


2-2000

Upper Elkhorn Natural Resources District Cooperative Agreement, Field Summary Report 1998-1999

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Upper Elkhorn Natural Resources
District
Cooperative Agreement

Field Summary Report
1998-1999

February 2000

Conservation & Survey Division
UN-L

Susan Olafsen Lackey



University of
Nebraska
Lincoln

Institute of Agriculture and Natural Resources

Institute of Agriculture and Natural Resources
Conservation and Survey Division
601 East Benjamin Avenue, Suite 104
Norfolk, NE 68701-0812
Telephone (402) 370-4007
FAX (402) 370-4010

Geological and Natural Resources Surveys



2/22/00

Upper Elkhorn NRD
Dennis Schueth, Manager
301 North Harrison
O'Neill, NE 68763

RE: Phase II Monitoring Well Network, of the November 1998
Cooperative Agreement between the NRD and CSD.

Dear Sirs:

Attached is a copy of the Field Summary Report, 1998 to 1999, for the above referenced project. Three copies have been provided to the NRD, two bound copies and one in a 3-ring notebook for production of additional copies.

The report is organized with summary maps and tables in the front. Individual site information follows the summary data. Sites are organized by well number with a blue cover page for each site. Site data include; 7.5-minute Quad Map, Final Test-Hole Log, Geophysical Log, Aerial Photo, Well Registrations, and Well Completion Diagrams.

Six test-holes were drilled, sampled, and electric logged. The total test-hole footage was 2028 feet. Fifteen monitoring wells were drilled, constructed, and developed. Individual well depths ranged from 30-feet to 335-feet. Total well footage was 2070 feet.

We suggest that water level measurements and water samples be taken on a monthly basis for one year. After reviewing water level and water quality variations during that year, new monitoring schedules will be determined for each well.

Sincerely,

Susan Olafsen Lackey
Hydrogeologist

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Map: Holt County Site Locations,
includes 319 sites, 1998, & 1999 sites
Table: 1998 and 1999 Test-Hole Correlation Data
Table: 1998 and 1999 Test-Hole Data
Map: Holt County Monitoring Well Locations, with 319 wells
Table: 1998 and 1999 Monitoring Well Data
Log: 1999 Daily Field Activities(2 pages)

Site Information organized by Well Number on Blue Cover Page

7.5-minute Quad Map.....Site Location
Final Test-Hole Log
Geophysical Log
Aerial Photo.....Well Locations
Well Registrations.....2 pages each Well
Well Completion Diagrams.....1 page each Wells

#1 Wells: T29N, R11W, Sec 34, SW
#1 Middle..... North
#1 Deep..... South

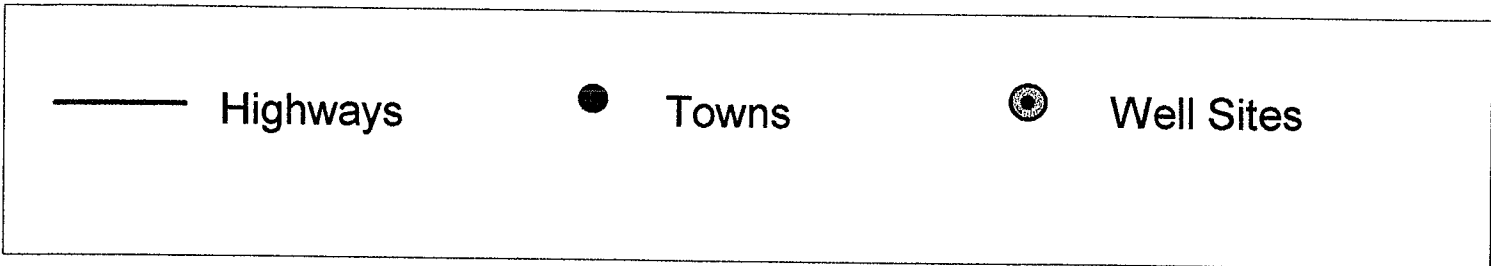
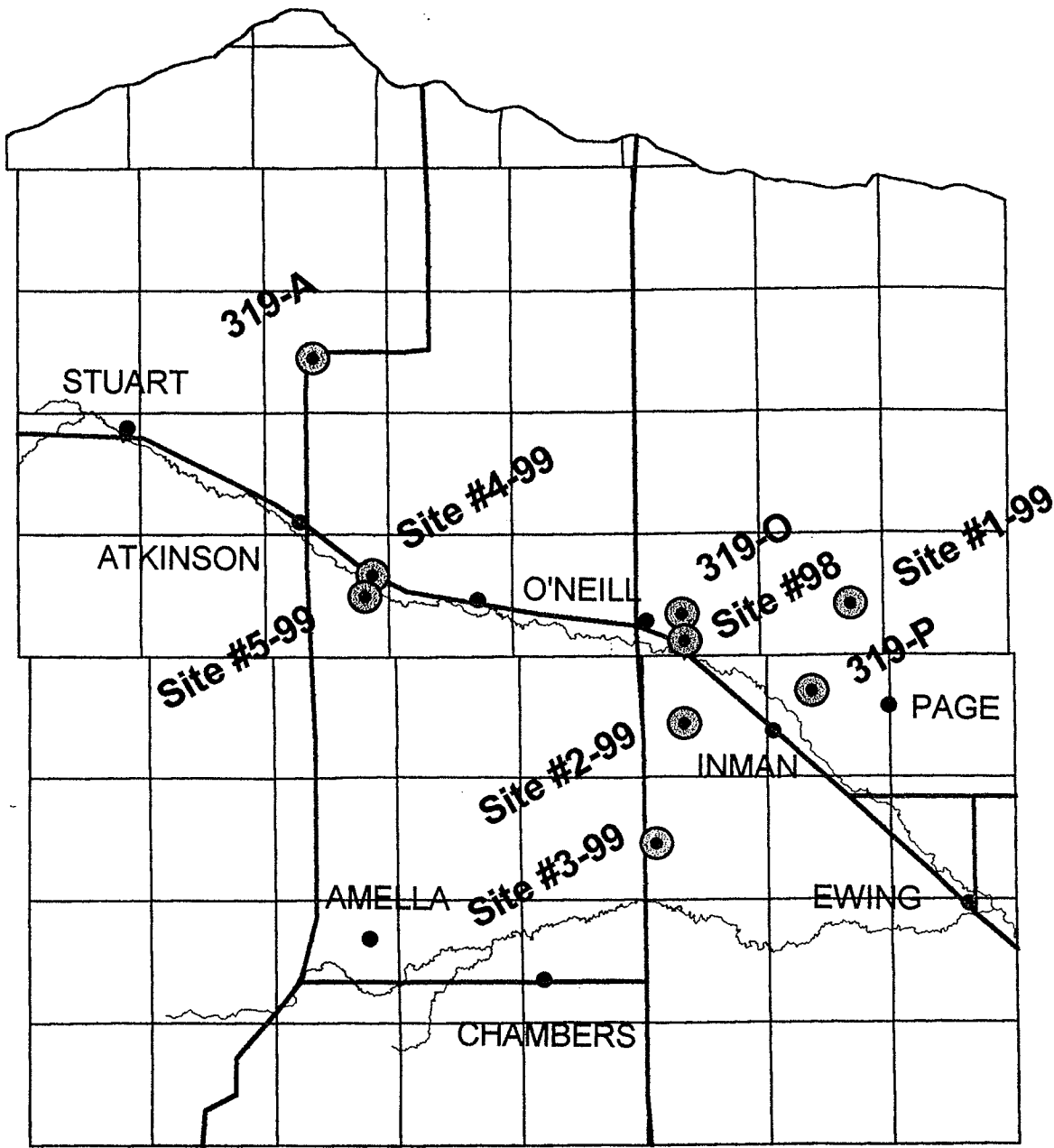
#2 Well: T29N, R14W, Sec 13, NW
#2 Shallow

#3 Wells: T29N, R14W, Sec 14, SE
#3 Shallow..... West
#3 Middle..... Center
#3 Deep..... East

#4 Wells: T28N, R11W, Sec 21, NW
#4 Shallow..... West
#4 Middle..... Center
#4 Deep..... East

#5 Wells: T27N, R11W, Sec 19, NW
#5 Shallow..... South
#5 Middle..... Center
#5 Deep..... North

#6 Wells: T29N, R10W, Sec 24, SW
#6 Shallow..... South
#6 Middle..... Center
#6 Deep..... North



Holt County Well Locations

**1998 and 1999 Upper Elkhorn NRD
Correlation Table**

Conservation & Survey Division

Sol 2/8/00

Test Hole	Site #	Legal Description	Drill Date	Total Depth	7.5' Quad	Topo Elev	Well #
1-UE-98*	1-98	29N-11W-34-SW	6/17/98	328	Inman	1945	1
1-UE-99	4-99	29N-14W-13-NW	9/20/99	60	Emmet NW	2052	2
2-UE-99	5-99	29N-14W-14-SE	9/21/99	400	Emmet NW	2055	3
3-UE-99	2-99	28N-11W-21-NW	9/23/99	440	Inman	1983	4
4-UE-99	3-99	27N-11W-19-NW	9/28/99	440	O'Neill SW	2053	5
5-UE-99	1-99	29N-10W-24-SW	9/30/99	360	Page	1937	6

* Field #1-UE-98 = Report #12-A-98

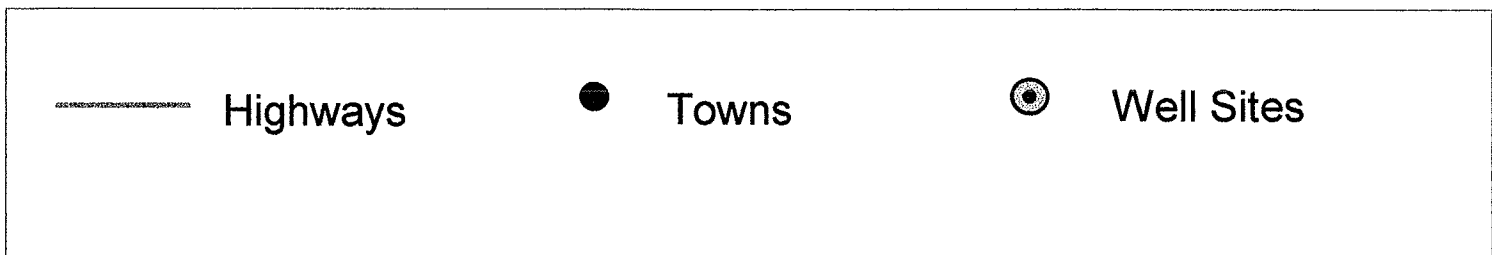
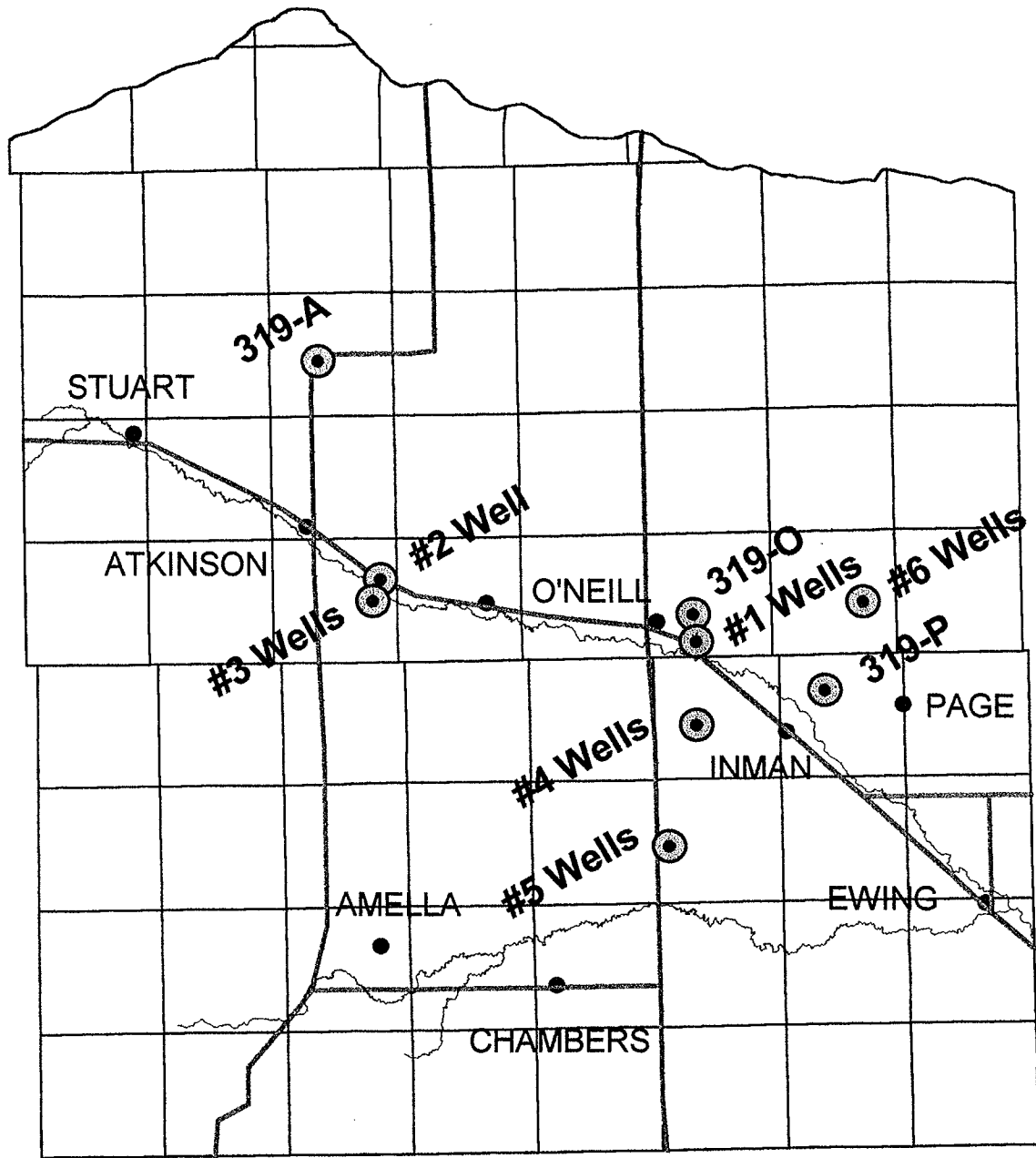
**1998 and 1999 Upper Elkhorn NRD
Test-Hole Data**

Conservation & Survey Division

Sol 2/8/00

Test Hole	Legal Description	Qtrs	Foot N/S	Foot E/W	Topo Elev	7.5' Quad	Total Depth
1-UE-98*	29N-11W-34-SW	ccdb	344	816	1945	Inman	328
1-UE-99	29N-14W-13-NW	bcbc	-1962	32	2052	Emmet NW	60
2-UE-99	29N-14W-14-SE	daab	2639	-462	2055	Emmet NW	400
3-UE-99	28N-11W-21-NW	bbba	-86.5	540	1983	Inman	440
4-UE-99	27N-11W-19-NW	bccc	-2602	180	2053	O'Neill SW	440
5-UE-99	29N-10W-24-SW	cccc	147	27	1937	Page	360

* Field #1-UE-98 = Report #12-A-98



Holt County Well Locations

1998 and 1999 Upper Elkhorn NRD
Monitoring Well Network
Well Data Table

Holt County

Well # Setting	Total Depth	Screen Length	Gravel Pack Top	Water Depth	Top of Ogallala	Top of Bedrock	Water Source
1M (No)	70	10	55	3.26	19	316	P-P S&G
1D (So)	225	5	215	2.4		Kp	To
2S	20.6	10	8.75	4.3	20		WT
3S (W)	25.6	10	12	5.25	30	380	WT
3M (Ctr)	100	10	79	4.0		Kp	P-P S&G
3D (E)	221	10	207.5	2.7			To
4S (W)	33	10	20	4.5	32.5	420	P-P S&G
4M (Ctr)	109	10	94	4.84		Kp	To
4D (E)	270	10	256.3	4.25			To
5S (So)	85	10	66.7	13.6	90	385	P-P S&G
5M (Ctr)	180	10	163.5	13.47		Kp	To
5D (No)	336	10	314	13.52			To
6S (So)	70	10	53	34.3	88	331	P-P S&G
6M (Ctr)	120	10	103.5	34.37		Kp	To
6D (No)	211	10	194.5	34.25			To

Conservation & Survey Division

Sol 2/8/00

DAILY FIELD LOG (UPPER ELKHORN NRD – 1999)

SARGENT IRRIGATION; Dale (Fred) Schindler, Travis, Tony, Richard, Ed, Nick,
and Roger Leegate

CONSERVATION & SURVEY DIVISION; Sue Lackey & Leonard Boryca

UPPER ELKHORN NRD; Bob Atkeson & Adam Ahlers

9/13/99 Monday Flagged Sites Atkeson , Boryca & Lackey

9/20/99 Monday

SITE #4 Test Hole # 1-UE-99 (60') (Bit 5-5/8-inches)
Well #2S—Screen 10-20', developed--.75 Hours (Bit 10-inches)

Site #5 set up for next test hole,

9/21/99 Tuesday

SITE #5 Test Hole #2-UE-99 (400'),
Deep monitoring well, set bottom plug, casing, filter pack . Make
shift grout mixer plugged after 1.5 batches down hole. Borehole
was caving(from 180 feet to 95 feet). Pulled casing and redrilled
hole, kept water in hole all night.

Site #4 Installed cover on well #2S

9/22/99 Wednesday

SITE #5 Well #3D (East)—Screen 210-220'
Well #3M(Center)—Screen 83.8-93.8'
Well #3S(West)—Screen 15.3-25.3'

Rich from Broken Bow at site to teach grout machine operation, on deep
well. Benseal poured too fast and tremie plugged. While clearing tremie,
formation caved from 99 to 96 feet.

Site #2 set up for test hole

9/23/99 Thursday

SITE #2 Test Hole #3-UE-99 (440'),
Well #4D(East)—Screen 258-268'

Site #5 Developed wells and installed covers.

9/24/99 Friday

SITE #2 Well #4M(Center)—Screen 97.8-107.8'
Well #4S(West)—Screen 22.25-32.25'

Added additional grout to deep well

9/27/99 Monday

Site #2 Sargent Crew developed wells at and installed covers.

9/28/99 Tuesday

SITE #3 Test Hole #4-UE-99 (440'),
Well #5D(North)—Screen 320.8-330.8'
Travis out, Fred & Tony drilled

9/29/99 Wednesday

SITE #3 Well #5M(Center)—Screen 166-167'
Well #5S(South)—Screen 69-79'
Tried to develop #5D, but compressor didn't have enough lift
Site #1 Set up for test hole

9/30/99 Thursday

SITE #1 Test Hole #5-UE-99 (360'),
Well #6D(North)—Screen 199.2-209.2
Site #3 Developed shallow and medium monitoring wells
Travis back on site

10/1/99 Friday

SITE #1 Well #6M(Center)—Screen 106-116'
Well #6S(South)—Screen 55.75-65.75'
developed deep well

10/4/99 to 10/18/99

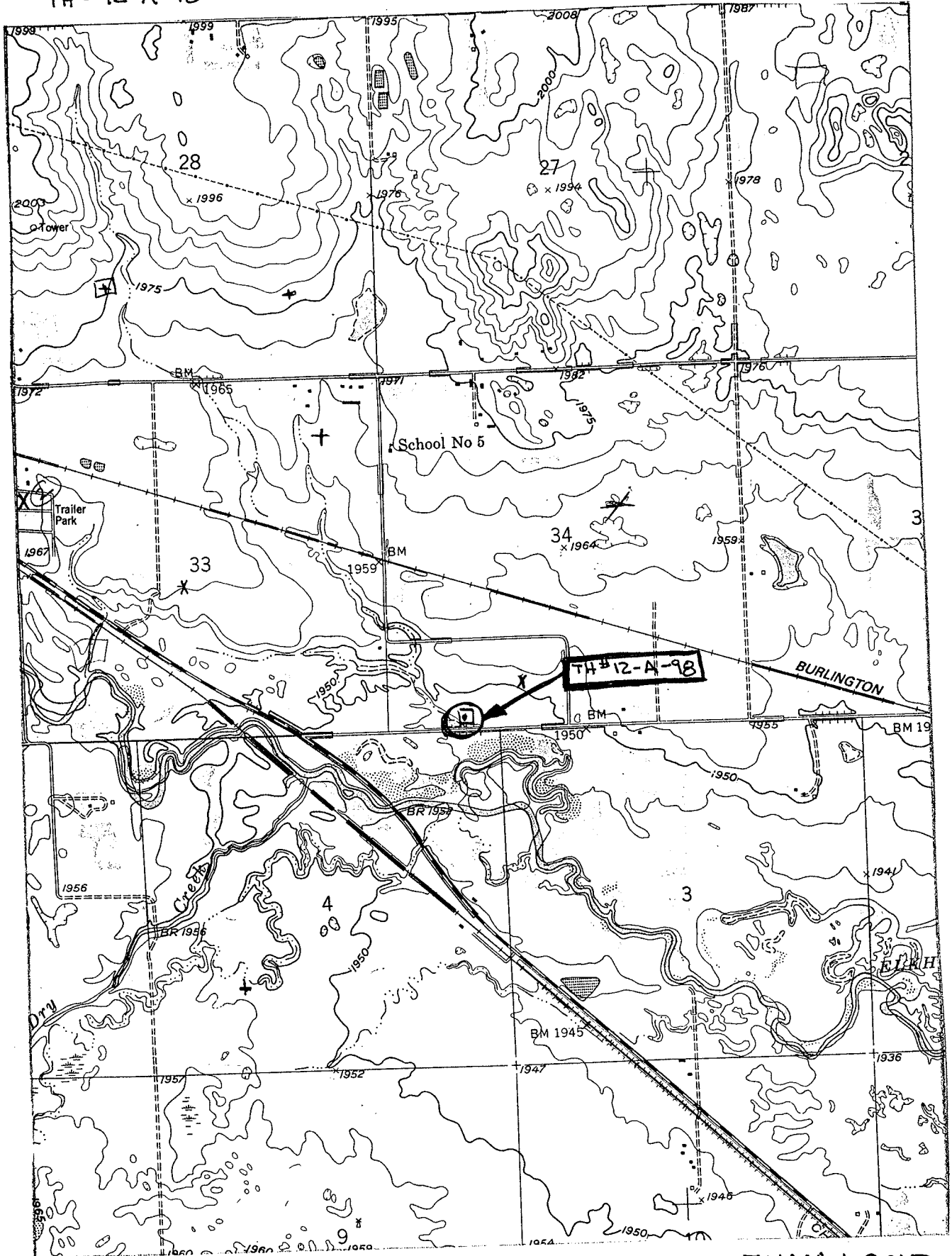
Site #1 Install covers
Site #1 Develop medium and shallow well
Site #1 Re-install fence
Site #3 Develop deep well
Site #3 Re-install fence

Number 1 Wells

HOLT COUNTY

#1 WELLS

TH # 12-A-98



T29N, R11W, SECTION 34 SW

INMAN QUAD

Test Hole #12-A-98
(29N-11W-34ccdb)
Holt County

Location: NW SE SW SW Sec. 34, T. 29 N., R. 11 W., approximately 344 feet north and 816 east of the southwest corner.
 Ground elevation: 1,945 ft. (t). (Inman, 7.5 min. quadrangle)
 Depth to water: 2.40 ft. (8-6-98) Well screened between 218-223 ft.

