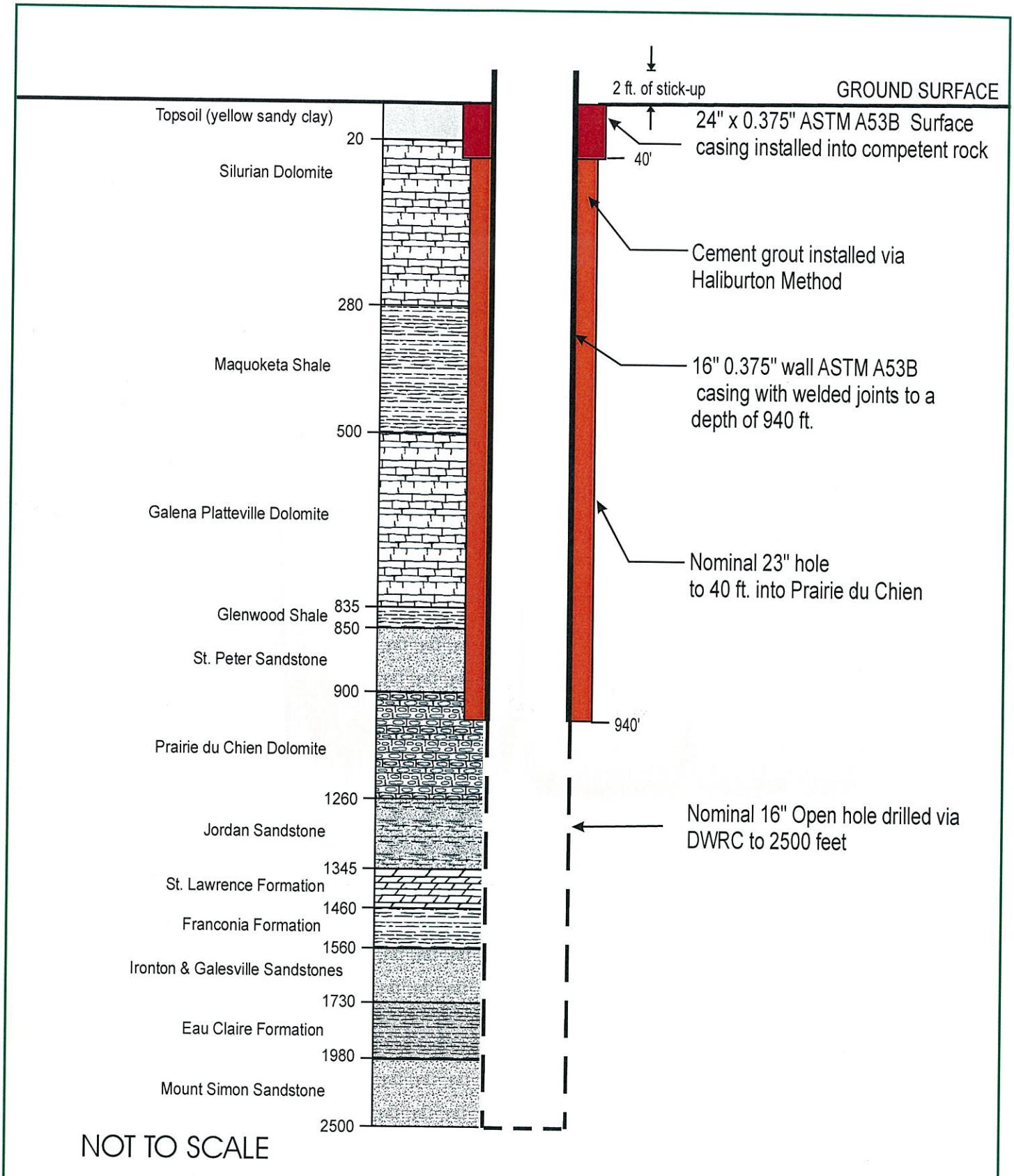
Layne Northwest
GeoSciences Group
a division of Layne Christensen Company

W229 N5005 DuPlainville Road Pewaukee, WI 53072
(414) 246-4646

Figure 1 - Well Location Map
Equistar Facility - Camanche, Iowa

July 2006

Approximate Scale
1" = 300'



Layne Northwest
WATER RESOURCES GROUP
a division of Layne Christensen Company

Figure 2 - Final Construction of Well 7
EquistFar Chemicals LP - Clinton Complex
Camanche, Iowa
July 2006

Layne Christensen Company

SUMMARY REPORT FOR THE INSTALLATION, LOGGING AND AQUIFER PERFORMANCE TESTING OF EQUISTAR WELL 7 CAMANCHE, IOWA

Prepared For:

EQUISTAR CHEMICALS, LP
CAMANCHE, IOWA

July 2006

Prepared By:

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HYDROGEOLOGIC SECIALISTS

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1.0 INTRODUCTION

This report presents the results from an aquifer performance test and geophysical well logging that was completed on the newly-constructed Well 7 at the Equistar Chemical facility in Comanche, Iowa. The purpose of the testing was to estimate the sustainable yield of the new well, compare its performance with other similarly-constructed wells at the site and determine the pumping interference between the new well and the existing wells at the facility.

2.0 BACKGROUND

The Equistar facility currently has 5 wells (i.e. Wells 1,3,4,6 and the recently-constructed Well 7) that are used to supply groundwater to the plant. Well 2 was abandoned by Layne in June 2006 and Well 7 was installed as its replacement. The casing of Well 2 had corroded to the point that perforations had developed in several areas. These perforations were allowing chemically-impacted water from shallow groundwater at the site to enter the well, thus affecting the quality of the facility's water supply. The available construction, geologic and performance information for Wells 1, 2, 3, 4 and 6 is provided in Appendix 1 and the well construction details are provided in Table 1. The location of these wells and Well 7 are shown on Figure 1.

Table 1 - Facility Well Construction Details

Well #	Construction Date	Grouted Casing Depth	Well Depth
1	May, 1967	886	2503
2	July, 1967	907	2530
3	February, 1967	936	2571
4	January, 1968	908	2546
6	November, 1966	not reported	2529
7	June, 2006	940	2500

Well 7 was constructed during May and June of 2006. As presented in Table 1, the grouted casing and well depths of Well 7 are similar to the other facility supply wells.

2.1 Well 7 Construction and Testing Processes

Well 7 is constructed with 24-inch outer casing extending to 40 feet, 16-inch inner casing extending to 940 feet and nominal 16-inch open hole from 940 feet to 2500 feet (Figure 2). Throughout the drilling process, drill cuttings were continuously collected and composited at 5-foot intervals. The 24-inch diameter outer casing was advanced into competent bedrock using the Dual Rotary method. After firmly seating the outer casing, a nominal 23-inch diameter drill hole was advanced to 940 feet (i.e. approximately 40 feet into the Galena-Platteville Dolomite) via reverse rotary methods.

After drilling to 940 feet, the drill hole was cleaned by air development, the drill string was removed and a natural gamma log was performed on the well in order to help correlate the stratigraphy with the formation samples. After completing the gamma log, 16-inch casing was then installed with centralizers and pressure grouted up to the ground surface using the Haliburton method.

After allowing the grout to cure for 72 hours, a nominal 16-inch bore hole was advanced to 2500 feet. During the entire bedrock drilling process, only air and clear water were used as drilling fluids via the Dual Wall Reverse Circulation process. A construction diagram for Well 7 is shown on Figure 2

After drilling the well to its intended depth, the well was hydraulically developed by a combination of air lifting and over-pumping with a test pump. Development was considered to be complete after the well maintained its maximum efficiency and sand-free water was produced.

A step-drawdown test was performed on Well 7 the day after completing the well development. The purpose of the step-drawdown test was to collect data needed to compare the performance of Well 7 with other wells at the facility and to confirm that the pump from the recently-abandoned Well 2 could be used in Well 7.

Shortly after completing the step drawdown test, a 24-hour pumping test was completed on Well 7. The analysis of the pumping test, geophysical logging and other data were then used to estimate the long term sustainable yield of Well 7 and its influence on other pumping wells at the site. The following sections of this report present the results and interpretation of the geophysical well logging, sampling and pump testing of Well 7.

3.0 GEOPHYSICAL WELL LOGGING

A series of geophysical well logging methods were used for the Well 7 survey. The following provides a brief summary of these geophysical well logging methods.

Gamma Log

For this logging study, the gamma log was used to differentiate between different types of bedrock materials, which can be interpreted along with the geological samples to identify shale-rich zones of the well. The gamma logging tool measures the natural gamma radiation emissions that are produced by the bedrock formation materials. Almost all materials naturally emit gamma radiation, although not necessarily at the high (and dangerous) energy levels associated with uranium, plutonium and other highly radioactive elements. In a typical geologic environment, naturally-occurring potassium is responsible for the majority of gamma radiation emissions. Within the bedrock materials associated with Well 7, shaley bedrock zones should contain the highest concentrations of potassium, followed by sandstone and limestone. Therefore, shale zones should produce the highest gamma measurements and limestone zones should produce the lowest. From a water productivity perspective, we would expect that clean sandstone zones are the most productive, followed by limestone and shale.

For the Well 7 well logging program, two gamma log surveys were performed. The first was completed in April 2006 within the 23-inch bore hole prior to installing the 16-inch

inner casing. The second gamma log and the other geophysical well logging methods, which are described below, were performed in May 2006 after the well construction was complete.

Electrical Resistivity Logs

Geological materials differ in their ability to conduct electricity. For example, most types of unweathered limestone and dolomite are more electrically resistive and shale is more electrically conductive. Sandstone and weathered limestone/dolomite are typically have intermediate electrical resistivity values. By knowing the general geology of an area and the typical electrical properties of geologic materials, it is possible to use electrical resistivity logging along with other logging data and formation samples to help distinguish between various geologic materials and to identify zones that are potentially more productive.

The electrical resistivity logging tool has four metal electrodes located along it. Throughout the logging process a precise current of a few tenths of an amp is applied to two of the electrodes. The current flowing between these electrodes creates an electrical potential field that is measured between two other electrodes. In this way, the apparent resistivity of the material between the electrodes is measured. The measured apparent resistivity is a combination of the electrical properties of the well water and the adjacent geologic formation materials. Expanding the spacing between the current electrodes will increase the lateral depth of investigation of the resistivity measurement. There are advantages and disadvantages with using resistivity logging tools with short and long electrode separation distances. A tool with a greater separation distance between electrodes obtains more data from the formation materials (as opposed to the formation water in the well); however, each data point represents a larger volume of materials, such that subtle resistivity anomalies are often not visible. Therefore, it is common practice to utilize both short and long resistivity tools for a well logging project. For this project, the short resistivity tool used a 16-inch separation distance between electrodes and the long tool used a 64-inch distance.

Fluid Electrical Conductivity

Measures the electrical conductivity of the water within the well. The electrical conductivity of saline water is much higher than fresh water. Therefore, the fluid electrical conductivity log was used to identify zones within the well where the water was more saline. With the logging tool used for this study, the fluid conductivity measurements are presented in units of microsiemens per centimeter (uS/cm). The precise definition of this conductivity unit is not important for the purpose of this report. However, the recorded conductivity values provide a relative sense of water salinity.

Fluid Temperature

Measures the temperature of the water within the well. A natural geothermal gradient exists within the earth, such that temperatures increase with depth toward the center of the earth. In this region of the country, it is generally accepted that temperatures increase by approximately 1° F (i.e. 0.56° C.) for every 100 feet in depth. Consequently, the temperature log can help to explain the flow dynamics within the well under pumping and static (i.e. non-pumping conditions).

Single Point Resistance and Spontaneous Potential
These two types of logs are of marginal use for the purpose of this project. However, these logs were performed because these logging tools were physically combined with the gamma logging tool. Spontaneous potential (referred to as SP) measures minute voltage changes within a well that can be caused by a variety of factors, including changes in water chemistry, corrosion, natural water movement, changes in geology, and many other factors. SP measurements are also affected by stray voltages from nearby electrical equipment, power lines and other man-made influences. Consequently, the SP log results should be considered with caution.

The single point resistance (SPR) log measures the electrical resistance between an electrode on the logging tool and an electrode at the ground surface. Similar to spontaneous potential, the SPR log can be used to identify changes in geology and water quality within the well. However, SPR is subject to the same man-made sources of noise as the SP log.

3.1 Discussion of Results

The results from the geophysical well logging program are graphically presented on Figures 3 and 4. As previously discussed, the logging was performed at two times; once prior to installing the grouted 16-inch casing and again after the well construction was complete. Prior to each of the logging event the drill hole was pumped for several hours by air lifting through the drill stem. The results from the geophysical well logging provided very useful information to help define the stratigraphy at the well site and some data regarding the water quality at depth. The estimated stratigraphy was determined based on the results from the geophysical well logging, drill cuttings samples and the geologic "striplog" for Well 3 (presented in Appendix 1) that was provided on the Iowa Geological Survey GEOSAM website database.

As shown on Figure 4, a good correlation was observed between the natural gamma log and the red to brown colored shale-rich zones within the Mt. Simon Sandstone (referred to regionally as "red beds"). Although only several feet thick, these red beds can hydraulically isolate underlying bedrock zones from overlying bedrock aquifers.

Regionally, sodium and chloride levels commonly increase toward the bottom of the Mt. Simon Sandstone. Because of the potential hydraulic confining nature of red bed zones, sharp increases in sodium and chloride levels can occur in sandstone units beneath and/or between them.

Since fluid resistivity is the inverse of fluid conductivity, increases in sodium and chloride levels in the well would show up as decreases on the fluid resistivity log. The fluid resistivity log, which is shown in brown on the far right of the graph on Figure 3, shows a decrease in resistivity from approximately 20 to 17 Ohm-m in the upper 140 feet of the log (i.e. from 900 to 1040' in the Prairie du Chien Group above the Root Valley Member). From approximately 1040' to 1900' the measured fluid resistivity gradually decreases from about 17 to 16.6 Ohm-m. From 1900' to approximately 2380' the fluid resistivity decreases more rapidly with depth from about 16.6 to 11.0 Ohm-m. Then a very rapid decrease in resistivity (from approximately 11.0 Ohm-m to 5.1 Ohm-m) is

observed between the depths of 2380 and 2410'. The explanation for these changes in fluid resistivity are likely a result of the bedrock stratigraphy and changes in water quality and groundwater heads with depth.

Because the geophysical well logging was performed under static (i.e. non-pumping) conditions, it is not possible to identify changes in dissolved solids levels and productivity at specific zones throughout the well. However, some general trends regarding the hydraulic heads and dissolved solids levels in the Mt. Simon Sandstone are apparent.

Since the geophysical well logging program was performed under static (i.e. non-pumping) conditions, any vertical movement of water within the well would be a result of water flowing between aquifer zones with differing hydraulic heads. A color video log was performed on this well to a depth of 1970' on May 28 under static well conditions. Based on the observed movement of suspended particles within the well apparent on the video log, it appears that an upward flow of groundwater is occurring at depth within the well. It is not practical to make any quantitative estimates of changes in heads or flows from the video log. However, the upward movement of groundwater helps to provide an explanation of the changes in fluid conductivity and also to infer some of the hydraulic qualities of various aquifer zones.

Based on the observed upward movement of particles within the well and the fluid conductivity log, it appears that water with relatively high dissolved solids levels and higher head are present beneath a zone of red beds at approximately 2380' in the Mt. Simon Sandstone. Although the fluid resistivity increases upwards from approx. 2380 to 1900', many "peaks" and "valleys" are present on the graph within this interval, suggesting that thin zones represented by the peaks and valleys represent areas that may be contributing water with lower and higher levels of dissolved solids, respectively.

Progressing upwards from the bottom of the well, the more rapid increase in fluid resistivity ends at 1900'. At this depth, a sharp increase in natural gamma levels were logged and inspection of the drill cuttings confirms that this depth corresponds to the bottom of a thick shale zone in the Eau Claire Formation.

Under non-pumping conditions, the apparent low-resistivity (i.e. higher TDS) water near the bottom of the well apparently moves upward in the well and gradually displaces the lower TDS water in the well from overlying bedrock units. The rapid increase in fluid resistivity at approximately 1050' (i.e. directly above the Root Valley Member) indicates that the higher TDS water from below is not moving upward as quickly from 940 to 1050'. This suggests that the upper 110 feet of the uncased part of the well are less permeable or have a higher hydraulic head than the underlying aquifers.

4.0 WATER QUALITY SAMPLING RESULTS

Near the end of the 24-hour pumping test (described below), a set of water samples was collected from Well 7 and analyzed for inorganic compounds and Safe Drinking Water Act (SDWA) synthetic and volatile organic compounds. Based on these analyses, no synthetic or volatile organic compounds were confirmed and the analyzed inorganic

constituents were below the federal primary drinking water standards. As is common for this aquifer system, however, iron was detected at 0.51 mg/L which is above the 0.3 mg/L secondary (i.e. aesthetic) drinking water limit for this compound.

On a regional scale, sodium, chlorides and sulfates can be problematic in the deep bedrock aquifer system. However, as presented in the following table the detected levels of these compounds were consistent with or slightly lower than other wells similarly-constructed wells in the area and were well-below current drinking water standards.

Table 2 – Comparative Levels of Sodium, Chloride and Sulfate in Equistar Wells 3 and 7 and City of Clinton Well 7

	Equistar Well 7	Clinton Well 7	Equistar Well 3	Federal Secondary Drinking Water Standard
Sample Date	May-06	August-91	February-67	
Well Depth	2500'	2242'	2571'	
Sodium (mg/L)	23	48	54	none established
Chloride (mg/L)	27	44	25	250
Sulfate (mg/L)	57	51	49	250

Note: Equistar Well 3 data obtained from Layne's internal records and data for Clinton Well 7 obtained from Iowa DNR

If sodium and/or chloride levels become problematic in Well 7, the results from the geophysical well logging suggest that backfilling the bottom approximately 100 feet of the well may be able to significantly reduce the levels of these compounds in the produced groundwater.

5.0 AQUIFER PERFORMANCE TESTING

The aquifer performance testing of Well 7 included a step-drawdown test and a 24-hour pumping test. The following paragraphs present the results and interpretation of the data from these tests.

5.1 Step-Drawdown Test

A step-drawdown test was performed on May 18th, which is one day after completing the well development. The purpose of the step-drawdown test was to collect data needed to compare the performance of Well 7 with other wells at the facility and to confirm that the pump from the recently-abandoned Well 2 could be used in Well 7.

For the step-drawdown test, Well 7 was pumped for 120 minutes at four progressively higher pumping rates. These pumping rates consisted of approximate rates: 530, 730, 1000 and 1500 gpm. The specific capacity data at each of these pumping rates is graphically shown on Figure 5. Also shown on Figure 5 is the available well performance data for Wells 1, 3, 4 and 6. We must emphasize, however, that the specific capacity testing methods and results for these four wells are not the same as those for

Well 7. As a result, the comparison of these wells' performance with Well 7 can be misleading.

As explained by Veolia Water North American Operating Services, LLC who operates the Equistar water system, Wells 1, 3, 4 and 6 are essentially in near-continuous operation, depending on the season. These four wells discharge into a common plant distribution system and the pumping rates for each well vary depending on the water system pressure/demand.

A brief step-drawdown test was performed on all of these wells on March 9, 2006 by Peerless Service Company. The hydraulic recovery and pumping step durations were considerably less than those for the Well 7 step-drawdown test. As we understand, except for Well 4 which had not been pumping for several days prior to March 9, the pump in each of these wells was shut down for a brief period to allow water levels to recover. The wells were then pumped at five pumping rates, beginning at the highest rate and progressing downward for each step. According to Jim Sass at Peerless Service Co., the test pumping at the 5 rates was performed in approximately 90 minutes or less for each well. Although the testing methods on the four pre-existing plant wells are valuable for measuring the relative performance of each well and pump from year to year, the recorded static water levels are not likely accurate and the specific capacity data could not be used to accurately compare the relative productivity of these wells to Well 7. The most recent recorded static water levels in the Equistar wells are presented on Figure 6.

If it were possible to perform step-drawdown testing program on the plant wells similar to that performed on Well 7, we would expect that static water levels would be significantly higher. Additionally, since water levels were likely still recovering as the plant wells were tested, we would expect to measure higher drawdowns and lower specific capacities if a complete step-drawdown test were to be performed on them.

5.2 Pumping Test Performance and Analysis

One hundred minutes after completing the step drawdown test, a 24-hour pumping test was completed on Well 7. Throughout the pumping test, Well 7 was pumped at 1,000 gpm. Prior to and throughout the Well 7 pumping test water levels were recorded (with automatic data loggers) in Wells 3, 4 and 7 using pressure transducers mounted on the airlines. A regulated supply of compressed air was used to maintain pressure on the airlines. A graph showing the recorded depths to water in these three wells is presented on Figure 7. Figure 7A presents the depth to water data during the development, step-drawdown test and pumping test on Well 7. As presented on these figures, the water level in Wells 3 and 4 are very sporadic, most likely due to changes in system pressure caused by variable water consumption by the plant. The variability of water levels in Wells 3 and 4, apparently overshadowed any water level impacts from pumping Well 7. As a result, there was no observable correlation between pumping Well 7 and the measured water levels in Wells 3 and 4 and only the pumping test data from Well 7 could be analyzed to estimate the local aquifer properties.

The drawdown and recovery data from Well 7 were analyzed using the Cooper-Jacob (1946) method for confined aquifers. Based on this analysis, transmissivity values of approximately 40,000 and 38,000 gpd/ft were estimated from the drawdown and recovery

data, respectively. Because of well losses within Well 7, the calculated storativity values (on the order of 10^{-8}) are unrealistically low. We expect that the actual aquifer storativity would be in the range of approximately 10^{-4} to 10^{-5}. Using a transmissivity of 40,000 gpd/ft and a storativity of $5x10^{-5}$, we estimate that approximately 13 and 11 feet of drawdown should have occurred in the aquifer at Wells 3 and 4, respectively as a result of the Well 7 pumping test. Although the water levels in Wells 3 and 4 were very erratic, due to plant operations, we expected that the effects of the pumping test would have been apparent in these wells.

