>	CO3	<input type="text" value="0"/>
Na	<input type="text" value="7.13"/>	SO4	<input type="text" value="11.43"/>
K	<input type="text" value="0.21"/>	Cl	<input type="text" value="0.39"/>
		F	<input type="text" value="0.03"/>
		NO3	<input type="text" value="0.05"/>
		CH	<input type="text" value="-99999"/>
TOT	<input type="text" value="23.36"/>	TOT	<input type="text" value="23.21"/>

Color

Date Started

Date Ended

Remarks

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

152-104-13AAD2

NDSWC 8024A

Date Completed: 07/14/1971
L.S. Elevation (ft): 1865
Depth Drilled (ft): 40
Screen Int. (ft.): 27-30

Purpose: Observation Well
Well Type: 1.25in. - ABS
Aquifer: Trenton
Data Source:

Completion Info:

Remarks: South well

Lithologic Log

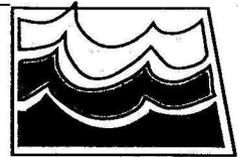
<u>Depth (ft)</u>	<u>Unit</u>	<u>Description</u>
0-0.5	SAND	Fine to medium
0.5-8	CLAY	Silty, yellowish brown
8-36	SAND	Fine to medium with a little coal
36-40	CLAY	Silty, olive-gray

Chemistry

1 of 1

Location

15210413AAD2



Lab ID	<input type="text"/>	<input checked="" type="checkbox"/> Verified
Surface	<input type="text"/>	Sample Source <input type="text" value="WC"/>
Date Sampled	<input type="text" value="07/15/71"/>	Sampling Method <input type="text"/>
Time Sampled	<input type="text" value="00:00:00"/>	Stage <input type="text" value="-99999"/>
Pump Time	<input type="text" value="360"/>	Surface Depth <input type="text" value="0"/>
Yield	<input type="text"/>	Downhole Temp <input type="text" value="-99999"/>
Water Level	<input type="text" value="-99999"/>	Dissolved O2 <input type="text" value="-99999"/>
Total Evacuated	<input type="text"/>	Field Conduct <input type="text" value="1840"/>
		Field pH <input type="text" value="-99999"/>
		Field Temp <input type="text" value="8"/>
		Lab Conduct <input type="text" value="1620"/>
		Lab pH <input type="text" value="7.2"/>

Major Cations and Anions	
Silica	<input type="text" value="17"/>
Calcium	<input type="text" value="183"/>
Magnesium	<input type="text" value="45"/>
Potassium	<input type="text" value="7"/>
Sodium	<input type="text" value="143"/>
Flouride	<input type="text" value="0.3"/>
Bicarbonate	<input type="text" value="624"/>
Carbonate	<input type="text" value="0"/>
Sulfate	<input type="text" value="390"/>
Chloride	<input type="text" value="17"/>
Nitrate	<input type="text" value="2.5"/>
Hydroxide	<input type="text" value="-99999"/>
Phosphate	<input type="text" value="-99999"/>
Boron	<input type="text" value="0.28"/>
Iron	<input type="text" value="0.28"/>
Manganese	<input type="text" value="0.03"/>

Trace Elements	
Selenium	<input type="text" value="-99999"/>
Lead	<input type="text" value="-99999"/>
Mercury	<input type="text" value="-99999"/>
Arsenic	<input type="text" value="-99999"/>
Lithium	<input type="text" value="-99999"/>
Molybdenum	<input type="text" value="-99999"/>
Strontium	<input type="text" value="-99999"/>
Cadmium	<input type="text" value="-99999"/>

General Characteristics	
Suspended Solid	<input type="text" value="-99999"/>
TDS Determined	<input type="text" value="1110"/>
TDS Calculated	<input type="text" value="1110"/>
Hardness	<input type="text" value="644"/>
NCH	<input type="text" value="132"/>
ALK as CaCO3	<input type="text" value="-99999"/>
SAR	<input type="text" value="2.4"/>
RSC	<input type="text" value="-99999"/>
Percent NA	<input type="text" value="32"/>

EPM			
Cations		Anions	
Ca	<input type="text" value="9.13"/>	HCO3	<input type="text" value="10.23"/>
Mg	<input type="text" value="3.7"/>	CO3	<input type="text" value="0"/>
Na	<input type="text" value="6.22"/>	SO4	<input type="text" value="8.12"/>
K	<input type="text" value="0.18"/>	Cl	<input type="text" value="0.48"/>
		F	<input type="text" value="0.02"/>
		NO3	<input type="text" value="0.04"/>
		CH	<input type="text" value="-99999"/>
TOT	<input type="text" value="19.23"/>	TOT	<input type="text" value="18.89"/>

Color

Date Started

Date Ended

Remarks

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Date Completed:	07/13/1971	Purpose:	Observation Well - Destroyed
L.S. Elevation (ft):	1875	Well Type:	1.25in. - ABS
Depth Drilled (ft):	180	Aquifer:	Trenton
Screen Int. (ft.):	152-158	Data Source:	

Completion Info:

Remarks: North well

Lithologic Log

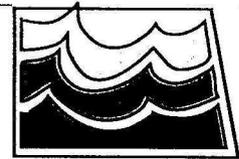
Depth (ft)	Unit	Description
0-1	TOPSOIL	Sandy, clayey, brown
1-12	CLAY	Very silty, sandy, dark yellowish brown, slightly cohesive, plastic, oxidized (alluvium)
12-38	SAND	Interbedded with thin clay lenses, very fine- to medium-grained, subrounded, mostly quartz, lignitic
38-60	CLAY	Very silty, moderately sandy, medium dark gray, slightly cohesive, plastic, laminated (alluvium)
60-65	GRAVEL	Very sandy, fine to medium, subangular to well-rounded, fair sorting, predominantly brownish western siliceous rocks, lignitic
65-69	SAND	Fine- to coarse-grained, subrounded, moderately well-sorted, mostly quartz, lignitic, some shale-poor samples
69-85	GRAVEL	(Interbedded with clay lenses), moderately sandy, fine to coarse, subangular to well-rounded, fair sorting, mostly brownish western siliceous rocks, some shale, much detrital lignite
85-114	GRAVEL	Slightly sandy, slightly clayey, fine to coarse, angular to well-rounded, fair sorting, predominantly brownish western siliceous rocks, some shale, siltstone and sandstone of local derivation, some carbonates, much detrital lignite
114-148	SAND	Clayey, slightly gravelly, fine- to coarse-grained, subangular to rounded, moderately well-sorted, predominantly quartz, lignitic, shaley
148-164	GRAVEL	Slightly sandy, fine to coarse (some cobble-sized material), subangular to well-rounded, poor to fair sorting, predominantly brownish western siliceous rocks, some siltstone, shale and sandstone of local derivation, lignitic, scoriaceous
164-180	SHALE	Clayey, slightly sandy, medium light gray with small brownish gray concretions, a few thin lignite stringers, highly calcareous, moderately indurated (Fort Union Group)

Chemistry

1 of 1

Location

15210413CBB1



Lab ID	<input type="text"/>	<input checked="" type="checkbox"/> Verified	
Surface	<input type="text"/>	Sample Source <input type="text" value="WC"/>	
Date Sampled	<input type="text" value="07/14/71"/>	Sampling Method <input type="text"/>	
Time Sampled	<input type="text" value="00:00:00"/>	Field Conduct	<input type="text" value="1850"/>
Pump Time	<input type="text" value="380"/>	Stage	<input type="text" value="-99999"/>
Yield	<input type="text"/>	Surface Depth	<input type="text" value="0"/>
Water Level	<input type="text" value="-99999"/>	Downhole Temp	<input type="text" value="-99999"/>
Total Evacuated	<input type="text"/>	Dissolved O2	<input type="text" value="-99999"/>
		Field pH	<input type="text" value="-99999"/>
		Field Temp	<input type="text" value="9"/>
		Lab Conduct	<input type="text" value="1800"/>
		Lab pH	<input type="text" value="7.6"/>

Major Cations and Anions	
Silica	<input type="text" value="30"/>
Calcium	<input type="text" value="115"/>
Magnesium	<input type="text" value="52"/>
Potassium	<input type="text" value="7.3"/>
Sodium	<input type="text" value="255"/>
Flouride	<input type="text" value="1"/>
Bicarbonate	<input type="text" value="708"/>
Carbonate	<input type="text" value="0"/>
Sulfate	<input type="text" value="428"/>
Chloride	<input type="text" value="14"/>
Nitrate	<input type="text" value="1"/>
Hydroxide	<input type="text" value="-99999"/>
Phosphate	<input type="text" value="-99999"/>
Boron	<input type="text" value="0.28"/>
Iron	<input type="text" value="1.3"/>
Manganese	<input type="text" value="0.04"/>

Trace Elements	
Selenium	<input type="text" value="-99999"/>
Lead	<input type="text" value="-99999"/>
Mercury	<input type="text" value="-99999"/>
Arsenic	<input type="text" value="-99999"/>
Lithium	<input type="text" value="-99999"/>
Molybdenum	<input type="text" value="-99999"/>
Strontium	<input type="text" value="-99999"/>
Cadmium	<input type="text" value="-99999"/>

General Characteristics	
Suspended Solid	<input type="text" value="-99999"/>
TDS Determined	<input type="text" value="1220"/>
TDS Calculated	<input type="text" value="1250"/>
Hardness	<input type="text" value="502"/>
NCH	<input type="text" value="0"/>
ALK as CaCO3	<input type="text" value="-99999"/>
SAR	<input type="text" value="4.9"/>
RSC	<input type="text" value="-99999"/>
Percent NA	<input type="text" value="52"/>

EPM

Cations		Anions	
Ca	<input type="text" value="5.74"/>	HCO3	<input type="text" value="11.6"/>
Mg	<input type="text" value="4.28"/>	CO3	<input type="text" value="0"/>
Na	<input type="text" value="11.09"/>	SO4	<input type="text" value="8.91"/>
K	<input type="text" value="0.19"/>	Cl	<input type="text" value="0.39"/>
		F	<input type="text" value="0.05"/>
TOT	<input type="text" value="21.3"/>	NO3	<input type="text" value="0.02"/>
		CH	<input type="text" value="-99999"/>
		TOT	<input type="text" value="20.97"/>

Color

Date Started

Date Ended

Remarks

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

152-104-13CBB2

NDSWC 8021A

Date Completed:	07/13/1971	Purpose:	Observation Well
L.S. Elevation (ft):	1875	Well Type:	1.25in. - ABS
Depth Drilled (ft):	40	Aquifer:	Trenton
Screen Int. (ft.):	27-30	Data Source:	

Completion Info:

Remarks: South well

Lithologic Log

<u>Depth (ft)</u>	<u>Unit</u>	<u>Description</u>
-------------------	-------------	--------------------

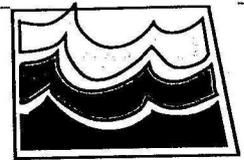
See log for NDSWC 8021 (152-104-13CBB1)

Chemistry

1 of 1

Location

15210413CBB2



Verified

Lab ID

Surface

Sample Source WC

Date Sampled

07/14/71

Sampling Method

Field Conduct

1890

Time Sampled

00:00:00

Stage

-99999

Field pH

-99999

Pump Time

380

Surface Depth

0

Field Temp

12

Yield

Downhole Temp

-99999

Lab Conduct

1780

Water Level

-99999

Dissolved O2

-99999

Lab pH

7.7

Total Evacuated

Major Cations and Anions

Silica	28
Calcium	117
Magnesium	43
Potassium	8.3
Sodium	257
Flouride	0.9
Bicarbonate	675
Carbonate	0
Sulfate	440
Chloride	15
Nitrate	4.1
Hydroxide	-99999
Phosphate	-99999
Boron	0.38
Iron	2.6
Manganese	0.02

Trace Elements

Selenium	-99999
Lead	-99999
Mercury	-99999
Arsenic	-99999
Lithium	-99999
Molybdenum	-99999
Strontium	-99999
Cadmium	-99999

General Characteristics

Suspended Solid	-99999
TDS Determined	1230
TDS Calculated	1250
Hardness	468
NCH	0
ALK as CaCO3	-99999
SAR	5.2
RSC	-99999
Percent NA	54

EPM

Cations		Anions	
Ca	5.84	HCO3	11.06
Mg	3.54	CO3	0
Na	11.18	SO4	9.16
K	0.21	Cl	0.42
		F	0.05
		NO3	0.07
		CH	-99999
TOT	20.77	TOT	20.76

Color

A

Date Started

08/24/71

Date Ended

08/30/71

Remarks

W

Percent Diff -99999

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

Unknown

NO3 Samp Method

Unknown

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

152-104-13DDA

David Herriot

Date Completed:	11/18/1984	Purpose:	Domestic Well
L.S. Elevation (ft):	N/A	Well Type:	5in. - PVC
Depth Drilled (ft):	60	Aquifer:	Trenton
Screen Int. (ft.):	40-60	Data Source:	

Completion Info:

Remarks: slotted casing from 40 to 60 ft.