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Topsoil, silt; organic, sandy, black; sand is very fine to fine; below 2 ft, slightly calcareous.....	0.0	3.0
Sand, slightly silty; sand is medium, some coarse.....	3.0	3.5
Silt, very sandy, slightly clayey, olive gray; sand is fine to medium.....	3.5	4.0
Sand, coarse to very coarse, trace fine gravel.....	4.0	6.0
Sand, very silty; sand is very fine to fine, some medium; below 6.5 ft, less silt.....	6.0	10.0
Sand, silty; sand is very fine to fine, some medium sand to coarse gravel.....	10.0	15.0
Soil, silty, clayey, sandy, medium dark gray; sand is very fine to fine.....	15.0	18.0
Sand, fine to very coarse, some gravel.....	18.0	19.0
Tertiary System - Miocene Series - Ogallala Group:		
Sandstone, sand is very fine, some fine; below 23 ft, sand is very fine to fine; some interbedded silt lenses.....	19.0	28.0
Siltstone to sandstone; moderately calcareous grayish brown; sand is very fine, some fine.....	28.0	33.0
Sandstone to siltstone, moderately calcareous light brownish gray; sand is very fine, trace fine.....	33.0	38.0
Sandstone, moderately silty; sand is very fine to fine, some medium.....	38.0	45.0
Sand, sand is very fine to fine, some medium; contains some cemented zones.....	45.0	68.0
Sand, fine, some very fine to medium; from 73 to 78 ft, trace of medium; below 78 ft, more medium sand, some cemented zones; below 98 ft, some rootlets.....	68.0	103.0
Sandstone, sand is very fine to fine, with		

medium.....	103.0	104.0
Sand, in part sandstone, silty; sand is very fine to fine, some medium; contains volcanic ash.....	104.0	123.0
Sandstone and siltstone, clayey; sand is very fine, some fine; below 128 ft, some cemented zones; contains volcanic ash.....	123.0	133.0
Sand to sandstone, sand is very fine to fine, some medium, trace of clay; contains volcanic ash.....	133.0	138.0
Sand, very fine to fine, some medium, trace clay; contains volcanic ash; below 143 ft, slightly silty; no ash overhead below 148 ft.....	138.0	153.0
Sand, moderately silty; sand is very fine to fine, some medium; below 163 ft, sand is very fine, some fine.....	153.0	168.0
Siltstone to sandstone, silty, moderately calcareous, olive; sand is very fine, some fine.....	168.0	188.0
Sandstone to siltstone; sand is very fine, moderately consolidated.....	188.0	193.0
Sandstone, sand is very fine to fine, much medium; below 198, less medium sand.....	193.0	218.0
Sand, fine, some very fine, trace of medium; below 228 ft, some cemented zones.....	218.0	233.0
Sand to sandstone, sand is very fine to fine, trace of medium; below 238 ft, sand is slightly silty, very fine to fine.....	233.0	250.0
Sand to sandstone; sand is very fine to fine..	250.0	258.0
Sandstone, sand is very fine to fine.....	258.0	268.0
Sandstone, silty; sand is very fine, some fine; below 273 ft, sand is very fine to fine; below 278 ft, some rootlets; from 298 to 303 ft, some claystone fragments; below 303 ft, rare bone fragment.....	268.0	308.0
No sample.....	308.0	315.0
Clay, weathered, gray, some sand grains.....	315.0	316.0

Cretaceous System - Upper Cretaceous Series - Montana Group:

Pierre Formation:

Clay, light medium gray, some yellow orange with trace white, some sand grains.....	316.0	323.0
Clay, medium gray; contains limy and siliceous fragments.....	323.0	325.0
Clay, dark gray, little black; contains sand grains and limestone fragments.....	325.0	328.0

SP 10

RES. 25

CSD/UNRD
PHASE II 1998

TH #12-A-98

HOLT COUNTY

T29N R11W 34 SWSWSE

TD 299 ← 6/18/99

LARKEY, CARLSON
GROCH, PENAS

50

100

150

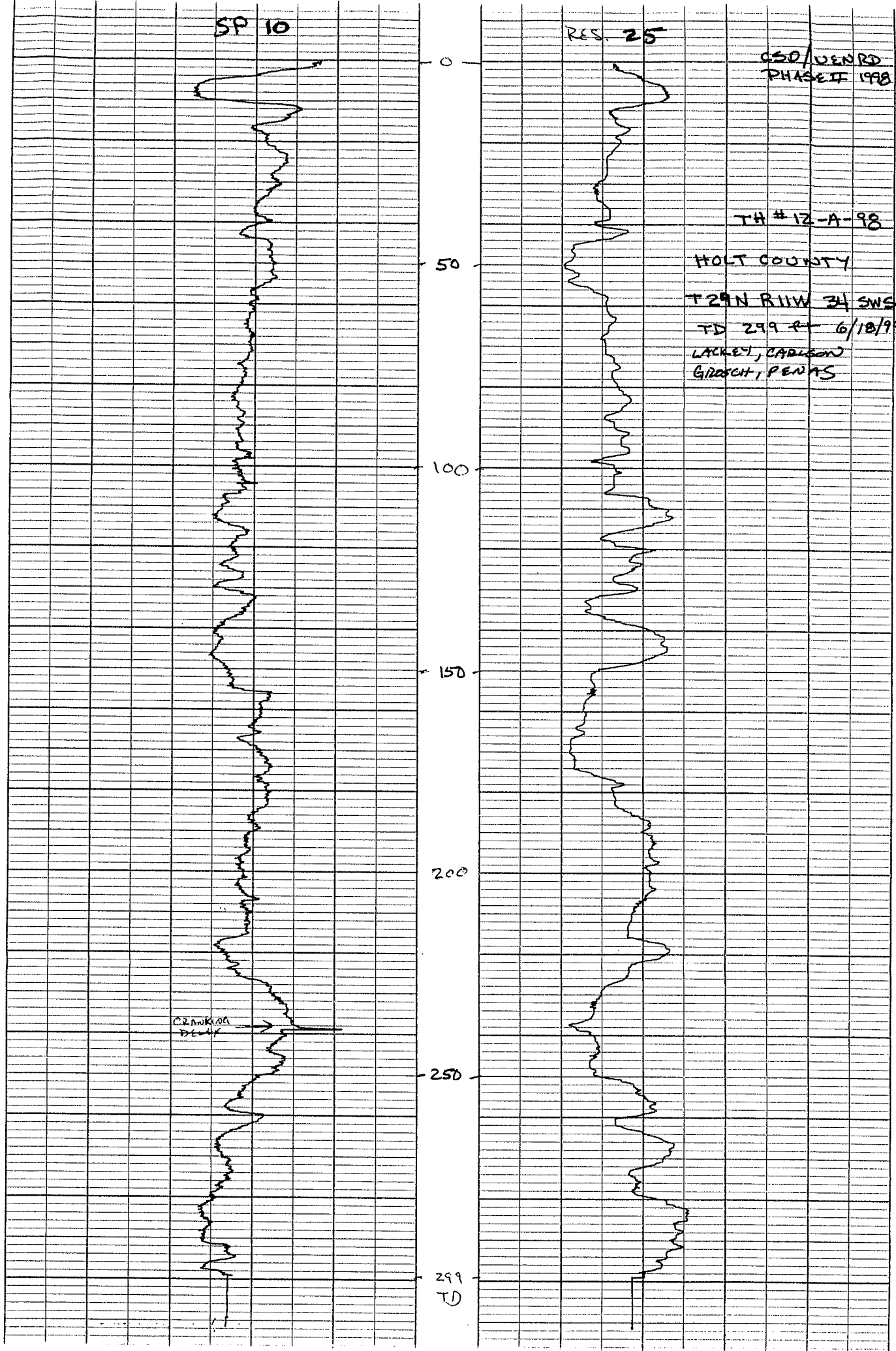
200

250

299

TD

CRANKING
DOWN



Holt Co. 1988
T-29-N R-11-W 100

Photo V18
Sec. 34

MIDDLE MIDDLE

TH # 12-A-98

SITE 1-98

T3381

2949
5015

(A)

1960
T1681

CRP

CRP

45.8 HEL/NW

2
40.9 HEL/NW

HEL/NW

3
18.1 HEL/NW

CRP

128.7

703

T3381

5
16.9 HEL/NW

CRP

CRP

4
44.1 HEL/NW

CRP

6
20.3 HEL/NW

7.4 HEL/NW

HEL/NW

HEL/NW

3663

T3368

Well # UE 1M
Well # UE # 1D
2

55 HEL/NW

1973
5066 5422
36910

T1570 T880

HEL/NW

HEL/NW

3
7.7

4 HEL/NW
33.3

HEL/NW

48 HEL/NW

124 HEL/NW

72
30.0 HEL/NW

CRP

CRP

10
6.0 HEL/NW

9 HEL/NW
4.3

197

T1570

7
5.5

8
HEL/NW

CRP

8
36.0 HEL/NW

STATE OF NEBRASKA
DEPARTMENT OF WATER RESOURCES
WATER WELL REGISTRATION

FOR DEPARTMENT USE ONLY

Registration No. _____ Sequence No. _____ Registration Date: _____
Owner Code No. _____ Receipt No. _____ NRD

1. Well Owner Upper Elkhorn NRD Telephone Number (402) 336-3867
Address 310 N. Harrison St
City O'Neill State NE Zip Code 68763 +

2. Drilling Firm Conservation & Survey Division, UN-L Telephone Number (402) 472-3471
Address 113 Nebraska Hall Contractor's License No. 17003 Pump Installer License No. _____
City Lincoln State NE Zip Code 68588 + 0517

3. Permit Number(s) N/A

4. Purpose of well (indicate one): Dewatering (over 90 days) Domestic Geothermal Ground Heat Exchanger
 Ground Water Source Heat Pump Industrial Injection Irrigation Livestock Monitoring
 Observation Public Water Supply (with spacing (46-638)) Public Water Supply (without spacing) Recovery
 Other _____
(indicate use)

5. Replacement and abandoned well information.

A. Is this well a replacement well? Yes No B. Registration number of abandoned well: _____
C. Replacement well is _____ feet from abandoned well. D. Abandoned well last operated _____, 19____
E. Original well pump column size: _____ inches. F. Abandoned well plugged _____, 19____

6. A. Well location: SW 1/4 SW 1/4 of Section 34, Township 29 North, Range 11 East/West Holt County.

B. The well is 360 feet from the North/South section line and 780 feet from the East/West section line.
(indicate one) (indicate one)

C. Street address or block, lot and subdivision, if applicable: _____

D. Location of water use, if applicable (give legal descriptions): _____

E. If for irrigation, the land to be irrigated is _____ acres.

F. Well reference letter(s), if applicable: UE #1M (North) TH #12-A-98

7. Pump Information.

Is pump installed at this time? Yes No

If yes, complete items A through E.

If no, complete items A and D with estimated information for those wells in which pump will be installed.

A. Actual pumping rate, if applicable: 1 to 5 gallons per minute. Measured or Estimated

B. Pump column diameter: _____ inches. C. Length of pump column: _____ feet.

D. Pumping equipment installed: As Needed, 19____. E. Brand/Type: REDI-FLO2 GRUND FOS

8. Well Construction Information.

- A. Total well depth: 70 feet. B. Static water level: 3.26 feet. C. Pumping water level: _____ feet.
 D. Construction began: 6/19, 1998. E. Construction completed: 6/19, 1998.
 F. Bore hole diameter: 8 inches.
 G. Casing: Diameter 2.5 ID 2.67 OD inches. Type of material: PVC SCH 40
 Wall thickness: .203 inches. Joints--Welded/Glued/Threaded/Other: _____ Guides at _____ ft.
 Length(s) and placement(s) depth from 0 ft. to 58 ft. from _____ ft. to _____ ft.
 H. Screen: 2.5 ID 2.67 OD in.; Type of material PVC SCH 40
 Screen openings (slot size): 0.010 Trade name: _____ Guides at _____ ft.
 Length(s) and placement(s) depth from 58 ft. to 68 ft. from _____ ft. to _____ ft.
 I. Gravel pack interval(s) from 55 ft. to 70 ft. from _____ ft. to _____ ft. Grade size: DE-ICING
 J. Grouted/Sealed from 3 ft. to 55 ft., with BENSEAL/EZ MUD
 (type)
 from _____ ft. to _____ ft., with _____
 (type)
 K. Drilling method: Mud Rotary L. Drilling fluid: Quick Gel
 M. Well development technique (total time and method): Airlift 20 Minutes
 N. Will chemicals, fertilizer or antifreeze be injected or utilized in the system? Yes No
 If yes, what will be used: _____

9. Geologic Materials Logged

DEPTH IN FEET FROM	TO	DESCRIPTION	DEPTH IN FEET FROM	TO	DESCRIPTION
<u>0</u>	<u>3</u>	<u>Topsoil; silty, sandy</u>	<u>45</u>	<u>70</u>	<u>Sand, very fine to fine</u>
<u>3</u>	<u>13</u>	<u>Sand, very fine to coarse, some gravel</u>			
<u>13</u>	<u>16</u>	<u>Silt, clayey medium to dark gray</u>			
<u>16</u>	<u>19</u>	<u>Sand, fine to very coarse, some gravel</u>			
<u>19</u>	<u>45</u>	<u>Sandstone, very fine to fine olive gray with interbedded siltstone</u>			

(Additional sheets may be submitted)

10. I am familiar with the information submitted on this registration, and to the best of my knowledge it is true.

[Signature]
 Water Well Contractor's Signature

7-21-98
 Date

[Signature]
 Water Well Owner's Signature

 Date

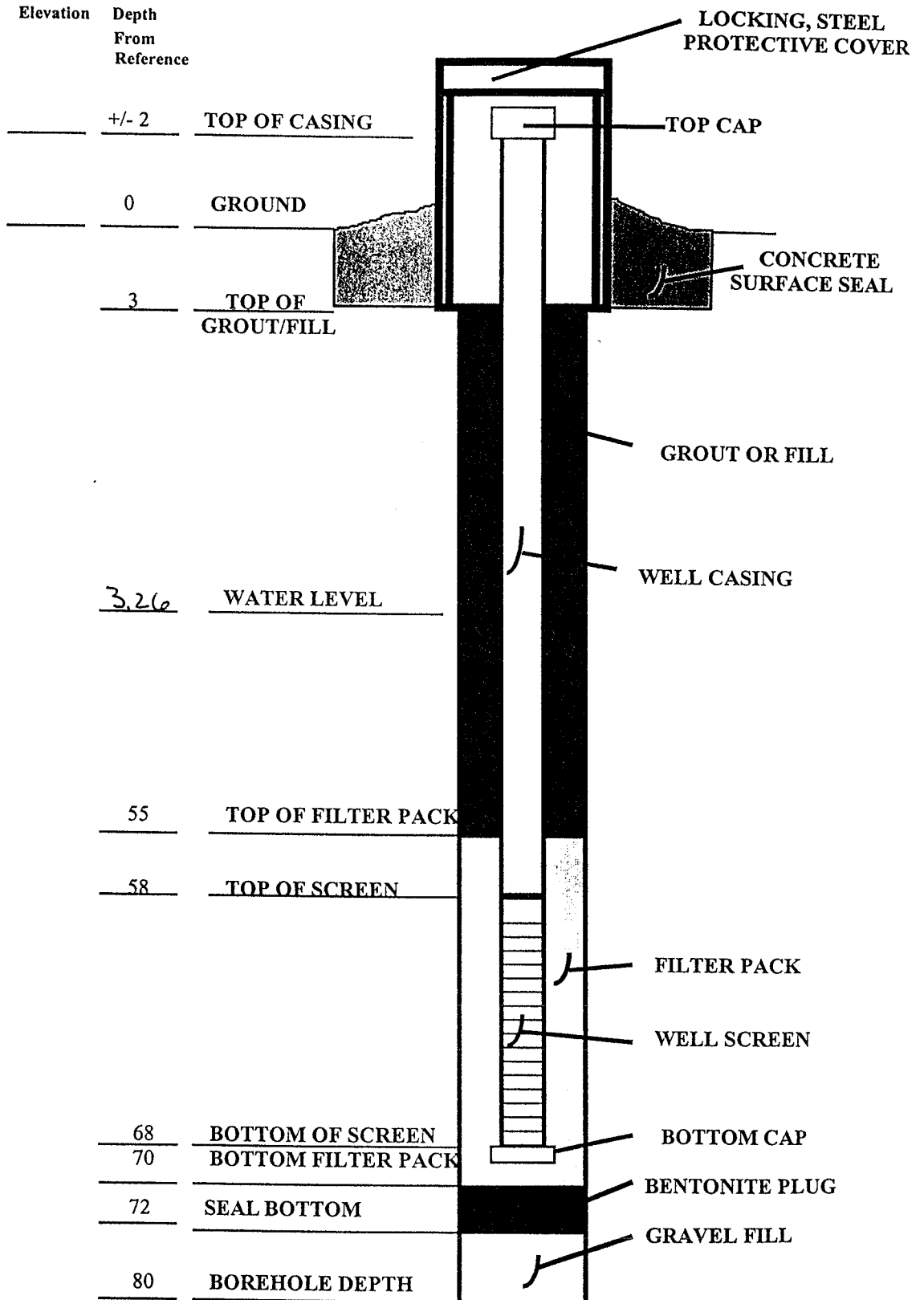
SITE 1-98

TH# 12-A-98

CONSERVATION AND SURVEY DIVISION--UNL			WELL COMPLETION LOG	
Project UENRD PHASE II	Well Number #1M (NORTH)	Date Drilled 6/19/98	Date Constructed 6/19/98	Ground Elevation 1945 (t)
County HOLT	Qtr/Qtr/Qtr SE/SW/SW	Section 34	Township 29N	Range 11W
Drilling Co. NGS	Method MUD ROTARY	Driller GROSCH	Log By CARLSON/LACKEY	Total Depth 68 FT

Borehole Diameter 8-INCHES
Survey Reference
Type/Size of Casing PVC 2.5" ID SCH 40
Type/Size of Screen PVC 2.5" ID SCH 40
Screen Slot Size 0.010
Joint Type THREADED
Type/Amount Grout/Fill BENSEAL/EZ-MUD 5 BATCHES
Type/Amount Seal HOLE PLUG

TEST HOLE #
12-A-98



STATE OF NEBRASKA
DEPARTMENT OF WATER RESOURCES
WATER WELL REGISTRATION

FOR DEPARTMENT USE ONLY

Registration No. _____ Sequence No. _____ Registration Date: _____
Owner Code No. _____ Receipt No. _____ NRD

1. Well Owner Upper Elkhorn NRD Telephone Number (402) 336-3867
Address 310 N. Harrison St
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Address 113 Nebraska Hall Contractor's License No. 17003 Pump Installer License No. _____
City Lincoln State NE Zip Code 68588 + 0517

3. Permit Number(s) N/A

1. Purpose of well (indicate one): Dewatering (over 90 days) Domestic Geothermal Ground Heat Exchanger
 Ground Water Source Heat Pump Industrial Injection Irrigation Livestock Monitoring
 Observation Public Water Supply (with spacing (46-638)) Public Water Supply (without spacing) Recovery
 Other _____
(indicate use)

2. Replacement and abandoned well information.
A. Is this well a replacement well? Yes No B. Registration number of abandoned well: _____
C. Replacement well is _____ feet from abandoned well. D. Abandoned well last operated _____, 19____
E. Original well pump column size: _____ inches. F. Abandoned well plugged _____, 19____

3. A. Well location: SW 1/4 SW 1/4 of Section 34, Township 29 North, Range 11 East/West, Holt County.
B. The well is 344 feet from the North/South section line and 816 feet from the East/West section line.
(indicate one) (indicate one)
C. Street address or block, lot and subdivision, if applicable: _____
D. Location of water use, if applicable (give legal descriptions): _____
E. If for irrigation, the land to be irrigated is _____ acres.
F. Well reference letter(s), if applicable: UE #ID (South) TH #12-A-98

4. Pump Information.
Is pump installed at this time? Yes No
If yes, complete items A through E.
If no, complete items A and D with estimated information for those wells in which pump will be installed.
A. Actual pumping rate, if applicable: 1 to 5 gallons per minute. Measured or Estimated
B. Pump column diameter: As needed inches. C. Length of pump column: _____ feet.
D. Pumping equipment installed: As needed, 19____. E. Brand/Type: REDI-F102 GRUND FOS

8. Well Construction Information.

- A. Total well depth: 255 feet. B. Static water level: 2.40 feet. C. Pumping water level: _____ feet.
- D. Construction began: 6/17, 1998. E. Construction completed: 6/18, 1998.
- F. Bore hole diameter: 8 inches.
- G. Casing: Diameter 2.5 ID 2.67 OD inches. Type of material: PVC SCH 40
 Wall thickness: .203 inches. Joints--Welded/Glued/Threaded/Other: _____ Guides at _____ ft.
 Length(s) and placement(s) depth from 0 ft. to 218 ft. from _____ ft. to _____ ft.
- H. Screen: 2.5 ID 2.67 OD in.; Type of material PVC SCH 40
 Screen openings (slot size): 0.010 Trade name: _____ Guides at _____ ft.
 Length(s) and placement(s) depth from 218 ft. to 223 ft. from _____ ft. to _____ ft.
- I. Gravel pack interval(s) from 215 ft. to 225 ft. from _____ ft. to _____ ft. Grade size: 20/40
- J. Grouted/Sealed from 0 ft. to 215 ft., with BENSEAL/EZ-MUD
 (type) _____
 from _____ ft. to _____ ft., with _____
 (type) _____
- K. Drilling method: Rotary L. Drilling fluid: Quick Gel
- M. Well development technique (total time and method): Air Lift 30 Minutes
- N. Will chemicals, fertilizer or antifreeze be injected or utilized in the system? Yes No
 If yes, what will be used: _____

9. Geologic Materials Logged

DEPTH IN FEET FROM	TO	DESCRIPTION	DEPTH IN FEET FROM	TO	DESCRIPTION
<u>0</u>	<u>3</u>	<u>Topsoil; Silty, sandy</u>	<u>148</u>	<u>188</u>	<u>Silty sand to sandy silt,</u>
<u>3</u>	<u>13</u>	<u>Sand, Very fine to coarse,</u>			<u>cemented in part</u>
		<u>some gravel</u>	<u>188</u>	<u>315</u>	<u>Sand to sandstone, some</u>
<u>13</u>	<u>16</u>	<u>Silt; clayey, medium to dark gray</u>			<u>silty areas</u>
<u>16</u>	<u>19</u>	<u>Sand, fine to very coarse,</u>	<u>315</u>	<u>316</u>	<u>Clay, light to dark gray</u>
		<u>some gravel</u>	<u>316</u>	<u>328</u>	<u>Clay/shale</u>
<u>19</u>	<u>45</u>	<u>Sandstone, very fine to fine,</u>			
		<u>olive gray w/ interbedded siltstone</u>			
<u>45</u>	<u>148</u>	<u>Sand to sandstone, very fine</u>			
		<u>to fine, some clay layers</u>			

(Additional sheets may be submitted)

10. I am familiar with the information submitted on this registration, and to the best of my knowledge it is true.

[Signature]
 Water Well Contractor's Signature

7-21-98
 Date

[Signature]
 Water Well Owner's Signature

 Date

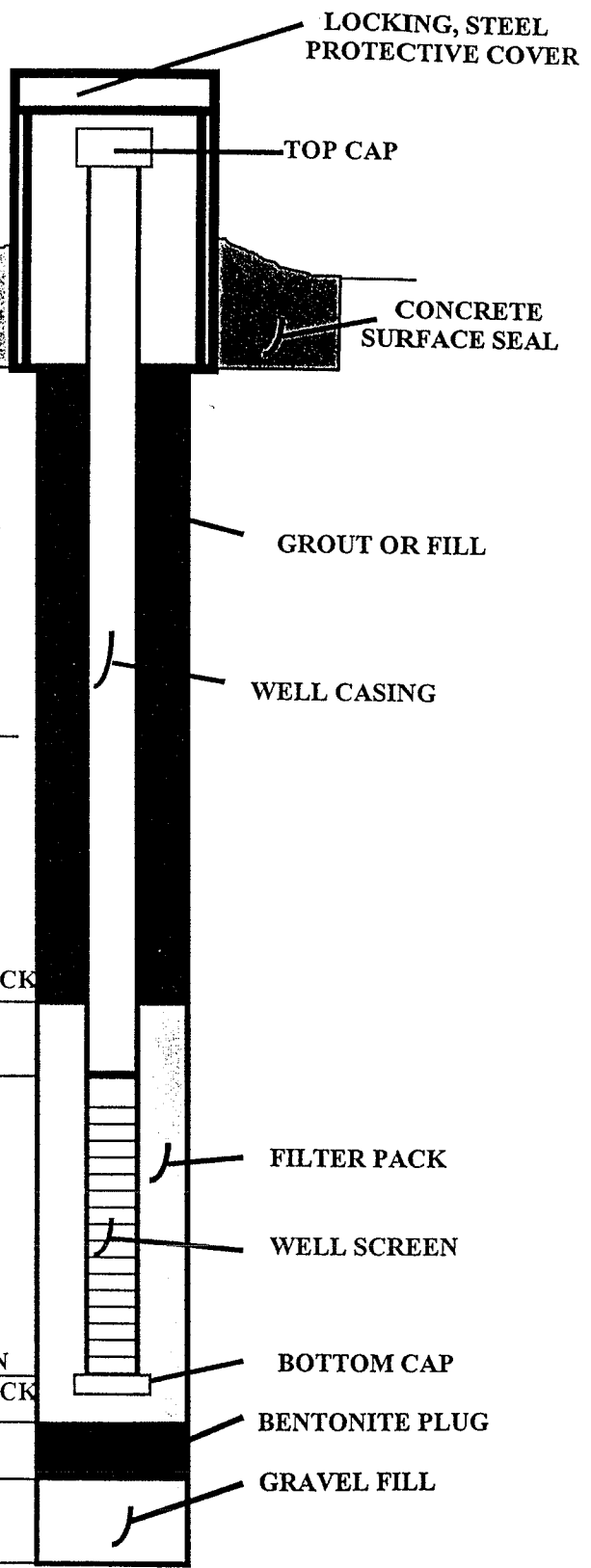
SITE # 1-98

TH# 12-A-98

CONSERVATION AND SURVEY DIVISION--UNL		WELL COMPLETION LOG		
Project UENRD PHASE II	Well Number #1D (SOUTH)	Date Drilled 6/17/98	Date Constructed 6/18/98	Ground Elevation 1945 (t)
County HOLT	Qtr/Qtr/Qtr SE/SW/SW	Section 34	Township 29N	Range 11W
Drilling Co. NGS	Method MUD ROTARY	Driller GROSCH	Log By CARLSON/LACKEY	Total Depth 225 FT

Borehole Diameter 8-INCHES
Survey Reference
Type/Size of Casing PVC 2.5" ID SCH 40
Type/Size of Screen PVC 2.5" ID SCH 40
Screen Slot Size 0.010
Joint Type THREADED
Type/Amount Grout/Fill BENSEAL/EZ-MUD 17 BATCHES
Type/Amount Seal HOLE PLUG 2 BAGS

Elevation	Depth From Reference
+/- 2	TOP OF CASING
0	GROUND
3	TOP OF GROUT/FILL
2.40	WATER LEVEL
215	TOP OF FILTER PACK
218	TOP OF SCREEN
223	BOTTOM OF SCREEN
225	BOTTOM FILTER PACK
227	SEAL BOTTOM
328	BOREHOLE DEPTH



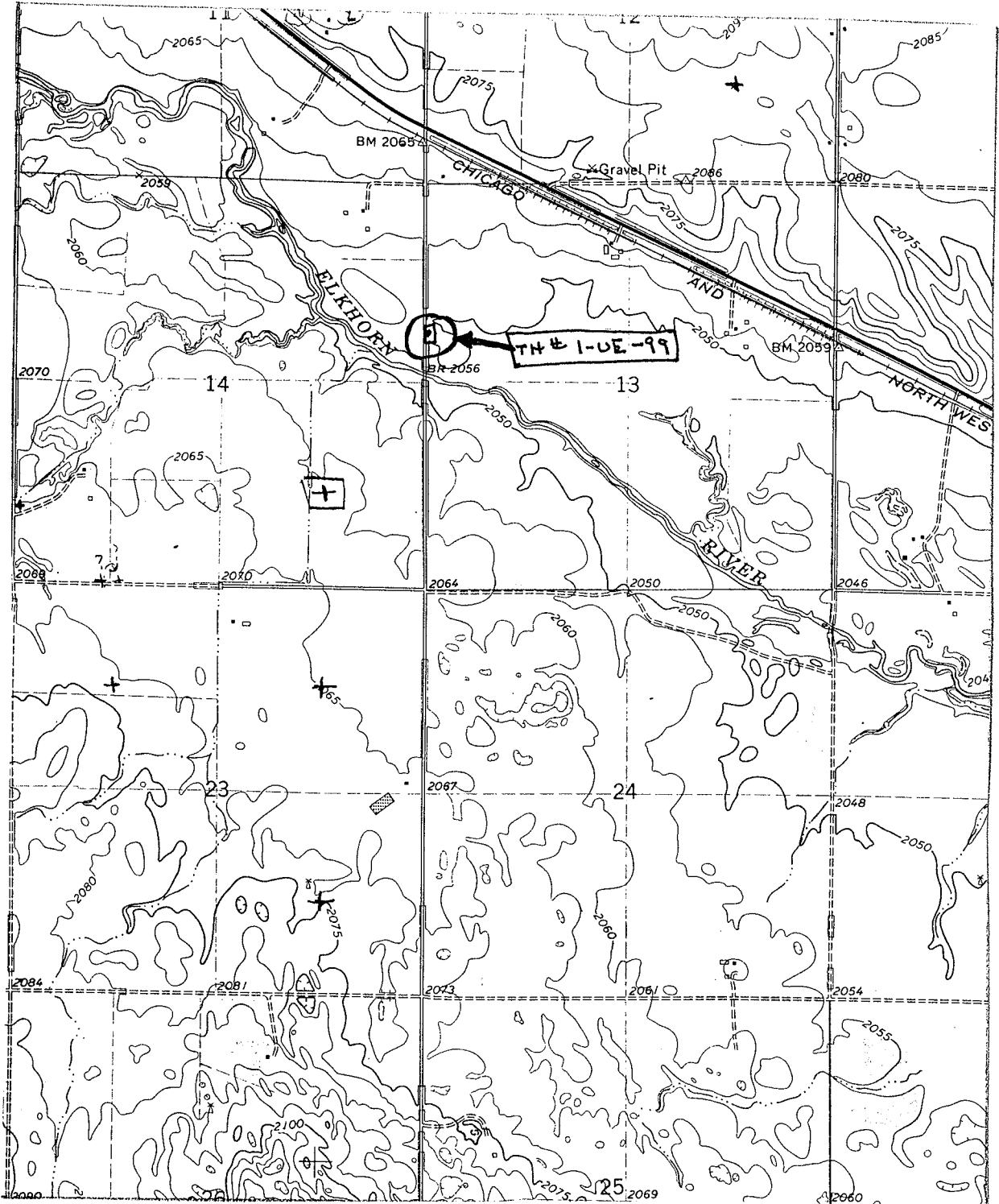
test hole
12-A-98
or 1-L2-98

Number 2 Well

HOLT COUNTY

TH # 1-UE-99

#2 WELL



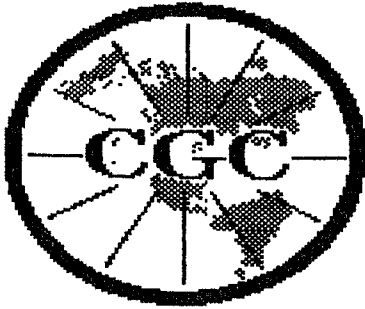
T 29N R14W SECTION 13 NW

EMMET NW QUAD

**Test Hole #1-UE-99
(29N-14W-13bcbc)
Holt County**

Location: SW NW SW NW Sec. 13, T. 29 N., R. 14 W., approximately
1,962 ft south and 32 ft east of the NW corner.
Ground elevation: 2,052 ft. (t) (Emmet NW, 7.5 min. quadrangle)
Depth to water: 4 ft (9-24-99)

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Top soil: silt, clayey, sandy, black; sand is very fine to medium, some coarser grains...	0.0	2.0
Sandstone, very dark brown; sand is very fine to medium, few coarser grains.....	2.0	5.0
Sand, light gray; sand is very fine to medium, some coarse to very coarse.....	5.0	10.0
Sand, gravelly; very fine sand to fine gravel.	10.0	20.0
Tertiary System - Miocene Series - Ogallala Group:		
Sand, light gray; very fine to medium; contains few rootlets; contains some siltstone below 30 ft.....	20.0	35.0
Sand, olive green; very fine to fine, some medium; contains some rootlets and sandstone fragments; less medium sand below 40 ft.....	35.0	45.0
Sand to sandstone, olive; sand is very fine to medium; little coarse; much rootlet fragments.....	45.0	50.0
Sand, olive; sand is very fine to fine, little medium to coarse; some rootlet fragments...	50.0	55.0
Sand, olive; very fine to fine, little medium; some rootlets.....	55.0	60.0



Century GEOPHYSICAL CORP.