A likely explanation for the lack of an observed response in Wells 3 and 4 is that these two wells are not hydraulically efficient, due to partial plugging over the last several decades of operation. Evidence for the loss in well efficiency can be seen on Figure 5. This figure shows that the specific capacity in Well 3 has dropped from approximately 35 gpm/ft @ 700 gpm in 1967 to its current level of approximately 13 gpm/ft @ 700 gpm (i.e. a 63% decline in specific capacity). As discussed in the preceding paragraph, the estimated current specific capacity is likely erroneously high. Consequently, the decline in specific capacity in Well 3 is likely higher than 63%. This partial plugging causes excessive drawdown in the wells when they are pumped. This excessive drawdown is referred to as "well loss". In a confined aquifer system, such as this, well loss is directly proportional to pumping rate and in an inefficient well, the pumping level is mainly the result of well loss rather than changes in aquifer water levels. Consequently, the estimated changes in aquifer water levels at Wells 3 and 4 resulting from the Well 7 pumping test are not reflected in the water level measurements in these two wells. If it would have been possible to turn Wells 3 and 4 off and fully recover prior to the pumping test, there would be no well loss and we would expect that drawdown from the Well 7 test could have been observed.

5.3 Estimated Long-Term Pumping Level in Well 7

The estimated pumping level in Well 7 over time was estimated using these aquifer properties and an assumed continuous pumping rate of 1,000 gpm. As shown on Figure 8, these calculations indicate that approximately 72 feet of drawdown would occur in the aquifer immediately adjacent to the well (i.e. at a radius of ¾ feet from the center of the well). With a static water level of approximately 288-feet, this corresponds to a pumping level of approximately 360 feet. This would leave more than 500 feet of available drawdown before the pumping level would fall below the 940 foot bottom of the grouted casing in Well 7. Consequently, it appears that Well 7 can easily sustain the desired capacity of 1,000 gpm long into the future (easily for more than 50 years with proper well maintenance) without impacting the availability of water to the other plant wells.

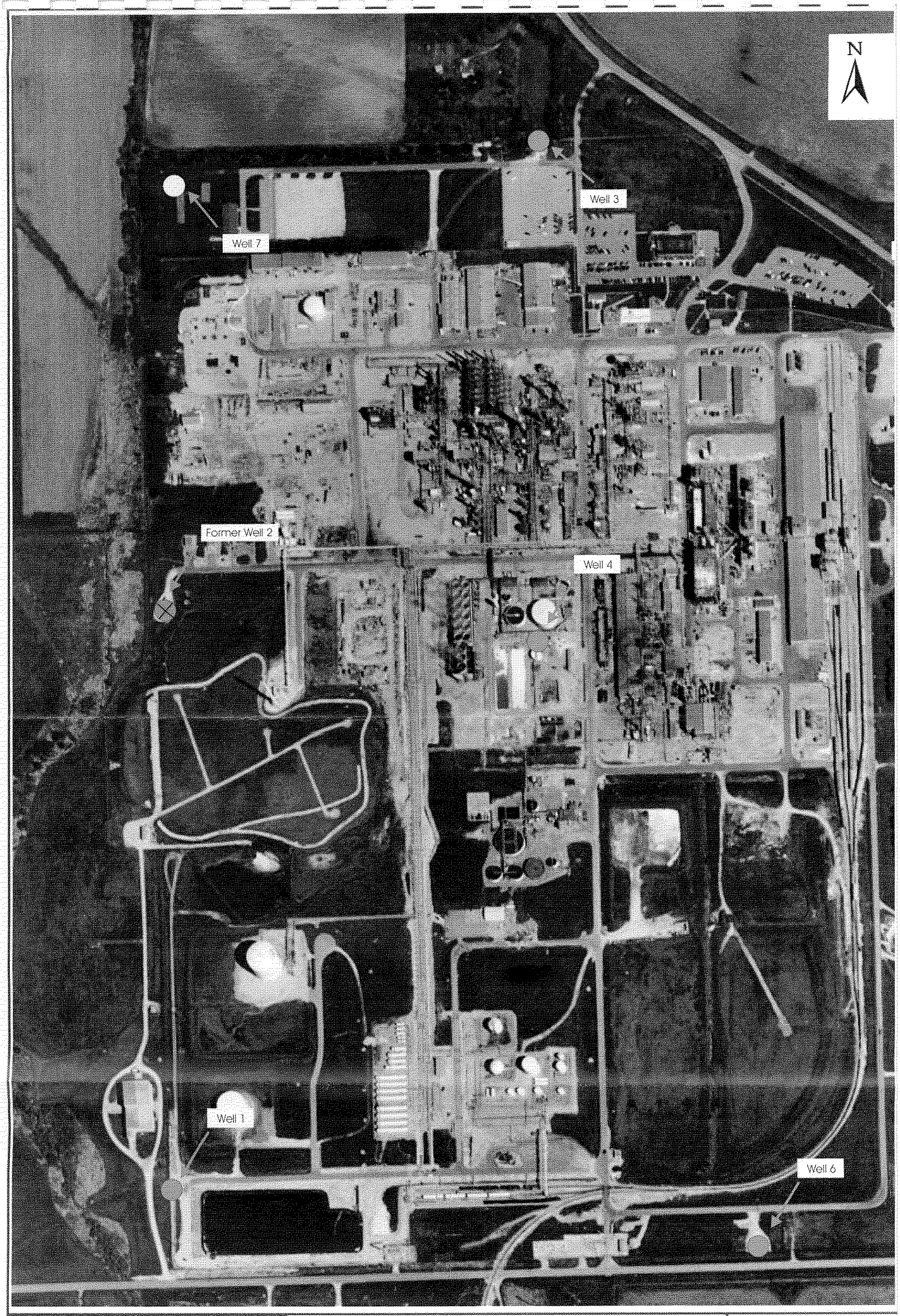

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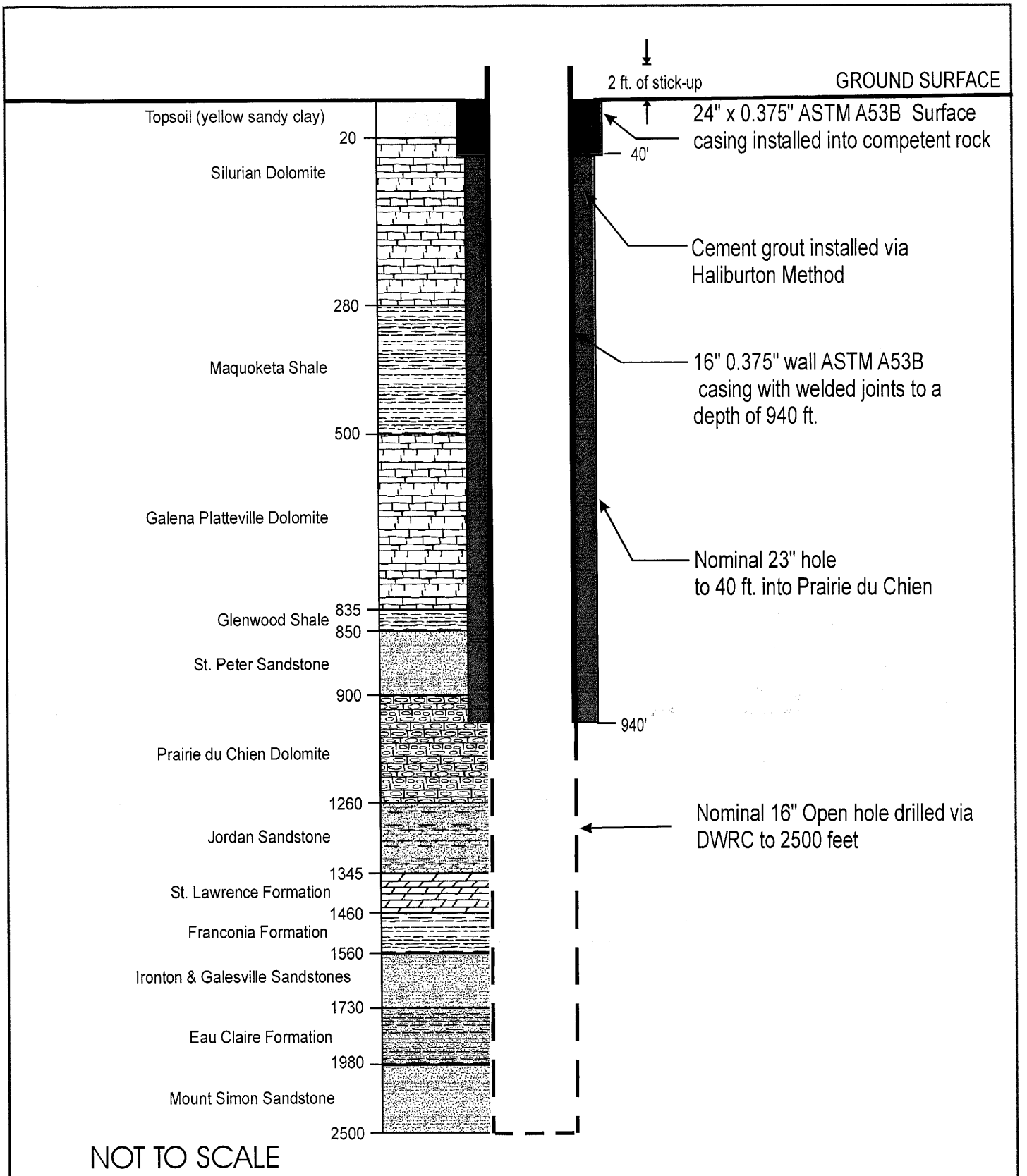
Figure 1 - Well Location Map
Equistar Facility - Camanche, Iowa

July 2006

Approximate Scale
1" = 300'



Layne Northwest
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a division of Layne Christensen Company

Figure 2 - Final Construction of Well 7
EquistFar Chemicals LP - Clinton Complex
Camanche, Iowa
July 2006

Figure 3 - Equistar Well 7
Natural Gamma Log for Upper Hole
April 2006

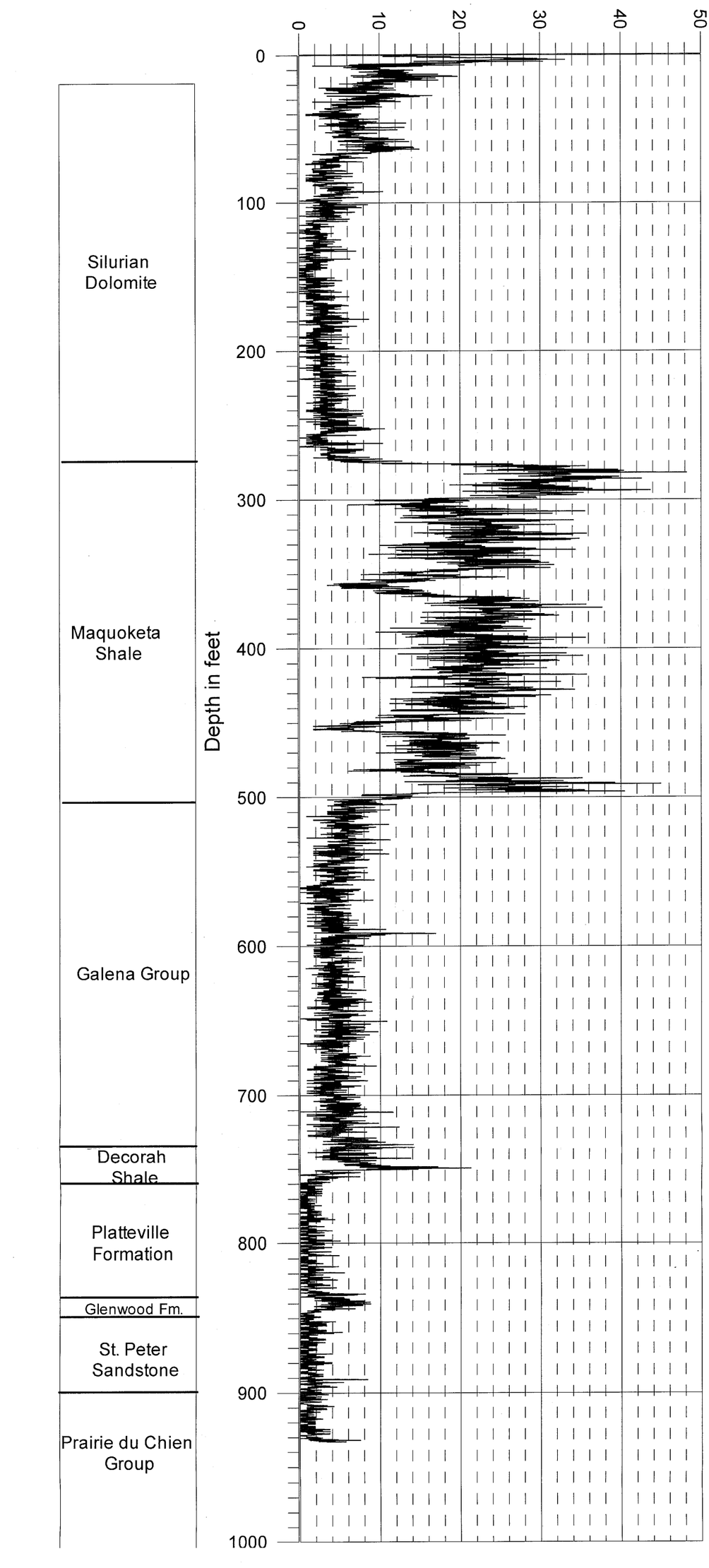


Figure 4 - Equistar Well 7
Geophysical Well Logging Results from June 2006

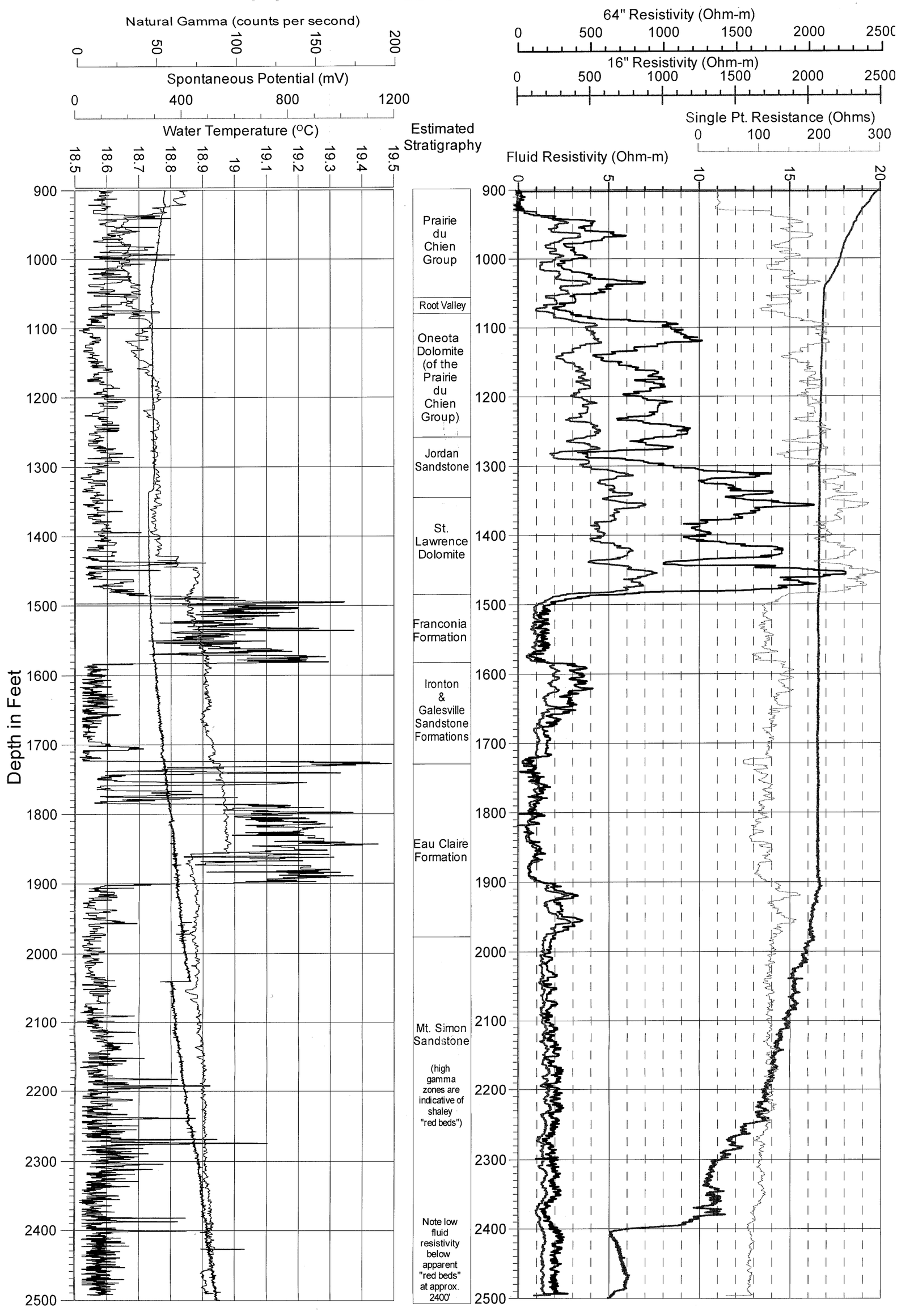


Figure 5 - Specific Capacity Data for Equistar Wells 1,3, 4, 6 and 7

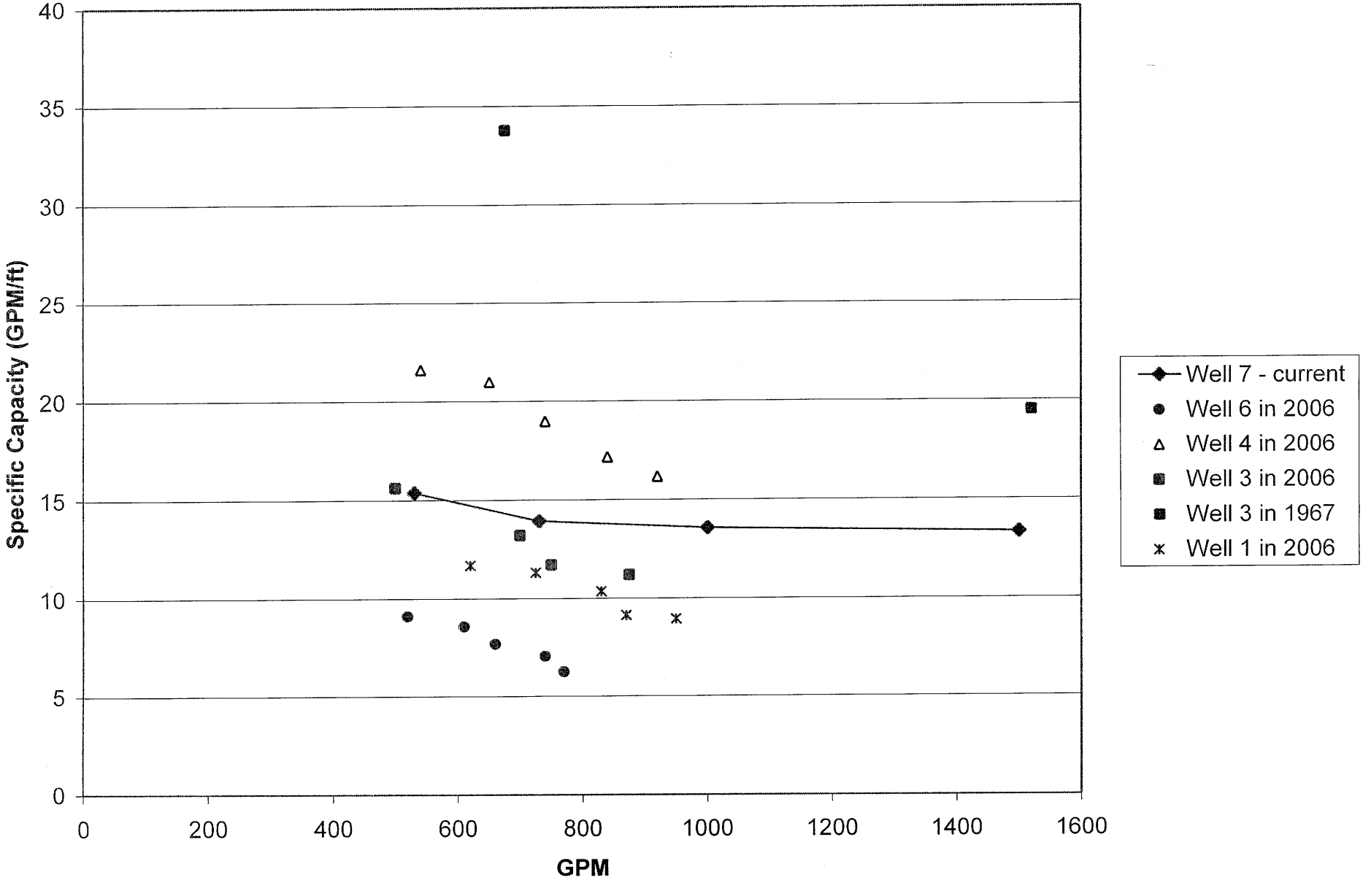
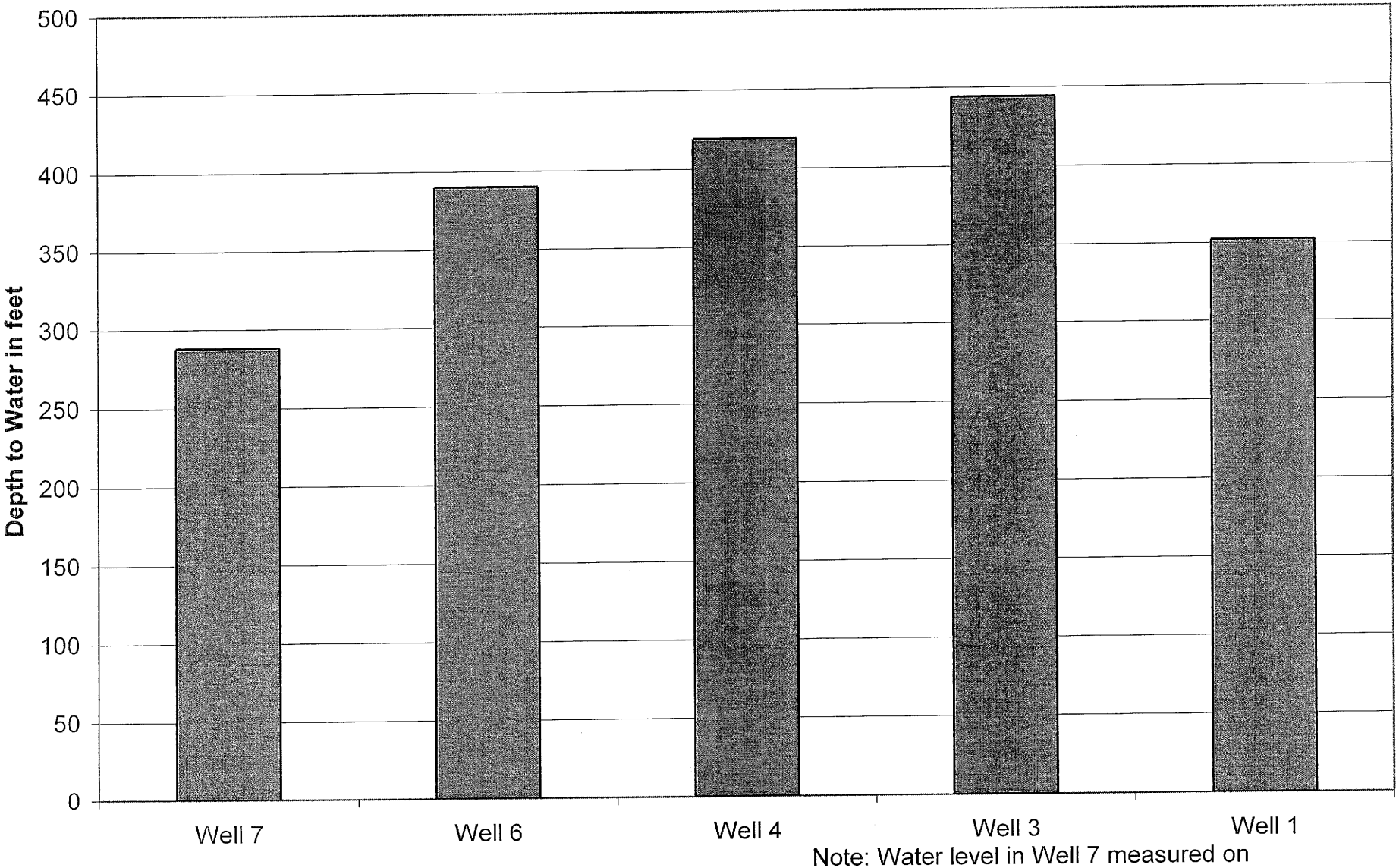