Lithologic Log

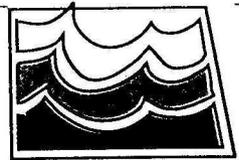
<u>Depth (ft)</u>	<u>Unit</u>	<u>Description</u>
0-2	TOPSOIL	
2-11	CLAY	sandy
11-60	SAND	very fine

Chemistry

1 of 1

Location

15210413DDA



Verified

Lab ID

Surface

Date Sampled

Time Sampled

Pump Time

Yield

Water Level

Total Evacuated

Sample Source

Sampling Method

Stage

Surface Depth

Downhole Temp

Dissolved O2

Field Conduct

Field pH

Field Temp

Lab Conduct

Lab pH

Major Cations and Anions

Silica

Calcium

Magnesium

Potassium

Sodium

Flouride

Bicarbonate

Carbonate

Sulfate

Chloride

Nitrate

Hydroxide

Phosphate

Boron

Iron

Manganese

Trace Elements

Selenium

Lead

Mercury

Arsenic

Lithium

Molybdenum

Strontium

Cadmium

General Characteristics

Suspended Solid

TDS Determined

TDS Calculated

Hardness

NCH

ALK as CaCO3

SAR

RSC

Percent NA

EPM

Cations		Anions	
Ca	<input type="text" value="4.59"/>	HCO3	<input type="text" value="6.97"/>
Mg	<input type="text" value="2.88"/>	CO3	<input type="text" value="0"/>
Na	<input type="text" value="2.74"/>	SO4	<input type="text" value="3.12"/>
K	<input type="text" value="0.09"/>	Cl	<input type="text" value="0.71"/>
		F	<input type="text" value="0.03"/>
TOT	<input type="text" value="10.3"/>	NO3	<input type="text" value="0"/>
		CH	<input type="text" value="-99999"/>
		TOT	<input type="text" value="10.83"/>

Color

Date Started

Date Ended

Remarks

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

152-104-14BBB

NDSWC 2351

Date Completed:	06/15/1965	Purpose:	Observation Well - Destroyed
L.S. Elevation (ft):	1889	Well Type:	1.25in. - ABS
Depth Drilled (ft):	115.5	Aquifer:	Trenton
Screen Int. (ft.):	0-83	Data Source:	

Completion Info:

Remarks:

Lithologic Log

<u>Depth (ft)</u>	<u>Unit</u>	<u>Description</u>
0-10	CLAY	Pale yellowish brown to moderate-yellowish-brown, silty, calcareous; oxidized; contains fine grains of quartz, dolomite, and lignite
10-21	CLAY	Olive-gray to moderate yellowish-brown, silty, calcareous, oxidized
21-42	SAND	Medium, moderately well sorted, angular to rounded
42-52	SAND	Gravelly, poorly sorted, angular, average size is about 2.5 millimeters
52-84	TILL	Moderate yellowish-brown to olive-gray
84-91	SAND	Gravelly, poorly sorted, angular to rounded; average size is about 2 millimeters
91-116	CLAY	Light olive-gray, silty (Fort Union Group)

152-104-24AAB

Steve Cayko

Date Completed: 05/08/1986
L.S. Elevation (ft): N/A
Depth Drilled (ft): 66
Screen Int. (ft.): 56-66

Purpose: Domestic Well
Well Type: 5in. - PVC
Aquifer: Trenton
Data Source:

Completion Info:

Remarks:

Lithologic Log

<u>Depth (ft)</u>	<u>Unit</u>	<u>Description</u>
0-1	TOPSOIL	
1-6	CLAY	sandy, brown
6-56	SAND	
56-66	GRAVEL	

Chemistry

1 of 1

Location

15210424AAB



Verified

Lab ID NDSWC Lab

Surface

Sample Source WC

Date Sampled 07/17/01

Sampling Method

Field Conduct 1165

Time Sampled 19:00:00

Stage -99999

Field pH -99999

Pump Time 5

Surface Depth 0

Field Temp -99999

Yield 10

Downhole Temp -99999

Lab Conduct 1370

Water Level -99999

Dissolved O2 -99999

Lab pH 7.62

Total Evacuated

Major Cations and Anions

Silica	-99999
Calcium	140
Magnesium	47
Potassium	9.4
Sodium	120
Flouride	0.5
Bicarbonate	722
Carbonate	0
Sulfate	210
Chloride	7.5
Nitrate	0.1
Hydroxide	-99999
Phosphate	-99999
Boron	-99999
Iron	4.1
Manganese	0.97

Trace Elements

Selenium	-99999
Lead	-99999
Mercury	-99999
Arsenic	-99999
Lithium	-99999
Molybdenum	-99999
Strontium	-99999
Cadmium	-99999

General Characteristics

Suspended Solid	-99999
TDS Determined	913
TDS Calculated	896
Hardness	540
NCH	0
ALK as CaCO3	-99999
SAR	2.2
RSC	1
Percent NA	32

EPM

Cations		Anions	
Ca	6.99	HCO3	11.83
Mg	3.87	CO3	0
Na	5.22	SO4	4.37
K	0.24	Cl	0.21
		F	0.03
		NO3	0
		CH	-99999
TOT	16.32	TOT	16.44

Color 1
 Date Started 07/24/01
 Date Ended 08/03/01

Remarks

Percent Diff 0.37

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source NDHD Lab

NO3 Samp Method Cadmium Reductio

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Date Completed:	07/13/1971	Purpose:	Observation Well - Destroyed
L.S. Elevation (ft):	1870	Well Type:	1.25in. - ABS
Depth Drilled (ft):	100	Aquifer:	Trenton
Screen Int. (ft.):	57-63	Data Source:	

Completion Info:

Remarks:

Lithologic Log

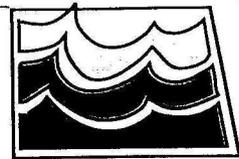
<u>Depth (ft)</u>	<u>Unit</u>	<u>Description</u>
0-1	TOPSOIL	Silty, sandy, clayey, brown
1-16	CLAY	Very silty, sandy, dark yellowish brown, slightly cohesive, plastic, oxidized (alluvium)
16-18	CLAY	Same as above, only olive-gray (alluvium)
18-78	SAND	Very fine- to medium-grained (mostly fine- to medium-grained), subangular to rounded, well-sorted, predominantly quartz, lignitic, shaley
78-85	CLAY	Very silty, moderately sandy, olive-gray, slightly cohesive, plastic, calcareous (alluvium)
85-87	COBBLES AND GRAVEL	Western siliceous rocks
87-100	SHALE	Clayey, moderately sandy, medium light gray, occasional small brownish gray concretions and mottling, moderately indurated, highly calcareous, bedded (Fort Union Formation)

Chemistry

1 of 1

Location

15210424ADA



Verified

Lab ID

Surface

Sample Source **WC**

Date Sampled

07/15/71

Sampling Method

Field Conduct

1750

Time Sampled

00:00:00

Stage

-99999

Field pH

-99999

Pump Time

360

Surface Depth

0

Field Temp

9

Yield

Downhole Temp

-99999

Lab Conduct

1630

Water Level

-99999

Dissolved O2

-99999

Lab pH

7.5

Total Evacuated

Major Cations and Anions

Silica	22
Calcium	155
Magnesium	50
Potassium	7.3
Sodium	165
Flouride	0.4
Bicarbonate	765
Carbonate	0
Sulfate	292
Chloride	18
Nitrate	6.4
Hydroxide	-99999
Phosphate	-99999
Boron	0.38
Iron	7.8
Manganese	0.56

Trace Elements

Selenium	-99999
Lead	-99999
Mercury	-99999
Arsenic	-99999
Lithium	-99999
Molybdenum	-99999
Strontium	-99999
Cadmium	-99999

General Characteristics

Suspended Solid	-99999
TDS Determined	1090
TDS Calculated	1100
Hardness	594
NCH	0
ALK as CaCO3	-99999
SAR	2.9
RSC	-99999
Percent NA	37

EPM

Cations		Anions	
Ca	7.73	HCO3	12.54
Mg	4.11	CO3	0
Na	7.18	SO4	6.08
K	0.19	Cl	0.51
		F	0.02
TOT	19.21	NO3	0.1
		OH	-99999
		TOT	19.25

Color

A

Date Started

08/24/71

Date Ended

08/30/71

Remarks

W

Percent Diff

-99999

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

Unknown

NO3 Samp Method

Unknown

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

153-102-17CCC

NDSWC 2338

Date Completed:	05/18/1965	Purpose:	Observation Well
L.S. Elevation (ft):	1898.12	Well Type:	1.25in. - ABS
Depth Drilled (ft):	94	Aquifer:	Trenton
Screen Int. (ft.):	67-75	Data Source:	

Completion Info:

Remarks: SOUTH SIDE RR TRACKS

Lithologic Log

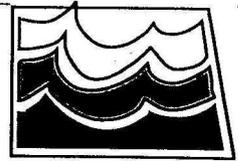
<u>Depth (ft)</u>	<u>Unit</u>	<u>Description</u>
0-1	SOIL	
0-0		
1-12	SILT	Dusky yellow, sandy and clayey, calcareous, oxidized
12-16	GRAVEL	Poorly sorted, angular, average size is 5 to 10 millimeters
16-35	CLAY	Dusky yellow, silty and sandy, calcareous
35-47	GRAVEL	Sandy, poorly sorted, subangular to subrounded, oxidized
47-57	TILL	Dusky yellow, silty, oxidized, contains lignite and grains
57-75	GRAVEL	Sandy, poorly sorted, subangular to angular
75-94	CLAY	Light bluish gray to light gray, sandy and silty, laminated (Fort Union Group)

Chemistry

1 of 2

Location

15310217CCC



Lab ID				<input checked="" type="checkbox"/> Verified	
Surface		Sample Source	WC		
Date Sampled	05/20/65	Sampling Method		Field Conduct	2700
Time Sampled	00:00:00	Stage	-99999	Field pH	-99999
Pump Time	2880	Surface Depth	0	Field Temp	10
Yield		Downhole Temp	-99999	Lab Conduct	3670
Water Level	48.33	Dissolved O2	-99999	Lab pH	8.3
Total Evacuated					

Major Cations and Anions

Silica	12
Calcium	78
Magnesium	47
Potassium	14
Sodium	924
Flouride	1.5
Bicarbonate	915
Carbonate	20
Sulfate	1490
Chloride	23
Nitrate	93
Hydroxide	-99999
Phosphate	-99999
Boron	0.55
Iron	0.14
Manganese	-99999

Trace Elements

Selenium	-99999
Lead	-99999
Mercury	-99999
Arsenic	-99999
Lithium	-99999
Molybdenum	-99999
Strontium	-99999
Cadmium	-99999

General Characteristics

Suspended Solid	-99999
TDS Determined	3160
TDS Calculated	3150
Hardness	388
NCH	0
ALK as CaCO3	-99999
SAR	20
RSC	-99999
Percent NA	83

EPM

Cations		Anions	
Ca	3.89	HCO3	15
Mg	3.87	CO3	0.67
Na	40.19	SO4	31.02
K	0.36	Cl	0.65
		F	0.08
		NO3	1.5
TOT	48.31	CH	-99999
		TOT	48.92

Color	
Date Started	05/28/65
Date Ended	06/15/65

Remarks

W

Percent Diff -99999

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source Unknown

NO3 Samp Method Unknown

Nitrate Remarks

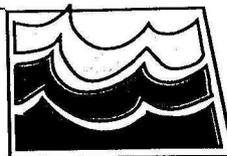
Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Chemistry

1 of 2

Location

15310217CCC



Verified

Lab ID NDSWC Lab

Surface

Sample Source WC

Date Sampled 07/19/01

Sampling Method A

Field Conduct 4750

Time Sampled 17:30:00

Stage -99999

Field pH -99999

Pump Time 90

Surface Depth 0

Field Temp -99999

Yield 1

Downhole Temp -99999

Lab Conduct 6600

Water Level 48.96

Dissolved O2 -99999

Lab pH 7.84

Total Evacuated

Major Cations and Anions

Silica	-99999
Calcium	270
Magnesium	180
Potassium	14
Sodium	1300
Flouride	0.9
Bicarbonate	856
Carbonate	0
Sulfate	3000
Chloride	42
Nitrate	230
Hydroxide	-99999
Phosphate	-99999
Boron	-99999
Iron	0.04
Manganese	0.18

Trace Elements

Selenium	-99999
Lead	-99999
Mercury	-99999
Arsenic	-99999
Lithium	-99999
Molybdenum	-99999
Strontium	-99999
Cadmium	-99999

General Characteristics

Suspended Solid	-99999
TDS Determined	5620
TDS Calculated	5460
Hardness	1400
NCH	710
ALK as CaCO3	-99999
SAR	15
RSC	0
Percent NA	66

EPM

Cations		Anions	
Ca	13.47	HCO3	14.03
Mg	14.81	CO3	0
Na	56.55	SO4	62.46
K	0.36	Cl	1.18
		F	0.05
TOT	85.19	NO3	3.71
		CH	-99999
		TOT	81.43