1-UE-99

COMPANY : Sargent
WELL : 1-UE-99
LOCATION/FIELD : Site 4
COUNTY : HOLT
STATE : NE
SECTION : 13

TOWNSHIP : 29 RANGE : 14w

DATE : 09/20/99
DEPTH DRILLER : 60
LOG BOTTOM : 47.50
LOG TOP : 0.58

PERMANENT DATUM : None
LOG MEASURED FROM: grd=0
DRL MEASURED FROM:

KB : None
DF : None
GL : 2050

CASING DIAMETER : 0
CASING TYPE : None
CASING THICKNESS: 0

LOGGING UNIT : 208A
FIELD OFFICE : Norfolk
RECORDED BY : Sol

BIT SIZE : 5
MAGNETIC DECL. : 0
MATRIX DENSITY : 2.71
NEUTRON MATRIX : Dolomite

BOREHOLE FLUID : 0
RM : 0
RM TEMPERATURE : 0
MATRIX DELTA T : 54

FILE : PROCESSED
TYPE : 8043A

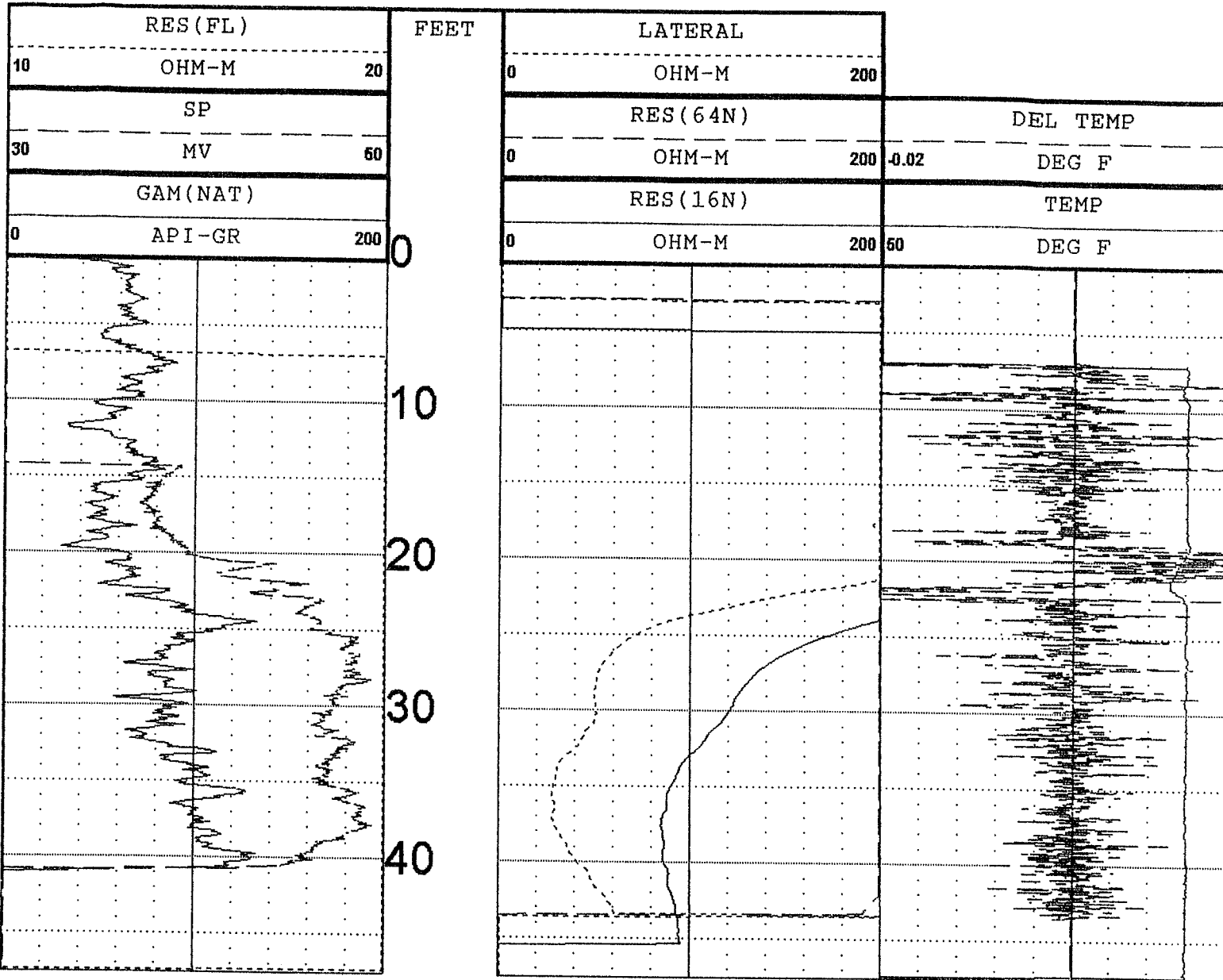
THRESH: 2500

Emmet NW Quad
Well 2S (UE)

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS

OTHER SERVICES:

Down
None
None



NO. SC. TH 1-UE-99 Site 4-99

3482

11463

38.7

HEL/NW

5391

4050

3596

14397

1308

5073

5941

19477

5940

19476

8111

133

HEL/NW

UE #25

182
22.1

NHEL/NW

3
9.4

13

92 SLI

4
83.0 HEL

STATE OF NEBRASKA
DEPARTMENT OF WATER RESOURCES
WATER WELL REGISTRATION

FOR DEPARTMENT USE ONLY

Registration Date: _____ Sequence No. _____ Registration No. _____
Owner Code No. _____ Receipt No. _____ **NRD**

1. Well Owner Upper Elkhorn Natural Resource District Telephone Number (402) 336-3867
Address 301 North Harrison
City O'Neill State NE Zip Code 68763 +

2. Drilling Firm Sargent Irrigation Telephone Number (402) 887-4112
Address Box 9 Contractor's License No. 39194
City Neligh State NE Zip Code 68756 +

3. Permit Number(s)

4. Purpose of well (indicate one): Dewatering (over 90 days) Domestic Geothermal Ground Heat Exchanger
 Ground Water Source Heat Pump Industrial Injection Irrigation Livestock Monitoring
 Observation Public Water Supply (with spacing (46-638)) Public Water Supply (without spacing) Recovery
 Aquaculture Other
(indicate use)

5. Replacement and abandoned well information.

- A. Is this well a replacement well? Yes No
- B. Replacement well is _____ feet from abandoned well
- C. Original well pump column size: _____ inches.
- D. Abandoned well last operated _____,
- E. Location of water use of abandoned well:
- F. Completion of original well abandonment on _____,

- A. Well location: SW 1/4 of the NW 1/4 of Section 13, Township 29 North, Range 14 East West, Holt County.
- B. The well is 1962 feet from the North or South section line and 32 feet from the East or West section line.
- C. Street address or block, lot and subdivision, if applicable: Site UE 4-99; TH 1-UE-99
- D. Location of water use, if applicable (give legal descriptions):
- E. If for irrigation, the land to be irrigated is _____ acres.
- F. Well reference letter(s), if applicable: Well UE #2S

7. Pump Information.

- Is pump installed at this time? Yes No
- If yes, complete items A through F.
- If no, complete items A and D with estimated information for those wells in which pump will be installed.
- A. Actual pumping rate, if applicable: _____ gallons per minute. Measured or Estimated
- B. Pump column diameter: _____ inches.
- C. Length of pump column: _____ feet.
- D. Pumping equipment-date installed: _____, _____.
- E. Brand/Type: _____
- F. Pump installed by: Contractor Owner Pump Installer License No. _____

8. Well Construction Information.

A. Total well depth: 20.6 feet.

B. Static water level: 4.3 feet.

C. Pumping water level: _____ feet.
 Estimated or Measured

D. Well Construction began: 9/20, 1999.

E. Well Construction completed: 9/21, 1999.

F. Bore hole diameter: 10 inches.

G. Plain Casing: Diameter 2.469 ID 2.875 OD inches. Type of material: PVC Schedule 40.

Wall thickness: 0.203 inch(es). Joints-- Welded Glued Threaded/Other:

Length(s) and placement(s) depth from +3 ft. to 10 ft. from _____ ft. to _____ ft.

H. Screen: 2.469 ID 2.875 OD in: type of material PVC Schedule 40

Screen Openings (slot size) 0.010 Trade Name Eagle

Length(s) and placement(s) depth from 10 ft. to 20 ft. from _____ to _____ ft. guides at 6 ft.

I. Gravel pack interval(s) from 8.75 ft. to 20.6 ft. from _____ ft. to _____ ft. Grade size: 10/20

J. Grouted/Sealed from 0 ft. to 3 ft., with steel cover in concrete
(type)

from 3 ft. to 8.75 ft., with Hole Plug
(type)

K. Drilling method: Mud Rotary

L. Drilling fluid: Premium Gel

M. Well development technique (total time and method): Air (1 hr)

N. Will chemicals, fertilizer or antifreeze be injected or utilized in the system? Yes No

If yes, what will be used:

9. Geologic Materials Logged

Depth in Feet		Description
From	To	
<u>0</u>	<u>2</u>	<u>Silt, Sandy, very dark brown</u>
<u>2</u>	<u>12</u>	<u>Sand, f-m, some coarse</u>
<u>12</u>	<u>20</u>	<u>Gravel, m-c, some medium sand</u>
<u>20</u>	<u>30</u>	<u>Sand, f-m, rootlets</u>
<u>30</u>	<u>60</u>	<u>Sand, vf-f, some sandstone & siltstones, olive</u>

Depth in Feet		Description
From	To	

(Additional sheets may be submitted)

10. I am familiar with the information submitted on this registration, and to the best of my knowledge it is true.

Water Well Contractor's Signature

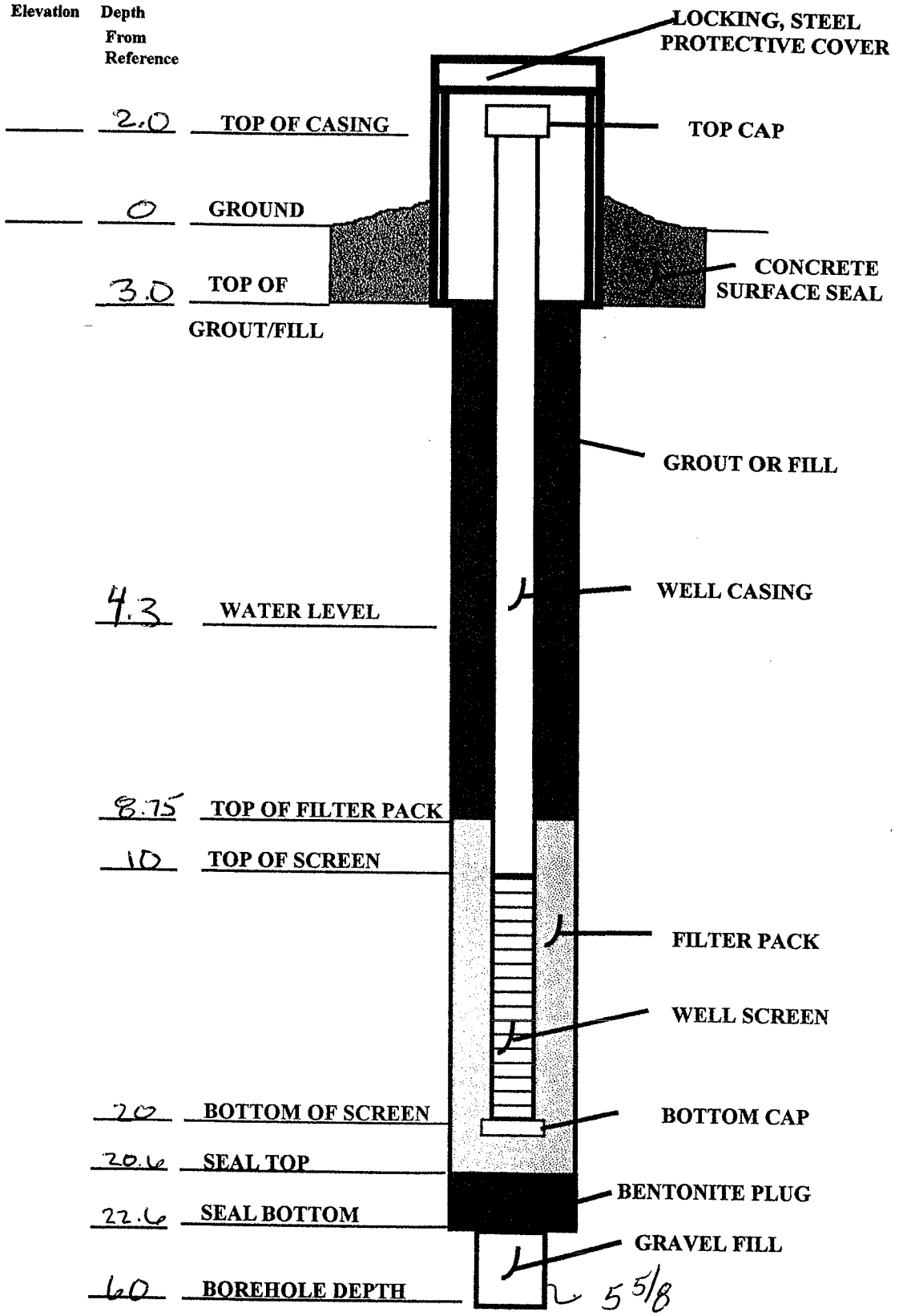
Date

Water Well Owner's Signature

Date

CONSERVATION AND SURVEY DIVISION--UNL			WELL COMPLETION LOG		
Project <i>UENRD PII</i>	Well Number <i>2S</i>	Date Drilled <i>9/20/99</i>	Date Constructed <i>9/20/99</i>	Ground Elevation <i>2050(±)</i>	
County <i>HOLT</i>	Qtr/Qtr/Qtr <i>NW SW NW</i>	Section <i>13</i>	Township <i>29N</i>	Range <i>14W</i>	
Drilling Co. <i>SARGENT</i>	Method <i>MUD ROTARY</i>	Driller <i>TRAVIS</i>	Log By <i>Paul</i>	Total Depth <i>20.6</i>	

Borehole Diameter <i>10-INCH</i>
Survey Reference
Type/Size of Casing <i>2 1/2" ID SCH 40</i>
<i>12 FEET</i>
Type/Size of Screen <i>2 1/2" ID SCH 40</i>
<i>10 FEET</i>
Screen Slot Size <i>0.010</i>
Filter Pack <i>15 BAGS 10/20 Si/Sz</i> <i>7 gal 1/4" Rd quartz</i>
Type/Amount Grout/Fill <i>CHUNK</i> <i>4 BAGS</i>
Type/Amount Seal <i>BOTTOM</i> <i>1 BAG</i>



1962 S 32 E
Developed 1 hr 9/20
Cover set 9/21

5 5/8

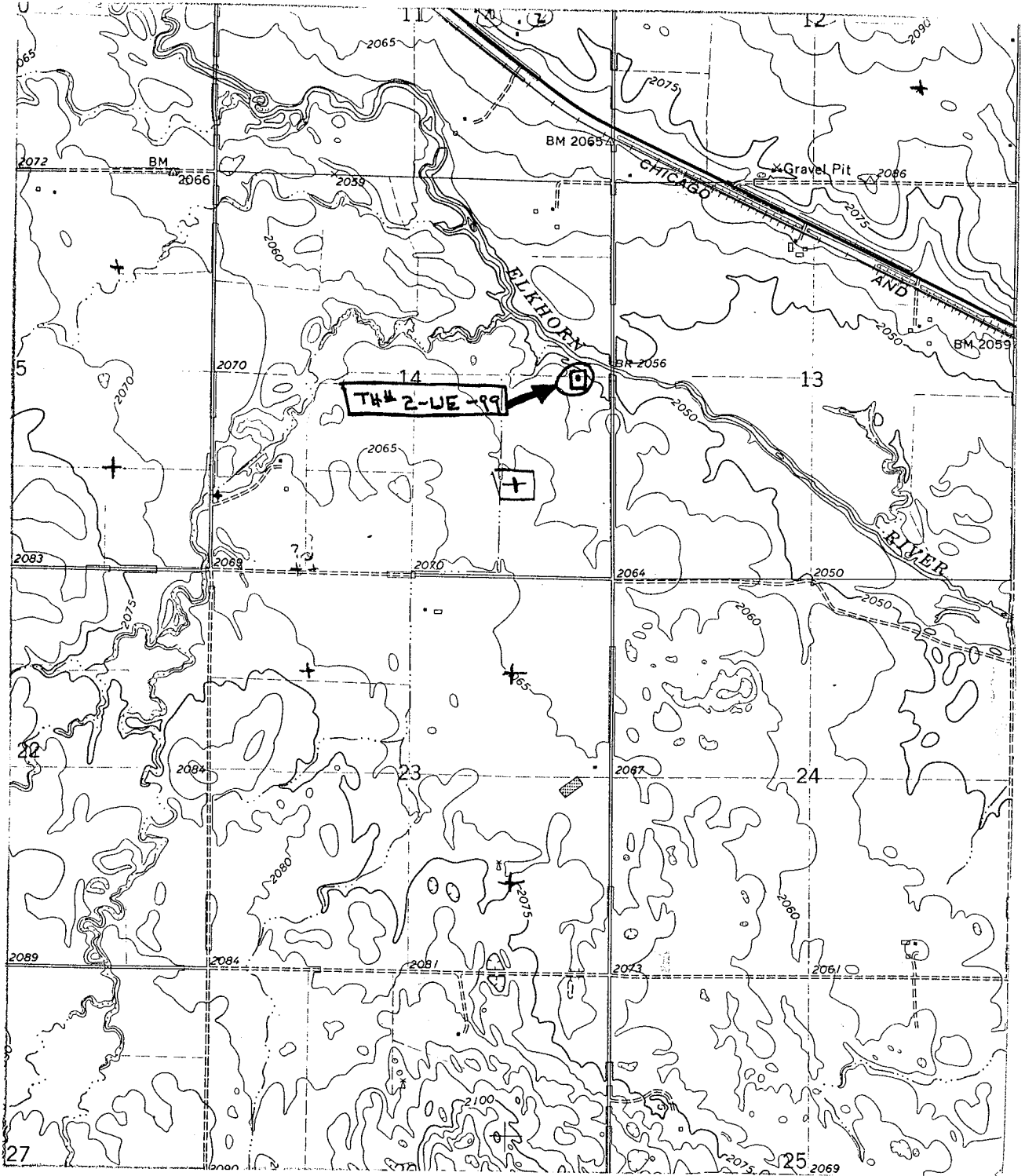
Number 3 Wells



HOLT COUNTY

TH # 2-LE-99

#3 WELLS



T29N R14W SECTION 14 SE

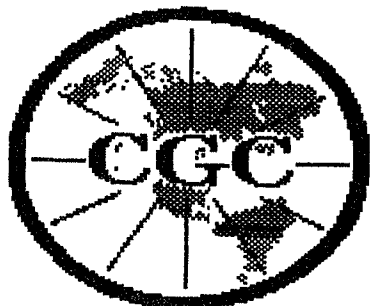
EMMET NW QUAD

**Test Hole #2-UE-99
(29N-14W-14daab)
Holt County**

Location: NW NE NE SE Sec. 14, T. 29 N., R. 14 W., approximately
2,639 ft south and 462 ft west.
Ground elevation: 2,055 ft. (t) (Emmett NW, 7.5 min. quadrangle)
Depth to water: 4.8 ft (9-24-99)

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Top soil: no sample.....	0.0	0.6
Sand, slightly silty, gray; sand is very fine to medium, little coarse; some very fine gravel below 15 ft.....	0.6	20.0
Sand, very fine to coarse, some medium sand to fine gravel; gray.....	20.0	30.0
Tertiary System - Miocene Series - Ogallala Group:		
Silt, very clayey, bentonitic, light olive gray.....	30.0	40.0
Sandstone, silty, light olive; sand is very fine to fine, little medium; contains rootlets.....	40.0	45.0
Silt, very clayey, slightly sandy, light olive gray; sand is very fine.....	45.0	50.0
Sand, moderately to very silty, with sandstone, light olive gray; sand is very fine to fine with a trace of rootlets.....	50.0	55.0
Sand to sandstone, olive gray; sand is very fine to fine; trace of rootlets.....	55.0	60.0
Sand, light gray; very fine to fine; contains rootlets; olive gray below 70 ft; silty below 95 ft.....	60.0	99.0
Silt, very sandy, slightly clayey, light gray; sand is very fine, some fine.....	99.0	100.0
Sand to sandstone, silty, light olive; sand is very fine.....	100.0	110.0
Silt, very sandy, slightly clayey, light olive; sand is very fine.....	110.0	115.0
Sand, slightly to very silty, light olive; sand is very fine to fine.....	115.0	129.0
Silt, moderately clayey, slightly sandy, light olive; sand is very fine.....	129.0	135.0
Sand to sandstone, very silty, light olive; sand is very fine.....	135.0	145.0
Silt, sandy to sand, silty, moderately clayey,		

light olive; sand is very fine.....	145.0	165.0
Sand to sandstone, slightly silty, light olive; sand is very fine, some fine; moderately silty below 175 ft; contains rootlets.....	165.0	185.0
Sand, slightly silty, light olive; sand is very fine to fine; contains rootlets.....	185.0	190.0
Sand, light olive; very fine to fine; contains rootlets; slightly silty from 195 to 200 ft; below 223 ft variably clayey.....	190.0	250.0
Sand to sandstone, light olive; sand is very fine; rootlets from 260 to 265 ft.....	250.0	267.0
Sand to sandstone, light olive, in part lime cemented.....	267.0	277.0
Sand, very silty, light olive, in part lime cemented.....	277.0	287.0
Sand to sandstone, light olive; sand is very fine to fine, some lime cement.....	287.0	298.0
Sand to sandstone, silty, light olive; sand is very fine to fine; contains claystone fragments and limy material below 300 ft...	298.0	310.0
Sand to sandstone, slightly silty, light olive; sand is very fine to fine.....	310.0	316.0
Sand to sandstone, moderately to very silty, light olive; sand is very fine to fine; clayey below 325 ft.....	316.0	335.0
Sandstone, silty, light olive; sand is very fine to fine; contains reworked bentonitic claystone, limestone fragments; contains rare bone fragment below 340 ft.....	335.0	344.0
Sand to sandstone, olive gray to light gray; sand is very fine to fine; contains bentonitic claystone and siliceous fragments.....	344.0	356.0
Sand, slightly to moderately silty, olive gray; sand is very fine to fine; contains reworked claystone and siltstone fragments; contains less silt below 362 ft.....	356.0	380.0
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Clay, shaley, pale olive, some yellow with gray.....	380.0	386.5
Shale, clayey, moderately calcareous, black...	386.5	400.0



Century GEOPHYSICAL CORP.