Figure 6 - Most Recent Recorded Static Water Levels in the Equistar Plant Wells



Note: Water level in Well 7 measured on 5/16/06. All others measured on 3/9/06.

Figure 7 - Measured Depths to Water in Equistar Wells 3, 4 and 7 Before, During and After the Well 7 Pumping Test

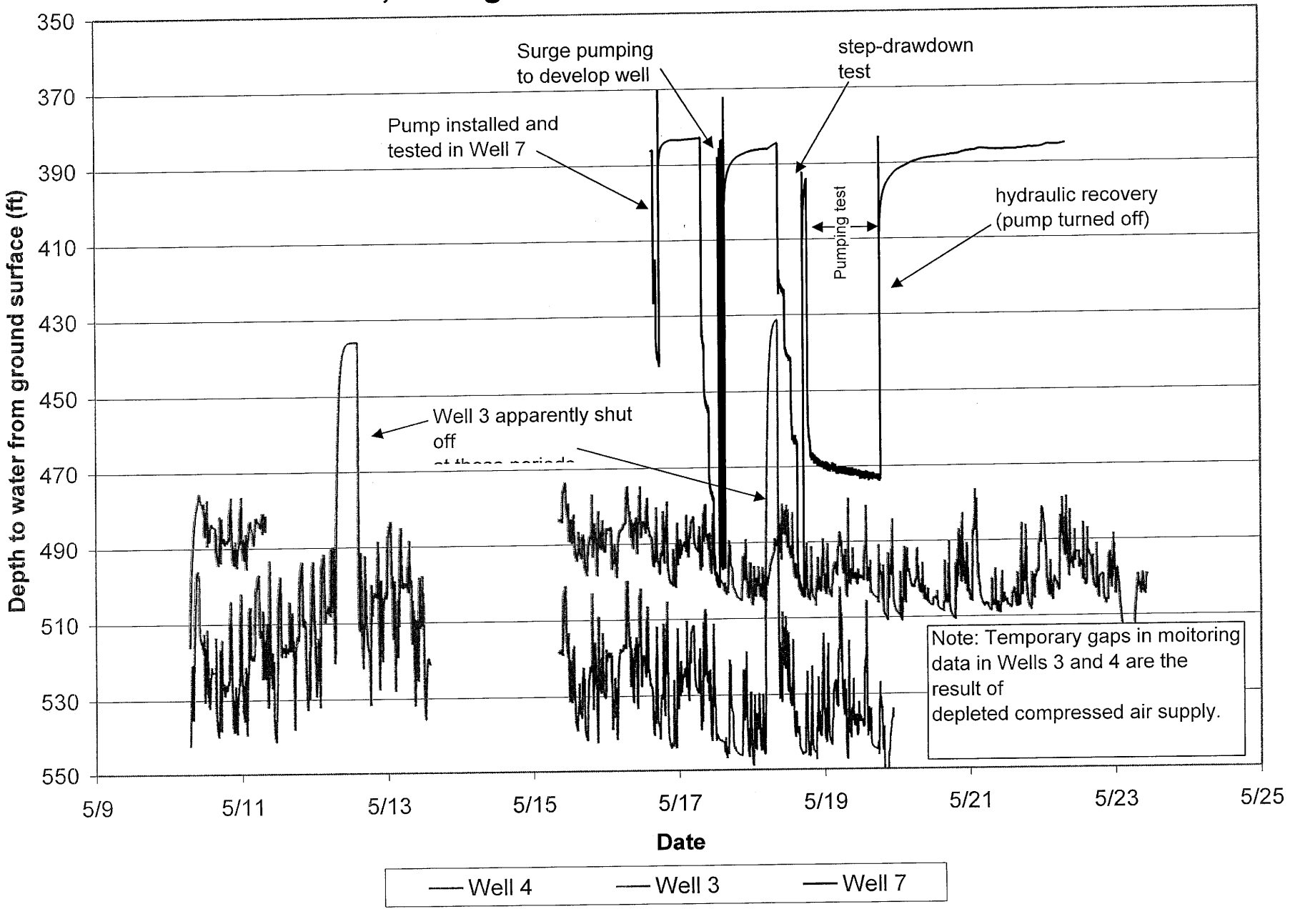


Figure 7A - Measured Depths to Water in Equistar Wells 3, 4 and 7 Before, During and After the Well 7 Pumping Test

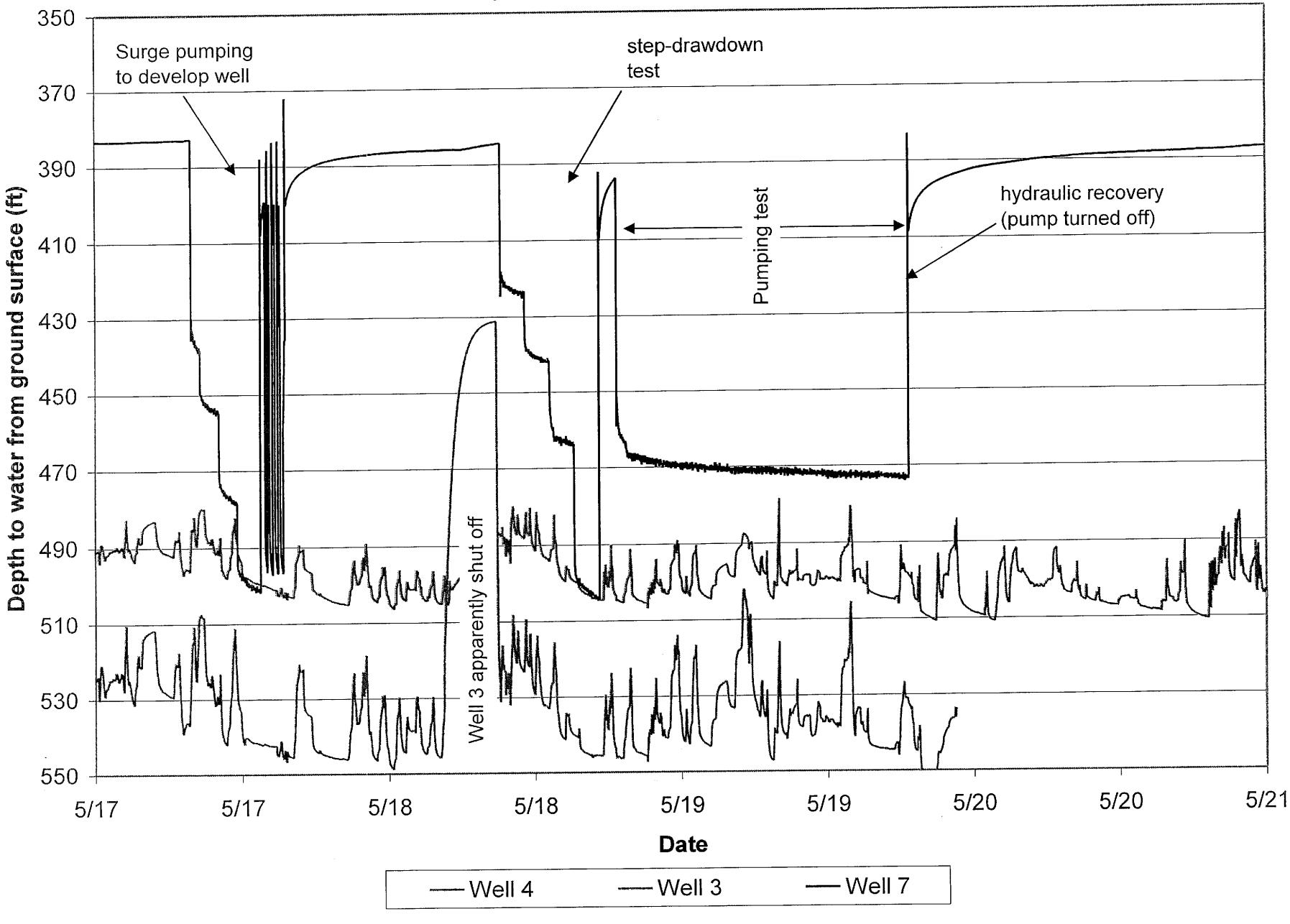
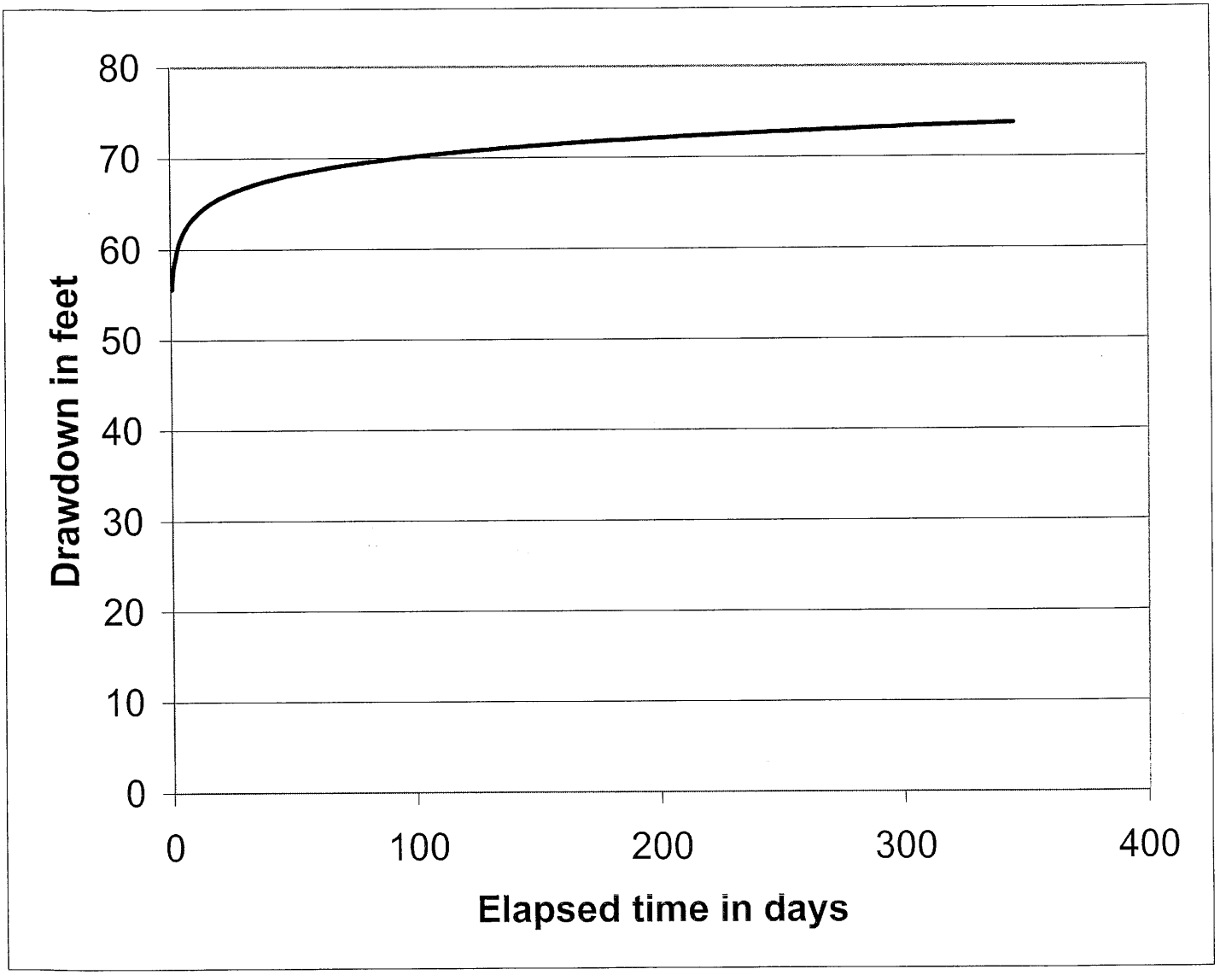


Figure 8 - Projected Drawdown Versus Time in Well 7
For a Continuous Pumping Rate of 1,000 gpm
Using the Theis Solution for Confined Aquifers



Assumed parameters

Pumping Rate (gpm):	1000
Distance in feet:	0.75
Transmissivity (gpd/ft):	40000
Storativity:	0.00005

Appendix 1

Information on Equistar Wells 1, 2, 3, 4 and 6

Iowa Geological Survey
Phone: 1-319-335-1575
Fax: 1-319-335-2754

Site Record
Wnumber: 19402

Wnumber: *19402*

Name Owner: *Chemplex #1*

County: *Clinton* **Quad map:** *Camanche, Iowa-Ill.*

Location: *T81N R6E Sec. 19 SE SE SW*

Elev: *627* **Total depth:** *2503* **Depth to bedrock:** *62*

Driller: *Layne Western - Ia.* **Date drilled:** *May 2, 1967*

Site type: *Drilled hole* **Well type:** *Commerical* **Sample type:** *Chips*

Log data: *Unknown*

Geologist: **Log Date:**

Exit Geology Water Production **Casing**

Iowa Geological Survey
Phone: 1-319-335-1575
Fax: 1-319-335-2754

Construction Information

Wnumber: 19402

← Return to Site Record

Construction date: May 2, 1967 **Comments:** 74' of 20", 886' of 16"□

Casing Data

Diameter	Type	Top depth	Btm depth	Length
20		0	0	74
16		0	0	886
0		0	0	0

Hole Data

Diameter	Depth

Screen / Perforation Data

Diameter	Opening	Top depth	Btm depth	Length
0	0	0	0	
0	0	0	0	

Grout data

Type	Top depth	Btm depth
	0	0

Pump data

Depth to intake 0

Type

Rating 0

Primary water source

Depth top 0

Depth bottom 0

Return to Site Record and select other information that might be available or close this window and select another site.

PEERLESS SERVICE CO.
WATER SUPPLY CONTRACTORS
DUBUQUE, IOWA

WELL TEST DATA SHEET

Job Veolia Well No. 1
Location Clinton, IA

Date tested 3/9/06
Tested by J Sass

Dia. of well 15 1/4"
Depth of well 2,475'
Length of airline 500'
Non-pumping level 352'
Orifice size 6" meter

Pump used: Driver 200 H.P.
Column and shaft 8"
Bowls 12LD 8-stage
Manufacturer Peerless
Serial No.

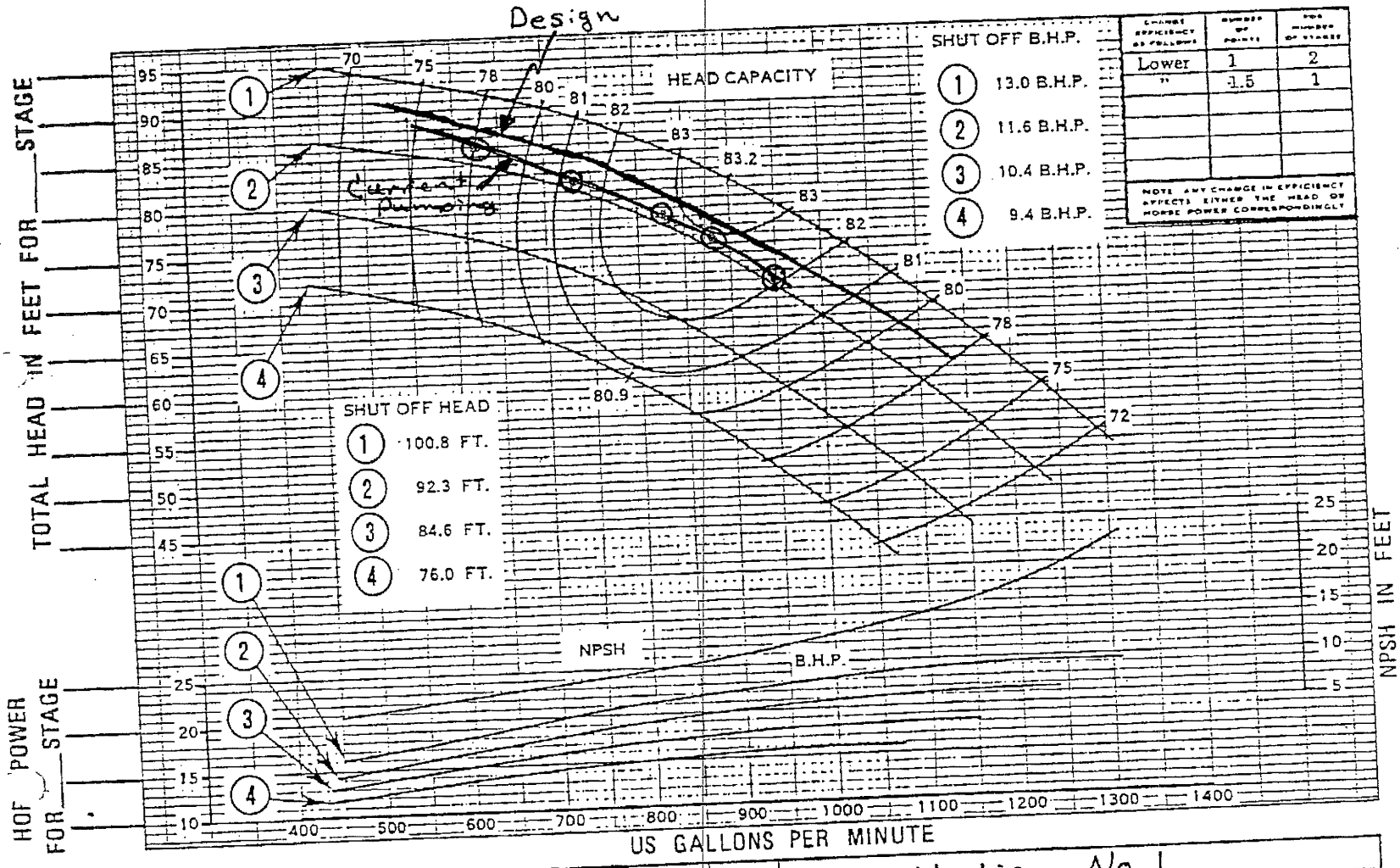
TIME	PIZOMETER READING (IN.)	G. P. M.	AIR GAUGE READING (FEET)	PUMPING LEVEL	DRAWDOWN	DISCH. PRESSURE LBS.	DISCH. PRESSURE FEET	TOTAL PUMPING HEAD	TEMP.	REMARKS
					0		0			START OF TE
	0	0								
		950		458'	106	42		564'		
		870		447'	95	64		602'	Amps	199,208,209
		830		432'	80	78		618'		
		725		416'	64	100		652'		
		620		405'	53	117		680'	Amps	171,178,179
		RV OPENED @ 150 P.S.I.								
		Megged 100 meg ohms								
		Continuity <1 ohm								
		Specific well yield @ 830 GPM					10.4	GPM/ft.D.D.		