Color A
 Date Started 07/26/01
 Date Ended 08/03/01

Remarks

Percent Diff 2.26

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source NDHD Lab

NO3 Samp Method Cadmium Reductid

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Date Completed: 04/19/1966 Purpose: Test Hole
 L.S. Elevation (ft): 1860
 Depth Drilled (ft): 94.5

Data Source:

Completion Info:

Remarks:

Lithologic Log

Depth (ft)	Unit	Description
0-0.5	LOAM	Dark brown, sandy
0.5-5	SILT	Light olive-gray, very sandy, slightly cohesive
5-23	CLAY	Light olive-gray, silty, cohesive, moderately plastic
23-29	GRAVEL	Sandy, fine to medium, brownish colored; contains thin lenses of clayey silt and clayey sand
29-42	GRAVEL	Fine to medium, and coarse sand; individual pebbles are brownish and reddish colored; contains considerable "scoria" (baked clay)
42-61	CLAY	Olive-gray, very silty, slightly calcareous, cohesive, plastic, interbedded with light olive-gray silt and dark greenish gray carbonaceous, fine to medium sand (Fort Union Group)
61-94	SILT	And very fine sand(?), micaceous (poor sample, returns suspended in drilling mud) (Fort Union Group)

153-102-17DCC2

NDSWC 3296A

Date Completed: 04/19/1966
L.S. Elevation (ft): 1860
Depth Drilled (ft): 31.5
Screen Int. (ft.): 28-31

Purpose: Observation Well - Destroyed
Well Type: 1.25in. - ABS
Aquifer: Trenton
Data Source:

Completion Info:

Remarks:

Lithologic Log

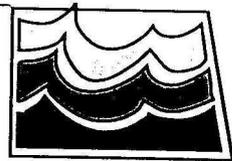
<u>Depth (ft)</u>	<u>Unit</u>	<u>Description</u>
0-15	CLAY	Yellowish brown, silty
15-21	CLAY	Olive-gray, sandy and silty
21-31	GRAVEL	Fine to coarse, and about 25 percent fine to medium sand

Chemistry

1 of 1

Location

15310217DCC2



Lab ID

Verified

Surface

Sample Source

Date Sampled

Sampling Method

Field Conduct

Time Sampled

Stage

Field pH

Pump Time

Surface Depth

Field Temp

Yield

Downhole Temp

Lab Conduct

Water Level

Dissolved O2

Lab pH

Total Evacuated

Major Cations and Anions

Silica	22
Calcium	140
Magnesium	55
Potassium	9.2
Sodium	469
Flouride	0.5
Bicarbonate	803
Carbonate	0
Sulfate	878
Chloride	18
Nitrate	0.4
Hydroxide	-99999
Phosphate	-99999
Boron	0.18
Iron	2.1
Manganese	-99999

Trace Elements

Selenium	-99999
Lead	-99999
Mercury	-99999
Arsenic	-99999
Lithium	-99999
Molybdenum	-99999
Strontium	-99999
Cadmium	-99999

General Characteristics

Suspended Solid	-99999
TDS Determined	1950
TDS Calculated	1990
Hardness	575
NCH	0
ALK as CaCO3	-99999
SAR	8.5
RSC	-99999
Percent NA	63

EPM

Cations		Anions	
Ca	6.99	HCO3	13.16
Mg	4.52	CO3	0
Na	20.4	SO4	18.28
K	0.24	Cl	0.51
		F	0.03
TOT	32.15	NO3	0.01
		CH	-99999
		TOT	31.99

Color

Date Started

Date Ended

Remarks

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Date Completed:	06/22/1971	Purpose:	Observation Well
L.S. Elevation (ft):	1861.71	Well Type:	4in. - PVC
Depth Drilled (ft):	80	Aquifer:	Trenton
Screen Int. (ft.):	49-54	Data Source:	

Completion Info:

Remarks: East side of fence, East of drainage ditch

Lithologic Log

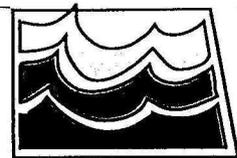
Depth (ft)	Unit	Description
0-1	TOPSOIL	Silty, sandy, brown
1-15	CLAY	Very silty, sandy, dusky yellow to moderate yellowish brown, cohesive, moderately plastic, oxidized (alluvium)
15-18	CLAY	Very silty, sandy, olive-gray, slightly cohesive, plastic, calcareous (alluvium)
18-31	SAND	Fine- to medium-grained, subangular to subrounded, well-sorted, mostly quartz, slightly lignitic
31-40	SAND	Slightly to moderately gravelly, slightly clayey, fine- to very coarse-grained, subrounded, moderately well-sorted
40-57	GRAVEL	Slightly sandy, fine to coarse (mostly medium to coarse), subangular to well-rounded, moderately well-sorted, about 70% brownish western siliceous rocks-chalcedony, agate, chert, jasper, quartzite, 10% carbonates, 20% shale, sandstone and siltstone
57-80	SHALE	Clayey, silty, medium light gray with thin brownish gray bedding and occasional small brownish concretions, moderately indurated, bedded, highly calcareous (Fort Union Group)

Chemistry

1 of 1

Location

15310229CDC



Lab ID

Verified

Surface

Sample Source WC

Date Sampled

Sampling Method

Field Conduct

Time Sampled

Stage

Field pH

Pump Time

Surface Depth

Field Temp

Yield

Downhole Temp

Lab Conduct

Water Level

Dissolved O2

Lab pH

Total Evacuated

Major Cations and Anions

Silica	21
Calcium	184
Magnesium	58
Potassium	8.3
Sodium	300
Flouride	0.2
Bicarbonate	775
Carbonate	0
Sulfate	688
Chloride	14
Nitrate	1
Hydroxide	-99999
Phosphate	-99999
Boron	0.45
Iron	0
Manganese	1.8

Trace Elements

Selenium	-99999
Lead	-99999
Mercury	-99999
Arsenic	-99999
Lithium	-99999
Molybdenum	-99999
Strontium	-99999
Cadmium	-99999

General Characteristics

Suspended Solid	-99999
TDS Determined	1580
TDS Calculated	1660
Hardness	700
NCH	65
ALK as CaCO3	-99999
SAR	4.9
RSC	-99999
Percent NA	48

EPM

Cations		Anions	
Ca	9.18	HCO3	12.7
Mg	4.77	CO3	0
Na	13.05	SO4	14.32
K	0.21	Cl	0.39
		F	0.01
TOT	27.21	NO3	0.02
		CH	-99999
		TOT	27.44

Color

Date Started

Date Ended

Remarks

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

153-102-30DCC

Monte Hininger

Date Completed:	05/31/1991	Purpose:	Domestic Well
L.S. Elevation (ft):	N/A	Well Type:	5in. - PVC
Depth Drilled (ft):	50	Aquifer:	Trenton
Screen Int. (ft.):	30-40	Data Source:	Hininger Drilling

Completion Info:

Remarks:

Lithologic Log

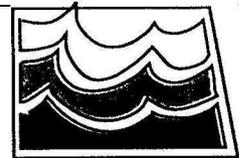
<u>Depth (ft)</u>	<u>Unit</u>	<u>Description</u>
0-1	TOPSOIL	
1-20	CLAY	sandy, brown
20-40	SAND & GRAVEL	
40-44	CLAY	blue
44-46	Coal	
46-50	SAND & GRAVEL	

Chemistry

1 of 1

Location

15310230DCC



Lab ID

Verified

Surface

Sample Source

Date Sampled

Sampling Method

Field Conduct

Time Sampled

Stage

Field pH

Pump Time

Surface Depth

Field Temp

Yield

Downhole Temp

Lab Conduct

Water Level

Dissolved O2

Lab pH

Total Evacuated

Major Cations and Anions

Silica	<input type="text" value="-99999"/>
Calcium	<input type="text" value="84"/>
Magnesium	<input type="text" value="31"/>
Potassium	<input type="text" value="4"/>
Sodium	<input type="text" value="64"/>
Flouride	<input type="text" value="0.6"/>
Bicarbonate	<input type="text" value="399"/>
Carbonate	<input type="text" value="0"/>
Sulfate	<input type="text" value="140"/>
Chloride	<input type="text" value="14"/>
Nitrate	<input type="text" value="0.2"/>
Hydroxide	<input type="text" value="-99999"/>
Phosphate	<input type="text" value="-99999"/>
Boron	<input type="text" value="-99999"/>
Iron	<input type="text" value="0.04"/>
Manganese	<input type="text" value="0.01"/>

Trace Elements

Selenium	<input type="text" value="-99999"/>
Lead	<input type="text" value="-99999"/>
Mercury	<input type="text" value="-99999"/>
Arsenic	<input type="text" value="-99999"/>
Lithium	<input type="text" value="-99999"/>
Molybdenum	<input type="text" value="-99999"/>
Strontium	<input type="text" value="-99999"/>
Cadmium	<input type="text" value="-99999"/>

General Characteristics

Suspended Solid	<input type="text" value="-99999"/>
TDS Determined	<input type="text" value="557"/>
TDS Calculated	<input type="text" value="535"/>
Hardness	<input type="text" value="340"/>
NCH	<input type="text" value="10"/>
ALK as CaCO3	<input type="text" value="-99999"/>
SAR	<input type="text" value="1.5"/>
RSC	<input type="text" value="0"/>
Percent NA	<input type="text" value="29"/>

EPM

Cations		Anions	
Ca	<input type="text" value="4.19"/>	HCO3	<input type="text" value="6.54"/>
Mg	<input type="text" value="2.55"/>	CO3	<input type="text" value="0"/>
Na	<input type="text" value="2.78"/>	SO4	<input type="text" value="2.91"/>
K	<input type="text" value="0.1"/>	Cl	<input type="text" value="0.39"/>
		F	<input type="text" value="0.03"/>
		NO3	<input type="text" value="0"/>
		CH	<input type="text" value="-99999"/>
TOT	<input type="text" value="9.62"/>	TOT	<input type="text" value="9.87"/>

Color

Date Started

Date Ended

Remarks

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Date Completed:	06/22/1971	Purpose:	Observation Well
L.S. Elevation (ft):	1878.16	Well Type:	1.25in. - ABS
Depth Drilled (ft):	160	Aquifer:	Trenton
Screen Int. (ft.):	47-50	Data Source:	

Completion Info:

Remarks: N. side of road, E. of irrigation ditch.

Lithologic Log

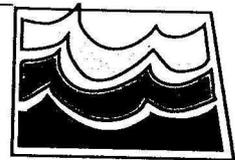
Depth (ft)	Unit	Description
0-1	TOPSOIL	Silty, sandy, clayey, dark brown
1-27	CLAY	Very silty, sandy, dusky yellow to moderate yellowish brown, slightly cohesive, plastic, a few sand layers lower 5 ft., oxidized (alluvium)
27-31	SAND	Slightly clayey, fine- to coarse-grained, subrounded moderately well-sorted, slightly oxidized
31-40	GRAVEL	Sandy, fine to coarse, subangular to rounded, moderately well-sorted, predominantly brownish western siliceous rocks-chalcedony, agate, chert jasper, quartzite, etc., appearance slightly oxidized
40-51	SAND	Slightly clayey, moderately gravelly, fine- to coarse-grained, subrounded, well-sorted, mostly quartz and siliceous rock fragments, lignitic
51-55	GRAVEL	Sandy, fine to coarse, rounded, well-sorted, mostly brownish western siliceous rocks
55-67	CLAY	Very silty, sandy, medium gray to brownish gray, moderately cohesive, highly plastic, very calcareous (alluvium)
67-79	SAND	Slightly clayey, fine- to medium-grained, subrounded, well-sorted, mostly quartz, lignitic
79-100	CLAY	Very silty, sandy, medium dark gray to brownish gray, cohesive, slightly plastic, occasional thin sand lenses (alluvium)
100-115	SAND	Clayey, fine- to coarse-grained, subangular, moderately well-sorted, mostly quartz, lignitic
115-125	CLAY	Very sandy, silty, olive-gray, cohesive, slightly plastic, calcareous (alluvium)
125-128	GRAVEL	Clayey, fine to coarse, angular to rounded, moderately well-sorted, mostly western siliceous rocks
128-138	CLAY	Very silty, sandy, gravelly lower 2 ft., medium gray, moderately cohesive, moderately plastic, calcareous (alluvium)
138-160	SHALE	Clayey, medium gray to light brownish gray, thin lignite stringers, highly calcareous to slightly calcareous, moderately indurated (Fort Union Group)

Chemistry

1 of 2

Location

15310230DCD



Lab ID

Verified

Surface

Sample Source

Date Sampled

Sampling Method

Field Conduct

Time Sampled

Stage

Field pH

Pump Time

Surface Depth

Field Temp

Yield

Downhole Temp

Lab Conduct

Water Level

Dissolved O2

Lab pH

Total Evacuated

Major Cations and Anions

Silica	25
Calcium	59
Magnesium	18
Potassium	5.9
Sodium	112
Flouride	0.5
Bicarbonate	283
Carbonate	0
Sulfate	222
Chloride	9.1
Nitrate	0
Hydroxide	-99999
Phosphate	-99999
Boron	0.55
Iron	0
Manganese	0.26