2-UE-99

COMPANY : Sargent
WELL : 2-UE-99
LOCATION/FIELD : Site 5
COUNTY : HOLT
STATE : NE
SECTION : 14

OTHER SERVICES:

Down
None
None

TOWNSHIP : 29 RANGE : 14w

DATE : 09/21/99
DEPTH DRILLER : 400
LOG BOTTOM : 401.72
LOG TOP : 2.43

PERMANENT DATUM : None

KB : None

LOG MEASURED FROM: grd=0

DF : None

DRL MEASURED FROM:

GL : 2055

CASING DIAMETER : 0

LOGGING UNIT : 208A

CASING TYPE : None

FIELD OFFICE : Norfolk

CASING THICKNESS: 0

RECORDED BY : Sol

BIT SIZE : 5

BOREHOLE FLUID : 0

FILE : ORIGINAL

MAGNETIC DECL. : 0

RM : 0

TYPE : 8043A

MATRIX DENSITY : 2.71

RM TEMPERATURE : 0

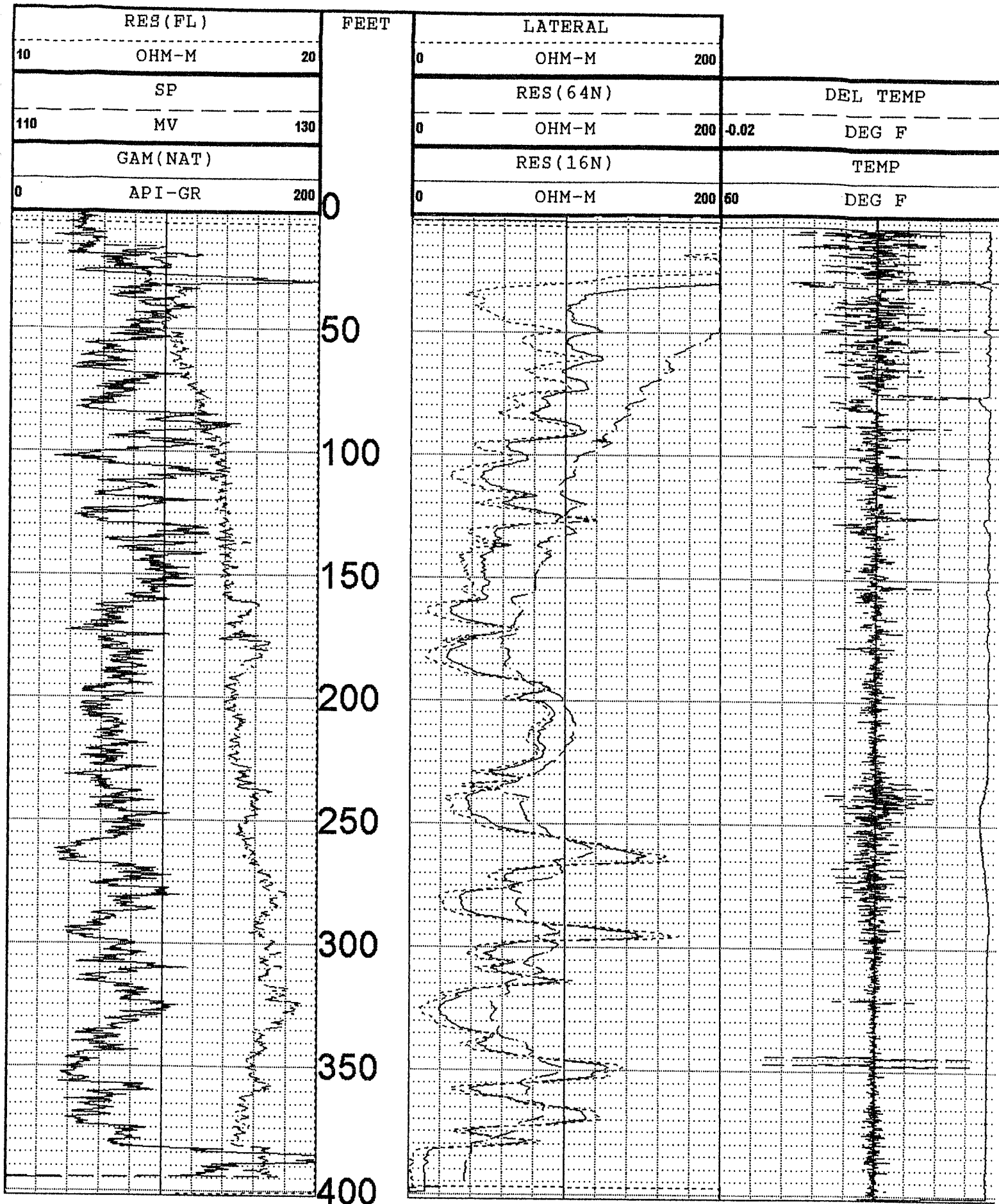
NEUTRON MATRIX : Dolomite

MATRIX DELTA T : 54

THRESH: 2500

Ermet NW Quad
Wells 3S, 3M, 3D (UE)

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS



NOT TO SCALE

Holt Co. 1988
T-29-N R-14-W
TH #2-UE-99

Photo K16
Sec. 14
Site S-99

2238
T7328

2237
T7327

23.8 HEL/NW

19.4 HEL/NW

4243 6400
1228 5449
T3446 T9196

6783
5400 6401
T9194 T9885

UE #35
UE #3M
UE #3D
Sq
1.1

12
4.6

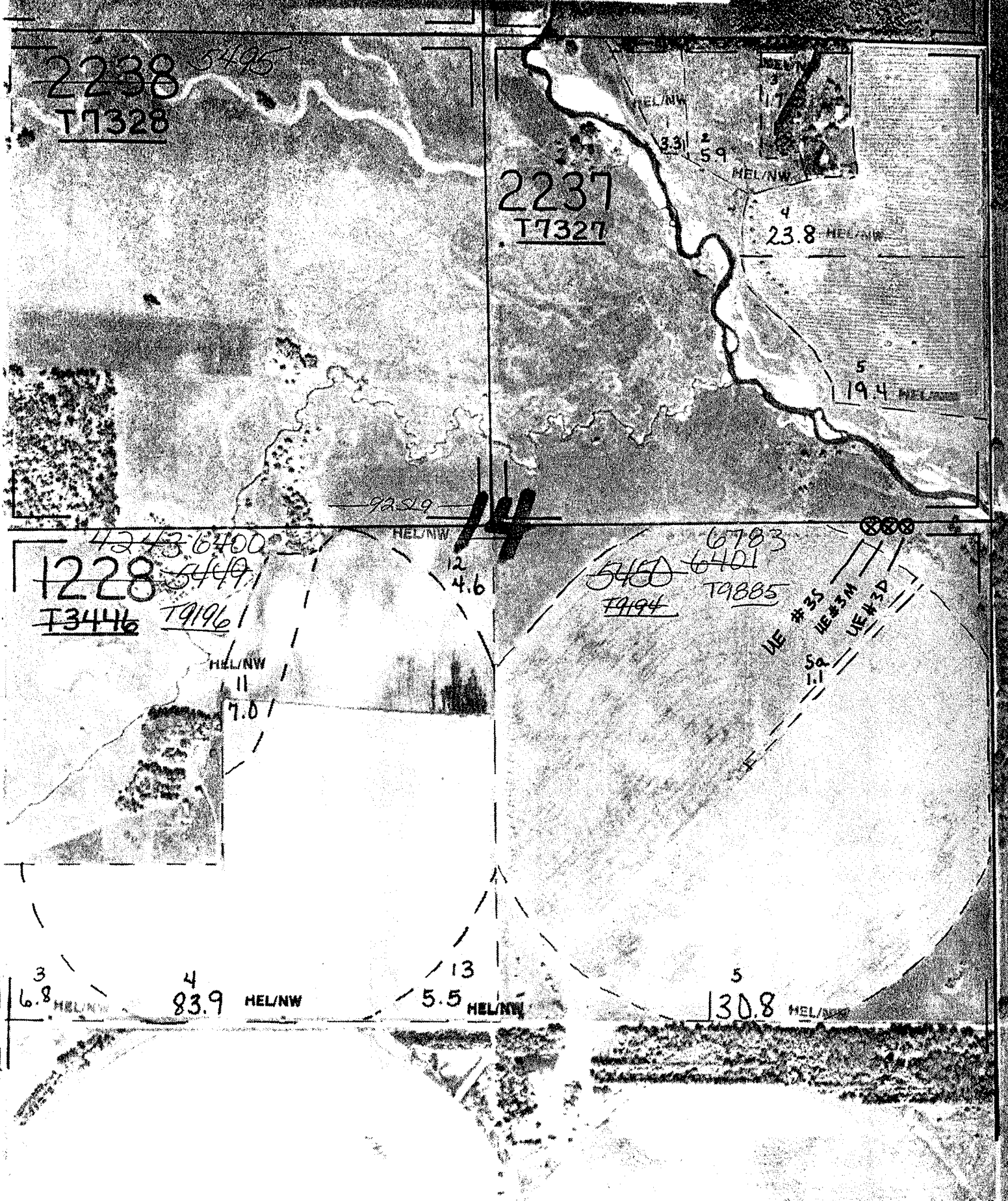
7.0

3
6.8 HEL/NW

4
83.9 HEL/NW

13
5.5 HEL/NW

5
130.8 HEL/NW



STATE OF NEBRASKA
DEPARTMENT OF WATER RESOURCES
WATER WELL REGISTRATION

FOR DEPARTMENT USE ONLY

Registration Date: _____ Sequence No. _____ Registration No. _____
Owner Code No. _____ Receipt No. _____ NRD

1. Well Owner Upper Elkhorn Natural Resource District Telephone Number (402) 336-3867
Address 301 North Harrison
City O'Neill State NE Zip Code 68763 +

2. Drilling Firm Sargent Irrigation Telephone Number (402) 887-4112
Address Box 9 Contractor's License No. 39194
City Neligh State NE Zip Code 68756 +

3. Permit Number(s)

4. Purpose of well (indicate one): Dewatering (over 90 days) Domestic Geothermal Ground Heat Exchanger
 Ground Water Source Heat Pump Industrial Injection Irrigation Livestock Monitoring
 Observation Public Water Supply (with spacing (46-638)) Public Water Supply (without spacing) Recovery
 Aquaculture Other
(indicate use)

5. Replacement and abandoned well information.

- A. Is this well a replacement well? Yes No
- B. Replacement well is _____ feet from abandoned well
- C. Original well pump column size: _____ inches.
- D. Abandoned well last operated _____,
- E. Location of water use of abandoned well:
- F. Completion of original well abandonment on _____,

6. A. Well location: NE 1/4 of the SE 1/4 of Section 14, Township 29 North, Range 14 East West, Holt County.
B. The well is 2639 feet from the North or South section line and 526.8 feet from the East or West section line.
C. Street address or block, lot and subdivision, if applicable: Site UE 5-99; TH 2-UE-99
D. Location of water use, if applicable (give legal descriptions):
E. If for irrigation, the land to be irrigated is _____ acres.
F. Well reference letter(s), if applicable: Well UE #3S (West)

7. Pump Information.

Is pump installed at this time? Yes No
If yes, complete items A through F.
If no, complete items A and D with estimated information for those wells in which pump will be installed.
A. Actual pumping rate, if applicable: _____ gallons per minute. Measured or Estimated
B. Pump column diameter: _____ inches. C. Length of pump column: _____ feet.
D. Pumping equipment-date installed: _____, _____. E. Brand/Type:
F. Pump installed by: Contractor Owner Pump Installer License No.

8. Well Construction Information.

A. Total well depth: 25.6 feet.

B. Static water level: 5.3 feet.

C. Pumping water level: _____ feet.
 Estimated or Measured

D. Well Construction began: 9/22, 1999.

E. Well Construction completed: 9/23, 1999.

F. Bore hole diameter: 7 inches.

G. Plain Casing: Diameter 2.469 ID 2.875 OD inches. Type of material: PVC Schedule 40.

Wall thickness: 0.203 inch(es). Joints-- Welded Glued Threaded/Other:

Length(s) and placement(s) depth from +3 ft. to 15.3 ft. from _____ ft. to _____ ft.

H. Screen: 2.469 ID 2.875 OD in: type of material PVC Schedule 40

Screen Openings (slot size) 0.010 Trade Name Eagle

Length(s) and placement(s) depth from 15.3 ft. to 25.3 ft. from _____ to _____ ft. guides at 11.3 ft.

I. Gravel pack interval(s) from 12 ft. to 25.6 ft. from _____ ft. to _____ ft. Grade size: 10/20

J. Grouted/Sealed from 0 ft. to 3 ft., with steel cover in concrete
(type)

from 3 ft. to 12 ft., with Hole Plug
(type)

K. Drilling method: Mud Rotary

L. Drilling fluid: Premium Gel

M. Well development technique (total time and method): Air .5hrs

N. Will chemicals, fertilizer or antifreeze be injected or utilized in the system? Yes No

If yes, what will be used:

9. Geologic Materials Logged

Depth in Feet		Description
From	To	
<u>0</u>	<u>6</u>	<u>Sand, fine, some silt</u>
<u>6</u>	<u>28</u>	<u>sand, coarse, some gravel</u>
<u>28</u>	<u>47</u>	<u>silt, sandy, olive, rootlets</u>
<u>47</u>	<u>76</u>	<u>sand, vf-f, some cementation</u>
<u>76</u>	<u>129</u>	<u>sandstone, some sand, vf-f, tan</u>
<u>129</u>	<u>159</u>	<u>sand, silty, some clayey</u>
<u>159</u>	<u>234</u>	<u>sandstone, vf-f, some sand lenses</u>
<u>234</u>	<u>246</u>	<u>clay, silty, sandy</u>
<u>246</u>	<u>256</u>	<u>sandstone, vf-f, rootlets</u>
<u>256</u>	<u>267</u>	<u>sand, vf-f</u>
<u>267</u>	<u>291</u>	<u>sandstone, silty, some silt lenses</u>
<u>291</u>	<u>298</u>	<u>sand, fine</u>

Depth in Feet		Description
From	To	
<u>298</u>	<u>311</u>	<u>sandstone, fine sand, some silt</u>
<u>311</u>	<u>316</u>	<u>sand, vf-f</u>
<u>316</u>	<u>345</u>	<u>sandstone, fine sand, some silt</u>
<u>345</u>	<u>357</u>	<u>sand, f-m</u>
<u>357</u>	<u>381</u>	<u>sand/sandstone, some silt lenses</u>
<u>381</u>	<u>386</u>	<u>clay, silty</u>
<u>386</u>	<u>400</u>	<u>clay shale, dark gray</u>

(Additional sheets may be submitted)

10. I am familiar with the information submitted on this registration, and to the best of my knowledge it is true.

Water Well Contractor's Signature _____

Date _____

Water Well Owner's Signature _____

Date _____

SITE 5-99

TH # 2-08-99

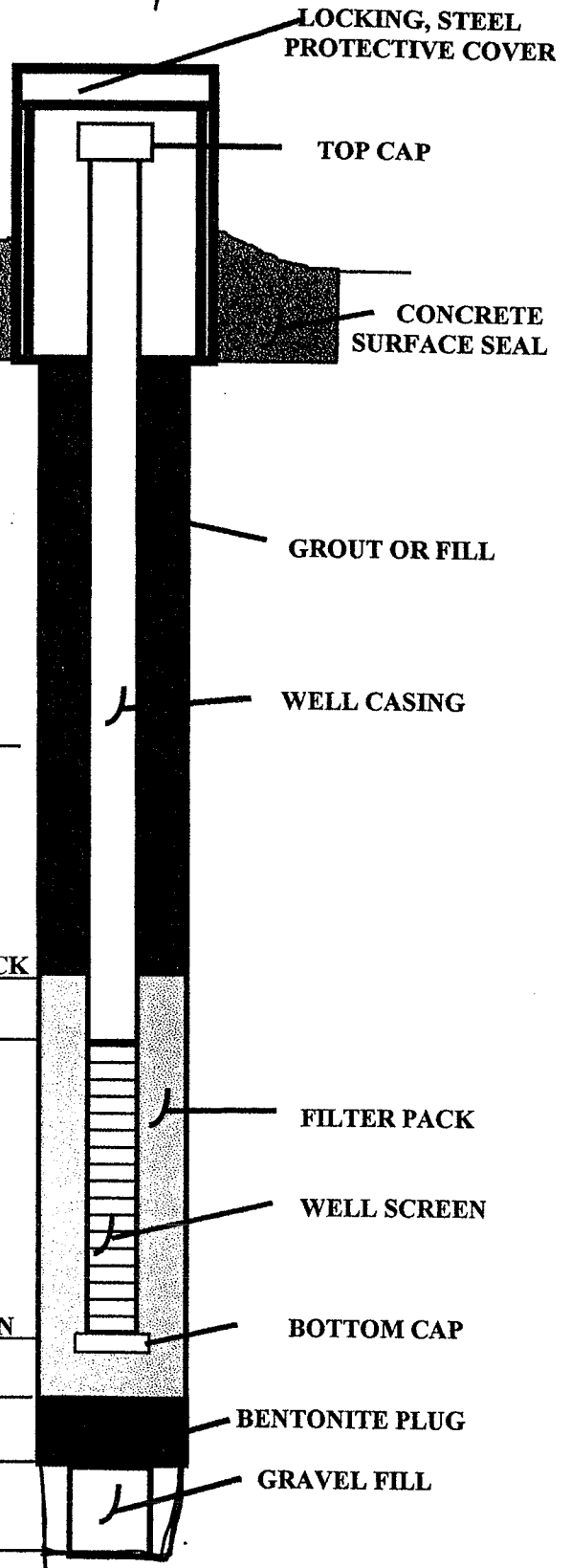
CONSERVATION AND SURVEY DIVISION--UNL

WELL COMPLETION LOG

Project VENRO PII	Well Number 35	Date Drilled 9/22/99	Date Constructed 9/22/99	Ground Elevation 2055(t)
County HOLT	Qtr/Qtr/Qtr NE NE SE	Section 14	Township 29 N	Range 14 W
Drilling Co. SARGENT	Method MUD ROTARY	Driller TRAVIS	Log By JPL	Total Depth 25.6

Borehole Diameter 7 INCH
Survey Reference
Type/Size of Casing 2 1/2" ID SCH40 18 FEET
Type/Size of Screen 2 1/2" ID SCH40 10 FEET
Screen Slot Size 0.010
Filter Pack 20/40 Si Sd 8.5 BAGS
Type/Amount Grout/Fill CHUNK 3.5 BAGS
Type/Amount Seal 1/2 BAG CHUNK BOTTOM

Elevation	Depth From Reference	Description
	2.5	TOP OF CASING
	0	GROUND
	3.0	TOP OF GROUT/FILL
	5.25	WATER LEVEL
	12	TOP OF FILTER PACK
	15.3	TOP OF SCREEN
	25.3	BOTTOM OF SCREEN
	25.6	SEAL TOP
	27.0	SEAL BOTTOM
	28.0	BOREHOLE DEPTH



2639 N 5268W
Developed 5 9/23

STATE OF NEBRASKA
DEPARTMENT OF WATER RESOURCES
WATER WELL REGISTRATION

FOR DEPARTMENT USE ONLY

Registration Date: _____ Sequence No. _____ Registration No. _____
Owner Code No. _____ Receipt No. _____ NRD

1. Well Owner Upper Elkhorn Natural Resource District Telephone Number (402) 336-3867
Address 301 North Harrison
City O'Neill State NE Zip Code 68763 +

2. Drilling Firm Sargent Irrigation Telephone Number (402) 887-4112
Address Box 9 Contractor's License No. 39194
City Neligh State NE Zip Code 68756 +

3. Permit Number(s) _____

4. Purpose of well (indicate one): Dewatering (over 90 days) Domestic Geothermal Ground Heat Exchanger
 Ground Water Source Heat Pump Industrial Injection Irrigation Livestock Monitoring
 Observation Public Water Supply (with spacing (46-638)) Public Water Supply (without spacing) Recovery
 Aquaculture Other
(indicate use)

5. Replacement and abandoned well information.
A. Is this well a replacement well? Yes No
B. Replacement well is _____ feet from abandoned well
C. Original well pump column size: _____ inches.
D. Abandoned well last operated _____
E. Completion of original well abandonment on _____
F. Location of water use of abandoned well:

6. A. Well location: NE 1/4 of the SE 1/4 of Section 14, Township 29 North, Range 14 East West, Holt County.
B. The well is 2639 feet from the North or South section line and 504.6 feet from the East or West section line.
C. Street address or block, lot and subdivision, if applicable: Site UE 5-99; TH 2-UE-99
D. Location of water use, if applicable (give legal descriptions):
E. If for irrigation, the land to be irrigated is _____ acres.
F. Well reference letter(s), if applicable: Well UE #3M (Center)

7. Pump Information.
Is pump installed at this time? Yes No
If yes, complete items A through F.
If no, complete items A and D with estimated information for those wells in which pump will be installed.
A. Actual pumping rate, if applicable: _____ gallons per minute. Measured or Estimated
B. Pump column diameter: _____ inches. C. Length of pump column: _____ feet.
D. Pumping equipment-date installed: _____, _____. E. Brand/Type:
F. Pump installed by: Contractor Owner Pump Installer License No.

8. Well Construction Information.

A. Total well depth: 100 feet.

B. Static water level: 4.0 feet.

C. Pumping water level: _____ feet.
 Estimated or Measured

D. Well Construction began: 9/22, 1999.

E. Well Construction completed: 9/23, 1999.

F. Bore hole diameter: 7 inches.

G. Plain Casing: Diameter 2.469 ID 2.875 OD inches. Type of material: PVC Schedule 40.

Wall thickness: 0.203 inch(es). Joints-- Welded Glued Threaded/Other:

Length(s) and placement(s) depth from +3 ft. to 83.8 ft. from _____ ft. to _____ ft.

H. Screen: 2.469 ID 2.875 OD in: type of material PVC Schedule 40

Screen Openings (slot size) 0.010 Trade Name Eagle

Length(s) and placement(s) depth from 83.8 ft. to 93.8 ft. from _____ to _____ ft. guides at 79.8 ft.

I. Gravel pack interval(s) from 79 ft. to 100 ft. from _____ ft. to _____ ft. Grade size: 20/40

J. Grouted/Sealed from 0 ft. to 3 ft., with steel cover in concrete
(type)

from 3 ft. to 79 ft., with Benseal/EZ mud

(type)

K. Drilling method: Mud Rotary

L. Drilling fluid: Premium Gel

M. Well development technique (total time and method): Air 1.5 hr

N. Will chemicals, fertilizer or antifreeze be injected or utilized in the system? Yes No

If yes, what will be used:

9. Geologic Materials Logged

Depth in Feet		Description
From	To	
<u>0</u>	<u>6</u>	<u>Sand, fine, some silt</u>
<u>6</u>	<u>28</u>	<u>sand, coarse, some gravel</u>
<u>28</u>	<u>47</u>	<u>silt, sandy, olive, rootlets</u>
<u>47</u>	<u>76</u>	<u>sand, vf-f, some cementation</u>
<u>76</u>	<u>129</u>	<u>sandstone, some sand, vf-f, tan</u>
<u>129</u>	<u>159</u>	<u>sand, silty, some clayey</u>
<u>159</u>	<u>234</u>	<u>sandstone, vf-f, some sand lenses</u>
<u>234</u>	<u>246</u>	<u>clay, silty, sandy</u>
<u>246</u>	<u>256</u>	<u>sandstone, vf-f, rootlets</u>
<u>256</u>	<u>267</u>	<u>sand, vf-f</u>
<u>267</u>	<u>291</u>	<u>sandstone, silty, some silt lenses</u>
<u>291</u>	<u>298</u>	<u>sand, fine</u>

Depth in Feet		Description
From	To	
<u>298</u>	<u>311</u>	<u>sandstone, fine sand, some silt</u>
<u>311</u>	<u>316</u>	<u>sand, vf-f</u>
<u>316</u>	<u>345</u>	<u>sandstone, fine sand, some silt</u>
<u>345</u>	<u>357</u>	<u>sand, f-m</u>
<u>357</u>	<u>381</u>	<u>sand/sandstone, some silt lenses</u>
<u>381</u>	<u>386</u>	<u>clay, silty</u>
<u>386</u>	<u>400</u>	<u>clay shale, dark gray</u>

(Additional sheets may be submitted)

10. I am familiar with the information submitted on this registration, and to the best of my knowledge it is true.

Water Well Contractor's Signature

Date

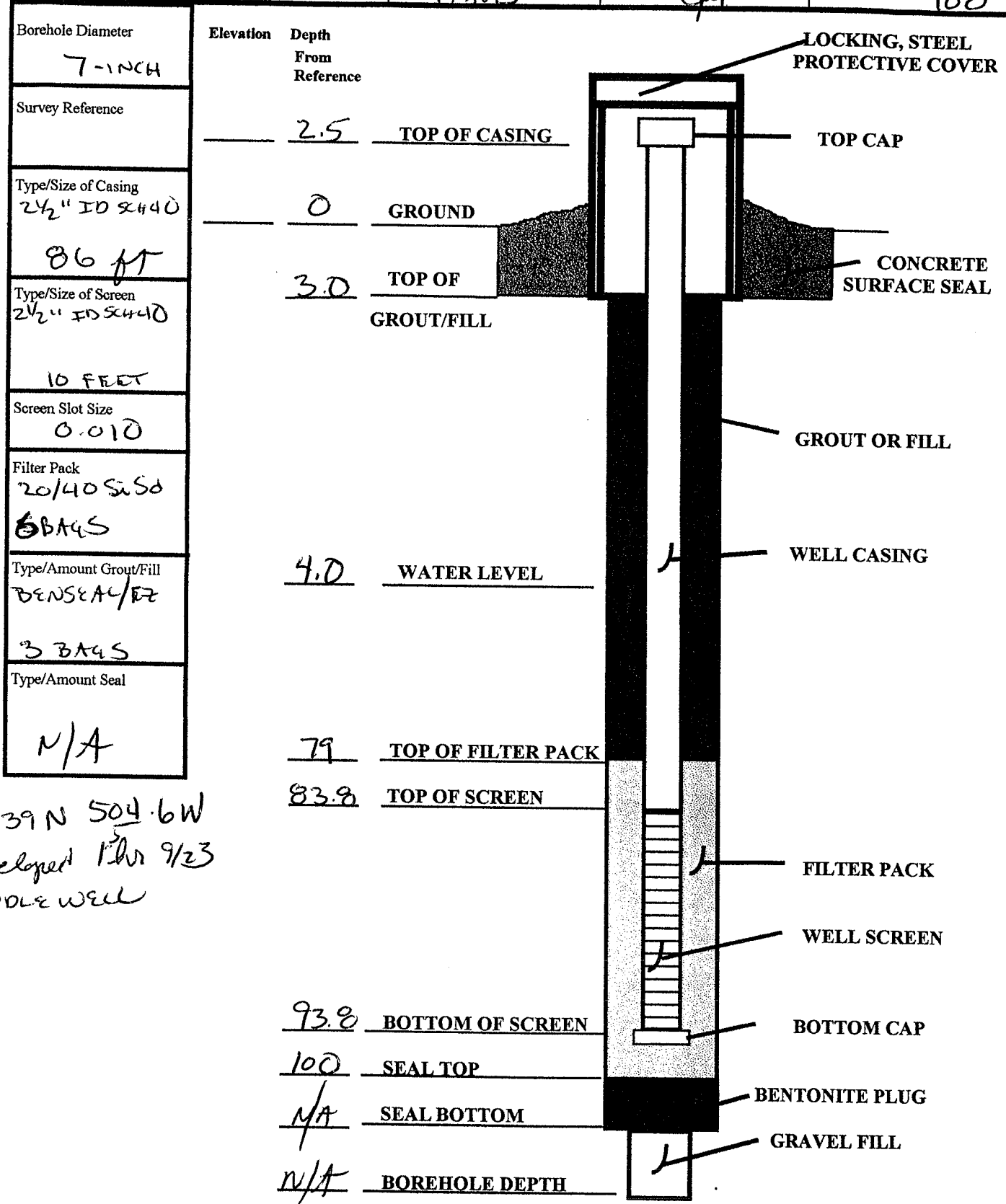
Water Well Owner's Signature

Date

SITE 5-99

TH # 2-08-99

CONSERVATION AND SURVEY DIVISION--UNL			WELL COMPLETION LOG		
Project VENRO PII	Well Number 3M	Date Drilled 9/22/99	Date Constructed 9/22/99	Ground Elevation 2055(±)	
County HOLT	Qtr/Qtr/Qtr NE NE SE	Section 14	Township 29N	Range 14W	
Drilling Co. SARGENT	Method	Driller TRAVIS	Log By epf	Total Depth 100	



2639N 504.6W
Developed 1hr 9/23
MIDDLE WELL

STATE OF NEBRASKA
DEPARTMENT OF WATER RESOURCES
WATER WELL REGISTRATION

FOR DEPARTMENT USE ONLY

Registration Date: _____ Sequence No. _____ Registration No. _____
Owner Code No. _____ Receipt No. _____ NRD

1. Well Owner Upper Elkhorn Natural Resource District Telephone Number (402) 336-3867
Address 301 North Harrison
City O'Neill State NE Zip Code 68763 +

2. Drilling Firm Sargent Irrigation Telephone Number (402) 887-4112
Address Box 9 Contractor's License No. 39194
City Neligh State NE Zip Code 68756 +

3. Permit Number(s)

4. Purpose of well (indicate one): Dewatering (over 90 days) Domestic Geothermal Ground Heat Exchanger
 Ground Water Source Heat Pump Industrial Injection Irrigation Livestock Monitoring
 Observation Public Water Supply (with spacing (46-638)) Public Water Supply (without spacing) Recovery
 Aquaculture Other
(indicate use)

5. Replacement and abandoned well information.
A. Is this well a replacement well? Yes No
C. Replacement well is _____ feet from abandoned well
E. Original well pump column size: _____ inches.
G. Location of water use of abandoned well:
D. Abandoned well last operated _____,
F. Completion of original well abandonment on _____.