up to a couple hrs for days 1.5 hrs.
#4 was off

Peerless Pump

VERTICAL TURBINE PUMPS

Section 140
5-83†



CHANGE EFFICIENCY AS FOLLOWS	NUMBER OF POINTS	NEW NUMBER OF STAGES
Lower	1	2
"	1.5	1

NOTE ANY CHANGE IN EFFICIENCY AFFECTS EITHER THE HEAD OR HORSE POWER CORRESPONDINGLY

HYDRAULIC PERFORMANCE WARRANTY	CURVE NO.	IMPELLER NO.	IMPELLER DIA.	TAKEN FROM
Guaranteed at designated point only, and contingent on: Proper flow to pump suction, Proper submergence, Fluid free of gas, air & abrasives, Proper lateral setting of impeller	1	2634820	$8\frac{15}{16}$" x $9\frac{23}{32}$"	54628
	2	2634820	$8\frac{5}{8}$" x $9\frac{7}{16}$"	54573
	3	2634820	$8\frac{1}{4}$" x $9\frac{5}{32}$"	54601
	4	2634820	$7\frac{7}{8}$" x $8\frac{29}{32}$"	54664

Customer Veolia No. 1

Item 1720 RPM Hitachi motors

Peerless Ref. No:

Laboratory Performance

SIZE 12LD RPM ~~1750~~ 1730

BOWL 2634907 CIE

CURVE 4805968

PUMP DESCRIPTION: Driver_____; Head_____; Column_____

GUARANTEED PERFORMANCE: BOWL ☐ FIELD ☐ Capacity_____ gpm; Head_____ ft; Eff_____ %; BHP_____

Iowa Geological Survey
Phone: 1-319-335-1575
Fax: 1-319-335-2754

Site Record
Wnumber: 19403

Wnumber: *19403*

Name Owner: *Chemplex #2*

County: *Clinton* **Quad map:** *Camanche, Iowa-Ill.*

Location: *T81N R6E Sec. 19 SE NE NW*

Elev: *662* **Total depth:** *2530* **Depth to bedrock:** *8*

Driller: *Layne Western - Ia.* **Date drilled:** *July 25, 1967*

Site type: *Drilled hole* **Well type:** *Commerical* **Sample type:** *Chips*

Log data: *Unknown*

Geologist: **Log Date:**

Exit Geology Water Production **Casing**

Iowa Geological Survey
Phone: 1-319-335-1575
Fax: 1-319-335-2754

Construction Information

Wnumber: 19403

← Return to Site Record

Construction date: July 25, 1967 **Comments:** 33' of 20", 907' of 16"□

Casing Data

Diameter	Type	Top depth	Btm depth	Length
20		0	0	33
16		0	0	907
0		0	0	0

Hole Data

Diameter	Depth

Screen / Perforation Data

Diameter	Opening	Top depth	Btm depth	Length
0	0	0	0	
0	0	0	0	

Grout data

Type	Top depth	Btm depth
	0	0

Pump data

Depth to intake	0
Type	
Rating	0

Primary water source

Depth top	0
Depth bottom	0

Return to Site Record and select other information that might be available or close this window and select another site.

PUMP INSTALLATION

1 Job Name: Equistar #2
Address:
City, State: Clinton, IA

2 Date: May (Month) 27 (Day) 2006 (Year) Job Completed

3 Pump No. ____ Oil or Water Lube
New - Repair
Pump Trouble

4 PUMP SIZE

	Diameter		Lengths
Discharge	8"	Above / (Below)	pitless
Column	8"	(Screw) / Flange	8" x random
Tubing			N/A
Shaft		Stainless / Carbon	N/A

Column setting to bowl 551 ft.

BOWL
Diameter ____ Shaft Diameter ____
Type Peerless Stages 10
Cast Iron
Suction ____ Diameter ____ Ft. Long Strn.
Special Paint or Coating on: Zinc Sleeves in:
Column coated inside and out
Tubing old and chipped

5 PUMP REPAIR

Condition of Pump When Pulled	
Column	needed to be deconned
Tubing	
Shafting	
Bowl	
Suction	
Machine Work	

New Parts Installed	
Column	
Tubing	
Shafting	
Bowl	rebuilt Peerless
Suction	

1. Drain Ports Open No
2. Chlorinate Well Yes
3. Pump Runs ____
4. Align Pump Head with Dial Indicator Yes No
5. Grouted Head-Base Plate Yes No

6 Motor or Gear Drive
Motor CD ____
Gear Drive CD ____
Make Sun Star HP 200
Speed 1800 Volts 460
Or Gear Drive Ratio ____ Standard Combination
Frame Size ____ Non-Reverse -- Yes No
Running Amps 253
Running Volts 460
Serial No.

7 WELL
Number 2 Year Drilled 2006
Location Rec Center
Diameter 16 Depth 2500
Measured from top of ____ " diameter casing which is 1 feet above ground
Tape to Water 260
Air Line Length 551 A.L. Material PVC & Rubber
Static Gage 285 Static Level 266
Pumping Gage 225 Pumping Level 296
Discharge Pressure 100 # when pumping into System

8 Installer Matt, John J & Keith J
Rig Used St. Louis Smeal
Foreman Hours to: Rig Up ____
To Pull ____ Inspect ____
Repair ____ To Set 13

Layne
Layne Northwest
a div. of Layne Christensen Company

Sep-01

Iowa Geological Survey
Phone: 1-319-335-1575
Fax: 1-319-335-2754

Site Record
Wnumber: 19126

Wnumber: *19126*

Name Owner: *Chemplex #3*

County: *Clinton* **Quad map:** *Camanche, Iowa-Ill.*

Location: *T81N R6E Sec. 20 NW SW NW*

Elev: *685* **Total depth:** *2571* **Depth to bedrock:** *20*

Driller: *Layne Western - Ia.* **Date drilled:** *February 11, 1967*

Site type: *Drilled hole* **Well type:** *Private* **Sample type:** *Chips*

Log data: *Strip log Good*

Geologist: *Church, Norman K.* **Log Date:** *August 2, 1967*

Exit Geology Water Production Casing Striplog

1967 SWL = 240'
PWL = 318 after 48 hrs @ 1520 gpm

St. Pete TO 900

Chemplex #6 wt#18973 drilled 1966 2529' = TD

Iowa Geological Survey
Phone: 1-319-335-1575
Fax: 1-319-335-2754

Geologic Data
Wnumber: 19126
← Return to Site Record

System	Group	Formation	Member	Depth top	Depth bot	Lithology
QUAT	Pleistocene Series			0	20	Till
SILU		Scotch Grove		20	140	dolomite
		Hopkinton		140	250	dolomite
		Blanding		250	274	dolomite
ORDO		Maquoketa		274	510	dolomite; shale
	Galena	Dubuque		510	550	dolomite
		Wise Lake		550	615	dolomite
		Dunleith		615	760	dolomite; Till
		Decorah/Platteville undiff.		760	848	dolomite; limestone
	Ancell	Glenwood		848	855	shale
		St. Peter Sandstone		855	905	sandstone
	Prairie du Chien	Shakopee		905	1095	dolomite; sandstone
		Oneota		1095	1237	dolomite
CAMB		Jordan		1237	1365	sandstone
		St. Lawrence		1365	1490	dolomite
	Tunnel City	Lone Rock		1490	1585	sandstone
		Wonewoc		1585	1725	sandstone
		Eau Claire		1725	1985	sandstone; shale
		Mt. Simon		1985	2571	sandstone

Return to Site Record and select other information that might be available or close this window and select another site.

Iowa Geological Survey
Phone: 1-319-335-1575
Fax: 1-319-335-2754

Construction Information

Wnumber: 19126

← Return to Site Record

Construction date: February 11, 1967 **Comments:**

Casing Data

Diameter	Type	Top depth	Btm depth	Length
20	Steel	-0.4	55	55.4
16	Steel	-1	934.9	935.9
0		0	0	0

Hole Data

Diameter	Depth

Screen / Perforation Data

Diameter	Opening	Top depth	Btm depth	Length
0	0	0	0	
0	0	0	0	

Grout data

Type	Top depth	Btm depth
	0	0

Pump data

Depth to intake	0
Type	
Rating	0

Primary water source

Depth top	0
Depth bottom	0

Return to Site Record and select other information that might be available or close this window and select another site.

PEERLESS SERVICE CO.
WATER SUPPLY CONTRACTORS
DUBUQUE, IOWA

262 342 1324
N 1330' from well 7

WELL TEST DATA SHEET

Job Veolia Well No. 3
Location Clinton, IA

Date tested 3/9/06
Tested by J. Sass

Dia. of well 15 1/4"
Depth of well 2,530'
Length of airline 612'
Non-pumping level 444'
Orifice size 6" meter

Pump used: Driver 200 H.P.
Column and shaft 8"
Bowls 12LD 8-stage
Manufacturer Peerless
Serial No.

TIME	PIZOMETER READING (IN.)	G. P. M.	AIR GAUGE READING (FEET)	PUMPING LEVEL	DRAWDOWN	DISCH. PRESSURE LBS.	DISCH. PRESSURE FEET	TOTAL PUMPING HEAD	TEMP.	REMARKS
	0	0	SPC		0		0			START OF TES
		875	11	522'	78'	40 PSI		624'	Amps	219,224,225
		750		508'	64'	64 PSI		663'		
		700		497'	53'	78 PSI		683'		
		500	15	476'	32'	100 PSI		711'	Amps	198,203,203
		RV Did not open								
		Megged 92 meg ohms								
		Continuity <1 ohm								
		Specific well yield @ 750 GPM 11.7 GPM/ft.D.D.								

115

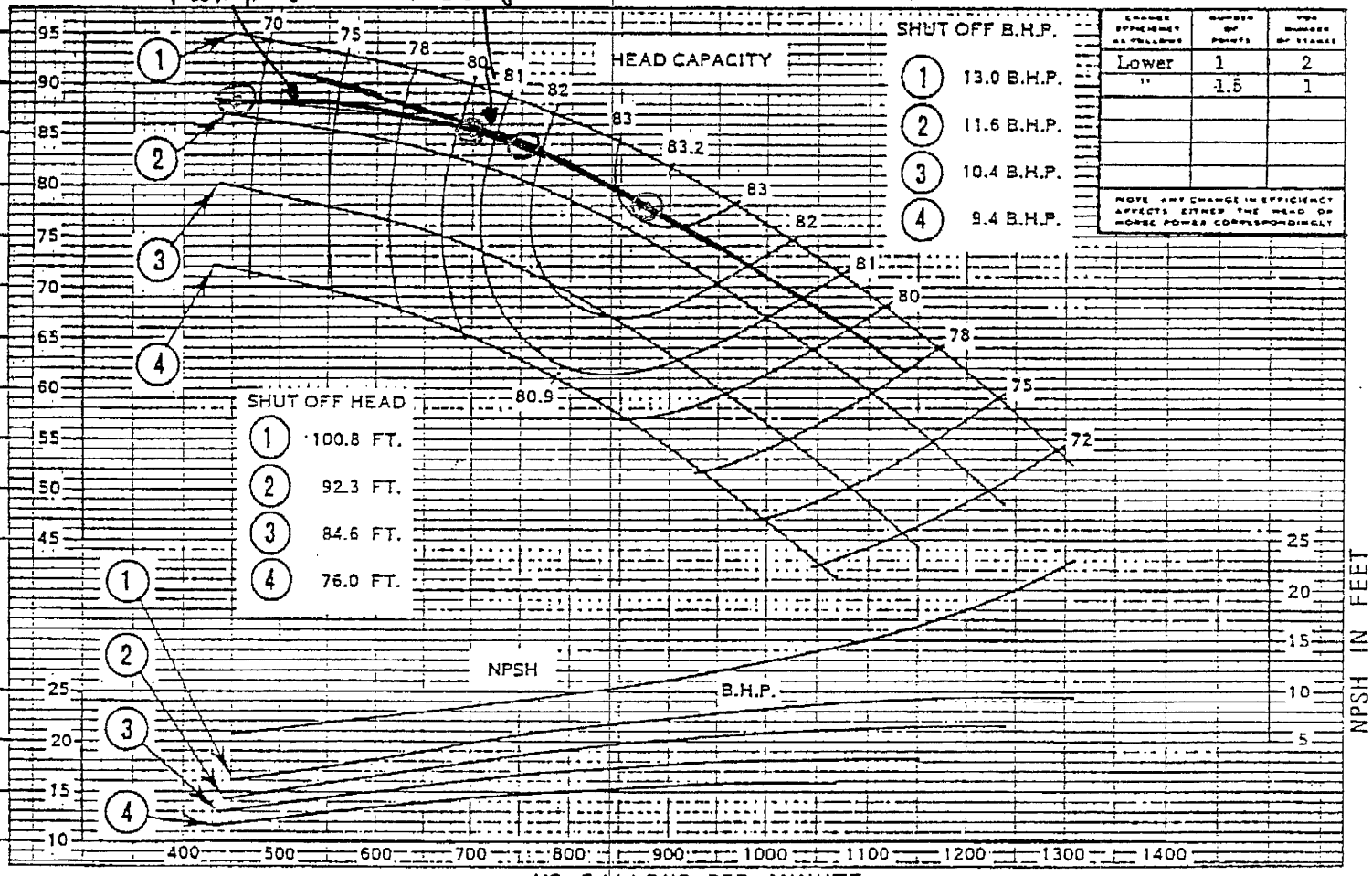
Peerless Pump

VERTICAL TURBINE PUMPS

Section 140
5-83†

Current Pumpage

Design



CHANGE EFFICIENCY AS FOLLOWS	NUMBER OF IMPELLERS	NUMBER OF STAGES
Lower	1	2
"	1.5	1

NOTE: ANY CHANGE IN EFFICIENCY AFFECTS EITHER THE HEAD OR HORSE POWER CORRESPONDINGLY

HYDRAULIC PERFORMANCE WARRANTY	CURVE NO.	IMPELLER NO.	IMPELLER DIA.	TAKEN FROM
Guaranteed at designated point only, and contingent on: Proper flow to pump suction, Proper submergence, Fluid free of gas, air & abrasives, Proper lateral setting of impeller	1	2634820	$8\frac{15}{16}$" x $9\frac{23}{32}$"	54628
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	4	2634820	$7\frac{7}{8}$" x $8\frac{29}{32}$"	54664

Customer Veolia No. 3

Item 1720 RPM Hitachi motors

Peerless Ref. No:

Laboratory Performance

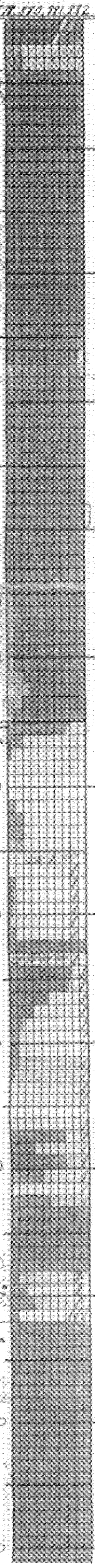
SIZE 12LD RPM ~~1760~~ 1739 BOWL 2634907 CIE CURVE 4805968

PUMP DESCRIPTION: Driver_____; Head_____; Column_____

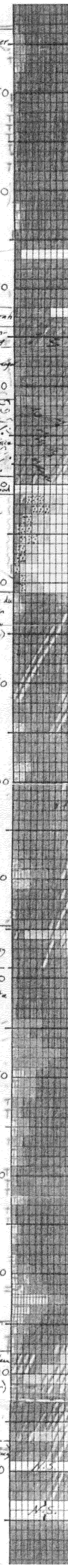
GUARANTEED BOWL☐ FIELD☐ PERFORMANCE: Capacity_____ gpm; Head_____ ft; Eff_____ %; BHP_____

FORM NO. 79—In stock and for sale by Ross-Martin Co., Tulsa. 19126

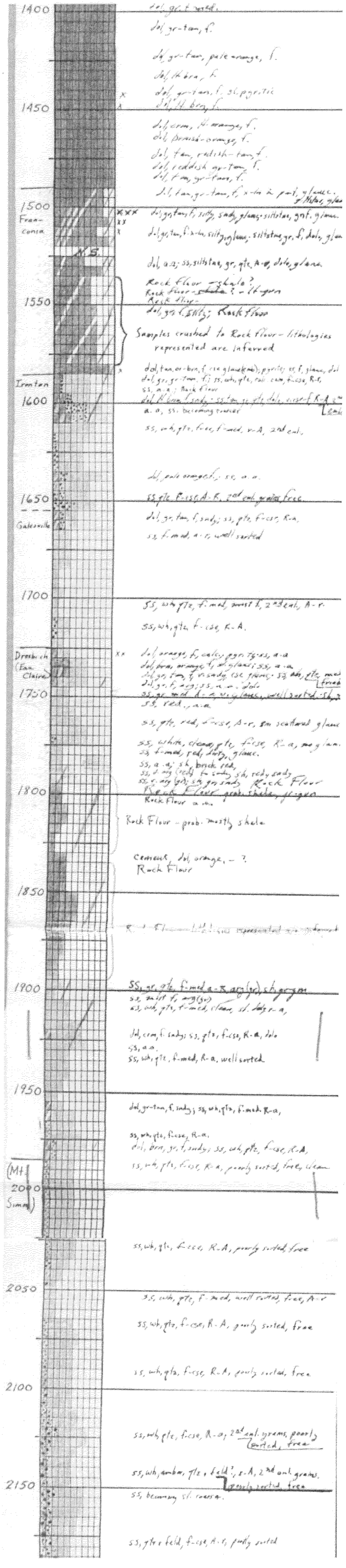
STATE Iowa	Clinton (Clinton)
NW SW NW	Chemplex Corp. Well #3
SEC. 20	Layne-Western - John Masters
TWP. 81N RGE. 6E.	COMMENCED COMPLETED 2/11/67
S	CASING RECORD 55'5" of 20"; 935'9" of 16"; open hole 934'9" to T.D.
	LOGGED Aug 2, 1967 BY Norm Church
Topo EL. 685	REMARKS SWL. 240'
TD 2571	PWL. 318 @ 1520 g.p.m.
	pumping test 48 hrs.
WGD. (S) 817-67 PLC-799, 878, 879, 880, 881, 882	