Trace Elements

Selenium	-99999
Lead	-99999
Mercury	-99999
Arsenic	-99999
Lithium	-99999
Molybdenum	-99999
Strontium	-99999
Cadmium	-99999

General Characteristics

Suspended Solid	-99999
TDS Determined	548
TDS Calculated	591
Hardness	219
NCH	0
ALK as CaCO3	-99999
SAR	2.9
RSC	-99999
Percent NA	52

EPM

Cations		Anions	
Ca	2.94	HCO3	4.64
Mg	1.48	CO3	0
Na	4.87	SO4	4.62
K	0.15	Cl	0.26
		F	0.03
		NO3	0
		CH	-99999
TOT	9.44	TOT	9.55

Color

Date Started

Date Ended

Remarks

W

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

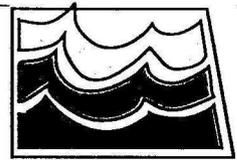
Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Chemistry

1 of 2

Location

15310230DCD



Lab ID	NDSWC Lab	<input checked="" type="checkbox"/> Verified
Surface		Sample Source WC
Date Sampled	07/18/01	Sampling Method A
Time Sampled	18:30:00	Stage -99999
Pump Time	7.0	Surface Depth 0
Yield	3	Downhole Temp -99999
Water Level	22.9	Dissolved O2 -99999
Total Evacuated		Field Conduct 977
		Field pH -99999
		Field Temp -99999
		Lab Conduct 1220
		Lab pH 7.81

Major Cations and Anions

Silica	-99999
Calcium	110
Magnesium	31
Potassium	8
Sodium	120
Flouride	0.5
Bicarbonate	308
Carbonate	0
Sulfate	390
Chloride	16
Nitrate	1.6
Hydroxide	-99999
Phosphate	-99999
Boron	-99999
Iron	0.3
Manganese	0.45

Trace Elements

Selenium	-99999
Lead	-99999
Mercury	-99999
Arsenic	-99999
Lithium	-99999
Molybdenum	-99999
Strontium	-99999
Cadmium	-99999

General Characteristics

Suspended Solid	-99999
TDS Determined	870
TDS Calculated	830
Hardness	400
NCH	150
ALK as CaCO3	-99999
SAR	2.6
RSC	0
Percent NA	39

EPM

Cations		Anions	
Ca	5.49	HCO3	5.05
Mg	2.55	CO3	0
Na	5.22	SO4	8.12
K	0.2	Cl	0.45
		F	0.03
		NO3	0.03
		OH	-99999
TOT	13.46	TOT	13.68

Color	A
Date Started	07/25/01
Date Ended	08/03/01

Remarks

Percent Diff 0.81

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source NDHD Lab

NO3 Samp Method Cadmium Reductio

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

153-102-31ABB

Ray Hoffman

Date Completed: 08/12/1983
L.S. Elevation (ft): N/A
Depth Drilled (ft): 40
Screen Int. (ft.): 31-38

Purpose: Domestic Well
Well Type: 5in. - PVC
Aquifer: Trenton
Data Source: Hininger Drilling

Completion Info:

Remarks:

Lithologic Log

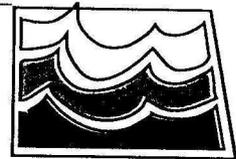
Depth (ft)	Unit	Description
0-2	TOPSOIL	
2-10	CLAY	sandy
10-21	CLAY	
21-25	SAND	
25-31	CLAY	sandy
31-40	SAND & GRAVEL	

Chemistry

1 of 1

Location

15310231ABB



Lab ID	NDSWC Lab	<input checked="" type="checkbox"/> Verified			
Surface		Sample Source WC			
Date Sampled	07/18/01	Sampling Method			
Time Sampled	09:35:00	Stage	-99999	Field Conduct	950
Pump Time	3	Surface Depth	0	Field pH	-99999
Yield	15	Downhole Temp	-99999	Field Temp	-99999
Water Level	-99999	Dissolved O2	-99999	Lab Conduct	1150
Total Evacuated				Lab pH	7.75

Major Cations and Anions

Silica	-99999
Calcium	97
Magnesium	39
Potassium	5.3
Sodium	96
Flouride	0.6
Bicarbonate	292
Carbonate	0
Sulfate	350
Chloride	15
Nitrate	8
Hydroxide	-99999
Phosphate	-99999
Boron	-99999
Iron	0.05
Manganese	0.05

Trace Elements

Selenium	-99999
Lead	-99999
Mercury	-99999
Arsenic	-99999
Lithium	-99999
Molybdenum	-99999
Strontium	-99999
Cadmium	-99999

General Characteristics

Suspended Solid	-99999
TDS Determined	792
TDS Calculated	755
Hardness	400
NCH	160
ALK as CaCO3	-99999
SAR	2.1
RSC	0
Percent NA	34

EPM

Cations		Anions	
Ca	4.84	HCO3	4.79
Mg	3.21	CO3	0
Na	4.18	SO4	7.29
K	0.14	Cl	0.42
		F	0.03
TOT	12.37	NO3	0.13
		CH	-99999
		TOT	12.66

Color	A
Date Started	07/24/01
Date Ended	08/03/01

Remarks

Percent Diff 1.16

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source NDHD Lab

NO3 Samp Method Cadmium Reductio

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

153-102-31CBB

Clarence Johnsrud

Date Completed:	04/15/1988	Purpose:	Domestic Well
L.S. Elevation (ft):	N/A	Well Type:	5in. - PVC
Depth Drilled (ft):	52	Aquifer:	Trenton
Screen Int. (ft.):	40-50	Data Source:	Hininger Drilling

Completion Info:

Remarks:

Lithologic Log

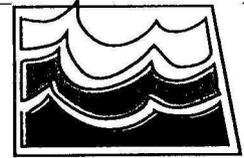
<u>Depth (ft)</u>	<u>Unit</u>	<u>Description</u>
0-21	CLAY	sandy, brown
21-26	CLAY	brown
26-30	SAND	lt. brown
30-40	CLAY	blue
40-50	GRAVEL	
50-52	CLAY	blue

Chemistry

1 of 1

Location

15310231CBB



Lab ID	NDSWC Lab	<input checked="" type="checkbox"/> Verified	
Surface		Sample Source	WC
Date Sampled	07/18/01	Sampling Method	
Time Sampled	08:50:00	Stage	-99999
Pump Time	4	Surface Depth	0
Yield	10	Downhole Temp	-99999
Water Level	-99999	Dissolved O2	-99999
Total Evacuated		Field Conduct	673
		Field pH	-99999
		Field Temp	-99999
		Lab Conduct	793
		Lab pH	7.79

Major Cations and Anions

Silica	-99999
Calcium	62
Magnesium	24
Potassium	3.7
Sodium	69
Flouride	0.7
Bicarbonate	275
Carbonate	0
Sulfate	170
Chloride	14
Nitrate	2.7
Hydroxide	-99999
Phosphate	-99999
Boron	-99999
Iron	0.05
Manganese	0.02

Trace Elements

Selenium	-99999
Lead	-99999
Mercury	-99999
Arsenic	-99999
Lithium	-99999
Molybdenum	-99999
Strontium	-99999
Cadmium	-99999

General Characteristics

Suspended Solid	-99999
TDS Determined	510
TDS Calculated	481
Hardness	250
NCH	28
ALK as CaCO3	-99999
SAR	1.9
RSC	0
Percent NA	37

EPM

Cations		Anions	
Ca	3.09	HCO3	4.51
Mg	1.97	CO3	0
Na	3	SO4	3.54
K	0.09	Cl	0.39
		F	0.04
		NO3	0.04
		OH	-99999
TOT	8.15	TOT	8.52

Color	A
Date Started	07/24/01
Date Ended	08/03/01

Remarks

Percent Diff 2.22

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source NDHD Lab

NO3 Samp Method Cadmium Reductid

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Date Completed:	06/19/1968	Purpose:	Observation Well
L.S. Elevation (ft):	1871.33	Well Type:	1.25in. - Steel
Depth Drilled (ft):	94	Aquifer:	Trenton
Screen Int. (ft.):	83-86	Data Source:	

Completion Info:

Remarks: 20' East of gate.

Lithologic Log

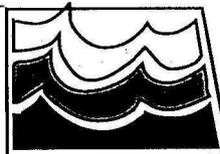
Depth (ft)	Unit	Description
0-15	CLAY	Slightly silty, soft, yellowish brown, becomes olive-gray after about 8 ft.
15-40	SAND	Fine to medium, moderately well-sorted, angular, primarily quartz with some black igneous rocks, some lignite
40-94	GRAVEL	Fine to coarse with pebbles, sandy, subangular, quite an amount of lignite, poorly sorted, layer of silt or fine sand from 78 to 79 ft. poor sample return

Chemistry

1 of 3

Location

15310231CDC



Lab ID	<input type="text"/>	<input checked="" type="checkbox"/> Verified
Surface	<input type="text"/>	Sample Source <input type="text" value="WC"/>
Date Sampled	<input type="text" value="06/20/68"/>	Sampling Method <input type="text"/>
Time Sampled	<input type="text" value="00:00:00"/>	Field Conduct <input type="text" value="-99999"/>
Pump Time	<input type="text" value="540"/>	Stage <input type="text" value="-99999"/>
Yield	<input type="text" value="4"/>	Surface Depth <input type="text" value="0"/>
Water Level	<input type="text" value="14.5"/>	Field Temp <input type="text" value="11.1"/>
Total Evacuated	<input type="text"/>	Downhole Temp <input type="text" value="-99999"/>
		Lab Conduct <input type="text" value="2220"/>
		Lab pH <input type="text" value="7.9"/>

Major Cations and Anions

Silica	<input type="text" value="25"/>
Calcium	<input type="text" value="170"/>
Magnesium	<input type="text" value="48"/>
Potassium	<input type="text" value="11"/>
Sodium	<input type="text" value="300"/>
Flouride	<input type="text" value="0.3"/>
Bicarbonate	<input type="text" value="720"/>
Carbonate	<input type="text" value="0"/>
Sulfate	<input type="text" value="685"/>
Chloride	<input type="text" value="13"/>
Nitrate	<input type="text" value="0"/>
Hydroxide	<input type="text" value="-99999"/>
Phosphate	<input type="text" value="-99999"/>
Boron	<input type="text" value="0.2"/>
Iron	<input type="text" value="6.6"/>
Manganese	<input type="text" value="0.36"/>

Trace Elements

Selenium	<input type="text" value="-99999"/>
Lead	<input type="text" value="-99999"/>
Mercury	<input type="text" value="-99999"/>
Arsenic	<input type="text" value="-99999"/>
Lithium	<input type="text" value="-99999"/>
Molybdenum	<input type="text" value="-99999"/>
Strontium	<input type="text" value="-99999"/>
Cadmium	<input type="text" value="-99999"/>

General Characteristics

Suspended Solid	<input type="text" value="-99999"/>
TDS Determined	<input type="text" value="1610"/>
TDS Calculated	<input type="text" value="1610"/>
Hardness	<input type="text" value="620"/>
NCH	<input type="text" value="30"/>
ALK as CaCO3	<input type="text" value="-99999"/>
SAR	<input type="text" value="5.3"/>
RSC	<input type="text" value="-99999"/>
Percent NA	<input type="text" value="51"/>

EPM

Cations		Anions	
Ca	<input type="text" value="8.48"/>	HCO3	<input type="text" value="11.8"/>
Mg	<input type="text" value="3.95"/>	CO3	<input type="text" value="0"/>
Na	<input type="text" value="13.05"/>	SO4	<input type="text" value="14.26"/>
K	<input type="text" value="0.28"/>	Cl	<input type="text" value="0.37"/>
		F	<input type="text" value="0.02"/>
TOT	<input type="text" value="25.76"/>	NO3	<input type="text" value="0"/>
		OH	<input type="text" value="-99999"/>
		TOT	<input type="text" value="26.45"/>

Color	<input type="text" value="M"/>
Date Started	<input type="text" value="07/08/68"/>
Date Ended	<input type="text" value="07/15/68"/>

Remarks

W

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

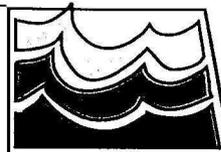
Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Chemistry

1 of 3

Location

15310231CDC



Lab ID	<input type="text"/>	<input checked="" type="checkbox"/> Verified	
Surface	<input type="text"/>	Sample Source <input type="text"/>	
Date Sampled	07/02/71	Sampling Method <input type="text"/>	
Time Sampled	00:00:00	Field Conduct	2550
Pump Time	45	Stage	-99999
Yield	1	Surface Depth	0
Water Level	-99999	Downhole Temp	-99999
Total Evacuated	<input type="text"/>	Dissolved O2	-99999
		Lab Conduct	2280
		Lab pH	7.6