5. A. Well location: NE 1/4 of the SE 1/4 of Section 14, Township 29 North, Range 14 East West, Holt County.
B. The well is 2639 feet from the North or South section line and 462 feet from the East or West section line.
C. Street address or block, lot and subdivision, if applicable: Site UE 5-99; TH 2-UE-99
D: Location of water use, if applicable (give legal descriptions):
E. If for irrigation, the land to be irrigated is _____ acres.
F. Well reference letter(s), if applicable: Well UE #3D (East)

7. Pump Information.
Is pump installed at this time? Yes No
If yes, complete items A through F.
If no, complete items A and D with estimated information for those wells in which pump will be installed.
A. Actual pumping rate, if applicable: _____ gallons per minute. Measured or Estimated
B. Pump column diameter: _____ inches. C. Length of pump column: _____ feet.
D. Pumping equipment-date installed: _____, _____. E. Brand/Type:
F. Pump installed by: Contractor Owner Pump Installer License No.

8. Well Construction Information.

A. Total well depth: 221 feet.

B. Static water level: 2.7 feet.

C. Pumping water level: _____ feet.
 Estimated or Measured

D. Well Construction began: 9/21, 1999.

E. Well Construction completed: 9/22, 1999.

F. Bore hole diameter: 7 inches.

G. Plain Casing: Diameter 2.469 ID

2.875 OD inches.

Type of material: PVC Schedule 40.

Wall thickness: 0.203 inch(es).

Joints-- Welded Glued Threaded/Other:

Length(s) and placement(s) depth from +3 ft

, to 210.2 ft.

from _____ ft. to _____ ft.

H. Screen: 2.469 ID 2.875 OD in:

type of material PVC Schedule 40

Screen Openings (slot size) 0.010

Trade Name Eagle

Length(s) and placement(s) depth from 210.2 ft

to 220.2 ft.

from _____ to _____ ft.

guides at 606.2 ft.

I. Gravel pack interval(s) from 207.5 ft. to 221 ft.

from _____ ft. to _____ ft.

Grade size: 10/20

J. Grouted/Sealed from 0 ft. to 3 ft.,

with steel cover in concrete
(type)

from 3 ft. to 207.5 ft.,

with Benseal/EZ mud
(type)

K. Drilling method: Mud Rotary

L. Drilling fluid: Premium Gel

M. Well development technique (total time and method): Air 1 hr

N. Will chemicals, fertilizer or antifreeze be injected or utilized in the system?

Yes No

If yes, what will be used:

9. Geologic Materials Logged

Depth in Feet		Description
From	To	
<u>0</u>	<u>6</u>	<u>Sand, fine, some silt</u>
<u>5</u>	<u>28</u>	<u>sand, coarse, some gravel</u>
<u>28</u>	<u>47</u>	<u>silt, sandy, olive, rootlets</u>
<u>47</u>	<u>76</u>	<u>sand, vf-f, some cementation</u>
<u>76</u>	<u>129</u>	<u>sandstone, some sand, vf-f, tan</u>
<u>129</u>	<u>159</u>	<u>sand, silty, some clayey</u>
<u>159</u>	<u>234</u>	<u>sandstone, vf-f, some sand lenses</u>
<u>234</u>	<u>246</u>	<u>clay, silty, sandy</u>
<u>246</u>	<u>256</u>	<u>sandstone, vf-f, rootlets</u>
<u>256</u>	<u>267</u>	<u>sand, vf-f</u>
<u>267</u>	<u>291</u>	<u>sandstone, silty, some silt lenses</u>
<u>291</u>	<u>298</u>	<u>sand, fine</u>

Depth in Feet		Description
From	To	
<u>298</u>	<u>311</u>	<u>sandstone, fine sand, some silt</u>
<u>311</u>	<u>316</u>	<u>sand, vf-f</u>
<u>316</u>	<u>345</u>	<u>sandstone, fine sand, some silt</u>
<u>345</u>	<u>357</u>	<u>sand, f-m</u>
<u>357</u>	<u>381</u>	<u>sand/sandstone, some silt lenses</u>
<u>381</u>	<u>386</u>	<u>clay, silty</u>
<u>386</u>	<u>400</u>	<u>clay shale, dark gray</u>

(Additional sheets may be submitted)

10. I am familiar with the information submitted on this registration, and to the best of my knowledge it is true.

Water Well Contractor's Signature

Date

Water Well Owner's Signature

Date

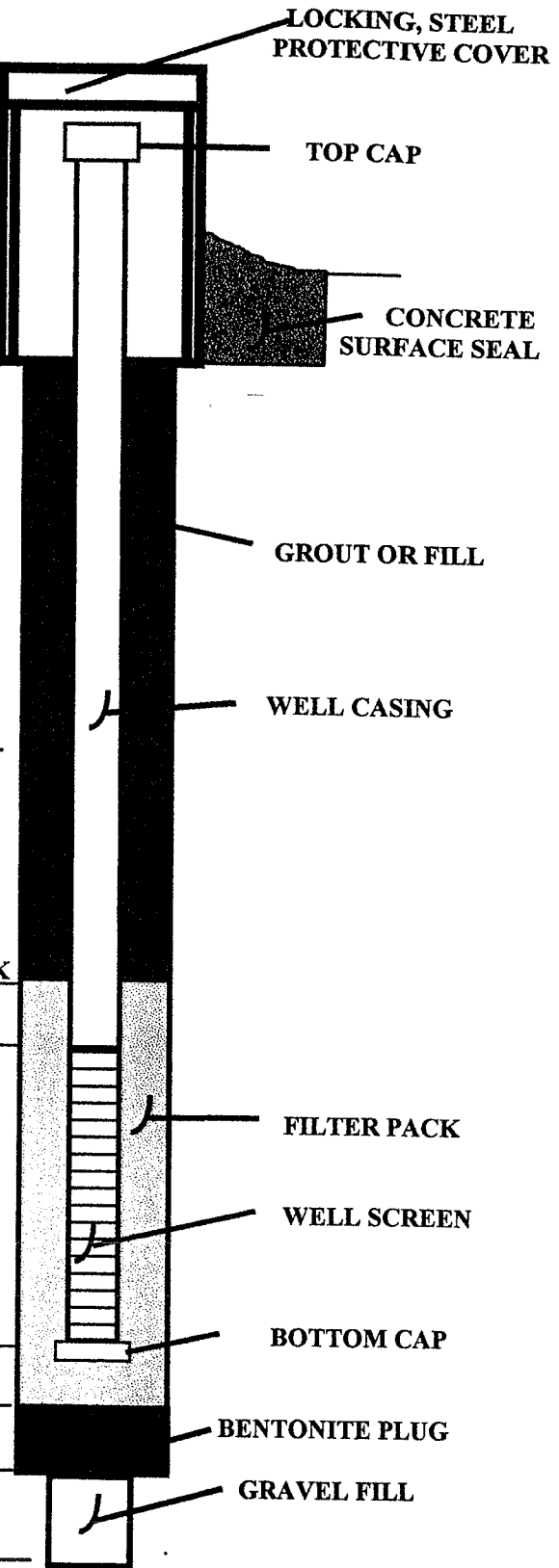
SITE 5-99

TH # 2-0E-99

CONSERVATION AND SURVEY DIVISION--UNL			WELL COMPLETION LOG		
Project UEWNO PII	Well Number 3D	Date Drilled 9/21/99	Date Constructed 9/22/99	Ground Elevation 2053(4)	
County HOLT	Qtr/Qtr/Qtr NE NE SE	Section 14	Township 29N	Range 14W	
Drilling Co. SARGENT	Method MUD ROTARY	Driller TRAVIS	Log By JCL	Total Depth 221	

Borehole Diameter 7-INCH
Survey Reference
Type/Size of Casing 2 1/2" ID PVC SCH 40 2 12.67 ft
Type/Size of Screen 2 1/2" ID SCH 40 10 ft
Screen Slot Size 8.010
Filter Pack 10/20 SAND 6 1/4 BAGS
Type/Amount Grout/Fill BENSAT/EZ-MUD 10 BAGS
Type/Amount Seal 2 BAGS CHUNK BOTTOM

Elevation	Depth From Reference	
2.4		TOP OF CASING
0		GROUND
		TOP OF GROUT/FILL
2.7		WATER LEVEL
207.5		TOP OF FILTER PACK
210.2		TOP OF SCREEN
220.2		BOTTOM OF SCREEN
221		SEAL TOP
226		SEAL BOTTOM
400		BOREHOLE DEPTH



2639N 462W
EAST WELL
Developed 1 hr 9/22
Natural fill 97-100 ft

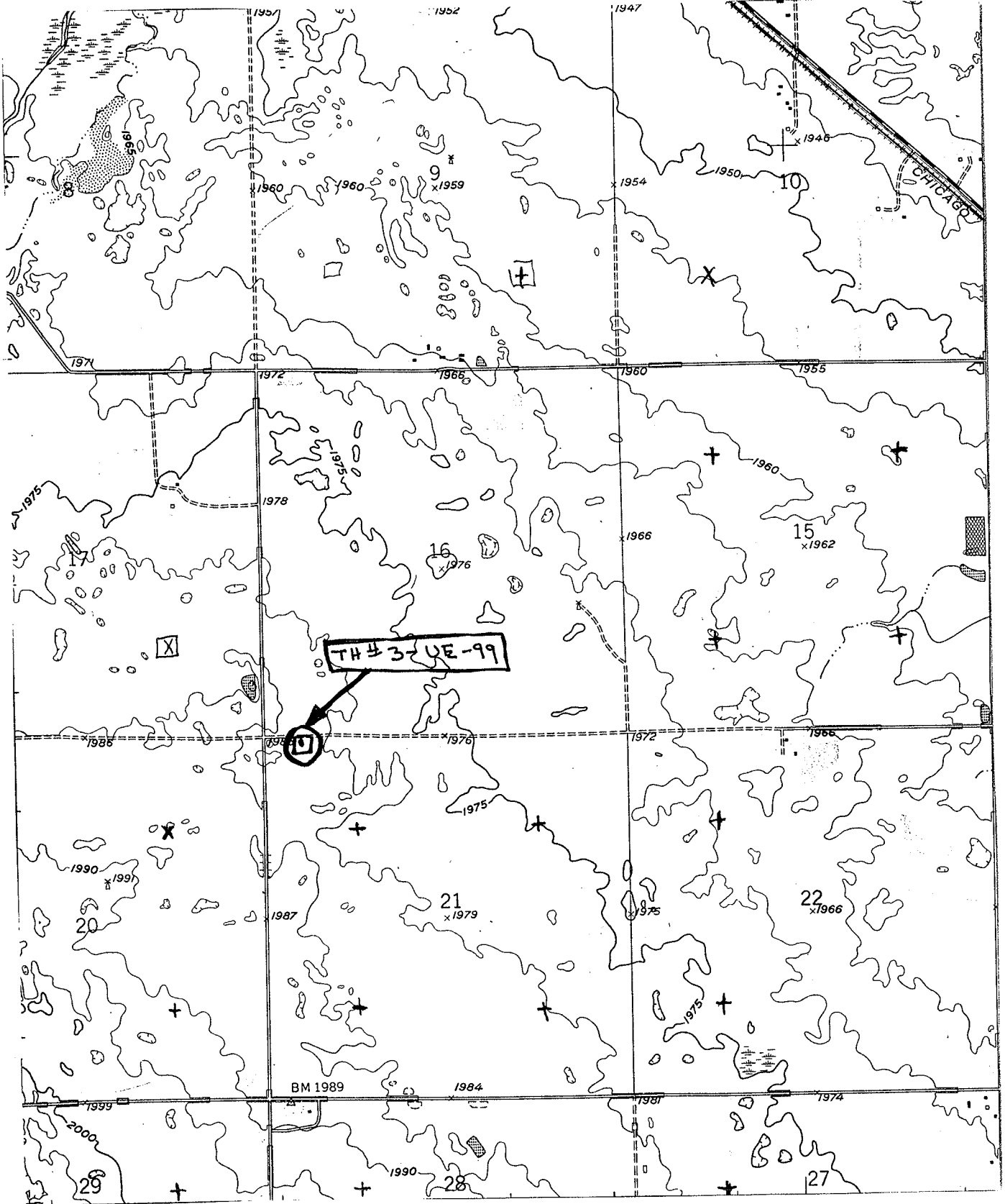
Number 4 Wells



HOLT COUNTY

TH # 3-UE-99

#4 WELLS



T 28N, R 11W, SECTION 21 NW

INMAN QUAD

Test Hole #3-UE-99
(28N-11W-21bbba)
Holt County

Location: NE NW NW NW Sec. 21, T. 28 N., R. 11 W., approximately
86.5 ft south and 540 ft east of northwest corner.

Ground elevation: 1,983 ft (t) (Inman, 7.5 min. quadrangle)

Depth to water: 4.5 ft (9-29-99)

	Depth, in feet	
	From	To
Quaternary System, undifferentiated:		
Top soil: no sample.....	0.0	0.6
Sand, tan; very fine to fine, some medium to coarse.....	0.6	5.0
Silt, slightly clayey, slightly sandy, light gray; sand is very fine.....	5.0	12.0
Sand, tan; very fine to coarse, some very coarse.....	12.0	15.0
Silt, slightly clayey, sandy, light brown; sand is very fine.....	15.0	20.0
Sand, tan; very fine to coarse, some very coarse, contains rare gravel below 30 ft...	20.0	32.5
Tertiary System - Miocene Series - Ogallala Group:		
Silt, very sandy, moderately clayey, light olive; sand is very fine; contains less clay below 40 ft.....	32.5	45.0
Sand, silty to silt, sandy, light olive; sand is very fine; contains rootlets and little sandstone; moderately calcareous; indurated from 57 to 58 ft; below 65 ft slightly calcareous.....	45.0	67.0
Silt, moderately sandy, moderately clayey, light olive; sand is very fine.....	67.0	70.0
Sand, clayey, silty, light olive; sand is very fine.....	70.0	75.0
Silty sand to sandy silt, clayey, light olive; sand is very fine; contains trace of rootlets; below 80 ft some sandstone.....	75.0	90.0
Sand to sandstone; silty, light olive; sand is very fine to fine; contains rootlets.....	90.0	95.0
Sandstone, light olive; sand is very fine to fine, contains rootlets; below 115 ft slightly silty.....	95.0	125.0
Sandstone, light olive; sand is very fine to fine; contains rootlets.....	125.0	139.0
Silt, very sandy, slightly clayey, light		

olive; sand is very fine.....	139.0	145.0
Sand to sandstone, light olive; sand is very fine to fine; contains rootlets.....	145.0	150.0
Silt, very sandy, slightly clayey, light olive; sand is very fine to fine; below 154 ft slightly more clayey.....	150.0	156.0
Sand to sandstone, light brown; sand is very fine to fine; below 160 ft moderately calcareous.....	156.0	169.0
Sand to sandstone, moderately silty, clayey, light olive; sand is very fine to fine.....	169.0	182.0
Sandstone, slightly silty, light olive; sand is very fine to fine.....	182.0	189.0
Silt, very clayey, very sandy, light olive; sand is very fine to fine; slightly less clayey below 200 ft.....	189.0	203.0
Silt, moderately clayey, very sandy, light olive; sand is very fine to fine; below 205 ft contains some sandstone.....	203.0	209.0
Silt, very sandy, moderately clayey, light olive; sand is very fine to fine; contains interbedded sandstone.....	209.0	225.0
Sand to sandstone, light olive; sand is very fine to fine.....	225.0	230.0
Silt, moderately clayey, moderately sandy to very sandy, light olive; sand is very fine to fine; below 235 ft slightly less clayey.	230.0	245.0
Sand, light olive; very fine to fine; contains sandstone and reworked clay fragments.....	245.0	251.0
Silty sand and sandy silt, very clayey, pale yellow; sand is very fine.....	251.0	257.0
Sand to sandstone, pale yellow to light brown; sand is very fine with little fine; from 269 to 275 ft trace of silt fragments; below 282 ft silty.....	257.0	285.0
Silt, very sandy, very clayey, pale yellow; sand is very fine, little fine.....	285.0	300.0
Sand to sandstone, very silty, light brown with olive tint; sand is very fine with some fine.....	300.0	308.0
Silt, very sandy, very clayey, pale yellow; sand is very fine, little fine.....	308.0	319.0
Sand to silty sand, slightly clayey, pale yellow; sand is very fine, little fine; below 329 ft moderately clayey.....	319.0	334.0
Sand to sandstone, pale yellow; very fine to fine; contains trace of rootlets.....	334.0	346.0

Sand to sandstone, silty, pale yellow; sand is very fine to fine; contains rare rootlets.....	346.0	354.0
Silty sand to sandy silt, moderately clayey, pale olive; sand is very fine, little fine; below 363 ft less silty; trace claystones..	354.0	375.0
Sand to sandstone, silty, pale olive; sand is very fine, some fine; below 395 ft contains reworked rootlets, green claystone fragments.....	375.0	402.0
Silt, moderately sandy, moderately clayey, brown; sand is very fine, little fine; below 410 ft contains reworked bentonitic clay and shale fragments.....	402.0	420.0
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clayey, gray with some yellow stain; from 425 to 435 ft gray to olive gray, little dark gray.....	420.0	435.0
Shale, clayey, olive gray to black.....	435.0	440.0



Century GEOPHYSICAL CORP.

3-UE-99

COMPANY : Sargent
WELL : 3-UE-99
LOCATION/FIELD : Site 2
COUNTY : HOLT
STATE : NE
SECTION : 21

OTHER SERVICES:

up2
None
None

TOWNSHIP : 28 RANGE : 11w

DATE : 09/23/99
DEPTH DRILLER : 440
LOG BOTTOM : 440.77
LOG TOP : 2.65

PERMANENT DATUM : None

KB : None

DF : None

GL : 1983

LOG MEASURED FROM: grd=0

DRL MEASURED FROM:

CASING DIAMETER : 0
CASING TYPE : None
CASING THICKNESS: 0

LOGGING UNIT : 208A

FIELD OFFICE : Norfolk

RECORDED BY : Sol

BIT SIZE : 5
MAGNETIC DECL. : 0
MATRIX DENSITY : 2.71
NEUTRON MATRIX : Dolomite

BOREHOLE FLUID : 0

RM : 0

RM TEMPERATURE : 0

MATRIX DELTA T : 54

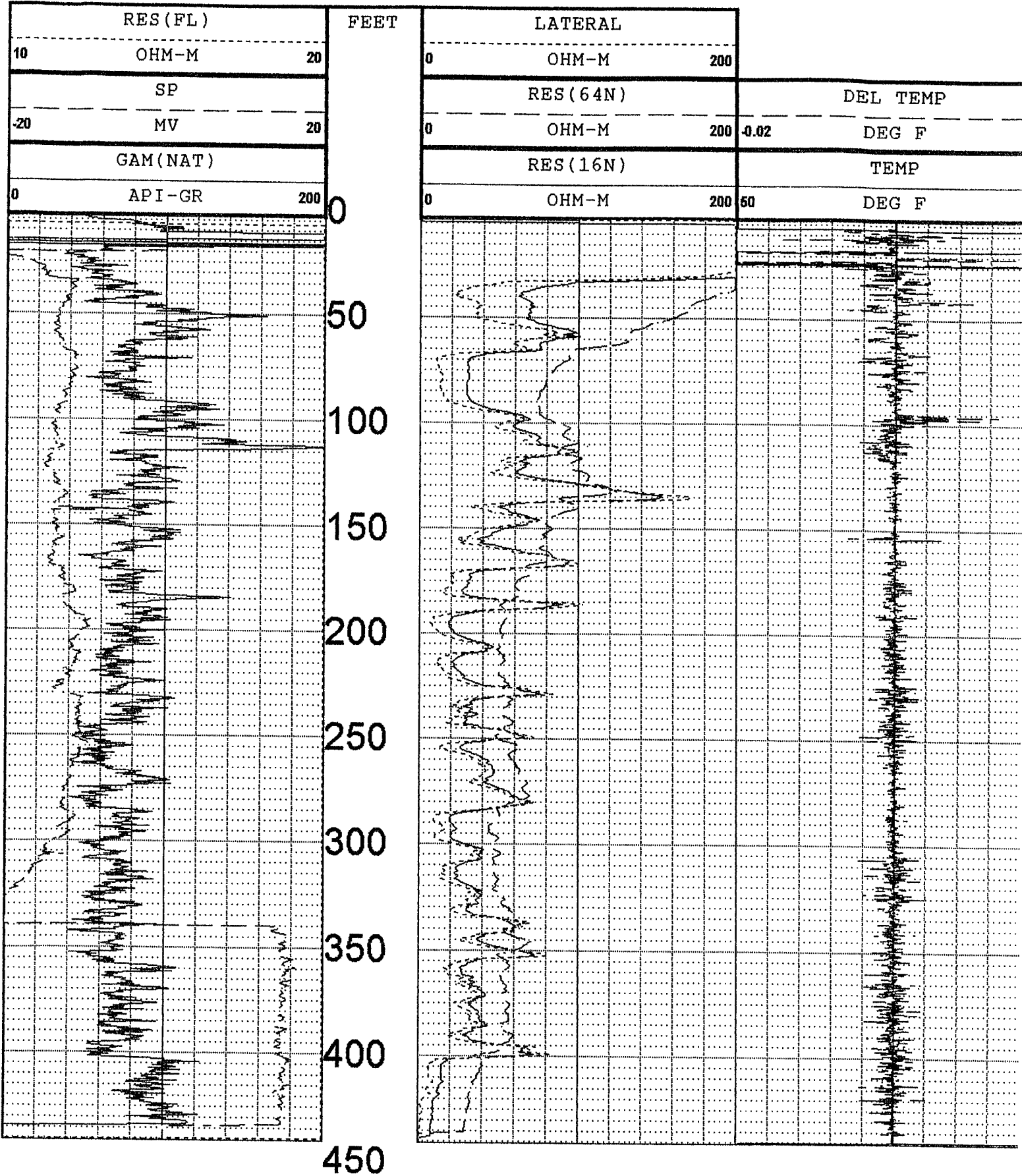
FILE : ORIGINAL

TYPE : 8043A

THRESH: 2500

Inman Quad
Wells 4S, 4M, 4D (UE)

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS



11-W

NOT TO SCALE
TH 3-UE-99 Site 2-99

HOLT CO. 1988
T-28-N R-11-W 25

PHOTO U20
SEC. 21



1596 5250 6742
 3 139.2 4 131.8
 1596 5250 6742

STATE OF NEBRASKA
DEPARTMENT OF WATER RESOURCES
WATER WELL REGISTRATION

FOR DEPARTMENT USE ONLY

Registration Date: _____ Sequence No. _____ Registration No. _____
Owner Code No. _____ Receipt No. _____ NRD

1. Well Owner Upper Elkhorn Natural Resource District Telephone Number (402) 336-3867
Address 301 North Harrison
City O'Neill State NE Zip Code 68763 +

2. Drilling Firm Sargent Irrigation Telephone Number (402) 887-4112
Address Box 9 Contractor's License No. 39194
City Neligh State NE Zip Code 68756 +

3. Permit Number(s)

4. Purpose of well (indicate one): Dewatering (over 90 days) Domestic Geothermal Ground Heat Exchanger
 Ground Water Source Heat Pump Industrial Injection Irrigation Livestock Monitoring
 Observation Public Water Supply (with spacing (46-638)) Public Water Supply (without spacing) Recovery
 Aquaculture Other
(indicate use)

5. Replacement and abandoned well information.

- A. Is this well a replacement well? Yes No D. Abandoned well last operated _____,
C. Replacement well is _____ feet from abandoned well F. Completion of original well abandonment on _____,
E. Original well pump column size: _____ inches.
G. Location of water use of abandoned well:

6. A. Well location: NW 1/4 of the NW 1/4 of Section 21, Township 28 North, Range 11 East West, Holt County.
B. The well is 97.5 feet from the North or South section line and 474 feet from the East or West section line.
C. Street address or block, lot and subdivision, if applicable: Site UE 2-99; TH 3-UE-99
D: Location of water use, if applicable (give legal descriptions):
E. If for irrigation, the land to be irrigated is _____ acres.
F. Well reference letter(s), if applicable: Well UE #4S (West)

7. Pump Information.

Is pump installed at this time? Yes No
If yes, complete items A through F.
If no, complete items A and D with estimated information for those wells in which pump will be installed.
A. Actual pumping rate, if applicable: _____ gallons per minute. Measured or Estimated
B. Pump column diameter: _____ inches. C. Length of pump column: _____ feet.
D. Pumping equipment-date installed: _____, _____. E. Brand/Type:
F. Pump installed by: Contractor Owner Pump Installer License No.