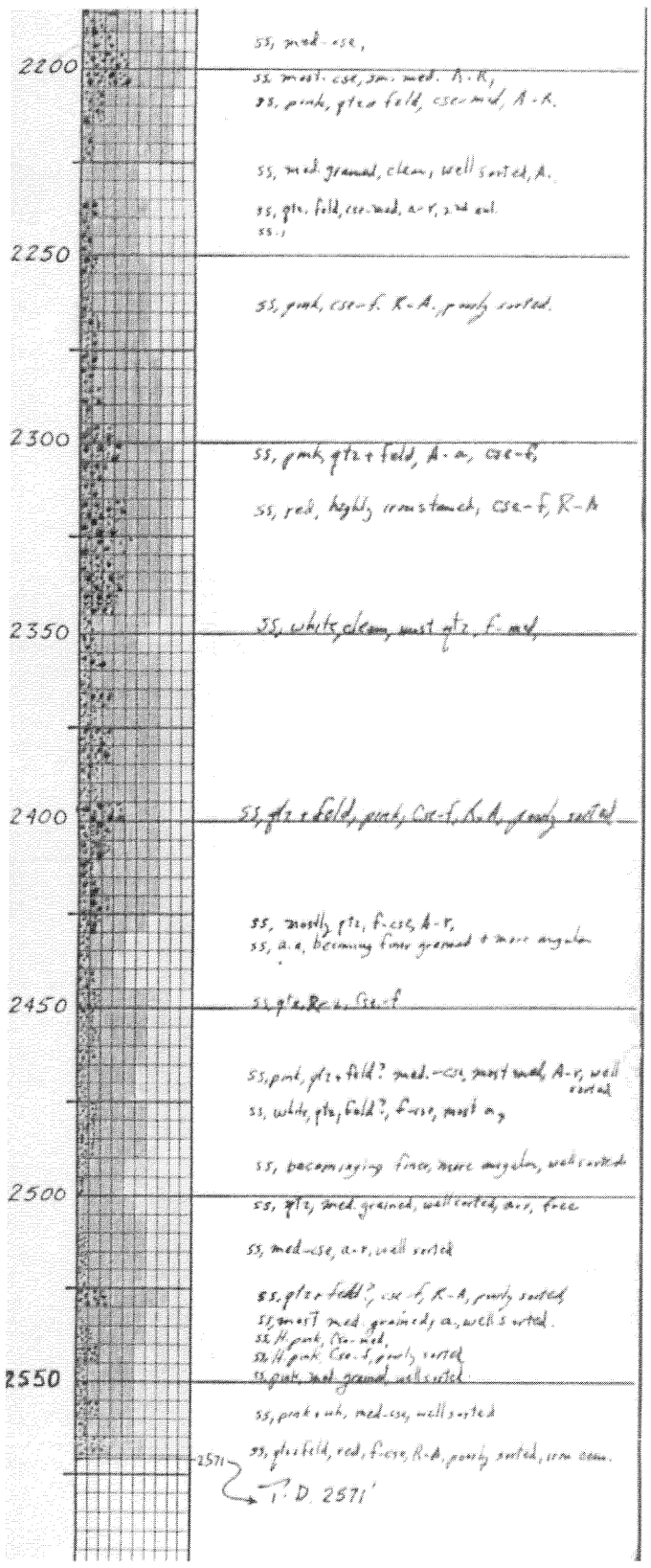


Soil, brown, leached, sandy, silty.
Soil, gr-brn, clayey, silty, leached
till, gr, yellow-brn, clayey, sndy
till, clayey, gr, yell-brn, sndy
dol, orange, f., pinhole por.
a.a.
dol, crm to orange, f.
Pleis. / Silurian (Niagaran)
dol, pale orange, f. x-ln.
50
dol, crm, orange, lt. brn.
dol, orange, f.
dol, lt. orange, f, sub-sach.
dol, orange, f, sm. por.
dol, crm to orange, f., sm. por.
100
dol, orange, f.
dol, orange, f., sh, v. lt. gr, chunky
dol, pale orange, f.
dol, orange, lt. brn, f-med.
150
dol, pale orange to orange-brn, f-med.
dol, lt. gr, orange, f.
dol, most lt. med. gr, f-med. orange, f-med.
dol, crm, v. lt. gr, orange, f-med.
dol, lt. gr, orange-brn, f-med.
200
dol, lt. gr, orange, f. sl. angular por.
dol, crm, v. lt. gr, f, calc (chalky) in part.
cht, white, tripo; dol, v. lt. gr, f.
(Kankakee) cht, a.a.; cht, v. lt. gr, wh, smooth & rough; dol, crm, f.
a.a.
cht, v. lt. gr, smooth; dol, lt. gr, f, sm. orange.
250
cht, v. lt. gr, smooth; dol, lt. gr, gr-tan, f.
cht, wh, trip; cht, crm, smooth; dol, crm, f.
cht, wh, trip; cht, tan, crm, f, microfoss.; dol, a.a.
cht, wh, lt. gr, R&S; dol, lt. gr-tan, f.
cht, lt. brn, smooth, dol, lt. brn, f; shale, lt. grn, chunky
Maquoketa shale, v. lt. gr, chunky, dol, a.a.
dol, brn, f; sh, gr-grn, chunky
shale, grn, chunky
300
dol, dk. gr, f; sh, gr-grn, chunky
dol, gr. brn, f.; sh, gr-grn, chunky
sh, gr-grn, chunky, dolo.
dol, gr, f; sh, lt. grn, chunky, dolo
350
dol, mott. gr-brn, f.
shale, gr-grn, chunky, v. dol.
dol, mott. gr-dk, f; sh, gr-grn, chunky, dolo.
dol, mott dk. gr & tan, f.; sh, gr-grn, chunky, dolo.
dol, orange, f.; sh, grn, chunky, dolo.
400
dol, orange, gr, f; sh, a.a.
dol, orange, gr, f; sh, gr-brn, chunky, dolo.
dol, a.a.; sh, gr-grn-brn.
sh, gr-grn-brn
sh, v. lt. gr, chunky, dolo.
sh, a.a. grn-gr
dol, brn, gr-brn, f; sh, gr.
dol, a.a.; sh, gr-brn, chunky, dolo
450
shale, lt. gr, chunky, dolo.
dol, brn, f, arg (brn); sh, gr-brn, chunky
dol, gr-brn, f, arg (brn)
(Elgin)
dol, brn, f. w/blk speckles, foss frags (emb)
shale, brn, chunky, gr-brn, dolo.; dol, a.a.
500
dol, brn f.; shale, gr-brn, chunky, phos. foss
a.a.
Galena
dol, brn, f.; sh, grn, sl. lam, v. dolo.
dol, tan, f. med. x-ln, sm. cin specks (emb)
dol, tan, gr-tan, f-med. x-ln, cin sphs (emb)
dol, tan, f-med.
dol, a.a., sm. gr mottling
550
dol, tan, f-med, sm. por.
dol, tan, lt. brn, f-med, sm. por
600
dol, lt. brn, f-med.



cht, brn, white, R&S; dol, tan, brn, f-med.
Prosser
cht, crm, tan, R&S; dol, a.a.
cht, gr-tan w/blk speckles; dol, brn, f-med.
cht, gr-tan, R&S; dol, a.a.
cht, lt. gr, smooth; dol, brn, f-med.
650
cht, gr, crm, R&S; dol, lt. gr-brn, f-med.
cht, wh, trip; cht, crm, smooth; dol, brn, f.
cht, wh, trip; dol, gr-tan, lt. brn, f.
cht, wh, trip; dol, gr-tan, brn, f.
cht, wh, trip; dol, gr-brn, f.
dol, tan, brn, f-med.
dol, tan, gr-tan, f-med., sm. por.
700
cht, wh, R&S; dol, tan, f-med.
cht, wh & tan, trip & smooth; dol, brn, f.
dol, lt. gr-brn, f.
dol, brn, f.; shale, crm, grn, tan, fissle.
dol, brn, f; calcite x-ln.
dol, lt brn, f; calcite
750
dol, lt. brn, f-med; calcite
Decorah dol, brn, f-med; sh, crm, grn, fissle
dol, a.a.; sh, grn.
Guttenberg dol, brn, f, foss, lt. gr-tan foss. — CIN. SPK
SH. BRN. W/ CIN SPK
dol, brn, f, v.f.
McGregor dol, lt. brn, f-med, v. por in part
cht, gr-tan; dol, lt. brn, arg (brn) por, calcite …
800
cht, crm, tan, smooth; dol, brn, f., por, arg (brn) sl. …
dol, mott. gr-brn, f; ls, crm, lt. gr, v.f., foss (blk)
dol-ls, brn-crm, f, foss (blk)
Platteville dol, lt brn, vesicular por in part; ls, brn, f.
Pecatonica cht, crm, smooth; dol, tan, f, vesicular por in part
a.a.; ls, tan, f, sndy. (Calc to ls, dolo)
855
850
cht, crm, smooth; dol, gr-tan, f, sndy, ss a.a., pyrite
Glenwood shale, green, chunky, pyritic (sh, grn, sndy, brn …)
St. Peter dol, gr, v. sndy; ss, qtz, med-cse, R.r., pyrite (Cont …)
dol, tan, f. sm. por; ss, a.a.
dol, tan, f, por; ss, qtz, f-cse, R-r, por
ss, white, qtz, f-cse, R, r,
dol, brn, f; ss, a.a.
900
900
dol, a.a.; ss, a.a.; sh, lt. grn, chunky
Prairie du Chien (Willow River)
cht, crm, oolitic; dol, tan, f; ls, brn, v.f.; sh, grn,
cht, a.a.; dol, crm, brn, f.
dol, pale orange-brn, v.f., sl. sndy (emb)
dol, crm, orange, brn, f., sndy
cht, wh, R&S; dol, crm, f, sl. sndy
dol, crm, lt. gr, f, sndy; ss, qtz, fsec f-med, …
dol, tan, brn, f, sndy
950
dol, crm, gr-tan, f, sndy
dol, a.a.; ss, wh, qtz, f, dolo. tight cem.
dol, crm, brn, sndy
dol, tan, brn, f, ool sndy
cht, crm, smooth; dol, crm, brn, f.
dol, crm, f.
dol, crm, lt. brn, f, sl. sndy
cht, brn & wh, ool, smooth; dol, lt. brn, f, sm. ool, gl…
1000
dol, crm, lt. brn, f, v.f., sndy
cht, crm, f; dol, crm, lt. brn, f, sl. glauc
dol, lt. gr-tan, crm, v.f.
dol, crm, f.
dol, a.a., sl. sndy
dol, crm, lt. brn, f.
dol, lt. brn, f.
cht, crm, ool, smooth; dol, crm, pale orange, f, …
cht, wh, brn, ool, trip; dol, brn, f, sl. sndy
1050
cht, orange, ool; dol, brn, tan, f.
dol, tan, lt. brn, sl. sndy (emb)
cht, orange, ool; dol, crm, pale orange, sl. sndy
dol, crm, gr-tan, pale orange, f, sndy
Root Valley
dol, a.a.; ss, wh, qtz, dolo cem, some free, med-cse, R…
dol, crm, tan, v.f.; ss, a.a.
dol, crm, pale orange, f, sndy
cht, orange, smooth; dol, crm, f.
1100
Oneota
cht, a.a.; dol, crm, lt. orange-gr, f.
cht, a.a.; dol, crm, v. lt. gr, f. x-ln
dol, a.a.
cht, mott. orange, rubbly, smooth; dol, a.a.
cht, wh, orange, smooth; dol, lt. gr, f.
cht, white, orange, sm. sl. dol, smooth; dol, a…
1150
cht, white, orange, smooth; dol, brn, med. x-ln.
cht, a.a.; dol, crm, brn, f-med.
cht, orange, lt. gr, R&S; dol, crm, gr-tan, f.
a.a., dol, brn, med x-ln (subhedra)
cht, a.a.; dol, mott gr-brn, med. x-ln
1200
cht, wh, pale orange, R&S; dol, reddish-brn, med.
cht, orange & wh, sm. ool; dol, reddish-gr-orange, …
cht, white; dol, pale gr-orange, f-med.
Qtz, pink, geode; cht, crm, smooth; dol, lt. gr, crm, f-m…
1250
cht, wh, pale orange, sl. ool; dol, orange, lt. gr, f.
chal, red; cht, wh, f; dol, gr, red-tan, f.
cht, wh, trip, orange; dol, reddish-gr, f.
cht, wh, R&S, dol, crm, f.
1275
cht, crm, pale orange, R&S; dol, crm, pink, sndy
Trempealeau
cht, wh; dol, gr-tan, sndy; ss, qtz, cse-f, R.r.
1300
dol, gr-tan, f, sndy; ss, gr, f-cse, dolo. tight …
(Jordan)
dol, a.a.; qtzite, siliceous cem. ss; ss, qtz, f-cse, sil, …
dol, tan, crm, f, sndy, siliceous, glauc; ss, a.a.
cht, wh, … dol, gr-tan, …
dol, pale pink-orange, f, sndy (cse), glauc
dol, gr, pink, f, v. sndy
dol, a.a.; ss, f, sil, tight
dol, gr, sndy, sil; ss, qtz, f-cse, dolo. sil.
1340
St. Lawrence
dol, tan, gr-tan, f-med. sl. sndy
1350
dol, gr, tan, f, sl. sndy
dol, crm, f, sl. sndy.
dol, pale orange, f
dol, crm, pale orange, f
dol, tan, pale orange, f.





2350 - 2500
lt tn - white fine
ss w/ chert

above 2350 - Coarser
reddish brown ss

well 7 samples

Iowa Geological Survey
Phone: 1-319-335-1575
Fax: 1-319-335-2754

Site Record
Wnumber: 21285

Wnumber: *21285*

Name Owner: *Chemplex #4*

County: *Clinton* **Quad map:** *Camanche, Iowa-Ill.*

Location: *T81N R6E Sec. 20 SW NW NW*

Elev: **Total depth:** *2546* **Depth to bedrock:** *30*

Driller: *Layne Western - Il.* **Date drilled:** *January 1, 1968*

Site type: *Drilled hole* **Well type:** *Commerical* **Sample type:** *Chips*

Log data: *Unknown*

Geologist: **Log Date:**

Exit Geology Water Production **Casing**

Iowa Geological Survey
Phone: 1-319-335-1575
Fax: 1-319-335-2754

Construction Information
Wnumber: 21285
← Return to Site Record

Construction date: January 1, 1968 **Comments:** 36' of 20", 908' of 16"□

Casing Data

Diameter	Type	Top depth	Btm depth	Length
20		0	0	36
16		0	0	908
0		0	0	0

Hole Data

Diameter	Depth

Screen / Perforation Data

Diameter	Opening	Top depth	Btm depth	Length
0	0	0	0	
0	0	0	0	

Grout data

Type	Top depth	Btm depth
	0	0

Pump data

Depth to intake	0
Type	
Rating	0

Primary water source

Depth top	0
Depth bottom	0

Return to Site Record and select other information that might be available or close this window and select another site.

Layne-Western Company, Inc.

WATER SUPPLY CONTRACTORS

705 SO. DUFF AVE. AMES, IOWA 50010
Phone 515 232-3563

~1580' from well 7

Name of Job Chemplex Construction Corp. Date 11-7-68

City Near Clinton State Iowa

Well No: 4 Drillers: Rentschler, Butcher

Well Location: _____ ft. (____) and _____ ft. (____) of the _____ corner

the ____ ¼ of Section ____, Twp. ____ (____), Range ____ (____) Clinton Coun

Otherwise located as Chemplex coordinates 61 + 00' E and 77 + 05'N

Work Began: June 14, 1968 Work Completed: Oct. 8, 1968

Casing Record:

Amount	Dia.	Wt. or Thickness	Material				
36'	20"	.375	steel	with welded	joints from 0	to	36'
908'	16"	.375	steel	with welded	joints from 0	to	908
				with	joints from	to	
				with	joints from	to	

Hole Record:

19½	inch from 0	to	908	
	inch from	to		
	inch from	to		
	inch from	to		
15½	inch from 908	to	2546	bottom of hole

Cementing Record: 16" casing cemented bottom to top

Well Test Data: Static Level 255 ; pumping level 390 after 48 hours pumping at 1515 g.p

Length of test 48 hrs. See Well Test Data Sheet Dated 9-26-68

Remarks: May 2000 - 16" OD failed 426'-431' - Set & cemented new 14" OD x .376" Stainless 910' bottom to 207.67' top, 14" x 3/8" steel to surface

SEE OTHER SIDE.

LW-34

WELL LOG

Feet		Feet	Description
0	to	20	Clay rock & mud
20	to	35	Gray shale
35	to	135	Brown limestone
135	to	160	Hard gray limestone
160	to	230	White limestone
230	to	235	Medium hard gray limestone
235	to	260	Gray shale
260	to	295	Blue shale
295	to	305	Gray shale
305	to	325	Medium hard, gray lime
325	to	410	Blue shale
410	to	435	Gray shale with limestone streaks
435	to	465	Gray limestone
465	to	480	Gray shale
480	to	530	Hard gray limestone
530	to	535	Medium hard, brown limestone
535	to	695	Medium hard, gray limestone
695	to	725	Very hard gray limestone
725	to	775	Hard brown limestone
775	to	833	Hard gray limestone
833	to	842	Blue shale
842	to	870	Hard dark gray sandstone
870	to	891	Hard white sandstone
891	to	895	Yellow sandstone, limestone & shale
895	to	910	Hard gray sandy limestone
910	to	1130	Medium gray limestone
1130	to	1140	Medium sandy gray limestone
1140	to	1230	Medium & hard gray limestone
1230	to	1240	Medium brown limestone
1240	to	1305	Hard sharp gray sandstone
1305	to	1340	Hard white sandstone
1340	to	1390	Very hard brown limestone
1390	to	1435	Very hard gray limestone
1435	to	1470	Hard brown limestone
1470	to	1485	Hard gray limestone
1485	to	1495	Hard brown limestone
1495	to	1540	Lime shells & shale
1540	to	1565	Sandy limestone & shale
1565	to	1570	Medium gray limestone
1570	to	1595	Medium gray sandy limestone
1595	to	1650	Medium white sandstone
1650	to	1720	Soft white sandstone
1720	to	1735	Hard gray sandstone
1735	to	1755	Medium sandstone & shale streaks
1755	to	1765	Medium sandstone & red rock
1765	to	1785	Medium gray sandstone
1785	to	1795	Medium brown sandstone
1795	to	1800	Medium gray sandstone with shale streak
1800	to	1860	Hard brown limestone
1860	to	1885	Hard brown sandy limestone
1885	to	1895	Hard brown limestone with shale streaks
1895	to	1910	Soft gray sandstone
1910	to	1920	Hard white sandstone
1920	to	1935	Soft white sandstone
1935	to	1975	Medium white sandstone
1975	to	2025	Soft white sandstone
2025	to	2045	Medium white sandstone

WELL LOG

Feet		Feet	Description
2045	to	2095	Soft & medium white sandstone
2095	to	2130	Medium hard white sandstone
2130	to	2170	Hard brown sandstone
2170	to	2225	Medium brown sandstone
2225	to	2255	Hard brown sandstone
2255	to	2275	Medium brown sandstone
2275	to	2335	Hard brown sandstone
2335	to	2360	Medium brown sandstone
2360	to	2370	Medium white sandstone
2370	to	2400	Medium brown sandstone
2400	to	2410	Hard brown sandstone
2410	to	2440	Hard gray sandstone
2440	to	2546	Hard brown sandstone

PEERLESS SERVICE CO.
WATER SUPPLY CONTRACTORS
DUBUQUE, IOWA

WELL TEST DATA SHEET

Job Veolia Well No. 4
Location Clinton, IA

Date tested 3/9/06
Tested by J. Sass

Dia. of well 13 1/4"
Depth of well 2,536'
Length of airline 560'
Non-pumping level 419'
Orifice size 6" meter

Pump used: Driver 200 H.P.
Column and shaft 8"
Bowls 12LD 8-stage
Manufacturer Peerless
Serial No.

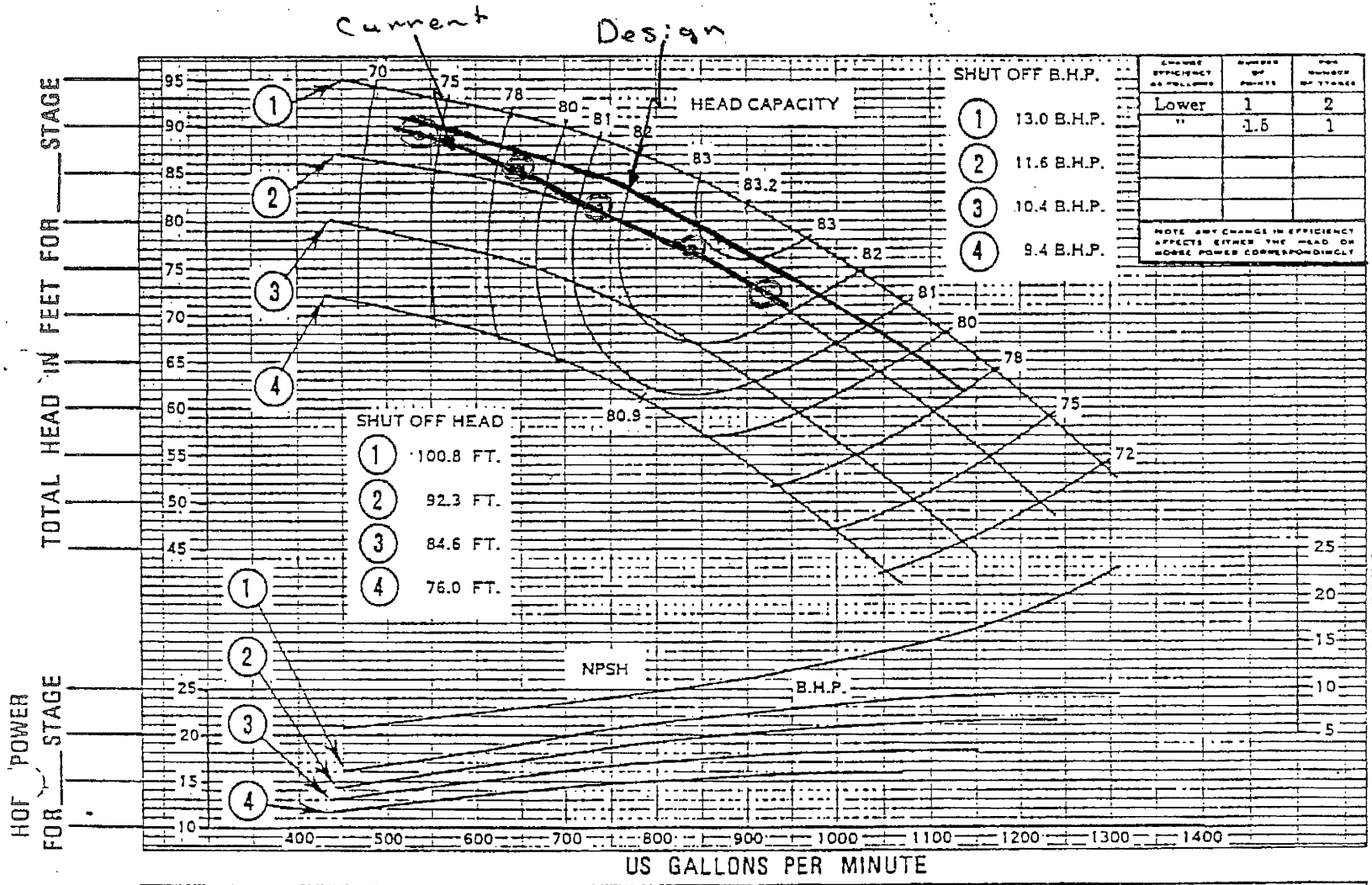
TIME	PIZOMETER READING (IN.)	G. P. M.	AIR GAUGE READING (FEET)	PUMPING LEVEL	DRAWDOWN	DISCH. PRESSURE LBS.	DISCH. PRESSURE FEET	TOTAL PUMPING HEAD	TEMP.	REMARKS
	0	0			0		0			START OF TE
		920	16 SPC	476'	57	38		573'	Amps	212,225,22
		840		468'	49	60		615'		
		740		458'	39	81		651'		
		650		450'	31	100		687'		
		540	21	444'	25	117		718'	Amps	185,194,19
		RV OPENED @ 150 PSI								
		Megged 90 meg ohms								
		Continuity < 1 ohm								
		Specific well yield @ 840 GPM					17.1	GPM/ft. D.D.		