Major Cations and Anions

Silica	24
Calcium	176
Magnesium	64
Potassium	11
Sodium	321
Flouride	0.3
Bicarbonate	712
Carbonate	0
Sulfate	773
Chloride	12
Nitrate	1
Hydroxide	-99999
Phosphate	-99999
Boron	0.14
Iron	7.3
Manganese	0.34

Trace Elements

Selenium	-99999
Lead	-99999
Mercury	-99999
Arsenic	-99999
Lithium	-99999
Molybdenum	-99999
Strontium	-99999
Cadmium	-99999

General Characteristics

Suspended Solid	-99999
TDS Determined	1770
TDS Calculated	1740
Hardness	704
NCH	120
ALK as CaCO3	-99999
SAR	5.3
RSC	-99999
Percent NA	49

EPM

Cations		Anions	
Ca	8.78	HCO3	11.67
Mg	5.26	CO3	0
Na	13.96	SO4	16.09
K	0.28	Cl	0.34
		F	0.02
		NO3	0.02
		CH	-99999
TOT	28.28	TOT	28.14

Color	M
Date Started	08/09/71
Date Ended	08/19/71

Remarks

Percent Diff 0.27

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

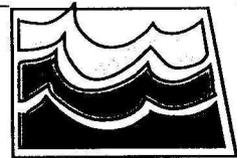
Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Chemistry

1 of 3

Location

15310231CDC



Lab ID: NDSWC Lab
 Surface:
 Date Sampled: 07/18/01
 Time Sampled: 12:30:00
 Pump Time: 120
 Yield:
 Water Level: 15.7
 Total Evacuated:

Verified

Sample Source: WC

Sampling Method: A
 Stage: -99999
 Surface Depth: 0
 Downhole Temp: -99999
 Dissolved O2: -99999
 Field Conduct: 1940
 Field pH: -99999
 Field Temp: -99999
 Lab Conduct: 2370
 Lab pH: 7.77

Major Cations and Anions

Silica: -99999
 Calcium: 170
 Magnesium: 59
 Potassium: 15
 Sodium: 360
 Flouride: 0.3
 Bicarbonate: 786
 Carbonate: 0
 Sulfate: 710
 Chloride: 16
 Nitrate: 0.2
 Hydroxide: -99999
 Phosphate: -99999
 Boron: -99999
 Iron: 0.09
 Manganese: 0.81

Trace Elements

Selenium: -99999
 Lead: -99999
 Mercury: -99999
 Arsenic: -99999
 Lithium: -99999
 Molybdenum: -99999
 Strontium: -99999
 Cadmium: -99999

General Characteristics

Suspended Solid: -99999
 TDS Determined: 1670
 TDS Calculated: 1720
 Hardness: 670
 NCH: 23
 ALK as CaCO3: -99999
 SAR: 6
 RSC: 0
 Percent NA: 53

EPM

Cations		Anions	
Ca	8.48	HCO3	12.88
Mg	4.85	CO3	0
Na	15.66	SO4	14.78
K	0.38	Cl	0.45
		F	0.02
		NO3	0
		CH	-99999
TOT	29.37	TOT	28.13

Color: M
 Date Started: 07/24/01
 Date Ended: 08/03/01

Remarks

Percent Diff: 2.16

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source: NDHD Lab

NO3 Samp Method: Cadmium Reductio

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

153-102-31DDB

Jerry Osterlund

Date Completed: 11/09/1994
L.S. Elevation (ft): N/A
Depth Drilled (ft): 60
Screen Int. (ft.): 38-48

Purpose: Domestic Well
Well Type: 5in. - PVC
Aquifer: Trenton
Data Source: Agri Industries

Completion Info:

Remarks:

Lithologic Log

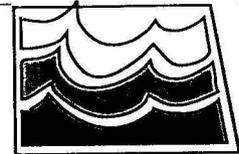
<u>Depth (ft)</u>	<u>Unit</u>	<u>Description</u>
0-1	TOPSOIL	
1-35	SAND	fine, yellow
35-48	SAND & GRAVEL	
48-51	LIGNITE	
51-60	CLAY	gray

Chemistry

1 of 1

Location

15310231DDB



Verified

Lab ID: NDSWC Lab
 Surface:
 Date Sampled: 07/18/01
 Time Sampled: 11:20:00
 Pump Time: 2
 Yield: 20
 Water Level: -99999
 Total Evacuated:

Sample Source: WC
 Sampling Method:
 Stage: -99999
 Surface Depth: 0
 Downhole Temp: -99999
 Dissolved O2: -99999

Field Conduct: 1430
 Field pH: -99999
 Field Temp: -99999
 Lab Conduct: 1750
 Lab pH: 7.59

Major Cations and Anions

Silica: -99999
 Calcium: 87
 Magnesium: 29
 Potassium: 8.5
 Sodium: 280
 Flouride: 0.5
 Bicarbonate: 706
 Carbonate: 0
 Sulfate: 400
 Chloride: 15
 Nitrate: 0.1
 Hydroxide: -99999
 Phosphate: -99999
 Boron: -99999
 Iron: 5.1
 Manganese: 0.69

Trace Elements

Selenium: -99999
 Lead: -99999
 Mercury: -99999
 Arsenic: -99999
 Lithium: -99999
 Molybdenum: -99999
 Strontium: -99999
 Cadmium: -99999

General Characteristics

Suspended Solid: -99999
 TDS Determined: 1210
 TDS Calculated: 1170
 Hardness: 340
 NCH: 0
 ALK as CaCO3: -99999
 SAR: 6.6
 RSC: 5
 Percent NA: 64

EPM

Cations		Anions	
Ca	4.34	HCO3	11.57
Mg	2.39	CO3	0
Na	12.18	SO4	8.33
K	0.22	Cl	0.42
		F	0.03
TOT	19.13	NO3	0
		CH	-99999
		TOT	20.35

Color: 1
 Date Started: 07/24/01
 Date Ended: 08/03/01

Remarks

Percent Diff: 3.09

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source: NDHD Lab

NO3 Samp Method: Cadmium Reductio

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Date Completed:	06/29/1971	Purpose:	Observation Well - Destroyed
L.S. Elevation (ft):	1862	Well Type:	1.25in. - ABS
Depth Drilled (ft):	140	Aquifer:	Trenton
Screen Int. (ft.):	52-55	Data Source:	

Completion Info:

Remarks:

Lithologic Log

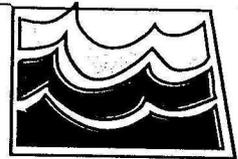
<u>Depth (ft)</u>	<u>Unit</u>	<u>Description</u>
0-1	TOPSOIL	Silty, sandy, clayey, brown
1-16	CLAY	Very silty, sandy, dark yellowish brown, slightly cohesive, plastic, oxidized (alluvium)
16-19	CLAY	Same as above, only olive-gray (alluvium)
19-53	SAND	Very fine- to medium-grained, subrounded, well-sorted, mostly quartz and siliceous rock fragments, lignitic
53-60	GRAVEL	Slightly sandy, fine to coarse (mostly medium to coarse), subangular to rounded, fair sorting, mostly brownish western silicates, lignitic, some shale and carbonates
60-97	SAND	Occasional thin clay lenses and layers, very fine- to coarse-grained (mostly fine- to medium-grained), subangular to rounded, moderately well-sorted, mostly quartz and siliceous rock fragments, lignitic, scoriaceous
97-140	SHALE	Clayey, very sandy to sandy, occasional thin lignite stringers, medium light gray to light gray, moderately indurated, occasional thin sandstone bedding, highly to moderately calcareous (Fort Union Group)

Chemistry

1 of 1

Location

15310232CBC



Lab ID Verified

Surface Sample Source

Date Sampled Sampling Method Field Conduct

Time Sampled Stage Field pH

Pump Time Surface Depth Field Temp

Yield Downhole Temp Lab Conduct

Water Level Dissolved O2 Lab pH

Total Evacuated

Major Cations and Anions

Silica	<input type="text" value="22"/>
Calcium	<input type="text" value="170"/>
Magnesium	<input type="text" value="61"/>
Potassium	<input type="text" value="10"/>
Sodium	<input type="text" value="270"/>
Flouride	<input type="text" value="0.2"/>
Bicarbonate	<input type="text" value="783"/>
Carbonate	<input type="text" value="0"/>
Sulfate	<input type="text" value="627"/>
Chloride	<input type="text" value="9"/>
Nitrate	<input type="text" value="1"/>
Hydroxide	<input type="text" value="-99999"/>
Phosphate	<input type="text" value="-99999"/>
Boron	<input type="text" value="0.24"/>
Iron	<input type="text" value="12"/>
Manganese	<input type="text" value="0.56"/>

Trace Elements

Selenium	<input type="text" value="-99999"/>
Lead	<input type="text" value="-99999"/>
Mercury	<input type="text" value="-99999"/>
Arsenic	<input type="text" value="-99999"/>
Lithium	<input type="text" value="-99999"/>
Molybdenum	<input type="text" value="-99999"/>
Strontium	<input type="text" value="-99999"/>
Cadmium	<input type="text" value="-99999"/>

General Characteristics

Suspended Solid	<input type="text" value="-99999"/>
TDS Determined	<input type="text" value="1590"/>
TDS Calculated	<input type="text" value="1570"/>
Hardness	<input type="text" value="677"/>
NCH	<input type="text" value="35"/>
ALK as CaCO3	<input type="text" value="-99999"/>
SAR	<input type="text" value="4.5"/>
RSC	<input type="text" value="-99999"/>
Percent NA	<input type="text" value="46"/>

EPM

Cations		Anions	
Ca	<input type="text" value="8.48"/>	HCO3	<input type="text" value="12.83"/>
Mg	<input type="text" value="5.02"/>	CO3	<input type="text" value="0"/>
Na	<input type="text" value="11.75"/>	SO4	<input type="text" value="13.05"/>
K	<input type="text" value="0.26"/>	Cl	<input type="text" value="0.25"/>
		F	<input type="text" value="0.01"/>
TOT	<input type="text" value="25.51"/>	NO3	<input type="text" value="0.02"/>
		CH	<input type="text" value="-99999"/>
		TOT	<input type="text" value="26.16"/>

Color
 Date Started
 Date Ended

Remarks

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

153-102-32DAA

Raymond Hoffman

Date Completed: 06/10/1984
L.S. Elevation (ft): N/A
Depth Drilled (ft): 45
Screen Int. (ft.): 35-45

Purpose: Domestic Well
Well Type: 5in. - PVC
Aquifer: Trenton
Data Source: Hininger Drilling

Completion Info:

Remarks:

Lithologic Log

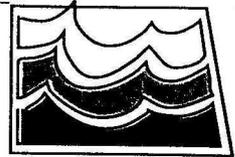
<u>Depth (ft)</u>	<u>Unit</u>	<u>Description</u>
0-1	TOPSOIL	
1-19	SAND	
19-20	CLAY	
20-33	SAND	
33-45	SAND & GRAVEL	

Chemistry

1 of 1

Location

15310232DAA



Lab ID	NDSWC Lab		<input checked="" type="checkbox"/> Verified
Surface		Sample Source	WC
Date Sampled	07/18/01	Sampling Method	
Time Sampled	11:55:00	Stage	-99999
Pump Time	5	Surface Depth	0
Yield	10	Downhole Temp	-99999
Water Level	-99999	Dissolved O2	-99999
Total Evacuated		Field Conduct	1750
		Field pH	-99999
		Field Temp	-99999
		Lab Conduct	2210
		Lab pH	7.47

Major Cations and Anions

Silica	-99999
Calcium	240
Magnesium	79
Potassium	9.6
Sodium	180
Flouride	0.3
Bicarbonate	884
Carbonate	0
Sulfate	410
Chloride	130
Nitrate	0.2
Hydroxide	-99999
Phosphate	-99999
Boron	-99999
Iron	12
Manganese	2.8

Trace Elements

Selenium	-99999
Lead	-99999
Mercury	-99999
Arsenic	-99999
Lithium	-99999
Molybdenum	-99999
Strontium	-99999
Cadmium	-99999

General Characteristics

Suspended Solid	-99999
TDS Determined	1540
TDS Calculated	1500
Hardness	920
NCH	200
ALK as CaCO3	-99999
SAR	2.6
RSC	0
Percent NA	29

EPM

	Cations		Anions
Ca	11.98	HCO3	14.49
Mg	6.5	CO3	0
Na	7.83	SO4	8.54
K	0.25	Cl	3.67
		F	0.02
TOT	26.56	NO3	0
		CH	-99999
		TOT	26.72

Color	1
Date Started	07/24/01
Date Ended	08/03/01

Remarks

Percent Diff 0.3

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source NDHD Lab

NO3 Samp Method Cadmium Reductid

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

153-102-33BBB

NDSWC 8002

Date Completed:	06/22/1971	Purpose:	Observation Well
L.S. Elevation (ft):	1863	Well Type:	1.25in. - ABS
Depth Drilled (ft):	80	Aquifer:	Trenton
Screen Int. (ft.):	47-50	Data Source:	

Completion Info:

Remarks: North ditch.