SITE # 2-99

TH # 3-UE-99

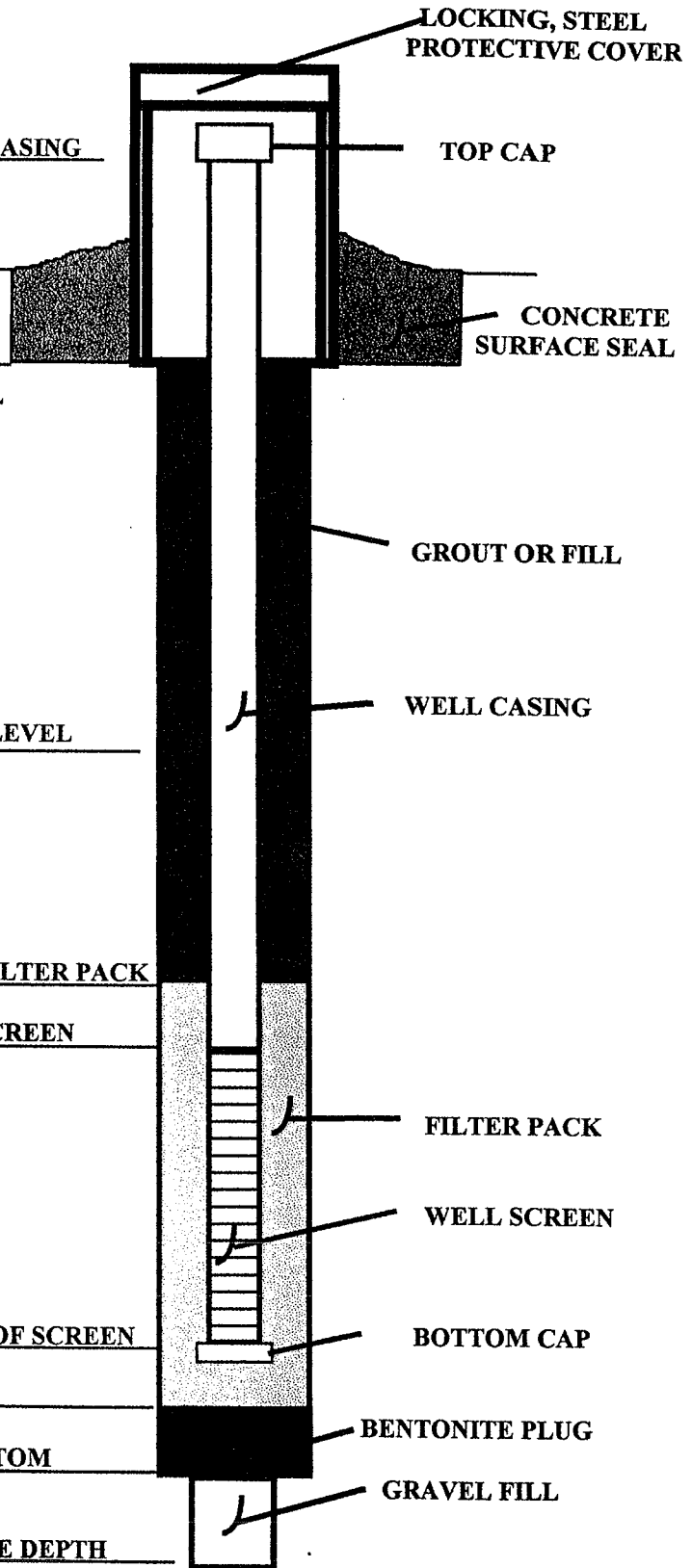
CONSERVATION AND SURVEY DIVISION--UNL

WELL COMPLETION LOG

Project VENRD PII	Well Number 45	Date Drilled 9/24/99	Date Constructed 9/24/99	Ground Elevation 1983 (t)
County HOLT	Qtr/Qtr/Qtr NWNW NW	Section 21	Township 78	Range 11 W
Drilling Co. SARGENT	Method MUD ROTARY	Driller TRAVIS	Log By <i>Gal</i>	Total Depth 33

Borehole Diameter 7-INCH
Survey Reference
Type/Size of Casing 2 1/2" ID SCH 40
25 FEET
Type/Size of Screen 2 1/2" ID SCH 40
10 FEET
Screen Slot Size 0.010
Filter Pack 20/40
7 1/2 BAGS
Type/Amount Grout/Fill 6 BAGS
CHUNK
Type/Amount Seal BOTTOM N/A

Elevation	Depth From Reference
<u>2.5</u>	<u>TOP OF CASING</u>
<u>0</u>	<u>GROUND</u>
<u>3.0</u>	<u>TOP OF GROUT/FILL</u>
<u>4.5</u>	<u>WATER LEVEL</u>
<u>20.0</u>	<u>TOP OF FILTER PACK</u>
<u>22.25</u>	<u>TOP OF SCREEN</u>
<u>32.25</u>	<u>BOTTOM OF SCREEN</u>
<u>33</u>	<u>SEAL TOP</u>
<u>N/A</u>	<u>SEAL BOTTOM</u>
<u>N/A</u>	<u>BOREHOLE DEPTH</u>



97.5 S 474 E
1 HOUR DEVELOPED
WEST WELL

STATE OF NEBRASKA
DEPARTMENT OF WATER RESOURCES
WATER WELL REGISTRATION

FOR DEPARTMENT USE ONLY

Registration Date: _____ Sequence No. _____ Registration No. _____
Owner Code No. _____ Receipt No. _____ NRD

1. Well Owner Upper Elkhorn Natural Resource District Telephone Number (402) 336-3867
Address 301 North Harrison
City O'Neill State NE Zip Code 68763 +

2. Drilling Firm Sargent Irrigation Telephone Number (402) 887-4112
Address Box 9 Contractor's License No. 39194
City Neligh State NE Zip Code 68756 +

3. Permit Number(s)

4. Purpose of well (indicate one): Dewatering (over 90 days) Domestic Geothermal Ground Heat Exchanger
 Ground Water Source Heat Pump Industrial Injection Irrigation Livestock Monitoring
 Observation Public Water Supply (with spacing (46-638)) Public Water Supply (without spacing) Recovery
 Aquaculture Other
(indicate use)

5. Replacement and abandoned well information.

- A. Is this well a replacement well? Yes No D. Abandoned well last operated _____,
C. Replacement well is _____ feet from abandoned well F. Completion of original well abandonment on _____,
E. Original well pump column size: _____ inches.
G. Location of water use of abandoned well:

5. A. Well location: NW 1/4 of the NW 1/4 of Section 21, Township 28 North, Range 11 East West, Holt County.
B. The well is 97.5 feet from the North or South section line and 503 feet from the East or West section line.
C. Street address or block, lot and subdivision, if applicable: Site UE 2-99; TH 3-UE-99
D: Location of water use, if applicable (give legal descriptions):
E. If for irrigation, the land to be irrigated is _____ acres.
F. Well reference letter(s), if applicable: Well UE #4M (Center)

7. Pump Information.

Is pump installed at this time? Yes No

If yes, complete items A through F.

If no, complete items A and D with estimated information for those wells in which pump will be installed.

- A. Actual pumping rate, if applicable: _____ gallons per minute. Measured or Estimated
B. Pump column diameter: _____ inches. C. Length of pump column: _____ feet.
D. Pumping equipment-date installed: _____, _____ E. Brand/Type: _____
F. Pump installed by: Contractor Owner Pump Installer License No. _____

8. Well Construction Information.

A. Total well depth: 109 feet.

B. Static water level: 4.8 feet.

C. Pumping water level: _____ feet.
 Estimated or Measured

D. Well Construction began: 9/24, 1999.

E. Well Construction completed: 9/27, 1999.

F. Bore hole diameter: 7 inches.

G. Plain Casing: Diameter 2.469 ID 2.875 OD inches. Type of material: PVC Schedule 40.

Wall thickness: 0.203 inch(es). Joints-- Welded Glued Threaded/Other:

Length(s) and placement(s) depth from +3 ft. to 97.8 ft. from _____ ft. to _____ ft.

H. Screen: 2.469 ID 2.875 OD in: type of material PVC Schedule 40

Screen Openings (slot size) 0.010 Trade Name Eagle

Length(s) and placement(s) depth from 97.8 ft. to 107.8 ft. from _____ to _____ ft. guides at 93.7 ft.

I. Gravel pack interval(s) from 94 ft. to 109 ft. from _____ ft. to _____ ft. Grade size: 10/20

J. Grouted/Sealed from 0 ft. to 3 ft., with steel cover in concrete (type)

from 3 ft. to 94 ft., with Benseal/EZ mud (type)

K. Drilling method: Mud Rotary

L. Drilling fluid: Premium Gel

M. Well development technique (total time and method): Air 1 hr

N. Will chemicals, fertilizer or antifreeze be injected or utilized in the system? Yes No

If yes, what will be used:

9. Geologic Materials Logged

Depth in Feet		Description
From	To	
<u>0</u>	<u>5</u>	<u>Sand, vf-f, some medium</u>
<u>5</u>	<u>12</u>	<u>clay, silty, light tan</u>
<u>12</u>	<u>15</u>	<u>sand, coarse, some fine</u>
<u>15</u>	<u>20</u>	<u>clay, silty to sandy, light brown</u>
<u>20</u>	<u>33</u>	<u>sand & gravel, coarse sand to fine gravel</u>
<u>33</u>	<u>51</u>	<u>silt, sandy, olive, rootlets</u>
<u>51</u>	<u>66</u>	<u>sand/sandstone, vf-f, olive</u>
<u>66</u>	<u>91</u>	<u>silt, sandy, some sand lenses</u>
<u>91</u>	<u>137</u>	<u>sandstone/sand, vf-f, some silt lenses</u>
<u>137</u>	<u>142</u>	<u>silt, sandy, very clayey</u>
<u>142</u>	<u>154</u>	<u>sandstone, vf-f</u>
<u>154</u>	<u>157</u>	<u>silt, sandy</u>

Depth in Feet		Description
From	To	
<u>157</u>	<u>257</u>	<u>sandstone/sand, some siltstone & silt</u>
<u>257</u>	<u>284</u>	<u>sand, vf-f</u>
<u>284</u>	<u>320</u>	<u>clay, silty, sandy, sand lenses</u>
<u>320</u>	<u>402</u>	<u>sand/sandstone, silty, vf-f</u>
<u>402</u>	<u>420</u>	<u>siltstone, sandy, clayey, red-brown</u>
<u>420</u>	<u>435</u>	<u>clay, shaley, yellow</u>
<u>435</u>	<u>440</u>	<u>shale, clayey, dark gray</u>

(Additional sheets may be submitted)

10. I am familiar with the information submitted on this registration, and to the best of my knowledge it is true.

Water Well Contractor's Signature

Date

Water Well Owner's Signature

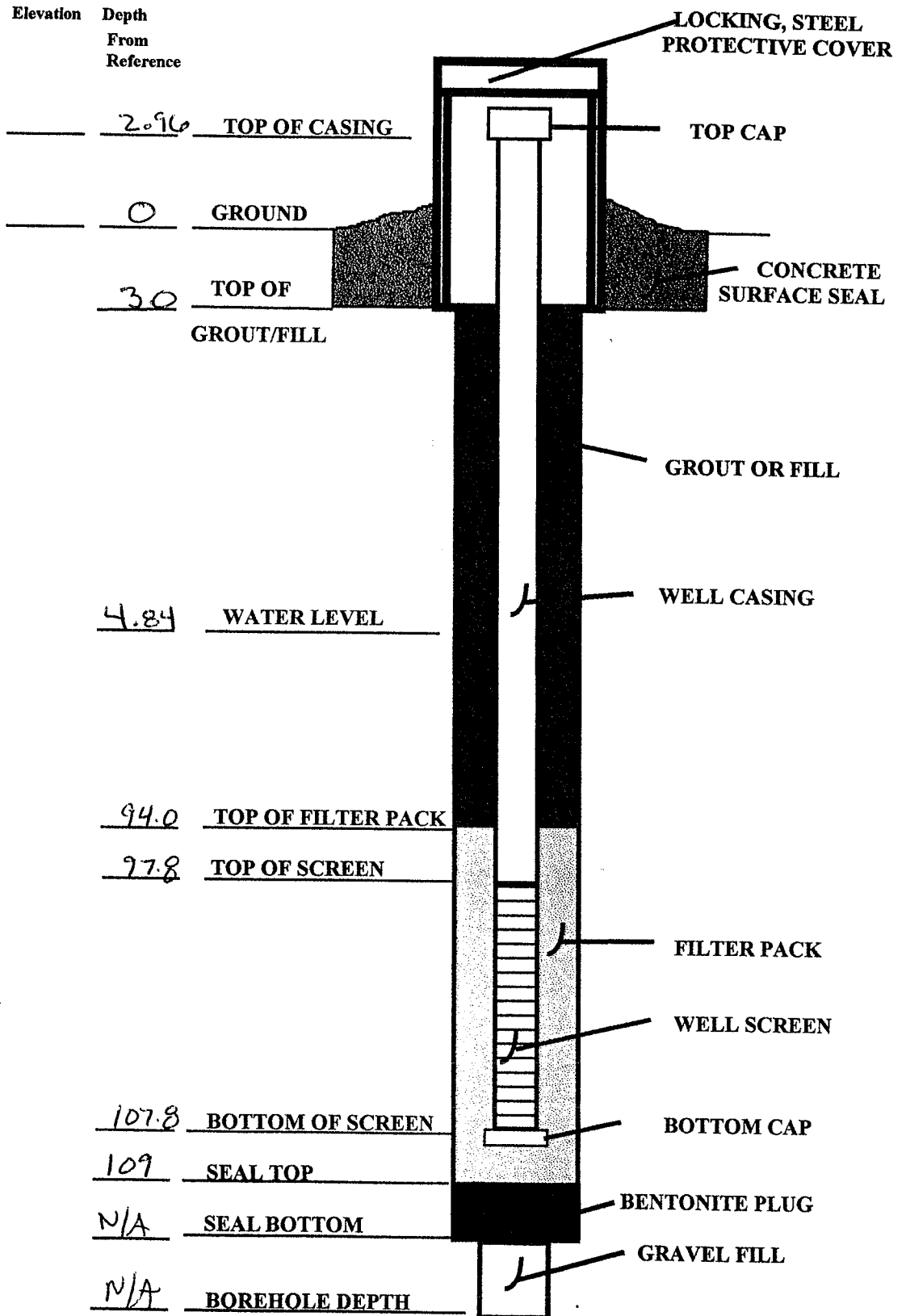
Date

CONSERVATION AND SURVEY DIVISION--UNL

WELL COMPLETION LOG

Project VENRO PII	Well Number 4M	Date Drilled 9/24/99	Date Constructed 9/24/99	Ground Elevation 1983(±)
County HOLT	Qtr/Qtr/Qtr NW NW NW	Section 21	Township 28 N	Range 11 W
Drilling Co. SARGENT	Method MUD ROTARY	Driller TRANS	Log By dal	Total Depth 109

Borehole Diameter 7-INCH
Survey Reference
Type/Size of Casing 2 1/2" ID SCH 40
107 FEET
Type/Size of Screen 2 1/2" ID SCH 40
10 FEET
Screen Slot Size 0.010
Filter Pack 20/40
7 BAGS
Type/Amount Grout/Fill BENSEAL/EZ-MUD
5 BAGS
Type/Amount Seal BOTTOM N/A



97.5 S 503 E
Developed 1 hr
CENTER WELL

STATE OF NEBRASKA
DEPARTMENT OF WATER RESOURCES
WATER WELL REGISTRATION

FOR DEPARTMENT USE ONLY

Registration Date: _____ Sequence No. _____ Registration No. _____
Owner Code No. _____ Receipt No. _____ NRD

1. Well Owner Upper Elkhorn Natural Resource District Telephone Number (402) 336-3867
Address 301 North Harrison
City O'Neill State NE Zip Code 68763 +

2. Drilling Firm Sargent Irrigation Telephone Number (402) 887-4112
Address Box 9 Contractor's License No. 39194
City Neligh State NE Zip Code 68756 +

3. Permit Number(s)

4. Purpose of well (indicate one): Dewatering (over 90 days) Domestic Geothermal Ground Heat Exchanger
 Ground Water Source Heat Pump Industrial Injection Irrigation Livestock Monitoring
 Observation Public Water Supply (with spacing (46-638)) Public Water Supply (without spacing) Recovery
 Aquaculture Other
(indicate use)

5. Replacement and abandoned well information.

- A. Is this well a replacement well? Yes No
- B. Abandoned well last operated _____,
- C. Replacement well is _____ feet from abandoned well
- D. Completion of original well abandonment on _____,
- E. Original well pump column size: _____ inches.
- F. Location of water use of abandoned well:

6. A. Well location: NW 1/4 of the NW 1/4 of Section 21, Township 28 North, Range 11 East West, Holt County.
B. The well is 86.5 feet from the North or South section line and 540 feet from the East or West section line.
C. Street address or block, lot and subdivision, if applicable: Site UE-2-99; TH 3-UE-99
D: Location of water use, if applicable (give legal descriptions):
E. If for irrigation, the land to be irrigated is _____ acres.
F. Well reference letter(s), if applicable: Well UE #4D (East)

7. Pump Information.

Is pump installed at this time? Yes No
If yes, complete items A through F.
If no, complete items A and D with estimated information for those wells in which pump will be installed.
A. Actual pumping rate, if applicable: _____ gallons per minute. Measured or Estimated
B. Pump column diameter: _____ inches. C. Length of pump column: _____ feet.
D. Pumping equipment-date installed: _____, _____. E. Brand/Type:
F. Pump installed by: Contractor Owner Pump Installer License No.

8. Well Construction Information.

A. Total well depth: 270 feet.

B. Static water level: 4.2 feet.

C. Pumping water level: _____ feet.
 Estimated or Measured

D. Well Construction began: 9/23, 1999.

E. Well Construction completed: 9/27, 1999.

F. Bore hole diameter: 7 inches.

G. Plain Casing: Diameter 2.469 ID

2.875 OD inches.

Type of material: PVC Schedule 40.

Wall thickness: 0.203 inch(es).

Joints-- Welded Glued Threaded/Other:

Length(s) and placement(s) depth from

+3 ft

. to 258.3 ft.

from _____ ft.

to _____ ft.

H. Screen: 2.469 ID 2.875 OD in:

type of material PVC Schedule 40

Screen Openings (slot size) 0.010

Trade Name Eagle

Length(s) and placement(s) depth from

258.3 ft

to 268.3 ft.

from _____ to _____ ft.

guides at 254.3 ft.

I. Gravel pack interval(s) from 256.3 ft. to 270 ft.

from _____ ft. to _____ ft.

Grade size: 10/20

J. Grouted/Sealed from 0 ft. to 3 ft.,

with steel cover in concrete

(type)

from 3 ft. to 256.3 ft.,

with Benseal/EZ Mud

(type)

K. Drilling method: Mud Rotary

L. Drilling fluid: Premium Gel

M. Well development technique (total time and method): Air (1 hr)

N. Will chemicals, fertilizer or antifreeze be injected or utilized in the system?

Yes No

If yes, what will be used:

9. Geologic Materials Logged

Depth in Feet		Description
From	To	
<u>0</u>	<u>5</u>	<u>Sand, vf-f, some medium</u>
<u>5</u>	<u>12</u>	<u>clay, silty, light tan</u>
<u>12</u>	<u>15</u>	<u>sand, coarse, some fine</u>
<u>15</u>	<u>20</u>	<u>clay, silty to sandy, light brown</u>
<u>20</u>	<u>33</u>	<u>sand & gravel, coarse sand to fine gravel</u>
<u>33</u>	<u>51</u>	<u>silt, sandy, olive, rootlets</u>
<u>51</u>	<u>66</u>	<u>sand/sandstone, vf-f, olive</u>
<u>66</u>	<u>91</u>	<u>silt, sandy, some sand lenses</u>
<u>91</u>	<u>137</u>	<u>sandstone/sand, vf-f, some silt lenses</u>
<u>137</u>	<u>142</u>	<u>silt, sandy, very clayey</u>
<u>142</u>	<u>154</u>	<u>sandstone, vf-f</u>
<u>154</u>	<u>157</u>	<u>silt, sandy</u>

Depth in Feet		Description
From	To	
<u>157</u>	<u>257</u>	<u>sandstone/sand, some siltstone & silt</u>
<u>257</u>	<u>284</u>	<u>sand, vf-f</u>
<u>284</u>	<u>320</u>	<u>clay, silty, sandy, sand lenses</u>
<u>320</u>	<u>402</u>	<u>sand/sandstone, silty, vf-f</u>
<u>402</u>	<u>420</u>	<u>siltstone, sandy, clayey, red-brown</u>
<u>420</u>	<u>435</u>	<u>clay, shaley, yellow</u>
<u>435</u>	<u>440</u>	<u>shale, clayey, dark gray</u>

(Additional sheets may be submitted)

10. I am familiar with the information submitted on this registration, and to the best of my knowledge it is true.

Water Well Contractor's Signature

Date

Water Well Owner's Signature

Date

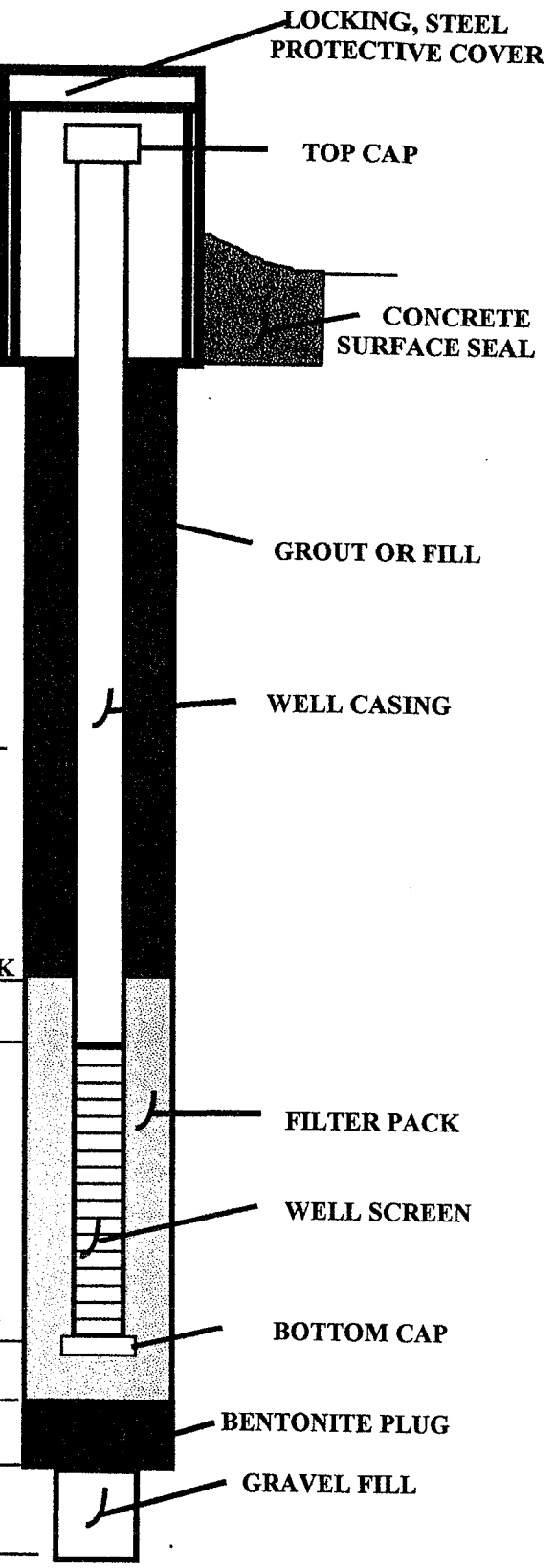
CONSERVATION AND SURVEY DIVISION--UNL

WELL COMPLETION LOG

Project UENRD 400T PIF	Well Number 4D	Date Drilled 9/23/99	Date Constructed 9/23/99	Ground Elevation 1983(6)
County HOLT	Qtr/Qtr/Qtr NW NW NW	Section 21	Township 28 N	Range 11 W
Drilling Co. SARGENT	Method MUD ROTARY	Driller TRAVIS	Log By [Signature]	Total Depth 270

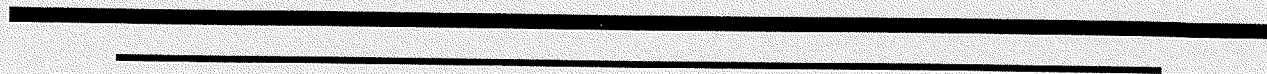
Borehole Diameter 7-INCH
Survey Reference
Type/Size of Casing 2 1/2" ID SCH 40 261 FEET
Type/Size of Screen 2 1/2" ID SCH 40 10 FEET
Screen Slot Size 0.010
Filter Pack 10/20 Si Sd 7 BAGS
Type/Amount Grout/Fill BENSEAL/EZ-MUD 10 BAGS
Type/Amount Seal 1 BAG CHUNK

Elevation	Depth From Reference
<u>2.75</u>	<u>TOP OF CASING</u>
<u>0</u>	<u>GROUND</u>
<u>3.0</u>	<u>TOP OF GROUT/FILL</u>
<u>4.25</u>	<u>WATER LEVEL</u>
<u>256.3</u>	<u>TOP OF FILTER PACK</u>
<u>258.3</u>	<u>TOP OF SCREEN</u>
<u>268.3</u>	<u>BOTTOM OF SCREEN</u>
<u>270</u>	<u>SEAL TOP</u>
<u>273</u>	<u>SEAL BOTTOM</u>
<u>440</u>	<u>BOREHOLE DEPTH</u>