118

Peerless Pump

VERTICAL TURBINE PUMPS

Section 140
5-83 t



HYDRAULIC PERFORMANCE WARRANTY	CURVE NO.	IMPELLER NO.	IMPELLER DIA.	TAKEN FROM
Guaranteed at designated point only, and contingent on: Proper flow to pump suction, Proper submergence, Fluid free of gas, air & abrasives, Proper lateral setting of impeller	1	2634820	8 13/16" x 9 23/32"	54628
	2	2634820	8 3/4" x 9 7/16"	54573
	3	2634820	8 1/4" x 9 5/32"	54601
	4	2634820	7 7/8" x 8 29/32"	54664

Customer Veolia No. 4

Item 1720 RPM Hitachi motors

Peerless Ref. No.

Laboratory Performance | BOWL 2634907 CIE

SIZE 12LD | RPM ~~1750~~ 1738 | CURVE 4805968

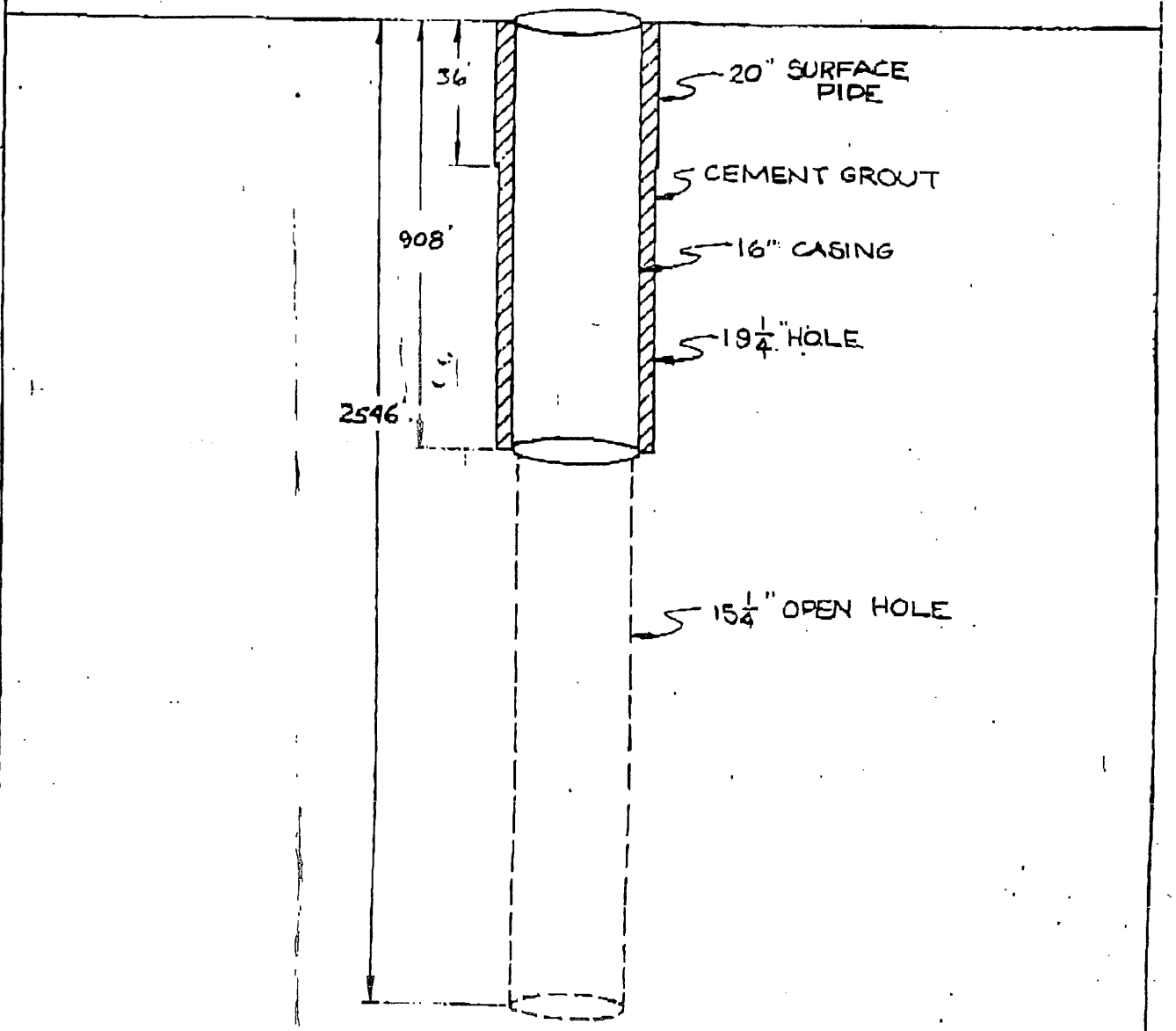
PUMP DESCRIPTION: Driver_____: Head_____: Column_____

GUARANTEED BOWL☐ FIELD☐ PERFORMANCE: Capacity_____gpm; Head_____ft; Eff_____%; BHP_____

DETAIL OF WELL CONSTRUCTION OF WELL NO.4 CHEMPLEX CHEMICAL CORPORATION CLINTON, IOWA

NOV. 1968

CONSTRUCTION



STATIC LEVEL 255'	CAPACITY 1515 GPM	DRAWDOWN 135'	PUMPING LEVEL 390'

LAYNE-WESTERN CO.

Iowa Geological Survey
Phone: 1-319-335-1575
Fax: 1-319-335-2754

Site Record
Wnumber: 18973

Wnumber: *18973*

Name Owner: *Chemplex #6*

County: *Clinton* **Quad map:** *Camanche, Iowa-Ill.*

Location: *T81N R6E Sec. 20 SW SW SE SW*

Elev: *653* **Total depth:** *2529* **Depth to bedrock:** *8*

Driller: *Layne Western - Il.* **Date drilled:** *November 28, 1966*

Site type: *Drilled hole* **Well type:** *Commerical* **Sample type:** *Chips*

Log data: *Unknown*

Geologist: **Log Date:**

Exit Geology Water Production Casing

PEERLESS SERVICE CO.
WATER SUPPLY CONTRACTORS
DUBUQUE, IOWA

WELL TEST DATA SHEET

Job Veolia Well No. 6
Location Clinton, IA

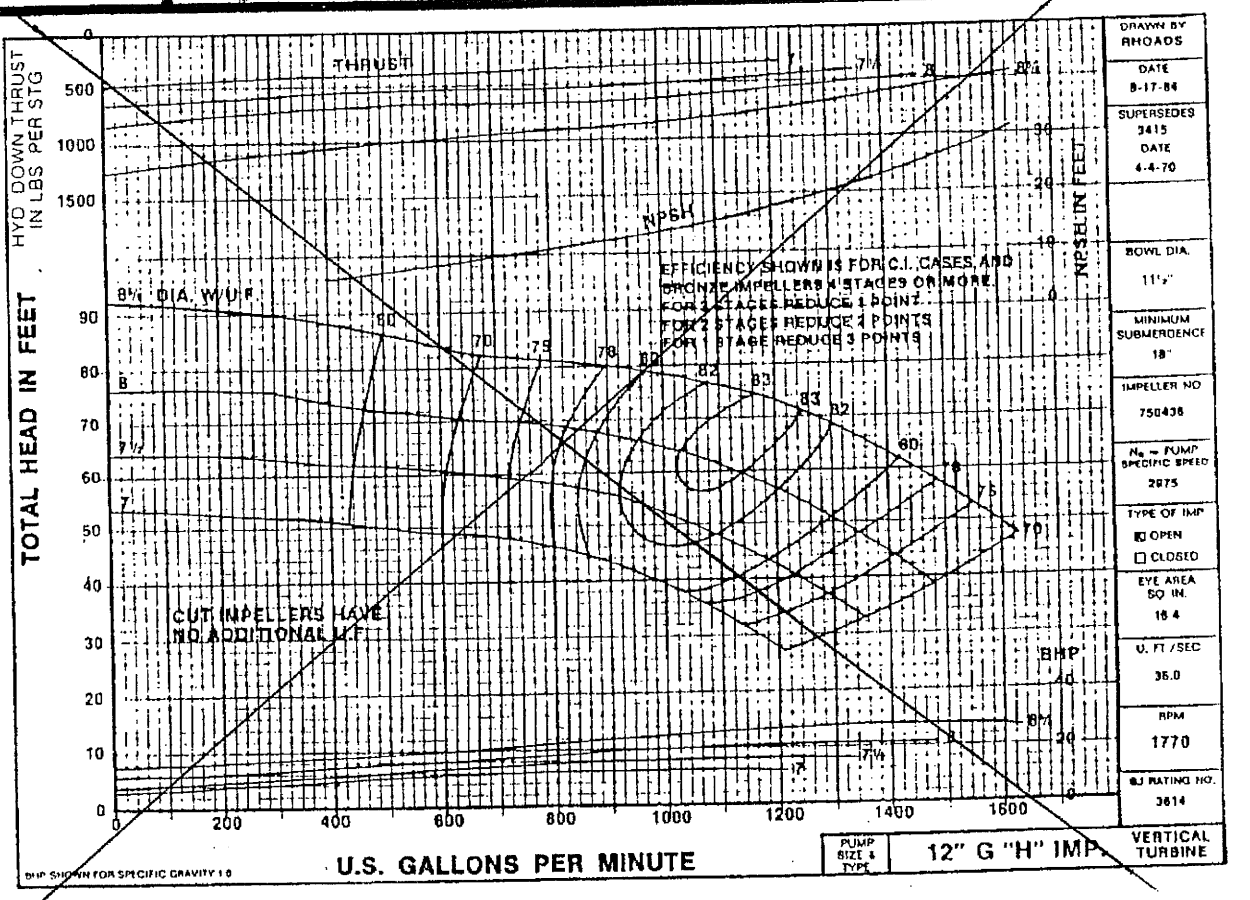
Date tested 3/9/06
Tested by J. Sass

Dia. of well 13 1/4"
Depth of well 2,509'
Length of airline 591'
Non-pumping level 390'
Orifice size 6" meter

Pump used: Driver 200 H.P.
Column and shaft 6"
Bowls 12 MQ-L 11-stage
Manufacturer Byron-Jackson
Serial No.

TIME	PIZOMETER READING (IN.)	G. P. M.	AIR GAUGE READING (FEET)	PUMPING LEVEL	DRAWDOWN	DISCH. PRESSURE LBS.	DISCH. PRESSURE FEET	TOTAL PUMPING HEAD	TEMP.	REMARKS
	0	0			0		0			START OF TE
		770		513'	123'	42	PSI	634'	Amps	223,209,205
		740		495'	105'	60	PSI	656'		
		660		476'	86'	80	PSI	682'		
		610		461'	71'	98	PSI	705'		
		520		447'	57'	120	PSI	736'	Amps	210,196,195
		RV Opened @ 125 PSI								
		Megged 10 meg ohms								
		Continuity ≤1 ohm								
		Specific well yield @ 740 GPM					7.0 GPM/ft. D.D.			

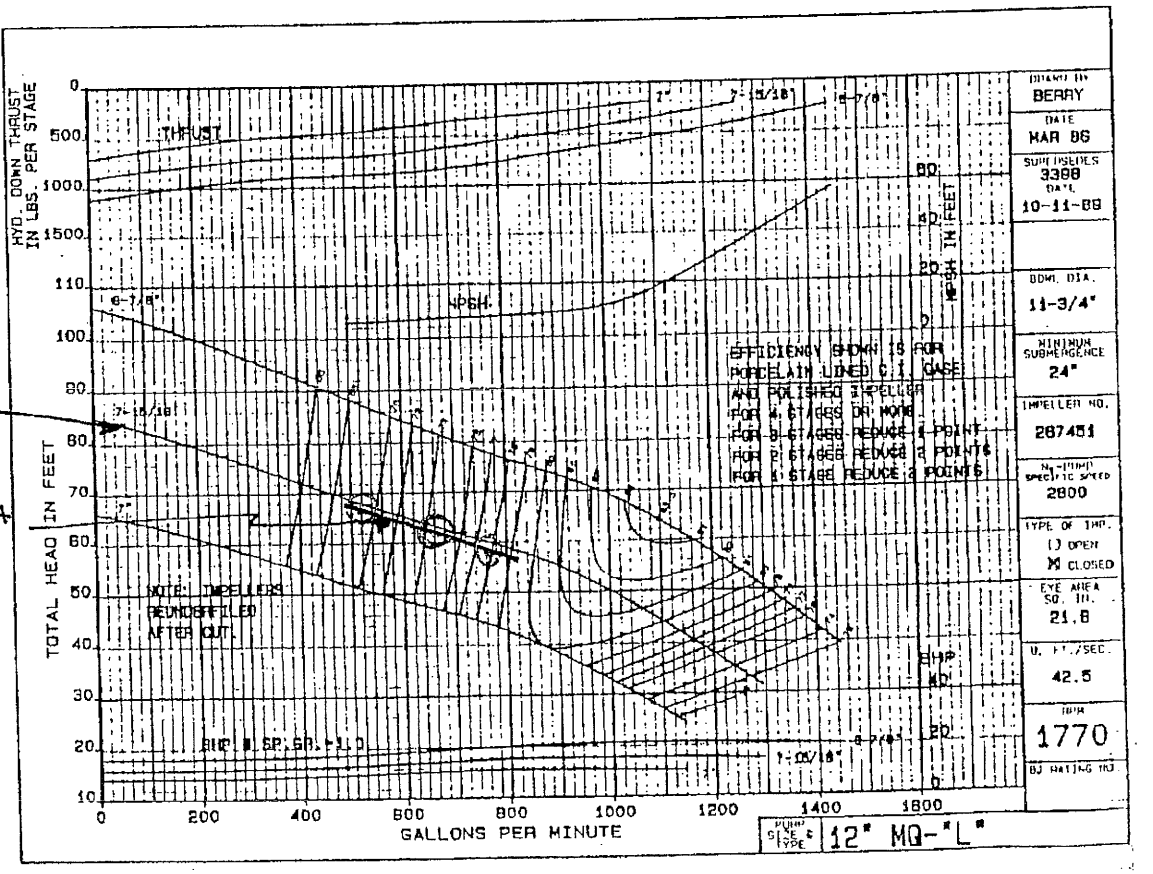
Johnson Pump Division
BORG-WARNER CORPORATION
JRG WARNER



Pump No. 6

Design

Current



Appendix 2

Step Drawdown and Pumping Test of Well Sheets

D velopment

DATE: May 16 & 17, 2006

LAYNE-NORTHWEST COMPANY
TEST OF WELL

WELL NO.: 7
WELL DEPTH: 2500
OWNER: Equistar
LOCATION: Clinton, IA

DIA. ORIFICE: meter
STATIC LEVEL: 288 FT.
LENGTH OF AIRLINE: 620 FT.
DRILLED BY: Layne-Northwest

CENTER OF GAUGE TO GROUND LEVEL: 2' 4"
PUMP SET TO DISCHARGE NOZZLE: 620
TO TAIL PIPE:
TESTED BY: Matt M & Rick T

READING NUMBER	TIME	G.P.M.	INCHES ON ORIFICE	ALT GA IN FEET	PUMPING LEVEL FT.	DRAWDOWN IN FEET	SPECIFIC YIELD	HEAD PRESSURE PSI	RATE OF RECOVERY OR AMPS	WATER APPEARANCE: CLEAR, CLOUDY, MURKY, MUDDY, SANDY, TEMP, ODOR	
	15:50			332	288						
1	16:05	470		300	320	32	14.69			foamy	1150 rpm
2	16:15	450		300	320	32	14.06			clear	
3	16:25	490		308	312	24	20.42			clear	
4		440		311	309	21	20.95			clear	
5	16:40	470		310	310	22	21.36			clear	
6	16:50	800		291	329	41	19.51	6	119	clear	1316 rpm
7	17:00	800		289	331	43	18.60	6		clear	
8	17:20	800		285	335	47	17.02	6		clear	
9	17:35	810		285	335	47	17.23	6	119		.01 ppm
10	05/17/2006										
11	7:20	0		348	292						
12	7:50	850		292	328	36	23.61	7	115	clear	1300 rpm
13	8:00	780		291	329	37	21.08	7		clear	
14	8:15	780		290	330	38	20.53	7		clear	
15	8:30	770		289	331	39	19.74	7		clear	
16	8:32	980		279	341	49	20.00	11	142	clear	1400 rpm
17	9:00	950		275	345	53	17.92	11		clear	
18	9:30	950		273	347	55	17.27			clear	
19	10:00	950		272	348	56	16.96	11		clear	.1 ppm
20	10:05	1230		252	368	76	16.18	20		clear	.4 ppm
21	10:35	1250		252	368	76	16.45	21	202	clear	
22	11:05	1206		250	370	78	15.46	21		clear	
23	11:30	1200		250	370	78	15.38	21		clear	
24	11:35	1510		232	388	96	15.73	33		clear	
25	12:05	1500		230	390	98	15.31	33	279	clear	
26	12:35	1520		229	391	99	15.35	33		clear	
27	13:05	1500		229	391	99	15.15	33		clear	
28											
29											
30											
31											
32											
33											
34											
35											

DATE: May 18, 2006

LAYNE-NORTHWEST COMPANY
TEST OF WELL

WELL NO.: 7
WELL DEPTH: 2500
OWNER: Equistar
LOCATION: Rec Center - Clinton, IA

DIA. ORIFICE: 10 x 7
STATIC LEVEL: 285 FT.
LENGTH OF AIRLINE: 620 FT.
DRILLED BY: Layne-Northwest

CENTER OF GAUGE TO GROUND LEVEL: 2'
PUMP SET TO DISCHARGE NOZZLE: 620
TO TAIL PIPE:
TESTED BY: Matt M & Keith J

READING NUMBER	TIME	G.P.M.	INCHES ON ORIFICE	ALT GA IN FEET	PUMPING LEVEL FT.	DRAWDOWN IN FEET	SPECIFIC YIELD	HEAD PRESSURE PSI	RATE OF RECOVERY OR AMPS	WATER APPEARANCE: CLEAR, CLOUDY, MURKY, MUDDY, SANDY, TEMP, ODOR
	9:05			335	285					
1	9:15	550		308	312	27	20.37			
2	9:16	530		308	312	27	19.63			1160 rpm
3	9:17	540		305	315	30	18.00		87	
4	9:18	540		305	315	30	18.00			
5	9:19	540		305	315	30	18.00			
6	9:20	550		304	316	31	17.74			
7	9:21	550		304	316	31	17.74			
8	9:22	550		303	317	32	17.19			
9	9:23	540		303	317	32	16.88			
10	9:24	540		303	317	32	16.88			
11	9:25	540	5	303	317	32	16.88			clear
12	9:26	550	5	303	317	32	17.19			clear
13	9:27	540	5	303	317	32	16.88			clear
14	9:28	540	5	303	317	32	16.88			clear
15	9:29	540	5	303	317	32	16.88			clear
16	9:30	550	5	303	317	32	17.19			clear
17	9:31	550	5	302	318	33	16.67			clear
18	9:32	540	5	302	318	33	16.36			clear
19	9:33	540	5	302	318	33	16.36			clear
20	9:34	540	5	302	318	33	16.36			clear
21	9:35	540	5	302	318	33	16.36			clear
22	9:40	530	5	302	318	33	16.06			clear
23	9:45	530	5	302	318	33	16.06			clear
24	9:50	530	5	302	318	33	16.06			
25	9:55	530	5	302	318	33	16.06			
26	10:00	530	5	302	318	33	16.06			
27	10:15	530	5	302	318	33	16.06			
28	10:30	530	5	302	318	33	16.06			
29	10:45	530	5	322	298	13	40.77		85	
30	11:00	530	5	322	298	13	40.77			
31	11:15	530	5	322	298	13	40.77			clear 1285 rpm
32	11:16	730	5	290	330	45	16.22	4		clear
33	11:17	740		290	330	45	16.44	4		clear
34	11:18	730	8.5	290	330	45	16.22			clear
35	11:19	730	8.5	289	331	46	15.87		110	clear

DATE: May 18, 2006

LAYNE-NORTHWEST COMPANY
TEST OF WELL

WELL NO.: 7
WELL DEPTH: 2500
OWNER: Equistar
LOCATION: Rec Center - Clinton, IA

DIA. ORIFICE: 10 x 7
STATIC LEVEL: 285 FT.
LENGTH OF AIRLINE: 620 FT.
DRILLED BY: Layne-Northwest

CENTER OF GAUGE TO GROUND LEVEL: 2'
PUMP SET TO DISCHARGE NOZZLE: 620
TO TAIL PIPE:
TESTED BY: Matt M & Keith J

READING NUMBER	TIME	G.P.M.	INCHES ON ORIFICE	ALT GA IN FEET	PUMPING LEVEL FT.	DRAWDOWN IN FEET	SPECIFIC YIELD	HEAD PRESSURE PSI	RATE OF RECOVERY OR AMPS	WATER APPEARANCE: CLEAR, CLOUDY, MURKY, MUDDY, SANDY, TEMP, ODOR
1	11:20	730	8.5	289	331	46	15.87	4		clear
2	11:21	730	8.5	289	331	46	15.87	4		clear
3	11:22	730	8.5	289	331	46	15.87			clear
4	11:23	730	8.5	289	331	46	15.87	4		clear
5	11:24	730	8.5	289	331	46	15.87			clear
6	11:25	730	8.5	289	331	46	15.87	4		clear
7	11:30	730	8.5	289	331	46	15.87	4		
8	11:35	730	8.5	289	331	46	15.87	4		
9	11:40	730	8.5	289	331	46	15.87			
10	11:45	730	8.5	288	332	47	15.53	4		
11	12:00	730	8.5	288	332	47	15.53			
12	12:15	730	8.5	288	332	47	15.53	4		
13	12:30	730	8.5	288	332	47	15.53			
14	12:45	730	8.5	287	333	48	15.21			
15	13:00	730	8.5	287	333	48	15.21	4		
16	13:15	730	8.5	287	333	48	15.21	4		
17	13:16	999		271	349	64	15.61	5		
18	13:17	999		271	349	64	15.61			
19	13:18	1000		269	351	66	15.15	5		
20	13:19	1000		269	351	66	15.15			
21	13:20	1000		269	351	66	15.15			
22	13:21	1000		269	351	66	15.15			
23	13:22	1000		269	351	66	15.15			
24	13:23	1000		269	351	66	15.15			
25	13:24	1000		269	351	66	15.15	5		
26	13:25	1000		269	351	66	15.15	5	146	clear
27	13:30	1000	17.5	269	351	66	15.15	5		clear
28	13:35	1000	17.5	268	352	67	14.93	5		clear
29	13:40	1000	17.5	265	355	70	14.29			clear
30	13:45	1000	17.5	265	355	70	14.29	5		clear
31	14:00	1000	17.5	265	355	70	14.29	5		
32	14:15	1000	17.5	265	355	70	14.29	5		
33	14:30	1000	17.5	264	356	71	14.08	5		
34	14:45	1000	17.5	264	356	71	14.08			
35	15:00	1000	17.5	264	356	71	14.08	5		