Lithologic Log

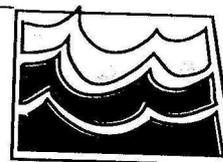
Depth (ft)	Unit	Description
0-1	TOPSOIL	Silty, sandy, brown
1-18	CLAY	Very silty, sandy, dark yellowish brown, slightly cohesive, plastic, oxidized (alluvium)
18-30	SAND	Very fine- to medium-grained, well-sorted, subrounded, mostly quartz, some lignite, shale and scoria
30-39	SAND	Slightly to moderately gravelly, fine- to very coarse-grained (mostly medium- to coarse-grained), subangular to rounded, well-sorted, mostly quartz and siliceous rock fragments, lignitic
39-55	GRAVEL	Slightly sandy, fine to coarse (mostly medium to coarse), subangular to well-rounded, moderately well-sorted, mostly brownish western siliceous rocks, lignitic
55-80	SHALE	Clayey, moderately sandy, medium light gray with occasional brownish concretions and thin lignite stringers, moderately calcareous, moderately indurated (Fort Union Group)

Chemistry

1 of 1

Location

15310233BBB



Lab ID		<input checked="" type="checkbox"/> Verified			
Surface		Sample Source WC			
Date Sampled	06/23/71	Sampling Method			
Time Sampled	00:00:00	Stage	-99999	Field Conduct	2025
Pump Time	360	Surface Depth	0	Field pH	-99999
Yield	4.5	Downhole Temp	-99999	Field Temp	6.5
Water Level	-99999	Dissolved O2	-99999	Lab Conduct	1970
Total Evacuated				Lab pH	7.7

Major Cations and Anions

Silica	21
Calcium	195
Magnesium	71
Potassium	8
Sodium	191
Flouride	0.2
Bicarbonate	666
Carbonate	0
Sulfate	596
Chloride	14
Nitrate	0.2
Hydroxide	-99999
Phosphate	-99999
Boron	0.17
Iron	4.2
Manganese	1.2

Trace Elements

Selenium	-99999
Lead	-99999
Mercury	-99999
Arsenic	-99999
Lithium	-99999
Molybdenum	-99999
Strontium	-99999
Cadmium	-99999

General Characteristics

Suspended Solid	-99999
TDS Determined	1440
TDS Calculated	1430
Hardness	778
NCH	231
ALK as CaCO3	-99999
SAR	3
RSC	-99999
Percent NA	35

EPM

Cations		Anions	
Ca	9.73	HCO3	10.92
Mg	5.84	CO3	0
Na	8.31	SO4	12.41
K	0.2	Cl	0.39
		F	0.01
TOT	24.08	NO3	0
		CH	-99999
		TOT	23.73

Color	M
Date Started	08/03/71
Date Ended	08/11/71

Remarks

W

Percent Diff -99999

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source **Unknown**

NO3 Samp Method **Unknown**

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Date Completed:	06/22/1971	Purpose:	Observation Well - Destroyed
L.S. Elevation (ft):	1863	Well Type:	1.25in. - ABS
Depth Drilled (ft):	145	Aquifer:	Trenton
Screen Int. (ft.):	57-63	Data Source:	

Completion Info:

Remarks: E. of garage on abandoned farmstead.

Lithologic Log

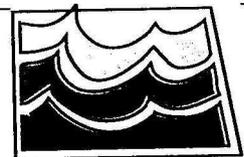
Depth (ft)	Unit	Description
0-1	TOPSOIL	Silty, sandy, clayey, brown
1-15	CLAY	Very silty, sandy, dusky yellow to moderate yellowish brown, slightly cohesive, moderately plastic, oxidized (alluvium)
15-18	CLAY	Same as above, only olive-gray (alluvium)
18-36	SAND	Very fine- to coarse-grained (mostly medium-grained), subrounded, well-sorted, mostly quartz and siliceous rock fragments, lignitic, scoriaceous
36-38	CLAY	Silty, sandy, medium gray, detrital lignite chips, slightly indurated, highly calcareous (alluvium)
38-66	GRAVEL	Slightly sandy, slightly clayey, fine to coarse (mostly medium to coarse), subangular to well-rounded, fair sorting, predominantly brownish western siliceous rocks-chalcedony, agate, chert, jasper, quartzite, sandstone, some shale, carbonates and lignite, small amount of scoria
66-135	SAND	Slightly to moderately gravelly, stratified, probably some matrix clay, occasional thin clay lenses, fine- to very coarse-grained (mostly medium- to coarse-grained), subrounded, moderately well-sorted, mostly quartz and siliceous rock fragments, much detrital lignite
135-142	GRAVEL AND COBBLES	Sandy, fine to coarse, angular to rounded, fair sorting, mostly western siliceous rocks
142-145	SHALE	Clayey, medium light gray, moderately indurated, calcareous, brownish concretions (Fort Union Group)

Chemistry

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Location

15310233CDD



Verified

Lab ID

Surface

Sample Source **WC**

Date Sampled

06/23/71

Sampling Method

Field Conduct

1220

Time Sampled

00:00:00

Stage

-99999

Field pH

-99999

Pump Time

420

Surface Depth

0

Field Temp

9

Yield

3.5

Downhole Temp

-99999

Lab Conduct

1150

Water Level

-99999

Dissolved O2

-99999

Lab pH

7.7

Total Evacuated

Major Cations and Anions

Silica	25
Calcium	123
Magnesium	43
Potassium	6.7
Sodium	92
Flouride	0.2
Bicarbonate	546
Carbonate	0
Sulfate	211
Chloride	8.4
Nitrate	0.4
Hydroxide	-99999
Phosphate	-99999
Boron	0.21
Iron	0.2
Manganese	0.9

Trace Elements

Selenium	-99999
Lead	-99999
Mercury	-99999
Arsenic	-99999
Lithium	-99999
Molybdenum	-99999
Strontium	-99999
Cadmium	-99999

General Characteristics

Suspended Solid	-99999
TDS Determined	829
TDS Calculated	780
Hardness	483
NCH	35
ALK as CaCO3	-99999
SAR	1.8
RSC	-99999
Percent NA	29

EPM

Cations		Anions	
Ca	6.14	HCO3	8.95
Mg	3.54	CO3	0
Na	4	SO4	4.39
K	0.17	Cl	0.24
		F	0.01
		NO3	0.01
		CH	-99999
TOT	13.85	TOT	13.6

Color

M

Date Started

08/09/71

Date Ended

08/31/71

Remarks

W

Percent Diff

-99999

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

Unknown

NO3 Samp Method

Unknown

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Date Completed:	09/17/2001	Purpose:	Observation Well
L.S. Elevation (ft):	1861.86	Well Type:	2in. - PVC
Depth Drilled (ft):	80	Aquifer:	Trenton
Screen Int. (ft.):	52-57	Data Source:	Wanek

Completion Info:

Remarks:

Lithologic Log

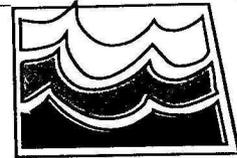
<u>Depth (ft)</u>	<u>Unit</u>	<u>Description</u>
0-1	TOPSOIL	
1-15	SILT	clayey, dark yellowish brown
15-22	SILT	slightly clayey, olive gray
22-37	SAND	fine, moderately well sorted, drills fast and smooth, takes water, mixed 1 bag mud
37-43	SAND & GRAVEL	very coarse, comprised of silicates, carbonates, scoria, lignite, taking water, mixed 1 bag mud
43-60	GRAVEL	sandy, pebbly, comprised of silicates, carbonates and scoria, mixed 1 bag mud
60-65	GRAVEL	as above, coarser, rougher drilling, rounded iron-stained pebbles
65-80	SILTSTONE	medium gra to olive gray, drills very slow, semi-indurated, sme fine sand, bedrock (Ft. Union Group)

Chemistry

1 of 1

Location

15310233DBB



Verified

Lab ID
 Surface
 Date Sampled
 Time Sampled
 Pump Time
 Yield
 Water Level
 Total Evacuated

Sample Source
 Sampling Method
 Stage
 Surface Depth
 Downhole Temp
 Dissolved O2

Field Conduct
 Field pH
 Field Temp
 Lab Conduct
 Lab pH

Major Cations and Anions

Silica
 Calcium
 Magnesium
 Potassium
 Sodium
 Flouride
 Bicarbonate
 Carbonate
 Sulfate
 Chloride
 Nitrate
 Hydroxide
 Phosphate
 Boron
 Iron
 Manganese

Trace Elements

Selenium
 Lead
 Mercury
 Arsenic
 Lithium
 Molybdenum
 Strontium
 Cadmium

General Characteristics

Suspended Solid
 TDS Determined
 TDS Calculated
 Hardness
 NCH
 ALK as CaCO3
 SAR
 RSC
 Percent NA

EPM

Cations		Anions	
Ca	<input type="text" value="8.98"/>	HCO3	<input type="text" value="14.49"/>
Mg	<input type="text" value="5.59"/>	CO3	<input type="text" value="0"/>
Na	<input type="text" value="8.27"/>	SO4	<input type="text" value="8.54"/>
K	<input type="text" value="0.22"/>	Cl	<input type="text" value="0.39"/>
		F	<input type="text" value="0.02"/>
		NO3	<input type="text" value="0"/>
		CH	<input type="text" value="-99999"/>
TOT	<input type="text" value="23.06"/>	TOT	<input type="text" value="23.44"/>

Color
 Date Started
 Date Ended

Remarks

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source
 NO3 Samp Method
 Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Date Completed:	06/23/1971	Purpose:	Observation Well - Destroyed
L.S. Elevation (ft):	1858	Well Type:	1.25in. - ABS
Depth Drilled (ft):	120	Aquifer:	Trenton
Screen Int. (ft.):	92-98	Data Source:	

Completion Info:

Remarks: in small clearing.

Lithologic Log

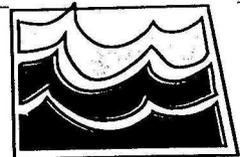
Depth (ft)	Unit	Description
0-1	TOPSOIL	Silty, sandy, brown
1-12	CLAY	Very silty, sandy, dark yellowish brown, slightly cohesive, plastic, oxidized (alluvium)
12-19	CLAY	Same as above, only olive-gray (alluvium)
19-28	SAND	Slightly clayey, fine- to very coarse-grained, subrounded, well-sorted
28-31	CLAY	Very silty, sandy, olive-gray, slightly indurated, calcareous, laminated (alluvium)
31-59	GRAVEL	Slightly to moderately sandy, fine to coarse (mostly medium to coarse), subangular to well-rounded, fair sorting, predominantly brownish western silicates, some carbonates, shale, scoria, and lignite
59-85	SAND	(Clay occurs as lenses and probably some matrix material), slightly clayey, fine- to coarse-grained (mostly medium-grained), subrounded, moderately well-sorted, mostly quartz and siliceous rock fragments, much detrital lignite, gravel caving in from above
85-115	GRAVEL	Slightly sandy, fine to coarse, subrounded to well-rounded, moderately well-sorted, mostly western siliceous rocks-chalcedony, chert, agate, jasper, quartzite, some shale, carbonates and lignite
115-120	SHALE	Clayey, medium light gray, moderately indurated, calcareous, occasionally brown concretions (Fort Union Group)

Chemistry

1 of 1

Location

15310233DAD



Verified

Lab ID
 Surface
 Date Sampled
 Time Sampled
 Pump Time
 Yield
 Water Level
 Total Evacuated

Sample Source
 Sampling Method
 Stage
 Surface Depth
 Downhole Temp
 Dissolved O2

Field Conduct
 Field pH
 Field Temp
 Lab Conduct
 Lab pH

Major Cations and Anions

Silica
 Calcium
 Magnesium
 Potassium
 Sodium
 Flouride
 Bicarbonate
 Carbonate
 Sulfate
 Chloride
 Nitrate
 Hydroxide
 Phosphate
 Boron
 Iron
 Manganese

Trace Elements

Selenium
 Lead
 Mercury
 Arsenic
 Lithium
 Molybdenum
 Strontium
 Cadmium

General Characteristics

Suspended Solid
 TDS Determined
 TDS Calculated
 Hardness
 NCH
 ALK as CaCO3
 SAR
 RSC
 Percent NA

EPM

Cations		Anions	
Ca	<input type="text" value="7.98"/>	HCO3	<input type="text" value="11.26"/>
Mg	<input type="text" value="3.29"/>	CO3	<input type="text" value="0"/>
Na	<input type="text" value="4.74"/>	SO4	<input type="text" value="4.41"/>
K	<input type="text" value="0.25"/>	Cl	<input type="text" value="0.17"/>
		F	<input type="text" value="0.02"/>
TOT	<input type="text" value="16.26"/>	NO3	<input type="text" value="0.01"/>
		CH	<input type="text" value="-99999"/>
		TOT	<input type="text" value="15.87"/>