86.5 S 540E
developed 1 hr
EAST WELL

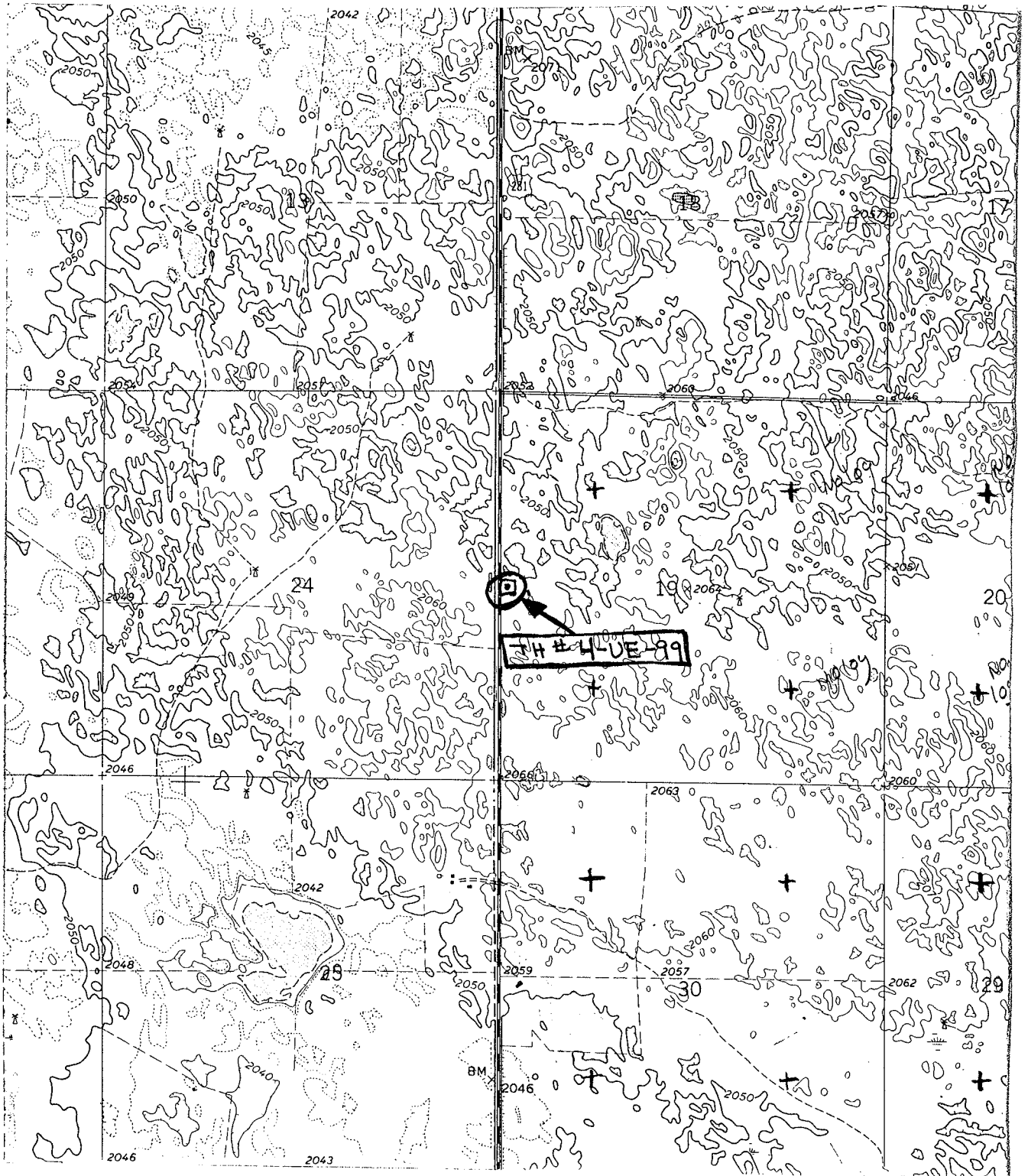
Number 5 Wells



HOLT COUNTY

TH # 4-UE-99

5 WELLS



T 27 N, R11W, SECTION 19 NW

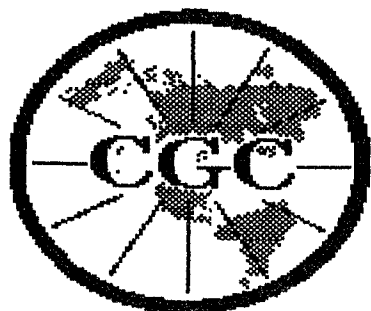
O'NEILL SW QUAD

Test Hole #4-UE-99
(27N-11W-19bccc)
Holt County

Location: SW SW SW NW Sec. 19, T. 27 N., R. 11 W., approximately
 2,602 ft south 180 ft east of the northwest corner.
 Ground elevation: 2,053 ft (t). (O'Neill SW, 7.5 min. quadrangle)
 Depth to water: 13.6 ft (10-1-99)

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Sand, light gray; sand is very fine to fine...	0.0	20.0
Silt, moderately clayey, moderately sandy, pale olive; sand is very fine to fine.....	20.0	25.0
Sand, slightly silty, pale olive; sand is very fine to fine, some medium.....	25.0	30.0
Sand, gravelly; very fine sand to fine gravel; below 35 ft contains trace of medium gravel.....	30.0	45.0
Sand, tan; very fine to very coarse, little fine to medium gravel.....	45.0	50.0
Sand, gravelly; very fine sand to fine gravel, trace of medium gravel.....	50.0	55.0
Sand, tan; very fine to very coarse, little fine gravel.....	55.0	60.0
Sand, gravelly; very fine sand to fine gravel.	60.0	70.0
Gravel, sandy; very fine sand to fine gravel, trace of medium gravel, rare coarse gravel.	70.0	75.0
Sand, tan; very fine to medium, little coarse, trace very coarse.....	75.0	80.0
Gravel, sandy; medium sand to fine gravel, rare medium gravel.....	80.0	90.0
Tertiary System - Miocene Series - Ogallala Group:		
Sandstone, pale olive; sand is very fine, little fine; contains some lag from above; below 100 ft very fine to fine sand.....	90.0	105.5
Silt, very sandy, moderately clayey, light gray; sand is very fine; contains rootlets.	105.5	111.0
Sand, light gray; sand is very fine; contains rootlets below 120 ft; contains sandstone below 125 ft, below 127 ft silty; pale olive below 130 ft.....	111.0	140.0
Silty sand to sandy silt with sandstone, mod- erately silty, pale olive, sand is very fine to fine; less silty below 145 ft; con- tains rootlets below 160 ft.....	140.0	165.0

Sand, little sandstone, slightly silty, light gray; sand is very fine to fine; more sandstone below 170 ft, contains white siliceous fragments.....	165.0	177.0
Silt, very clayey, pale olive; contains sandstone.....	177.0	181.0
Sand to sandstone, pale olive; sand is very fine to fine; contains some rootlets below 185 ft, much rootlet material below 195 ft.	181.0	205.0
Silty sand to sandy silt to sandstone, silty; sand is very fine to fine; contains rootlets from 220 to 224 ft; below 231 ft slightly more silty.....	205.0	234.0
Silt, very sandy, slightly clayey, pale yellow; sand is very fine, some fine; contains some sandstone.....	234.0	241.0
Silt, moderately clayey, moderately sandy, yellow; sand is very fine, some fine; contains few siltstone fragments; contains trace of sandstone.....	241.0	246.0
Sand to sandstone, silty, pale olive; sand is very fine to fine; contains rootlets; below 250 ft in part lime cemented.....	246.0	270.0
Silt, very sandy, moderately clayey, pale yellow; sand is very fine, little fine; from 270 to 275 ft limy areas; contains sandstone, silty below 290 ft.....	270.0	315.0
Sand, silty, pale yellow; sand is very fine to fine; below 320 ft contains some silty sandstone.....	315.0	325.0
Sand, very fine to fine, gray; contains little sandstone; from 340 to 345 ft silty; silty area at 356 ft.....	325.0	369.0
Sand, olive, very fine to fine, below 371 ft silty.....	369.0	385.0
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clayey, yellow; moderately calcareous; slightly calcareous from 385 to 420 ft.....	385.0	420.0
Shale, clayey, pale yellow.....	420.0	425.0
Shale, clayey, gray to dark gray.....	425.0	430.0
Shale, clayey, black.....	430.0	440.0



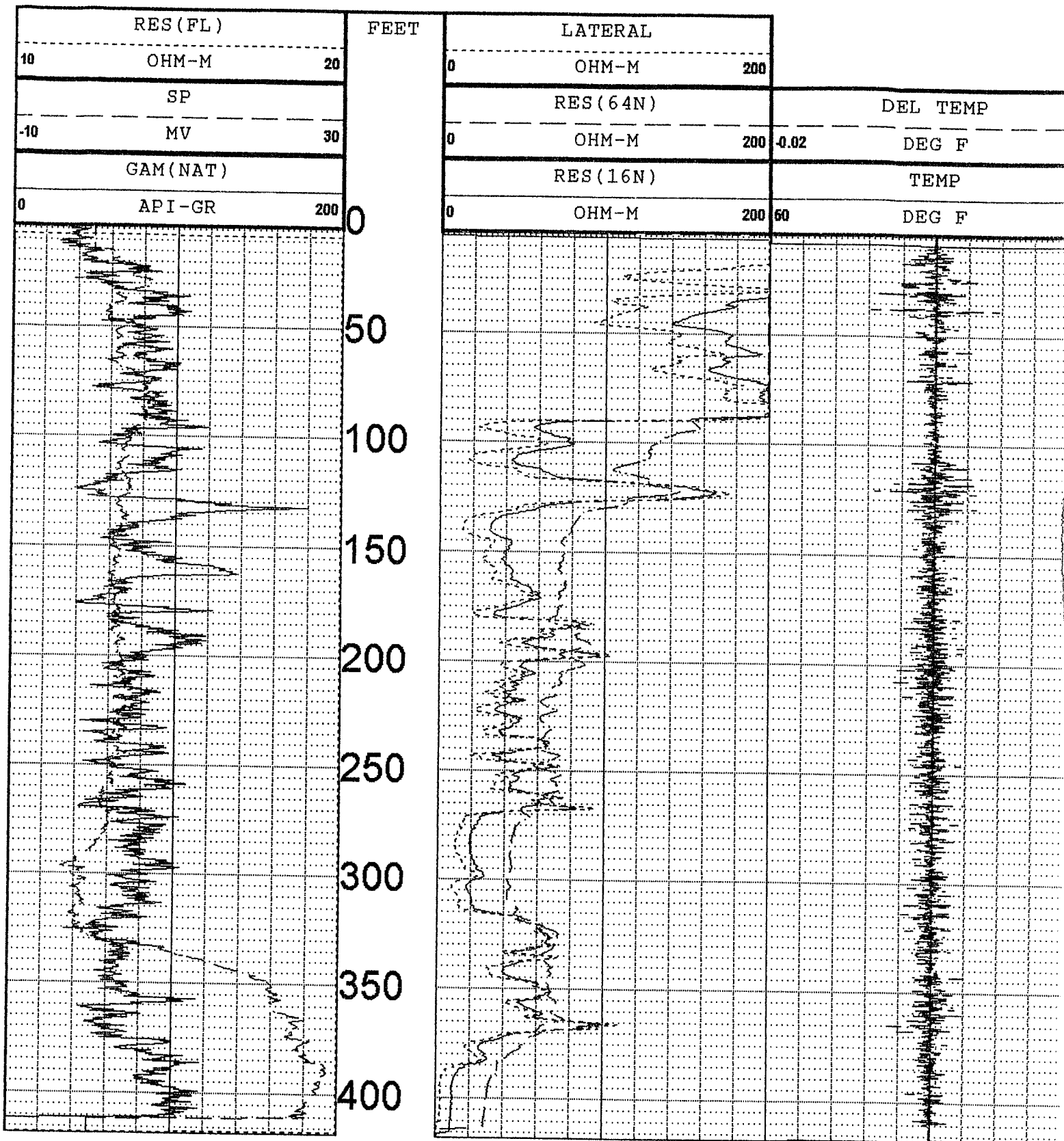
Century GEOPHYSICAL CORP.

4-UE-99

COMPANY	: Sargent	OTHER SERVICES:	
WELL	: 4-UE-99	down	
LOCATION/FIELD	: Site 3	None	
COUNTY	: HOLT	None	
STATE	: NE		
SECTION	: 19	TOWNSHIP	: 27
		RANGE	: 11w
DATE	: 09/28/99	PERMANENT DATUM	: None
DEPTH DRILLER	: 440		
LOG BOTTOM	: 417.80	LOG MEASURED FROM:	grd=0
LOG TOP	: 3.38	DRL MEASURED FROM:	
		KB	: None
		DF	: None
		GL	: 2053
CASING DIAMETER	: 0	LOGGING UNIT	: 208A
CASING TYPE	: None	FIELD OFFICE	: Norfolk
CASING THICKNESS:	0	RECORDED BY	: Sol
BIT SIZE	: 5	BOREHOLE FLUID	: 0
MAGNETIC DECL.	: 0	RM	: 0
MATRIX DENSITY	: 2.71	RM TEMPERATURE	: 0
NEUTRON MATRIX	: Dolomite	MATRIX DELTA T	: 54
		FILE	: ORIGINAL
		TYPE	: 8043A
		THRESH:	2500

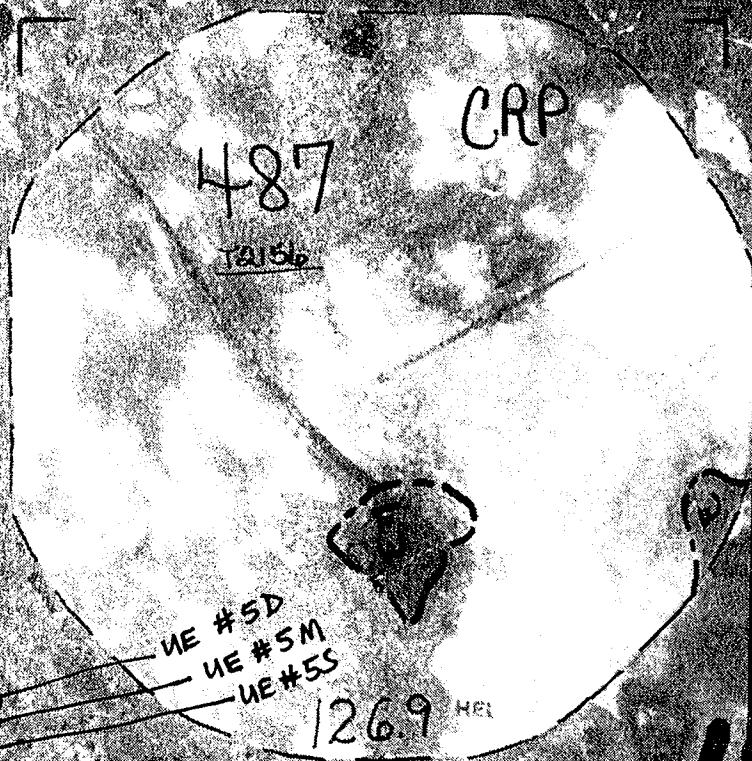
O'Neill SW Quad
Wells 5S, 5M, 5D (UE)

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS



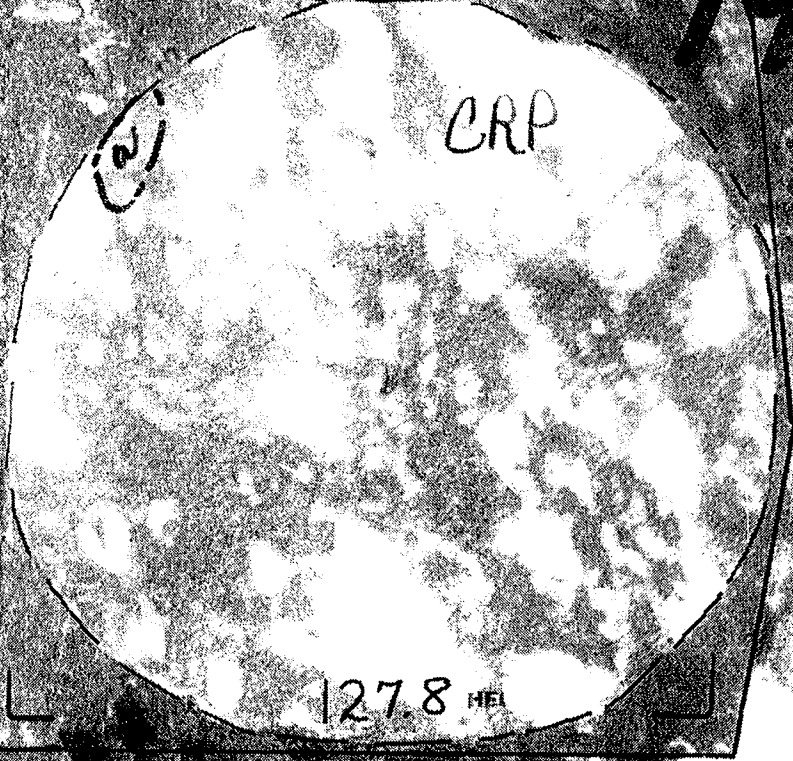
NOTES

11 Co. 1954
7-N R-11-W
TH #4-UE-99 Site 3-99



837
TABLE

19



STATE OF NEBRASKA
DEPARTMENT OF WATER RESOURCES
WATER WELL REGISTRATION

FOR DEPARTMENT USE ONLY

Registration Date: _____ Sequence No. _____ Registration No. _____
Owner Code No. _____ Receipt No. _____ NRD

1. Well Owner Upper Elkhorn Natural Resource District Telephone Number (402) 336-3867
Address 301 North Harrison
City O'Neill State NE Zip Code 68763 +

2. Drilling Firm Sargent Irrigation Telephone Number (402) 887-4112
Address Box 9 Contractor's License No. 39194
City Neligh State NE Zip Code 68756 +

3. Permit Number(s)

4. Purpose of well (indicate one): Dewatering (over 90 days) Domestic Geothermal Ground Heat Exchanger
 Ground Water Source Heat Pump Industrial Injection Irrigation Livestock Monitoring
 Observation Public Water Supply (with spacing (46-638)) Public Water Supply (without spacing) Recovery
 Aquaculture Other
(indicate use)

5. Replacement and abandoned well information.

- A. Is this well a replacement well? Yes No
C. Replacement well is _____ feet from abandoned well
E. Original well pump column size: _____ inches.
G. Location of water use of abandoned well:
D. Abandoned well last operated _____,
F. Completion of original well abandonment on _____,

6. A. Well location: SW 1/4 of the NW 1/4 of Section 19, Township 27 North, Range 11W East West, Holt County.
B. The well is 2635 feet from the North or South section line and 180 feet from the East or West section line.
C. Street address or block, lot and subdivision, if applicable: Site UE 3-99; TH 4-UE-99
D: Location of water use, if applicable (give legal descriptions):
E. If for irrigation, the land to be irrigated is _____ acres.
F. Well reference letter(s), if applicable: Well UE #5S (South)

7. Pump Information.

Is pump installed at this time? Yes No

If yes, complete items A through F.

If no, complete items A and D with estimated information for those wells in which pump will be installed.

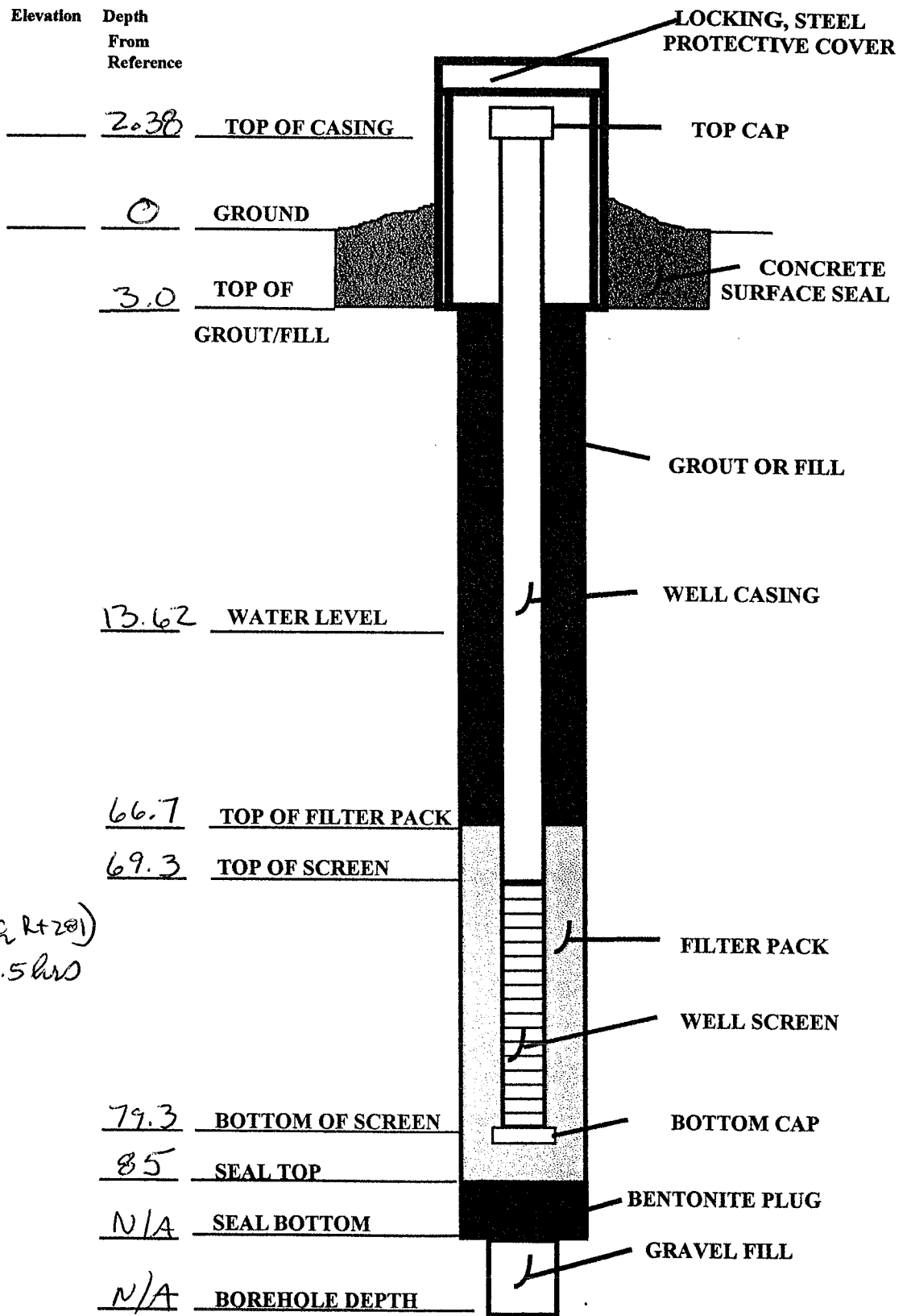
- A. Actual pumping rate, if applicable: _____ gallons per minute. Measured or Estimated
B. Pump column diameter: _____ inches. C. Length of pump column: _____ feet.
D. Pumping equipment-date installed: _____, _____. E. Brand/Type:
F. Pump installed by: Contractor Owner Pump Installer License No. _____

SITE 3-99

TH #4-UE-99

CONSERVATION AND SURVEY DIVISION--UNL			WELL COMPLETION LOG		
Project VENARD PII	Well Number 55	Date Drilled 9/29/99	Date Constructed 9/29/99	Ground Elevation 2053(E)	
County HOLT	Qtr/Qtr/Qtr SW SW NW	Section 19	Township 27N	Range 11W	
Drilling Co. SARGENT	Method MUD ROTARY	Driller FRED/TONY	Log By Ejal	Total Depth 85	

Borehole Diameter 7-INCH
Survey Reference
Type/Size of Casing 2 1/2" ID SCH 40 72 FEET
Type/Size of Screen 2 1/2" ID SCH 40 10 FEET
Screen Slot Size 0.010
Filter Pack 20/40 SILS 10 BAGS
Type/Amount Grout/Fill BENSEAL/EZ-MUD 3 BAGS
Type/Amount Seal BOTTOM N/A



26355 180E
(118E OF Q RT 20)
DEVELOPED 9/30 1.5 bwd
SOUTH WELL

STATE OF NEBRASKA
DEPARTMENT OF WATER RESOURCES
WATER WELL REGISTRATION

FOR DEPARTMENT USE ONLY

Registration Date: _____ Sequence No. _____ Registration No. _____
Owner Code No. _____ Receipt No. _____ NRD

1. Well Owner Upper Elkhorn Natural Resource District Telephone Number (402) 336-3867
Address 301 North Harrison
City O'Neill State NE Zip Code 68763 +

2. Drilling Firm Sargent Irrigation Telephone Number (402) 887-4112
Address Box 9 Contractor's License No. 39194
City Neligh State NE Zip Code 68756 +

3. Permit Number(s)

4. Purpose of well (indicate one): Dewatering (over 90 days) Domestic Geothermal Ground Heat Exchanger
 Ground Water Source Heat Pump Industrial Injection Irrigation Livestock Monitoring
 Observation Public Water Supply (with spacing (46-638)) Public Water Supply (without spacing) Recovery
 Aquaculture Other
(indicate use)

5. Replacement and abandoned well information.

- A. Is this well a replacement well? Yes No
- D. Abandoned well last operated _____,
- C. Replacement well is _____ feet from abandoned well
- F. Completion of original well abandonment on _____,
- E. Original well pump column size: _____ inches.
- G. Location of water use of abandoned well:

- 5. A. Well location: SW 1/4 of the NW 1/4 of Section 19, Township 27 North, Range 11 East West, Holt County.
- B. The well is 2616 feet from the North or South section line and 180 feet from the East or West section line.
- C. Street address or block, lot and subdivision, if applicable: Site UE 3-99; TH 4-UE-99
- D. Location of water use, if applicable (give legal descriptions):
- E. If for irrigation, the land to be irrigated is _____ acres.
- F. Well reference letter(s), if applicable: Well UE #5M (Center)

7. Pump Information.

Is pump installed at this time? Yes No

If yes, complete items A through F.

If no, complete items A and D with estimated information for those wells in which pump will be installed.

- A. Actual pumping rate, if applicable: _____ gallons per minute. Measured or Estimated
- B. Pump column diameter: _____ inches.
- C. Length of pump column: _____ feet.
- D. Pumping equipment-date installed: _____, _____.
- E. Brand/Type:
- F. Pump installed by: Contractor Owner Pump Installer License No.

8. Well Construction Information.

A. Total well depth: 180 feet.

B. Static water level: 13.5 feet.

C. Pumping water level: _____ feet.
 Estimated or Measured

D. Well Construction began: 9/29, 1999.

E. Well Construction completed: 9/30, 1999.

F. Bore hole diameter: 7 inches.

Type of material: PVC Schedule 40.

G. Plain Casing: Diameter 2.469 ID

2.875 OD inches.

Joints-- Welded Glued Threaded/Other:

Wall thickness: 0.203 inch(es).

Length(s) and placement(s) depth from +3 ft

to 166 ft.

from _____ ft. to _____ ft.

type of material PVC Schedule 40

H. Screen: 2.469 ID 2.875 OD in:

Trade Name Eagle

Screen Openings (slot size) 0.010

Length(s) and placement(s) depth from 166 ft

to 176 ft.

from _____ to _____ ft.

guides at 162 ft.