DATE: May 18, 2006

LAYNE-NORTHWEST COMPANY
TEST OF WELL

WELL NO.: 7
WELL DEPTH: 2500
OWNER: Equistar
LOCATION: Rec Center - Clinton, IA

DIA. ORIFICE: 10 x 7
STATIC LEVEL: 285 FT.
LENGTH OF AIRLINE: 620 FT.
DRILLED BY: Layne-Northwest

CENTER OF GAUGE TO GROUND LEVEL: 2'
PUMP SET TO DISCHARGE NOZZLE: 620
TO TAIL PIPE:
TESTED BY: Matt M & Keith J

READING NUMBER	TIME	G.P.M.	INCHES ON ORIFICE	ALT GA IN FEET	PUMPING LEVEL FT.	DRAWDOWN IN FEET	SPECIFIC YIELD	HEAD PRESSURE PSI	RATE OF RECOVERY OR AMPS	WATER APPEARANCE: CLEAR, CLOUDY, MURKY, MUDDY, SANDY, TEMP, ODOR
1	15:15	1000	17.5	264	356	71	14.08	6		
2	15:16	1570	41.5	233	387	102	15.39	24		
3	15:17	1590	41.5	231	389	104	15.29			
4	15:18	1590	41.5	231	389	104	15.29			
5	15:19	1590	41.5	231	389	104	15.29			
6	15:20	1590	41.5	231	389	104	15.29	24		
7	15:21	1590	41.5	231	389	104	15.29			
8	15:22	1590	41.5	231	389	104	15.29			
9	15:23	1590	41.5	231	389	104	15.29			
10	15:24	1590	41.5	231	389	104	15.29	24		
11	15:25	1500	41.5	230	390	105	14.29	24		turbid, blackish
12	15:30	1500	40.5	230	390	105	14.29			
13	15:35	1500	40.5	230	390	105	14.29			
14	15:40	1500	40.5	230	390	105	14.29			clear
15	15:45	1500	40.5	230	390	105	14.29	24	266	
16	16:00	1500	40.5	229	391	106	14.15	24		
17	16:15	1500	40.5	229	391	106	14.15			
18	16:30	1500	40.5	228	392	107	14.02	22		turbid
19	16:45	1500	40.5	228	392	107	14.02			cloudy
20	17:00	1500		228	392	107	14.02			
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
32										
33										
34										
35										

Duration

DATE: May 18, 2006

LAYNE-NORTHWEST COMPANY
TEST OF WELL

WELL NO.: 7
WELL DEPTH: 2500
OWNER: Equistar
LOCATION: Rec Center

DIA. ORIFICE: 10 x 7
STATIC LEVEL: 294 FT.
LENGTH OF AIRLINE: 620 FT.
DRILLED BY: Layne-Northwest

CENTER OF GAUGE TO GROUND LEVEL: 2' 4"
PUMP SET TO DISCHARGE NOZZLE: 620
TO TAIL PIPE:
TESTED BY: Matt M & Keith J

READING NUMBER	TIME	G.P.M.	INCHES ON ORIFICE	ALT GA IN FEET	PUMPING LEVEL FT.	DRAWDOWN IN FEET	SPECIFIC YIELD	HEAD PRESSURE PSI	RATE OF RECOVERY OR AMPS	WATER APPEARANCE: CLEAR, CLOUDY, MURKY, MUDDY, SANDY, TEMP, ODOR
	18:35			326						
1	18:40	1000		269	351	57	17.54	6	142	
2	18:41	1000		269	351	57	17.54			
3	18:42	1000		269	351	57	17.54			
4	18:43	1000		268	352	58	17.24	6		
5	18:44	1000		266	354	60	16.67			
6	18:45	1000		266	354	60	16.67	6		clear
7	18:46	1000		266	354	60	16.67			clear
8	18:47	1000		266	354	60	16.67	6		clear
9	18:48	1000		266	354	60	16.67	6	143	clear
10	18:49	1000		266	354	60	16.67			clear
11	18:50	1000		266	354	60	16.67			clear
12	18:55	1000		266	354	60	16.67			clear
13	19:00	1000		265	355	61	16.39	6	143	clear
14	19:05	1000		264	356	62	16.13			clear
15	19:10	1000		264	356	62	16.13	6		
16	19:15	1000		263	357	63	15.87	6		
17	19:20	1000		263	357	63	15.87			
18	19:25	1000		262	358	64	15.63	6		
19	19:30	1000		262	358	64	15.63			
20	19:35	1000		261	359	65	15.38	6		
21	19:40	1000		260	360	66	15.15	6		
22	19:45	1000		260	360	66	15.15			
23	19:50	1000		260	360	66	15.15			
24	19:55	1000		260	360	66	15.15			
25	20:00	1000		260	360	66	15.15	6		
26	20:05	1000		259	361	67	14.93			
27	20:10	1000		259	361	67	14.93	6		
28	20:15	1000		259	361	67	14.93	6		
29	20:20	1000		259	361	67	14.93			
30	20:25	1000		259	361	67	14.93			
31	20:30	1000		259	361	67	14.93	6	155	clear
32	20:35	1000		259	361	67	14.93			clear
33	20:40	1000		259	361	67	14.93	6		clear
34	20:45	1000		258	362	68	14.71	6		clear
35	20:50	1000		258	362	68	14.71	6		clear

DATE: May 18/19, 2006

LAYNE-NORTHWEST COMPANY
TEST OF WELL

WELL NO.: 7
WELL DEPTH: 2500
OWNER: Equistar
LOCATION: Rec Center

DIA. ORIFICE: 10 x 7
STATIC LEVEL: 294 FT.
LENGTH OF AIRLINE: 620 FT.
DRILLED BY: Layne-Northwest

CENTER OF GAUGE TO GROUND LEVEL: 2' 4"
PUMP SET TO DISCHARGE NOZZLE: 620
TO TAIL PIPE:
TESTED BY: Matt M & Keith J

READING NUMBER	TIME	G.P.M.	INCHES ON ORIFICE	ALT GA IN FEET	PUMPING LEVEL FT.	DRAWDOWN IN FEET	SPECIFIC YIELD	HEAD PRESSURE PSI	RATE OF RECOVERY OR AMPS	WATER APPEARANCE: CLEAR, CLOUDY, MURKY, MUDDY, SANDY, TEMP, ODOR
1	21:00	1000		258	362	68	14.71	6		clear
2	21:15	1000		258	362	68	14.71	6		clear
3	21:30	1000		258	362	68	14.71	6		clear
4	21:45	1000		258	362	68	14.71	6	155	clear
5	22:00	1000		258	362	68	14.71	6		
6	22:15	1000		258	362	68	14.71	6		
7	22:30	1000		258	362	68	14.71	6		
8	22:45	1000		258	362	68	14.71	6		
9	23:00	1000		258	362	68	14.71	6		
10	23:30	1000		258	362	68	14.71	6	155	
11	24:00	1000		258	362	68	14.71	6		
12	24:30	1000		258	362	68	14.71	6		
13	1:00	1000		258	362	68	14.71	6		
14	1:30	1000		258	362	68	14.71	6		
15	2:00	1000		258	362	68	14.71	6		
16	2:30	1000		258	362	68	14.71	6		
17	3:00	1000		258	362	68	14.71	6		
18	3:30	1000		257	363	69	14.49	6		
19	4:00	1000		257	363	69	14.49	6	155	
20	4:30	1000		257	363	69	14.49	6		
21	5:00	1000		257	363	69	14.49	6		
22	5:30	1000		257	363	69	14.49	6		
23	6:00	1000		257	363	69	14.49	6		
24	6:30	1000		257	363	69	14.49	6		
25	7:00	1000		257	363	69	14.49	6	155	
26	7:30	1000		256	364	70	14.29	6	155	clear
27	8:00	1000		255	365	71	14.08	6		clear
28	8:30	1000		255	365	71	14.08	6		clear
29	9:00	1000		254	366	72	13.89	6		clear
30	9:30	1000		254	366	72	13.89	6	155	clear
31	10:00	1000		254	366	72	13.89	6		clear
32	10:30	1000		254	366	72	13.89	6		clear
33	11:00	1000		254	366	72	13.89	6		clear
34	11:30	1000		254	366	72	13.89	6		clear
35	12:00	1000		254	366	72	13.89			clear

DATE: May 19, 2006

LAYNE-NORTHWEST COMPANY
TEST OF WELL

WELL NO.: 7
WELL DEPTH: 2500
OWNER: Equistar
LOCATION: Rec Center

DIA. ORIFICE: 10 x 7
STATIC LEVEL: 294 FT.
LENGTH OF AIRLINE: 620 FT.
DRILLED BY: Layne-Northwest

CENTER OF GAUGE TO GROUND LEVEL: 2' 4"
PUMP SET TO DISCHARGE NOZZLE: 620
TO TAIL PIPE:
TESTED BY: Matt M & Keith J

READING NUMBER	TIME	G.P.M.	INCHES ON ORIFICE	ALT GA IN FEET	PUMPING LEVEL FT.	DRAWDOWN IN FEET	SPECIFIC YIELD	HEAD PRESSURE PSI	RATE OF RECOVERY OR AMPS	WATER APPEARANCE: CLEAR, CLOUDY, MURKY, MUDDY, SANDY, TEMP, ODOR
1	12:30	1000		254	366	72	13.89	6		clear
2	13:00	1000		254	366	72	13.89	6		clear
3	13:30	1000		254	366	72	13.89	6		clear
4	14:00	1000		253	367	73	13.70	6		
5	14:30	1000		253	367	73	13.70	6		
6	15:00	1000		253	367	73	13.70	6		
7	15:30	1000		253	367	73	13.70	6		
8	16:00	1000		253	367	73	13.70	6		
9	16:30	1000		253	367	73	13.70	6		
10	17:00	1000		253	367	73	13.70	6		
11	17:30	1000		253	367	73	13.70			
12	18:00	1000		253	367	73	13.70	6		
13	18:30	1000		253	367	73	13.70	6		
14										
15	RECOVERY									
16	18:40									
17	18:41			304						
18	18:42			306						
19	18:43			308						
20	18:44			310						
21	18:45			311						
22	18:46			311						
23	18:47			312						
24	18:48			315						
25	18:49			316						
26	18:50			318						
27	18:55			320						
28	19:00			320						
29	19:05			321						
30	19:10			321						
31	19:15			321						
32	19:20			322						
33	19:25			322						
34	19:30			322						
35	19:35			323						

Recovery

DATE: May 19, 2006

LAYNE-NORTHWEST COMPANY
TEST OF WELL

WELL NO.: 7
WELL DEPTH: 2500
OWNER: Equistar
LOCATION: Rec Center

DIA. ORIFICE: 10 x 7
STATIC LEVEL: 294 FT.
LENGTH OF AIRLINE: 620 FT.
DRILLED BY: Layne-Northwest

CENTER OF GAUGE TO GROUND LEVEL: 2' 4"
PUMP SET TO DISCHARGE NOZZLE: 620
TO TAIL PIPE:
TESTED BY: Matt M & Keith J

READING NUMBER	TIME	G.P.M.	INCHES ON ORIFICE	ALT GA IN FEET	PUMPING LEVEL FT.	DRAWDOWN IN FEET	SPECIFIC YIELD	HEAD PRESSURE PSI	RATE OF RECOVERY OR AMPS	WATER APPEARANCE: CLEAR, CLOUDY, MURKY, MUDDY, SANDY, TEMP, ODOR
1	19:40			325						
2	19:45			325						
3	19:50			325						
4	19:55			325						
5	20:00			325						
6	20:05			326						
7	20:10			328						
8	20:15			328						
9	20:20			328						
10	20:25			328						
11	20:30			329						
12	20:35			329						
13	20:40			329						
14										
15										
16										
17										
18										
19										
20										
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32										
33										
34										
35										

DATE: May 28, 2006

LAYNE-NORTHWEST COMPANY
TEST OF WELL

WELL NO.: 7
WELL DEPTH:
OWNER: Equistar
LOCATION: Iowa

DIA. ORIFICE:
STATIC LEVEL: 266 FT.
LENGTH OF AIRLINE: 251 FT.
DRILLED BY: Layne-Northwest

CENTER OF GAUGE TO GROUND LEVEL:
PUMP SET TO DISCHARGE NOZZLE: 551
TO TAIL PIPE:
TESTED BY:

READING NUMBER	TIME	G.P.M.	INCHES ON ORIFICE	ALT GA IN FEET	PUMPING LEVEL FT.	DRAWDOWN IN FEET	SPECIFIC YIELD	HEAD PRESSURE PSI	RATE OF RECOVERY OR AMPS	WATER APPEARANCE: CLEAR, CLOUDY, MURKY, MUDDY, SANDY, TEMP, ODOR
				285	266					
1	8:40			225	296	30		110	240	4 ppm chlorine to zero
2										
3										
4										
5										
6										
7										
8										
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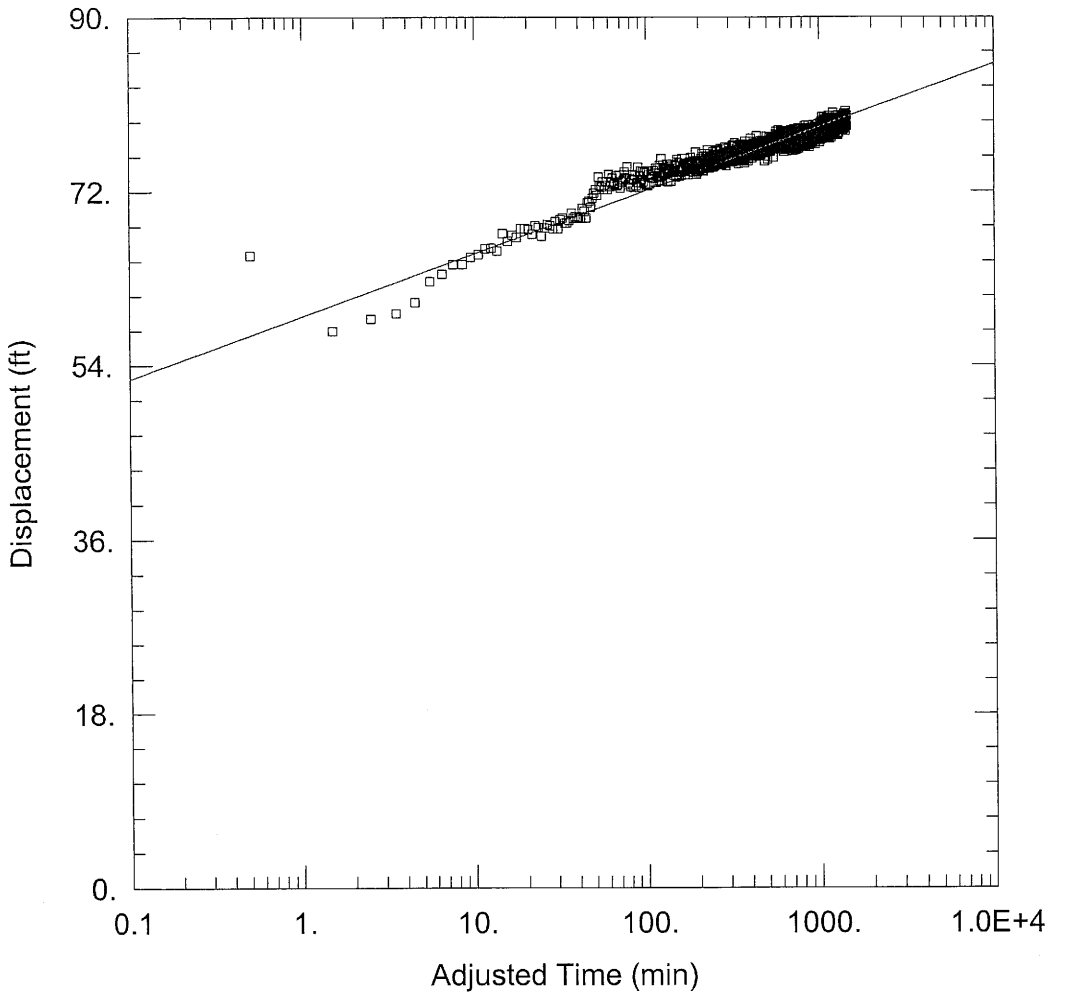
33										
34										
35										

djr/excel/testofwell/Equistar 7 052806.xls/a

Appendix 3

Pumping Test Data Analysis Results



WELL TEST ANALYSIS

Data Set: U:\Equistar Pumping Test\Equistar Well 7 Drawdown.aqt
Date: 07/20/06 Time: 15:50:09

AQUIFER DATA

Saturated Thickness: 1570. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
Well 7	0	0

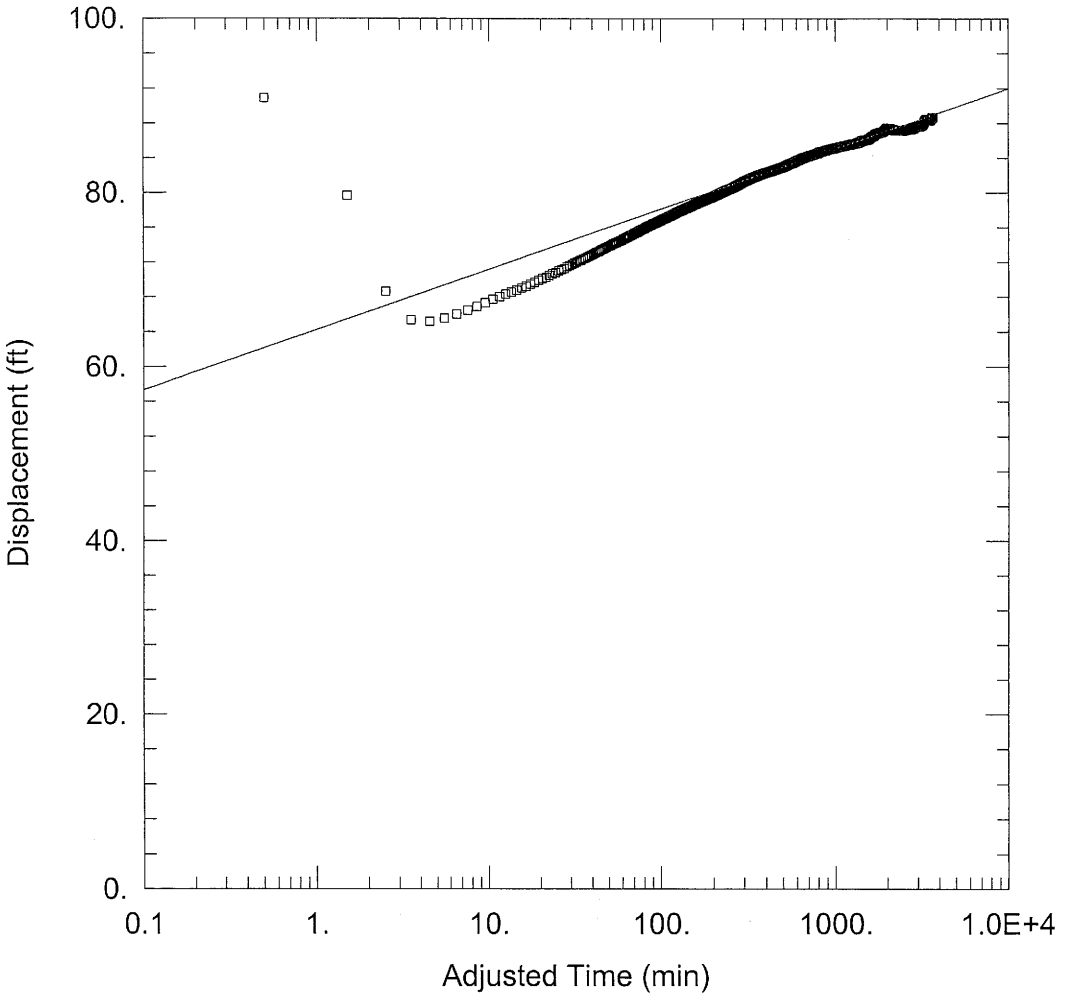
Observation Wells

Well Name	X (ft)	Y (ft)
▫ Well 7	0.75	0

SOLUTION

Aquifer Model: Confined Solution Method: Cooper-Jacob

T = 4.048E+4 gal/day/ft S = 1.309E-8



WELL TEST ANALYSIS

Data Set: U:\Equistar Pumping Test\Equistar Well 7 Recovery.aqt
Date: 07/20/06 Time: 15:51:56

AQUIFER DATA

Saturated Thickness: 1570. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
Well 7	0	0