Color
 Date Started
 Date Ended

Remarks

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

153-102-33DCD

Dean Bauste

Date Completed:	10/30/1987	Purpose:	Stock Well
L.S. Elevation (ft):	N/A	Well Type:	5in. - PVC
Depth Drilled (ft):	60	Aquifer:	Trenton
Screen Int. (ft.):	50-60	Data Source:	

Completion Info:

Remarks:

Lithologic Log

<u>Depth (ft)</u>	<u>Unit</u>	<u>Description</u>
0-18	SAND	
18-19	SAND & GRAVEL	
19-55	SAND	
55-60	GRAVEL	

Date Completed:	09/14/2001	Purpose:	Observation Well
L.S. Elevation (ft):	1860.4	Well Type:	2in. - PVC
Depth Drilled (ft):	140	Aquifer:	Trenton
Screen Int. (ft.):	106-111	Data Source:	Bob Shaver

Completion Info:

Remarks: South Well

Lithologic Log

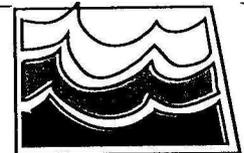
Depth (ft)	Unit	Description
0-9	CLAY	silty, yellow brown, oxidized
9-17	CLAY	silty, with very fine sand, silty, clayey, cohesive, soft, yellow brown, oxidized
17-22	SAND	very fine, silty, slightly clayey, as above, olive gray, unoxidized, soft
22-36	SAND	very fine to medium, some scoria and lignite grains, no bit chatter, drills smooth and fast
36-55	SAND	very fine to very coarse pred. medium to coarse, <5% gravel, up to about 1/4 inch diameter, some scoria and lignite fragments, drills as stratified, comprised of western silicates, scoria, lignite, claystones, siltstones, subangular to well rounded, light bit chatter
55-61	SAND	as above, predom. medium to coarse, more gravelly, up to 3/4 inch diameter, stratified sequence, composition as above, moderate bit chatter, mixed 2 mud @ 60 feet
61-85	SAND	very fine to fine, mud thick, sand in suspension, bit slowed, no chatter, interbedded with silty clay, good recovery, mixed 1 bag mud @ 80 feet
85-131	SAND & GRAVEL	moderate bit chatter, caving, takes lots of water, mixed 1 bag mud @ 90 feet, most all sand in suspension, gravel up to 1 inch diameter, mostly 1/4 to 1/2 inch diameter, composition as above, mixed 1 bag mud @ 100 feet, very strong bit chatter from 100 to 110 feet, mixed 1 bag mud @ 110 feet, mixed 1 bag mud @ 120 feet and 1 bag mud @ 130 feet
131-140	CLAY	light gray, soft, drills slow, smooth, no bit chatter, bedrock, (Fort Union Group)

Chemistry

1 of 1

Location

15310233DDD1



Verified

Lab ID

Surface

Date Sampled

Time Sampled

Pump Time

Yield

Water Level

Total Evacuated

Sample Source

Sampling Method

Stage

Surface Depth

Downhole Temp

Dissolved O2

Field Conduct

Field pH

Field Temp

Lab Conduct

Lab pH

Major Cations and Anions

Silica

Calcium

Magnesium

Potassium

Sodium

Flouride

Bicarbonate

Carbonate

Sulfate

Chloride

Nitrate

Hydroxide

Phosphate

Boron

Iron

Manganese

Trace Elements

Selenium

Lead

Mercury

Arsenic

Lithium

Molybdenum

Strontium

Cadmium

General Characteristics

Suspended Solid

TDS Determined

TDS Calculated

Hardness

NCH

ALK as CaCO3

SAR

RSC

Percent NA

EPM

Cations		Anions	
Ca	<input type="text" value="6.49"/>	HCO3	<input type="text" value="9.13"/>
Mg	<input type="text" value="3.7"/>	CO3	<input type="text" value="0"/>
Na	<input type="text" value="4.35"/>	SO4	<input type="text" value="6.04"/>
K	<input type="text" value="0.23"/>	Cl	<input type="text" value="0.31"/>
		F	<input type="text" value="0.02"/>
TOT	<input type="text" value="14.77"/>	NO3	<input type="text" value="0"/>
		CH	<input type="text" value="-99999"/>
		TOT	<input type="text" value="15.5"/>

Color

Date Started

Date Ended

Remarks

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

153-102-33DDD2

NDSWC 14769

Date Completed:	09/14/2001	Purpose:	Observation Well
L.S. Elevation (ft):	1860.19	Well Type:	2in. - PVC
Depth Drilled (ft):	0	Aquifer:	Trenton
Screen Int. (ft.):	33-38	Data Source:	Bob Shaver

Completion Info:

Remarks: North Well

Lithologic Log

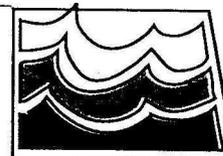
<u>Depth (ft)</u>	<u>Unit</u>	<u>Description</u>
0-18	CLAY	silty, and very fine sand, slightly clayey, very soft, cohesive, yellow brown, oxidized
18-22	CLAY	as above, olive gray, oxidized
22-36	SAND	very fine to medium, some scoria and lignite fragments, no bit chatter, drills smooth and fast
36-60	SAND	very fine to very coarse, prodom. medium to coarse, <5% gravel up to 1/4 inch in diameter, drills as stratified, comprised of western silicates, scoria, lignite, claystones, siltstones, subangular to well rounded, light bit chatter

Chemistry

1 of 1

Location

15310233DDD2



Lab ID	NDSWC Lab	<input checked="" type="checkbox"/> Verified
Surface		Sample Source WC
Date Sampled	10/03/01	Sampling Method A
Time Sampled	14:18:00	Stage -99999
Pump Time	20	Surface Depth 0
Yield	4	Downhole Temp -99999
Water Level	12.9	Dissolved O2 -99999
Total Evacuated		Field Conduct 1011
		Field pH 6.73
		Field Temp -99999
		Lab Conduct 1050
		Lab pH 7.86

Major Cations and Anions	
Silica	-99999
Calcium	110
Magnesium	41
Potassium	5.9
Sodium	71
Flouride	0.5
Bicarbonate	496
Carbonate	0
Sulfate	200
Chloride	15
Nitrate	0.1
Hydroxide	-99999
Phosphate	-99999
Boron	-99999
Iron	2.4
Manganese	0.92

Trace Elements	
Selenium	3
Lead	2
Mercury	0
Arsenic	10
Lithium	100
Molybdenum	3
Strontium	1000
Cadmium	-99999

General Characteristics	
Suspended Solid	-99999
TDS Determined	687
TDS Calculated	691
Hardness	440
NCH	37
ALK as CaCO3	-99999
SAR	1.5
RSC	0
Percent NA	26

EPM			
Cations		Anions	
Ca	5.49	HCO3	8.13
Mg	3.37	CO3	0
Na	3.09	SO4	4.16
K	0.15	Cl	0.42
		F	0.03
TOT	12.1	NO3	0
		CH	-99999
		TOT	12.74

Color	1
Date Started	10/10/01
Date Ended	03/15/02

Remarks

Percent Diff 2.58

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source NDHD Lab

NO3 Samp Method Cadmium Reductio

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Date Completed:	05/19/1965	Purpose:	Observation Well
L.S. Elevation (ft):	1895	Well Type:	1.25in. - ABS
Depth Drilled (ft):	115.5	Aquifer:	Trenton
Screen Int. (ft.):	0-73	Data Source:	

Completion Info:

Remarks: W. of road, N. of fence line.

Lithologic Log

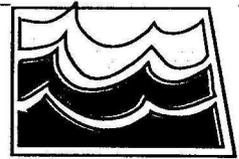
Depth (ft)	Unit	Description
0-1	SOIL	Black
1-5	TILL	Dusky yellow to light olive-gray, silty
5-11	SAND	Gravelly, poorly sorted, subrounded to subangular, oxidized
11-42	TILL	Light olive-gray to dusky yellow, silty, oxidized
42-49	GRAVEL	Sandy, poorly sorted, subrounded to angular
49-51	TILL	Olive-gray to dark greenish gray, silty
51-53	GRAVEL	Fine to coarse
53-57	TILL	Olive-gray to dark greenish gray, silty
57-74	GRAVEL	Sandy, poorly sorted, angular to rounded
74-116	CLAY	Light bluish gray, silty and sandy, some thin sandstone (Fort Union Group)

Chemistry

1 of 2

Location

15310325DAD



Lab ID	<input type="text"/>	<input checked="" type="checkbox"/> Verified
Surface	<input type="text"/>	Sample Source <input type="text" value="WC"/>
Date Sampled	<input type="text" value="07/02/71"/>	Sampling Method <input type="text"/>
Time Sampled	<input type="text" value="00:00:00"/>	Stage <input type="text" value="-99999"/>
Pump Time	<input type="text" value="60"/>	Surface Depth <input type="text" value="0"/>
Yield	<input type="text" value="2.5"/>	Downhole Temp <input type="text" value="-99999"/>
Water Level	<input type="text" value="-99999"/>	Dissolved O2 <input type="text" value="-99999"/>
Total Evacuated	<input type="text"/>	Field Conduct <input type="text" value="-99999"/>
		Field pH <input type="text" value="-99999"/>
		Field Temp <input type="text" value="7.5"/>
		Lab Conduct <input type="text" value="3330"/>
		Lab pH <input type="text" value="8"/>

Silica	<input type="text" value="24"/>
Calcium	<input type="text" value="88"/>
Magnesium	<input type="text" value="33"/>
Potassium	<input type="text" value="8.3"/>
Sodium	<input type="text" value="734"/>
Flouride	<input type="text" value="0.9"/>
Bicarbonate	<input type="text" value="961"/>
Carbonate	<input type="text" value="0"/>
Sulfate	<input type="text" value="1130"/>
Chloride	<input type="text" value="8.9"/>
Nitrate	<input type="text" value="1"/>
Hydroxide	<input type="text" value="-99999"/>
Phosphate	<input type="text" value="-99999"/>
Boron	<input type="text" value="0.38"/>
Iron	<input type="text" value="0.66"/>
Manganese	<input type="text" value="0.57"/>

Selenium	<input type="text" value="-99999"/>
Lead	<input type="text" value="-99999"/>
Mercury	<input type="text" value="-99999"/>
Arsenic	<input type="text" value="-99999"/>
Lithium	<input type="text" value="-99999"/>
Molybdenum	<input type="text" value="-99999"/>
Strontium	<input type="text" value="-99999"/>
Cadmium	<input type="text" value="-99999"/>

Suspended Solid	<input type="text" value="-99999"/>
TDS Determined	<input type="text" value="2540"/>
TDS Calculated	<input type="text" value="2500"/>
Hardness	<input type="text" value="355"/>
NCH	<input type="text" value="0"/>
ALK as CaCO3	<input type="text" value="-99999"/>
SAR	<input type="text" value="17"/>
RSC	<input type="text" value="-99999"/>
Percent NA	<input type="text" value="81"/>

Cations		Anions	
Ca	<input type="text" value="4.39"/>	HCO3	<input type="text" value="15.75"/>
Mg	<input type="text" value="2.71"/>	CO3	<input type="text" value="0"/>
Na	<input type="text" value="31.93"/>	SO4	<input type="text" value="23.53"/>
K	<input type="text" value="0.21"/>	Cl	<input type="text" value="0.25"/>
		F	<input type="text" value="0.05"/>
TOT	<input type="text" value="39.24"/>	NO3	<input type="text" value="0.02"/>
		CH	<input type="text" value="-99999"/>
		TOT	<input type="text" value="39.6"/>

Color

Date Started

Date Ended

Remarks

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

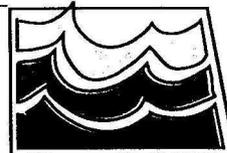
Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Chemistry

1 of 2

Location

15310325DAD



Lab ID				<input checked="" type="checkbox"/> Verified	
Surface		Sample Source	WC		
Date Sampled	08/18/71	Sampling Method		Field Conduct	2700
Time Sampled	00:00:00	Stage	-99999	Field pH	-99999
Pump Time	15	Surface Depth	0	Field Temp	9
Yield	3	Downhole Temp	-99999	Lab Conduct	3420
Water Level	-99999	Dissolved O2	-99999	Lab pH	8
Total Evacuated					

Major Cations and Anions

Silica	24
Calcium	90
Magnesium	30
Potassium	7.9
Sodium	728
Flouride	1.2
Bicarbonate	974
Carbonate	0
Sulfate	1120
Chloride	10
Nitrate	1
Hydroxide	-99999
Phosphate	-99999
Boron	0.42
Iron	0.36
Manganese	0.68

Trace Elements

Selenium	-99999
Lead	-99999
Mercury	-99999
Arsenic	-99999
Lithium	-99999
Molybdenum	-99999
Strontium	-99999
Cadmium	-99999

General Characteristics

Suspended Solid	-99999
TDS Determined	2420
TDS Calculated	2490
Hardness	350
NCH	0
ALK as CaCO3	-99999
SAR	17
RSC	-99999
Percent NA	81

EPM

Cations		Anions	
Ca	4.49	HCO3	15.96
Mg	2.47	CO3	0
Na	31.67	SO4	23.32
K	0.2	Cl	0.28
		F	0.06
TOT	38.83	NO3	0.02
		CH	-99999
		TOT	39.64

Color	A
Date Started	08/24/71
Date Ended	08/30/71

Remarks

W

Percent Diff -99999

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source Unknown

NO3 Samp Method Unknown

Nitrate Remarks

--

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

153-103-36DAA

Dwight Aune

Date Completed:	04/15/1982	Purpose:	Domestic Well
L.S. Elevation (ft):	N/A	Well Type:	5in. - PVC
Depth Drilled (ft):	55	Aquifer:	Trenton
Screen Int. (ft.):	45-55	Data Source:	

Completion Info:

Remarks:

Lithologic Log

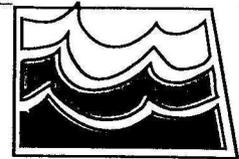
<u>Depth (ft)</u>	<u>Unit</u>	<u>Description</u>
0-15	CLAY	sandy, lignite mixed
15-30	CLAY	sandy
30-37	GRAVEL	
37-41	CLAY	sandy
41-45	SAND & GRAVEL	
45-53	GRAVEL	
53-55	CLAY	

Chemistry

1 of 1

Location

15310336DAA



Lab ID	NDSWC Lab			<input checked="" type="checkbox"/> Verified	
Surface		Sample Source	WC		
Date Sampled	07/18/01	Sampling Method		Field Conduct	692
Time Sampled	17:30:00	Stage	-99999	Field pH	-99999
Pump Time	2	Surface Depth	0	Field Temp	-99999
Yield	10	Downhole Temp	-99999	Lab Conduct	872
Water Level	-99999	Dissolved O2	-99999	Lab pH	7.52
Total Evacuated					

Major Cations and Anions

Silica	-99999
Calcium	67
Magnesium	25
Potassium	3.9
Sodium	82
Flouride	0.6
Bicarbonate	309
Carbonate	0
Sulfate	180
Chloride	14
Nitrate	8.2
Hydroxide	-99999
Phosphate	-99999
Boron	-99999
Iron	0.03
Manganese	0.01

Trace Elements

Selenium	-99999
Lead	-99999
Mercury	-99999
Arsenic	-99999
Lithium	-99999
Molybdenum	-99999
Strontium	-99999
Cadmium	-99999

General Characteristics

Suspended Solid	-99999
TDS Determined	574
TDS Calculated	533
Hardness	270
NCH	17
ALK as CaCO3	-99999
SAR	2.2
RSC	0
Percent NA	39

EPM

Cations		Anions	
Ca	3.34	HCO3	5.06
Mg	2.06	CO3	0
Na	3.57	SO4	3.75
K	0.1	Cl	0.39
		F	0.03
TOT	9.07	NO3	0.13
		CH	-99999
		TOT	9.36

Color	A
Date Started	07/25/01
Date Ended	08/03/01

Remarks

Percent Diff 1.57

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source NDHD Lab

NO3 Samp Method Cadmium Reductio

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Date Completed:	06/30/1971	Purpose:	Observation Well
L.S. Elevation (ft):	1876.88	Well Type:	1.25in. - ABS
Depth Drilled (ft):	105	Aquifer:	Trenton
Screen Int. (ft.):	87-93	Data Source:	

Completion Info:

Remarks: South side of private road.

Lithologic Log

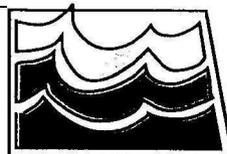
Depth (ft)	Unit	Description
0-1	TOPSOIL	Sandy, silty, clayey, brown
1-16	CLAY	Very silty, sandy, dark yellowish brown, slightly cohesive, plastic, oxidized (alluvium)
16-21	CLAY	Same as above, only olive-gray, occasional thin sand lenses (alluvium)
21-48	CLAY	Very silty, olive-gray to medium gray with dark greenish gray mottling, moderately cohesive, highly plastic, very calcareous (alluvium)
48-69	SAND	Fine- to coarse-grained (mostly fine- to medium-grained), subrounded, moderately well-sorted, mostly quartz and siliceous rock fragments, lignitic
69-75	GRAVEL	Moderately sandy, fine to coarse (mostly medium to coarse), subangular to rounded, fair sorting, mostly brownish western silicates
75-92	SAND	Occasional thin clay lenses, very fine- to coarse-grained (mostly fine- to medium-grained), subangular to rounded, moderately well sorted, mostly quartz and siliceous rock fragments, scoriaceous, lignitic
92-105	GRAVEL	Moderately sandy, fine to coarse (mostly fine to medium), angular to rounded, fair sorting, mostly brownish western silicates, some shale and carbonates, scoria, much detrital lignite

Chemistry

1 of 2

Location

15310336DDD



Lab ID	<input type="text"/>	<input checked="" type="checkbox"/> Verified
Surface	<input type="text"/>	Sample Source <input type="text" value="WC"/>
Date Sampled	<input type="text" value="07/01/71"/>	Sampling Method <input type="text"/>
Time Sampled	<input type="text" value="00:00:00"/>	Stage <input type="text" value="-99999"/>
Pump Time	<input type="text" value="360"/>	Surface Depth <input type="text" value="0"/>
Yield	<input type="text" value="7.5"/>	Downhole Temp <input type="text" value="-99999"/>
Water Level	<input type="text" value="-99999"/>	Dissolved O2 <input type="text" value="-99999"/>
Total Evacuated	<input type="text"/>	Field Conduct <input type="text" value="1510"/>
		Field pH <input type="text" value="-99999"/>
		Field Temp <input type="text" value="8.5"/>
		Lab Conduct <input type="text" value="1440"/>
		Lab pH <input type="text" value="7.9"/>

Major Cations and Anions

Silica	<input type="text" value="26"/>
Calcium	<input type="text" value="46"/>
Magnesium	<input type="text" value="15"/>
Potassium	<input type="text" value="7.4"/>
Sodium	<input type="text" value="296"/>
Flouride	<input type="text" value="0.8"/>
Bicarbonate	<input type="text" value="724"/>
Carbonate	<input type="text" value="0"/>
Sulfate	<input type="text" value="190"/>
Chloride	<input type="text" value="6.9"/>
Nitrate	<input type="text" value="0.4"/>
Hydroxide	<input type="text" value="-99999"/>
Phosphate	<input type="text" value="-99999"/>
Boron	<input type="text" value="0.24"/>
Iron	<input type="text" value="1.3"/>
Manganese	<input type="text" value="0.18"/>

Trace Elements

Selenium	<input type="text" value="-99999"/>
Lead	<input type="text" value="-99999"/>
Mercury	<input type="text" value="-99999"/>
Arsenic	<input type="text" value="-99999"/>
Lithium	<input type="text" value="-99999"/>
Molybdenum	<input type="text" value="-99999"/>
Strontium	<input type="text" value="-99999"/>
Cadmium	<input type="text" value="-99999"/>

General Characteristics

Suspended Solid	<input type="text" value="-99999"/>
TDS Determined	<input type="text" value="1020"/>
TDS Calculated	<input type="text" value="947"/>
Hardness	<input type="text" value="176"/>
NCH	<input type="text" value="0"/>
ALK as CaCO3	<input type="text" value="-99999"/>
SAR	<input type="text" value="9.7"/>
RSC	<input type="text" value="-99999"/>
Percent NA	<input type="text" value="78"/>

EPM

Cations		Anions	
Ca	<input type="text" value="2.3"/>	HCO3	<input type="text" value="11.87"/>
Mg	<input type="text" value="1.23"/>	CO3	<input type="text" value="0"/>
Na	<input type="text" value="12.88"/>	SO4	<input type="text" value="3.96"/>
K	<input type="text" value="0.19"/>	Cl	<input type="text" value="0.19"/>
		F	<input type="text" value="0.04"/>
TOT	<input type="text" value="16.6"/>	NO3	<input type="text" value="0.01"/>
		CH	<input type="text" value="-99999"/>
		TOT	<input type="text" value="16.07"/>

Color

Date Started

Date Ended

Remarks

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

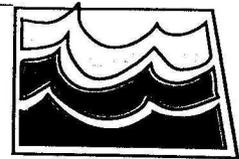
Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

Chemistry

1 of 2

Location

15310336DDD



Lab ID	NDSWC Lab	<input checked="" type="checkbox"/> Verified
Surface		Sample Source WC
Date Sampled	07/18/01	Sampling Method A
Time Sampled	10:10:00	Stage -99999
Pump Time	95	Surface Depth 0
Yield	5	Downhole Temp -99999
Water Level	21.39	Dissolved O2 -99999
Total Evacuated		Field Conduct 1500
		Field pH -99999
		Field Temp -99999
		Lab Conduct 1820
		Lab pH 7.91

Major Cations and Anions

Silica	-99999
Calcium	65
Magnesium	23
Potassium	11
Sodium	340
Flouride	0.8
Bicarbonate	740
Carbonate	0
Sulfate	410
Chloride	5.6
Nitrate	0.1
Hydroxide	-99999
Phosphate	-99999
Boron	-99999
Iron	1.3
Manganese	0.4

Trace Elements

Selenium	-99999
Lead	-99999
Mercury	-99999
Arsenic	-99999
Lithium	-99999
Molybdenum	-99999
Strontium	-99999
Cadmium	-99999

General Characteristics

Suspended Solid	-99999
TDS Determined	1240
TDS Calculated	1220
Hardness	260
NCH	0
ALK as CaCO3	-99999
SAR	9.2
RSC	7
Percent NA	73

EPM

Cations		Anions	
Ca	3.24	HCO3	12.13
Mg	1.89	CO3	0
Na	14.79	SO4	8.54
K	0.28	Cl	0.16
		F	0.04
TOT	20.2	NO3	0
		OH	-99999
		TOT	20.87

Color

Date Started

Date Ended

Remarks

Percent Diff

Nitrate Info

NO3 Sample Chilled

NO3 Samp Source

NO3 Samp Method

Nitrate Remarks

Fields that have not been measured are identified with a default value of -99999. In order to return a field to the default value click on the field name.

APPENDIX II

Water Permitting Process

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Water Permitting Process

A permit is required to use water in North Dakota for an industrial purpose. The State Engineer administers the procedures for obtaining a conditional water permit. A conditional water permit reserves a specified volume of water for a specified use, subject to conditions that are a part of the permit.

The initial step in obtaining a water permit is filing an application with the State engineer. The application consists of the completed application form, a map and an application fee. For industrial use pumping in excess of one cubic foot per second the application fee is \$750.00. The priority date is established when the application is received by the State Engineer. The required form and instructions are available from the office of the State Engineer on request.

When the State Engineer receives a completed application, the applicant is instructed to send a "Notice of Application" by certified mail to all record title owners of real property and water permit holders within one-mile radius of the point of diversion, as well as all municipal and public use water facilities in the county in which the proposed point of diversion is located. There are exceptions for the need to notify all real property owners.

The notice includes the locations and use of the appropriation, the amount of and purpose for which the water is to be used, the applicant's address, and the newspaper in which the notice will be published. The notice also states that the notice published in the newspaper will contain a date by

which any person having an interest in the application may file written comments regarding the proposed appropriation with the State Engineer.

After notice of application has been mailed to those required, the applicant completes an Affidavit of Notice and returns it to the State Engineer by certified mail. The Affidavit of Notice must state how the applicant determined the record title owners and must list the names and addresses of those who were sent notices by certified mail.

Upon receipt of the completed affidavit, the State Engineer publishes a notice of the water permit application in the official newspaper in the county in which the proposed point of diversion is located. The notice is published once a week for two consecutive weeks. The notice will specify the date by which any person having interest in the application may submit written comments to the State Engineer and must state that anyone who files written comments with the State Engineer will be mailed a copy of the State Engineer's recommended decision on the application. A copy of the notice will be sent to the applicant. The applicant pays the cost of publication.

The State Engineer will consider all written comments and provide a copy of the recommended decision to the applicant and any person who filed written comments. Within 30 days of service of the recommended decision, the applicant and any parties who filed written comments may file additional written comments with the State Engineer or request a hearing on the application, or both. If a request for a hearing is made, the State Engineer will designate a time and place for the hearing and serve a copy of the notice of hearing to the applicant and any person who filed written comments.

A water permit application must meet the following criteria: 1) the rights of a prior appropriator will not be unduly affected, 2) the proposed means of diversion or construction are adequate, 3) the proposed use of water is beneficial, and, 4) the proposed appropriation is in the public interest. In determining the public interest, the State Engineer considers the following: a) the benefit to the applicant, b) the effect on economic activity, c) the effect on fish, wildlife, and recreational opportunities, d) the effect of loss of alternate uses of water that might be made within a reasonable time if not precluded or hindered by the proposed appropriation, and, f) the applicant's intent and ability to complete the appropriation.