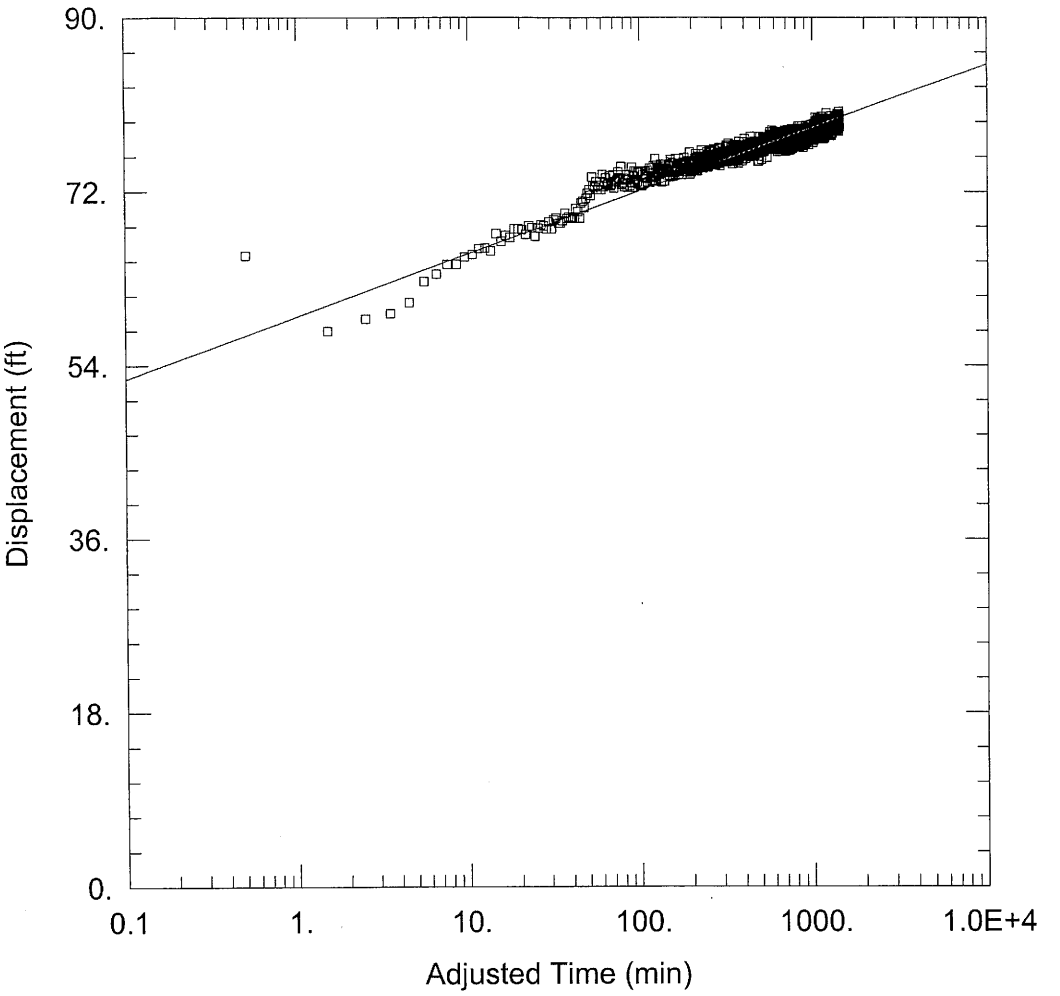
Observation Wells

Well Name	X (ft)	Y (ft)
▫ Well 7	0.75	0

SOLUTION

Aquifer Model: Confined Solution Method: Cooper-Jacob

T = 3.804E+4 gal/day/ft S = 7.777E-9



WELL TEST ANALYSIS

Data Set: U:\Equistar Pumping Test\Equistar Well 7 Drawdown.aqt
Date: 07/20/06 Time: 18:00:48

AQUIFER DATA

Saturated Thickness: 1570. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
Well 7	0	0

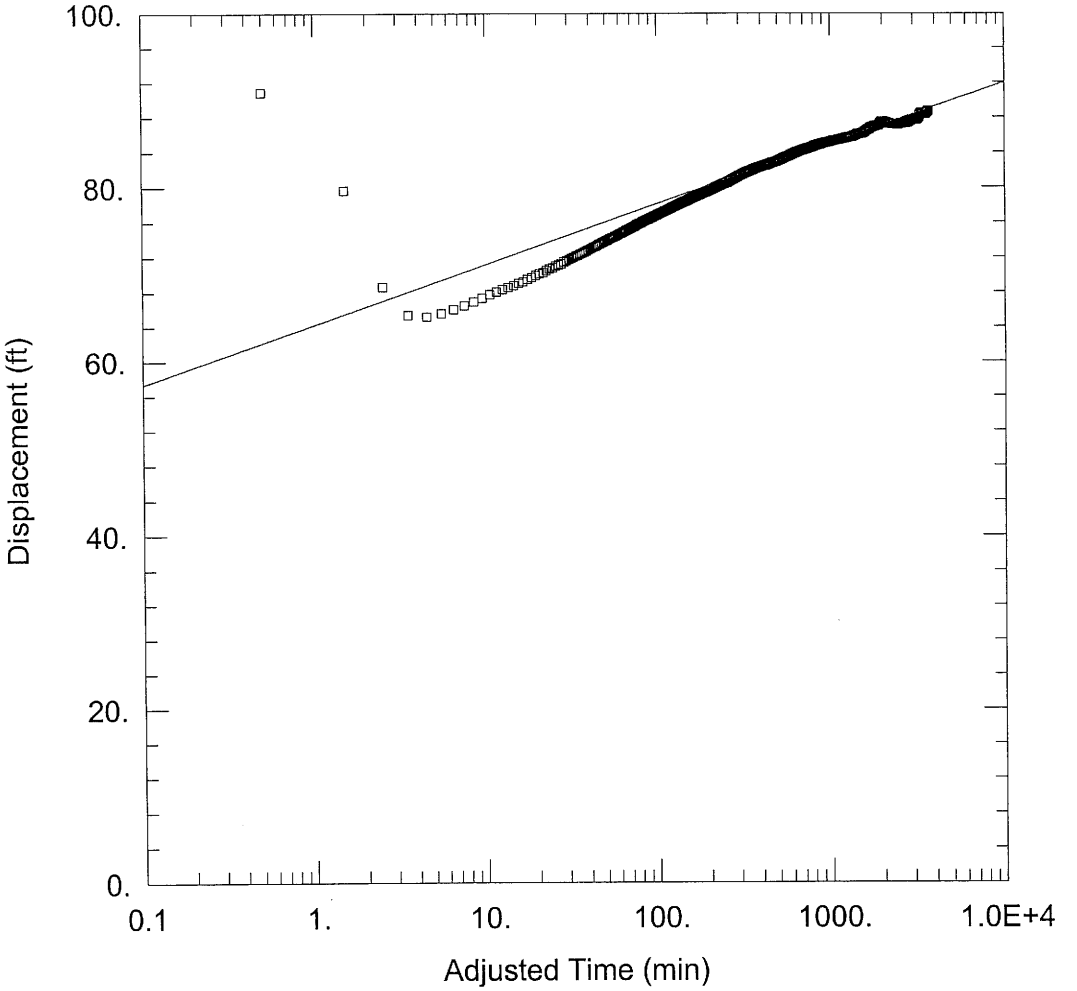
Observation Wells

Well Name	X (ft)	Y (ft)
▫ Well 7	0.75	0

SOLUTION

Aquifer Model: Confined Solution Method: Cooper-Jacob

T = 4.048E+4 gal/day/ft S = 1.309E-8



WELL TEST ANALYSIS

Data Set: U:\Equistar Pumping Test\Equistar Well 7 Recovery.aqt
Date: 07/20/06 Time: 18:01:05

AQUIFER DATA

Saturated Thickness: 1570. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
Well 7	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
▫ Well 7	0.75	0

SOLUTION

Aquifer Model: Confined Solution Method: Cooper-Jacob

T = 3.804E+4 gal/day/ft S = 7.777E-9

Appendix 4

Water Sample Analytical Results

Hygienic Laboratory

DUPLICATE COPY

The University of Iowa

Date of report: 07-21-2006

LAYNE CHRISTENSEN COMPANY
W229 N5005 DUPLAINVILLE RD

PEWAUKEE WI 53072

Sample Number	**200606626**
Date Received	05-19-2006
Project	
Date Collected	05-19-2006 10:00
Collection Site	equistar #7
Collection Town	Clinton
Description	water
Reference	NEW WELL #7
Collector	MATTHEWS MATT
Phone	(262) 246-4646
Purchase Order	606739

Comments *Upon arrival, sample met container and preservation requirements for the analysis requested. Please review carefully your sample results for additional analyte comments or method exceptions. Paperwork lists collection date as 9-19-06; per label 5-19-06.*

SDWIS Information

PWS Id: IA2326104 Facility Id: WL06 Sample Point Id: WL06
Sample Category: Chemical Sample Type: Routine (RT)

Results of Analyses

Nitrate as Nitrogen

Analyte	Concentration mg/L	Quantitation Limit mg/L
Nitrate Nitrogen as N	<1.0	1.0

Date Analyzed: 05-19-2006
Method: EPA 300.0
Analyst: LDA
Verified: SB

Nitrite as Nitrogen

Analyte	Concentration mg/L	Quantitation Limit mg/L
Nitrite Nitrogen as N	<0.1	0.1

Date Analyzed: 05-19-2006
Method: EPA 300.0
Analyst: LDA
Verified: SB

Silica as SiO2

Analyte	Concentration mg/L	Quantitation Limit mg/L
Silica as SiO2	9.3	1.0

Date Analyzed: 05-23-2006
Method: SM 4500-SI D
Analyst: DH
Verified: SB

Page 1 - Continued on next page

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Iowa City, Iowa 52242-5002
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Iowa Laboratories Complex
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Hygienic Laboratory

DUPLICATE COPY

The University of Iowa

Sample Number 200606626

Laboratory pH

Analyte	Concentration pH Units	Quantitation Limit pH Units
Laboratory pH	7.5	

Date Analyzed: 05-19-2006
Method: EPA 150.1
Analyst: BV
Verified: SB

Specific Conductance

Analyte	Concentration umhos/cm	Quantitation Limit umhos/cm
Specific Conductance	660	1.0

Date Analyzed: 05-19-2006
Method: SM 2510B
Analyst: BV
Verified: SB

Total Alkalinity

Analyte	Concentration mg/L as CaCO3	Quantitation Limit mg/L as CaCO3
Total Alkalinity	260	1.0

Date Analyzed: 05-19-2006
Method: SM 2320B
Analyst: BV
Verified: SB

Total Hardness

Analyte	Concentration mg/L as CaCO3	Quantitation Limit mg/L as CaCO3
Total Hardness	310	5.0

Date Analyzed: 05-19-2006
Method: SM18 2340 B
Analyst: BV
Verified: SB

Total Dissolved Solids

Analyte	Concentration mg/L	Quantitation Limit mg/L
Total Dissolved Solids	390	1
Comments	*Dried at 180 degrees C.*	

Date Analyzed: 05-22-2006
Method: EPA 160.1
Analyst: LD
Verified: TAB

Total Suspended Solids

Analyte	Concentration mg/L	Quantitation Limit mg/L
Total Suspended Solids	1	1
Comments	*Dried at 103 degrees C*	

Date Analyzed: 05-22-2006
Method: USGS I-3765-85
Analyst: LD
Verified: TAB

Page 2 - Continued on next page

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Hygienic Laboratory DUPLICATE COPY

The University of Iowa

Sample Number 200606626

Total Calcium

Analyte	Concentration mg/L	Quantitation Limit mg/L
Total Calcium	81	1.0

Date Analyzed: 05-24-2006
Method: EPA 200.7
Analyst: TAB
Verified: SB

Total Magnesium

Analyte	Concentration mg/L	Quantitation Limit mg/L
Total Magnesium	23	0.50

Date Analyzed: 05-24-2006
Method: EPA 200.7
Analyst: TAB
Verified: SB

Total Potassium

Analyte	Concentration mg/L	Quantitation Limit mg/L
Total Potassium	9.3	1.0

Date Analyzed: 05-24-2006
Method: EPA 200.7
Analyst: TAB
Verified: SB

Total Sodium

Analyte	Concentration mg/L	Quantitation Limit mg/L
Total Sodium	23	0.50

Date Analyzed: 05-24-2006
Method: EPA 200.7
Analyst: TAB
Verified: SB

Chloride

Analyte	Concentration mg/L	Quantitation Limit mg/L
Chloride	27	1.0

Date Analyzed: 05-24-2006
Method: EPA 300.0
Analyst: JK
Verified: DS

Manual Fluoride by ISE (SDWA)

Analyte	Concentration mg/L	Quantitation Limit mg/L
Fluoride	0.37	0.10

Date Analyzed: 05-23-2006
Method: SM 4500-F C
Analyst: JF
Verified: TAB

Page 3 - Continued on next page

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Hygienic Laboratory

DUPLICATE COPY

The University of Iowa

Sample Number 200606626

Sulfate

Analyte	Concentration mg/L	Quantitation Limit mg/L
Sulfate	57	1.0

Date Analyzed: 05-24-2006
Method: EPA 300.0
Analyst: JK
Verified: DS

Ammonia as N

Analyte	Concentration mg/L	Quantitation Limit mg/L
Ammonia Nitrogen as N	0.18	0.05

Date Analyzed: 05-24-2006
Method: LAC10-107-06-1J
Analyst: JK
Verified: LF

Total Barium

Analyte	Concentration mg/L	Quantitation Limit mg/L
Total Barium	0.10	0.05

Date Analyzed: 05-24-2006
Method: EPA 200.7
Analyst: TAB
Verified: SB

Total Chromium

Analyte	Concentration mg/L	Quantitation Limit mg/L
Total Chromium	<0.01	0.01

Date Analyzed: 05-24-2006
Method: EPA 200.7
Analyst: TAB
Verified: SB

Total Cadmium

Analyte	Concentration mg/L	Quantitation Limit mg/L
Total Cadmium	<0.001	0.001

Date Analyzed: 05-24-2006
Method: EPA 200.8
Analyst: SB
Verified: DS

Total Arsenic

Analyte	Concentration mg/L	Quantitation Limit mg/L
Total Arsenic	<0.001	0.001

Date Analyzed: 05-24-2006
Method: EPA 200.8
Analyst: SB
Verified: DS

Page 4 - Continued on next page

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Hygienic Laboratory

DUPLICATE COPY

The University of Iowa

Sample Number 200606626

Total Copper

Analyte	Concentration mg/L	Quantitation Limit mg/L
Total Copper	<0.01	0.01

Date Analyzed: 05-24-2006
Method: EPA 200.8
Analyst: SB
Verified: DS

Total Antimony

Analyte	Concentration mg/L	Quantitation Limit mg/L
Total Antimony	<0.005	0.005

Date Analyzed: 05-24-2006
Method: EPA 200.8
Analyst: SB
Verified: DS

Total Lead

Analyte	Concentration mg/L	Quantitation Limit mg/L
Total Lead	0.001	0.001

Date Analyzed: 05-24-2006
Method: EPA 200.8
Analyst: SB
Verified: DS

Total Thallium

Analyte	Concentration mg/L	Quantitation Limit mg/L
Total Thallium	<0.001	0.001

Date Analyzed: 05-24-2006
Method: EPA 200.8
Analyst: SB
Verified: DS

Total Selenium

Analyte	Concentration mg/L	Quantitation Limit mg/L
Total Selenium	<0.01	0.01

Date Analyzed: 05-24-2006
Method: EPA 200.8
Analyst: SB
Verified: DS

Total Iron

Analyte	Concentration mg/L	Quantitation Limit mg/L
Total Iron	0.51	0.02

Date Analyzed: 05-24-2006
Method: EPA 200.7
Analyst: TAB
Verified: SB

Page 5 - Continued on next page

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The University of Iowa

Dissolved Iron

Analyte	Concentration mg/L	Quantitation Limit mg/L
Dissolved Iron	0.36	0.02

Date Analyzed: 05-24-2006 Analyst: TAB
Method: EPA 200.7 Verified: SB

Total Manganese

Analyte	Concentration mg/L	Quantitation Limit mg/L
Total Manganese	<0.02	0.02

Date Analyzed: 05-24-2006 Analyst: TAB
Method: EPA 200.7 Verified: SB

Total Mercury

Analyte	Concentration mg/L	Quantitation Limit mg/L
Total Mercury	<0.0002	0.0002

Date Analyzed: 05-24-2006 Analyst: PJM
Method: EPA 245.2 Verified: SB

Total Zinc

Analyte	Concentration mg/L	Quantitation Limit mg/L
Total Zinc	0.03	0.02

Date Analyzed: 05-24-2006 Analyst: TAB
Method: EPA 200.7 Verified: SB

Description of units used within this report

mg/L - Milligrams per Liter
umhos/cm - Micromhos per Centimeter
Quant Limit - Lowest concentration reliably measured
pH Units - pH Units
mg/L as CaCO3 - Milligrams per Liter as Calcium Carbonate

Iowa Laboratory Certification No. 027. AIHA, NELAP, USEPA, NVLAP #101288-0 and other credentials available upon request.

If you have any questions please call Sherri Marine at 800/421-IOWA (4692) or 319/335-4500. Thank you.

Mary J. R. Gilchrist, Ph.D.
Director

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Hygienic Laboratory DUPLICATE COPY

The University of Iowa

Date of report: 07-21-2006

LAYNE CHRISTENSEN COMPANY
W229 N5005 DUPLAINVILLE RD

PEWAUKEE WI 53072

Sample Number	200606627
Date Received	05-19-2006
Project	
Date Collected	05-19-2006 10:30
Collection Site	equistar #7
Collection Town	Clinton
Description	water
Reference	NEW WELL #7
Collector	MATTHEWS MATT
Phone	(262) 246-4646
Purchase Order	606739

Comments: *Upon arrival, sample met container and preservation requirements for the analysis requested. Please review carefully your sample results for additional analyte comments or method exceptions.*
No collection time on paperwork; per earliest label 10:30.
Shipping & Handling charge for sample pickup is $305. This includes 5.5 hours @ $35 for the driver and $.36 x 310 for mileage.

SDWIS Information

PWS Id: IA2326104 Facility Id: WL06 Sample Point Id: WL06
Sample Category: Chemical Sample Type: Routine (RT)

Results of Analyses

SDWA Regulated SOC A/S #4 by GC/MS

Analyte	Concentration mg/L	Quantitation Limit mg/L
Simazine	<0.0001	0.0001
Atrazine	<0.0001	0.0001
Alachlor	<0.0001	0.0001

Date Analyzed: 05-25-2006 Analyst: ES
Method: EPA 525.2 Verified: SM
Date Prepared: 05-24-2006 Analyst: GJ
Preparation Method: EPA 525.2 Verified: EE

SDWA Regulated SOC A/S #6 & #7 by GC/MS

Analyte	Concentration mg/L	Quantitation Limit mg/L
bis(2-Ethylhexyl)adipate	<0.0006	0.0006
bis(2-Ethylhexyl)phthalate	<0.0006	0.0006
Benzo(a)pyrene	<0.0001	0.0001

Date Analyzed: 05-25-2006 Analyst: ES
Method: EPA 525.2 Verified: SM
Date Prepared: 05-24-2006 Analyst: GJ
Preparation Method: EPA 525.2 Verified: EE

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Mary J. R. Gilchrist, Ph.D.
Director

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Iowa Laboratories Complex
2220 S. Ankeny Blvd, Ankeny, Iowa 50023
515/725-1600 Fax: 515/725-1642

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Sample Number 200606627

GC/MS 524.2 Volatiles

Analyte	Concentration ug/L	Quantitation Limit ug/L
Vinyl chloride	<0.5	0.5
Methylene chloride	<1.0	1.0
1,1-Dichloroethene	<0.5	0.5
trans-1,2-Dichloroethylene	<0.5	0.5
cis-1,2-Dichloroethylene	<0.5	0.5
1,2-Dichloroethane	<0.5	0.5
1,1,1-Trichloroethane	<0.5	0.5
Carbon tetrachloride	<0.5	0.5
1,2-Dichloropropane	<0.5	0.5
Trichloroethene	<0.5	0.5
1,1,2-Trichloroethane	<0.5	0.5
Benzene	<0.5	0.5
Tetrachloroethylene	<0.5	0.5
Toluene	<0.5 J	0.5
Chlorobenzene	<0.5	0.5
Ethylbenzene	<0.5	0.5
Styrene	<0.5	0.5
Total Xylenes	<0.5	0.5
o-Dichlorobenzene	<0.5	0.5
p-Dichlorobenzene	<0.5	0.5
1,2,4-Trichlorobenzene	<0.5	0.5

Comments: *J - Please note that this compound was observed below the quantitation limit in the analysis of this sample.*

Date Analyzed: 05-22-2006
Method: EPA 524.2

Analyst: LL
Verified: CR

SDWA Regulated SOC A/S #3

Analyte	Concentration mg/L	Quantitation Limit mg/L
2,4-D	<0.001	0.001
Silvex	<0.0002	0.0002
Dalapon	<0.001	0.001
Dinoseb	<0.0005	0.0005
Pentachlorophenol	<0.0005	0.0005
Picloram	<0.0005	0.0005

Date Analyzed: 05-24-2006
Method: EPA 515.3
Date Prepared: 05-22-2006
Preparation Method: EPA 515.3

Analyst: JF
Verified: TC
Analyst: SE
Verified: GJ

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Description of units used within this report

mg/L - Milligrams per Liter
ug/L - Micrograms per Liter
Quant Limit - Lowest concentration reliably measured

Iowa Laboratory Certification No. 027. AIHA, NELAP, USEPA, NVLAP #101288-0 and other credentials available upon request.

If you have any questions please call Sherri Marine at 800/421-IOWA (4692) or 319/335-4500. Thank you.

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