I. Gravel pack interval(s) from 163.5 ft. to 180 ft.

from _____ ft. to _____ ft.

Grade size: 10/20

J. Grouted/Sealed from 0 ft. to 3 ft.,

with steel cover in concrete
(type)

from 3 ft. to 163.5 ft.,

with Benseal/EZ Mud
(type)

K. Drilling method: Mud Rotary

L. Drilling fluid: Premium Gel

M. Well development technique (total time and method): Air 1hr

N. Will chemicals, fertilizer or antifreeze be injected or utilized in the system?

Yes No

If yes, what will be used:

9. Geologic Materials Logged

Depth in Feet		Description	Depth in Feet		Description
From	To		From	To	
<u>0</u>	<u>21</u>	<u>sand, fine, trace gravel @ base</u>	<u>301</u>	<u>313</u>	<u>clay, sandy</u>
<u>21</u>	<u>26</u>	<u>clay, sandy, silty, red</u>	<u>313</u>	<u>370</u>	<u>sand/sandstone, vf-f, some silty clay</u>
<u>26</u>	<u>90</u>	<u>sand & gravel, medium sand to coarse gravel</u>	<u>370</u>	<u>387</u>	<u>sand, vf-f, silty, red-brown</u>
<u>90</u>	<u>105</u>	<u>sandstone/sand, vf-f</u>	<u>387</u>	<u>420</u>	<u>clay, yellow-orange, trace shale @ base</u>
<u>105</u>	<u>117</u>	<u>silt, clayey, olive brown</u>	<u>420</u>	<u>440</u>	<u>shale, clayey, dark gray with some yellow streaks</u>
<u>117</u>	<u>133</u>	<u>sand/sandstone, vf-f, rootlets</u>			
<u>133</u>	<u>158</u>	<u>sandstone, sand is vf, rootlets</u>			
<u>158</u>	<u>163</u>	<u>silt, sandy</u>			
<u>163</u>	<u>177</u>	<u>sandstone, sand is vf-f, olive</u>			
<u>177</u>	<u>181</u>	<u>silt, clayey, sandy</u>			
<u>181</u>	<u>269</u>	<u>sandstone/sand, vf-f, some silt lenses</u>			
<u>269</u>	<u>301</u>	<u>silt, interbedded with silty sandstone</u>			

(Additional sheets may be submitted)

10. I am familiar with the information submitted on this registration, and to the best of my knowledge it is true.

Water Well Contractor's Signature

Date

Water Well Owner's Signature

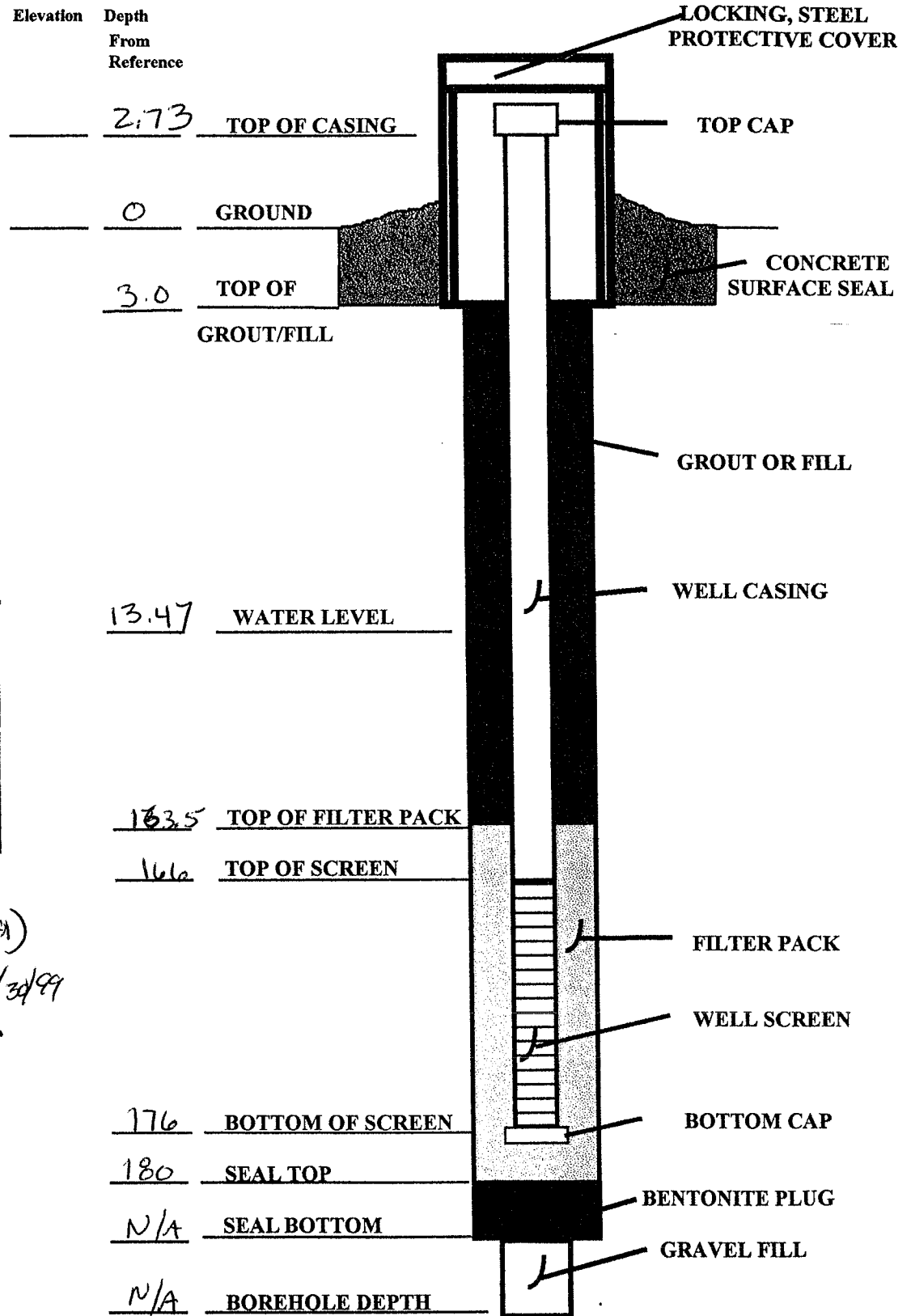
Date

SITE 3-99

TH #4-UE-99

CONSERVATION AND SURVEY DIVISION--UNL			WELL COMPLETION LOG		
Project UENRD PTE	Well Number 5M	Date Drilled 9/29/99	Date Constructed 9/29/99	Ground Elevation 2053(4)	
County HOLT	Qtr/Qtr/Qtr SW SW NW	Section 19	Township 27N	Range 11W	
Drilling Co. SARGENT	Method MUD ROTARY	Driller FRED	Log By djal	Total Depth 180	

Borehole Diameter 7- INCH
Survey Reference
Type/Size of Casing 2 1/2" ID SCH 40 169 FEET
Type/Size of Screen 2 1/2" ID SCH 40 10 FEET
Screen Slot Size 0.010
Filter Pack 10/20 Si Se 5 BAGS (500 E. Ft.)
Type/Amount Grout/Fill BENSEAL EZ-MUD 8 BAGS
Type/Amount Seal Bottom N/A



26165 180E
(110E & RT 281)
Revised 1/22 9/30/99
CENTER WELL

STATE OF NEBRASKA
DEPARTMENT OF WATER RESOURCES
WATER WELL REGISTRATION

FOR DEPARTMENT USE ONLY

Registration Date: _____ Sequence No. _____ Registration No. _____ NRD
Owner Code No. _____ Receipt No. _____

1. Well Owner Upper Elkhorn Natural Resource District
Address 301 North Harrison
City O'Neill
Telephone Number (402) 336-3867
State NE Zip Code 68763 +

2. Drilling Firm Sargent Irrigation
Address Box 9
City Neligh
Telephone Number (402) 887-4112
Contractor's License No. 39194
State NE Zip Code 68756 +

3. Permit Number(s) _____

4. Purpose of well (indicate one):
 Dewatering (over 90 days) Domestic Geothermal Ground Heat Exchanger
 Ground Water Source Heat Pump Industrial Injection Irrigation Livestock Monitoring
 Observation Public Water Supply (with spacing (46-638)) Public Water Supply (without spacing) Recovery
 Aquaculture Other (indicate use)

5. Replacement and abandoned well information.
A. Is this well a replacement well? Yes No
C. Replacement well is _____ feet from abandoned well
E. Original well pump column size: _____ inches.
G. Location of water use of abandoned well:
D. Abandoned well last operated _____,
F. Completion of original well abandonment on _____,

6. A. Well location: SW 1/4 of the NW 1/4 of Section 19, Township 27 North, Range 11 East West, Holt County.
B. The well is 2602 feet from the North or South section line and 180 feet from the East or West section line.
C. Street address or block, lot and subdivision, if applicable: Site UE 3-99; TH 4-UE-99
D: Location of water use, if applicable (give legal descriptions):
E. If for irrigation, the land to be irrigated is _____ acres.
F. Well reference letter(s), if applicable: Well UE #5D (North)

7. Pump Information.
Is pump installed at this time? Yes No
If yes, complete items A through F.
If no, complete items A and D with estimated information for those wells in which pump will be installed.
A. Actual pumping rate, if applicable: _____ gallons per minute. Measured or Estimated
B. Pump column diameter: _____ inches. C. Length of pump column: _____ feet.
D. Pumping equipment-date installed: _____, _____ E. Brand/Type: _____
F. Pump installed by: Contractor Owner Pump Installer License No. _____

8. Well Construction Information.
 A. Total well depth: 336 feet.

B. Static water level: 13.5 feet.

C. Pumping water level: _____ feet.
 Estimated or Measured

D. Well Construction began: 9/28, 1999.

E. Well Construction completed: 10/11, 1999.

F. Bore hole diameter: 7 inches.

G. Plain Casing: Diameter 2.469 ID 2.875 OD inches. Type of material: PVC Schedule 40.

Wall thickness: 0.203 inch(es). Joints-- Welded Glued Threaded/Other:

Length(s) and placement(s) depth from +3 ft. to 320.83 ft. from _____ ft. to _____ ft.

type of material PVC Schedule 40

H. Screen: 2.469 ID 2.875 OD in:

Screen Openings (slot size) 0.010 Trade Name Eagle

Length(s) and placement(s) depth from 320.83 ft. to 330.83 ft. from _____ to _____ ft. guides at 316.83 ft.

I. Gravel pack interval(s) from 314 ft. to 336 ft.

from _____ ft. to _____ ft. Grade size: 10/20

J. Grouted/Sealed from 0 ft. to 3 ft.,

with steel cover in concrete (type)

from 3 ft. to 314 ft.,

with Benseal/EZ Mud (type)

K. Drilling method: Mud Rotary

M. Well development technique (total time and method): Air 2 hrs

N. Will chemicals, fertilizer or antifreeze be injected or utilized in the system? Yes No

If yes, what will be used:

9. Geologic Materials Logged

Depth in Feet		Description	Depth in Feet		Description
From	To		From	To	
<u>0</u>	<u>21</u>	<u>sand, fine, trace gravel @ base</u>	<u>301</u>	<u>313</u>	<u>clay, sandy</u>
<u>21</u>	<u>26</u>	<u>clay, sandy, silty, red</u>	<u>313</u>	<u>370</u>	<u>sand/sandstone, vf-f, some silty clay</u>
<u>26</u>	<u>90</u>	<u>sand & gravel, medium sand to coarse gravel</u>	<u>370</u>	<u>387</u>	<u>sand, vf-f, silty, red-brown</u>
<u>90</u>	<u>105</u>	<u>sandstone/sand, vf-f</u>	<u>387</u>	<u>420</u>	<u>clay, yellow-orange, trace shale @ base</u>
<u>105</u>	<u>117</u>	<u>silt, clayey, olive brown</u>	<u>420</u>	<u>440</u>	<u>shale, clayey, dark gray with some yellow streaks</u>
<u>117</u>	<u>133</u>	<u>sand/sandstone, vf-f, rootlets</u>			
<u>133</u>	<u>158</u>	<u>sandstone, sand is vf, rootlets</u>			
<u>158</u>	<u>163</u>	<u>silt, sandy</u>			
<u>163</u>	<u>177</u>	<u>sandstone, sand is vf-f, olive</u>			
<u>177</u>	<u>181</u>	<u>silt, clayey, sandy</u>			
<u>181</u>	<u>269</u>	<u>sandstone/sand, vf-f, some silt lenses</u>			
<u>269</u>	<u>301</u>	<u>silt, interbedded with silty sandstone</u>			

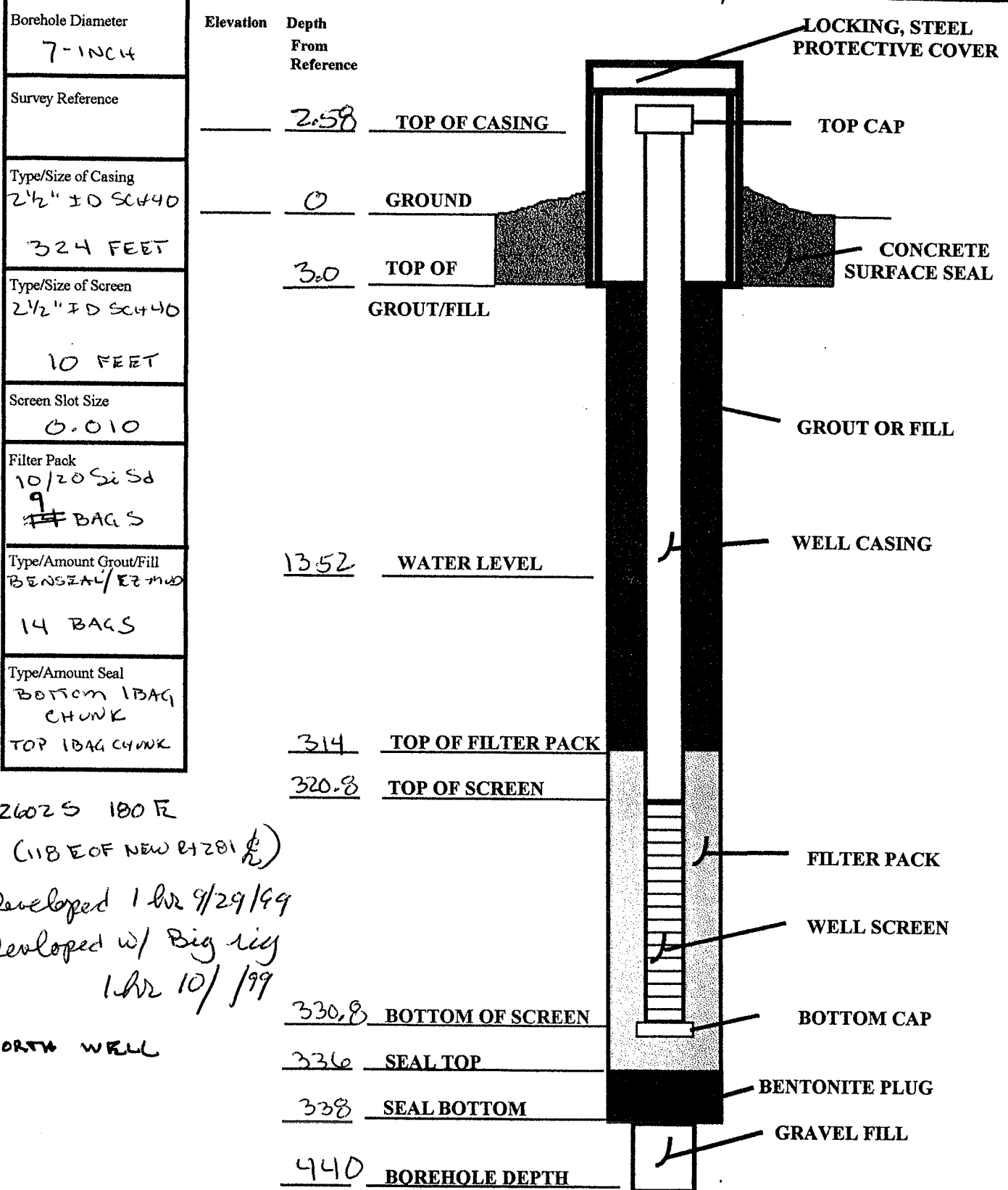
(Additional sheets may be submitted)

10. I am familiar with the information submitted on this registration, and to the best of my knowledge it is true.

SITE 3-99

TH # 4-0E-99

CONSERVATION AND SURVEY DIVISION--UNL			WELL COMPLETION LOG		
Project VE NAD P II	Well Number 5D	Date Drilled 9/28/99	Date Constructed 9/28/99	Ground Elevation 2053(4)	
County HOLT	Qtr/Qtr/Qtr SW SW NW	Section 19	Township 27N	Range 11W	
Drilling Co. SARGENT	Method MWD ROTARY	Driller FRED	Log By Jal	Total Depth 336	



Borehole Diameter 7-INCH	Elevation	Depth From Reference
Survey Reference	2058	TOP OF CASING
Type/Size of Casing 2 1/2" ID SCH 40 324 FEET	0	GROUND
Type/Size of Screen 2 1/2" ID SCH 40 10 FEET	320	TOP OF GROUT/FILL
Screen Slot Size 0.010		
Filter Pack 10/20 Si Sd 9 BAGS	1352	WATER LEVEL
Type/Amount Grout/Fill BENSAL/ET MUD 14 BAGS		
Type/Amount Seal BOTTOM 1 BAG CHUNK TOP 1 BAG CHUNK	314	TOP OF FILTER PACK
	320.8	TOP OF SCREEN
	330.8	BOTTOM OF SCREEN
	336	SEAL TOP
	338	SEAL BOTTOM
	440	BOREHOLE DEPTH

2602 S 180 E
(118 E OF NEW 24281 1/2)

Developed 1 hr 9/29/99
Developed w/ Big rig
1 hr 10/1/99

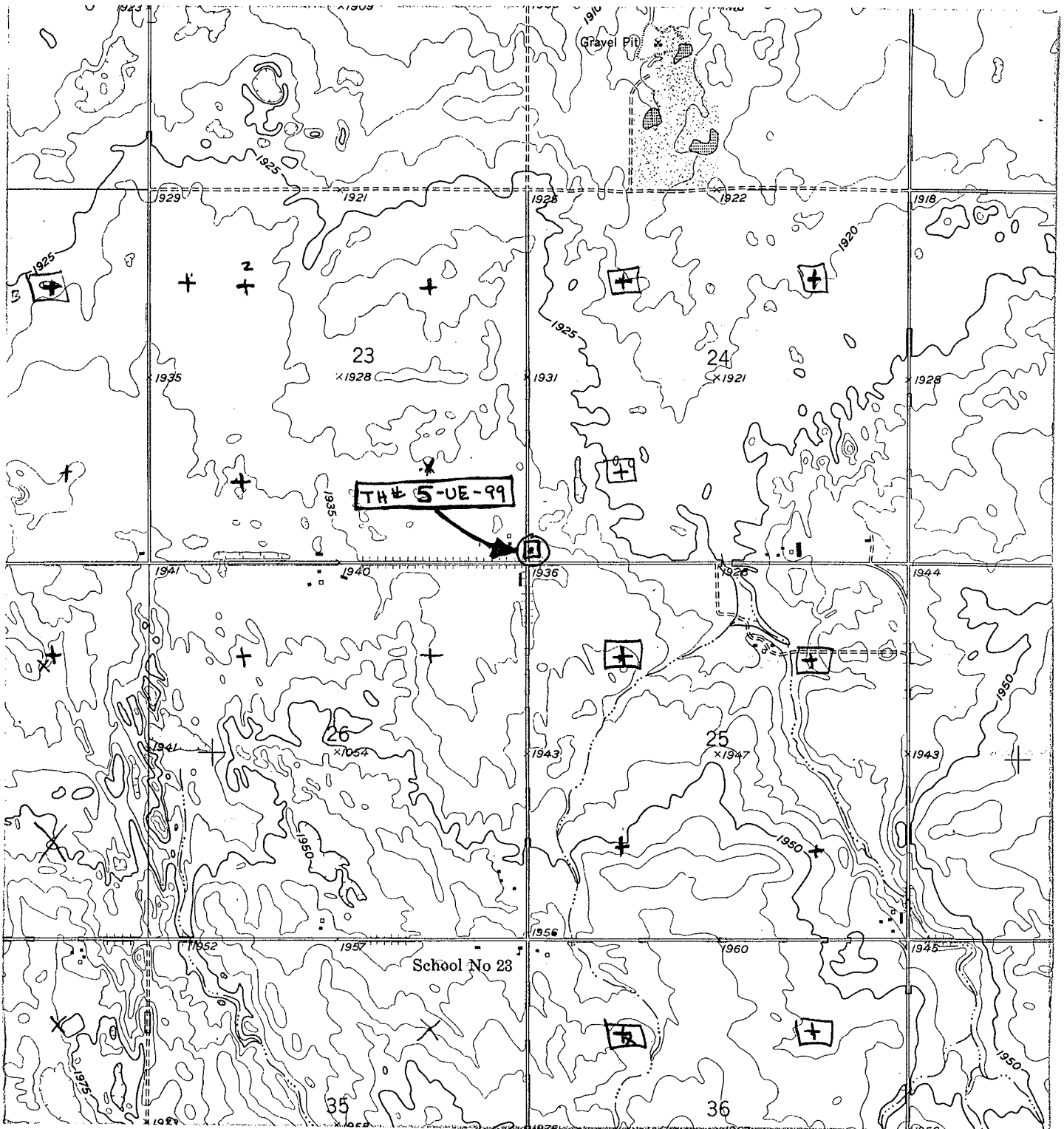
NORTH WELL

Number 6 Wells

HOLT COUNTY

TH # 5-UE-99

#6 WELLS



T29N, R10W, SECTION 24 SW

PAGE QUAD

Test Hole #5-UE-99
(29N-10W-24cccc)
Holt County

Location: SW SW SW SW Sec. 24, T. 29 N., R. 10 W., approximately 147 feet north and 27 feet east of the southwest corner.

Ground elevation: 1,937 ft. (t). (Page, 7.5 min. quadrangle)

Depth to water: 34.29 ft (10-12-99).

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Top soil: silt, very sandy, slightly clayey, dark brown; sand is very fine to fine.....	0.0	1.5
Silt, very sandy, slightly clayey, light brown; sand is very fine to fine; below 5 ft light brown.....	1.5	12.5
Sand, light brown; very fine to medium; from 15 to 20 ft medium to coarse, little very coarse; below 20 ft medium to very coarse, trace of fine gravel.....	12.5	25.0
Sand, gravelly; medium sand to fine gravel, trace of medium gravel; rare pebbles from 30 to 35 ft; medium sand to medium gravel, trace of coarse gravel below 35 ft.....	25.0	40.0
Sand, gravelly; medium sand to medium gravel, little coarse gravel with silt lens.....	40.0	45.0
Sand, very fine to very coarse, little very fine gravel; contains silt lens.....	45.0	50.0
Sand, gravelly; fine sand to fine gravel, little medium to coarse gravel; contains silt lens.....	50.0	55.0
Gravel, sandy; medium sand to medium gravel, rare pebbles; contains clay lens.....	55.0	60.0
Sand, gravelly; medium sand to medium gravel, little coarse gravel.....	60.0	65.0
Sand, very fine to very coarse, little very fine to fine gravel, trace of medium gravel; silt lens below 68 ft.....	65.0	70.0
Sand, very fine to coarse, little very coarse.	70.0	75.0
Sand, gravelly; very fine sand to fine gravel, little medium gravel; rare coarse gravel below 85 ft.....	75.0	88.0
Tertiary System - Miocene Series - Ogallala Group:		
Silt, very sandy, slightly clayey, pale olive; sand is very fine to fine.....	88.0	98.5
Clay, silty, olive; contains some fine sand...	98.5	101.0

Sand, light gray, sand is very fine to fine; contains reworked claystone fragments.....	101.0	112.0
Clay, silty, sandy, light olive; sand is very fine to fine.....	112.0	115.0
Sand, light brown, very fine to fine; contains reworked claystones.....	115.0	119.0
Clay, silty, sandy, light olive; sand is very fine.....	119.0	123.0
Sand to sandstone, white, lime cemented; very fine to fine sand.....	123.0	134.0
Sand to sandstone, limy, silty, pale olive; sand is very fine to fine.....	134.0	144.0
Silt, moderately clayey to clay, sandy, slightly calcareous, pale olive; sand is very fine to fine.....	144.0	147.0
Sandstone, pale olive, lime cemented; sand is very fine to fine.....	147.0	169.0
Sandstone, pale olive; silty, lime cemented; sand is very fine to fine; less silt below 174 ft.....	169.0	183.0
Silty sand with sandstone, pale olive, very calcareous; sand is very fine.....	183.0	185.0
Silt, very sandy, moderately clayey, very calcareous, olive; sand is very fine to fine.....	185.0	193.0
Sand to sandstone, silty, lime cemented, olive; sand is very fine to fine; contains rootlets below 200 ft.....	193.0	205.0
Sand, olive; very fine to fine; contains trace of sandstone; contains reworked clay fragments; below 265 ft no clay fragments.....	205.0	267.0
Silt, very sandy, slightly clayey, olive; sand is very fine to fine; below 278 ft slightly more clayey.....	267.0	281.0
Silt, very sandy, clayey, olive; sand is very fine to fine.....	281.0	290.0
Silt, sandy, gray; very fine to medium sand; contains a little sandstone; contains some clay fragments; contains clay layer from 303 to 307 ft; contains clay fragments below 310 ft; contains trace of rootlets below 320 ft.....	290.0	331.0

**Cretaceous System - Upper Cretaceous Series - Montana Group:
Pierre Formation:**

Shale, clayey, slightly calcareous, yellowish brown.....	331.0	345.0
Shale, clayey, slightly calcareous, dark		

olive; below 350 ft dark olive to dark
olive gray..... 345.0 360.0



Century GEOPHYSICAL CORP.

5-UE-99

COMPANY : Sargent
WELL : 5-UE-99
LOCATION/FIELD : Site 1
COUNTY : HOLT
STATE : NE
SECTION : 24

OTHER SERVICES:

up2
None
None

TOWNSHIP : 29 RANGE : 10w

DATE : 09/30/99
DEPTH DRILLER : 360
LOG BOTTOM : 357.11
LOG TOP : 2.05

PERMANENT DATUM : None
LOG MEASURED FROM: grd=0
DRL MEASURED FROM:

KB : None
DF : None
GL : 1937

CASING DIAMETER : 0
CASING TYPE : None
CASING THICKNESS: 0

LOGGING UNIT : 208A
FIELD OFFICE : Norfolk
RECORDED BY : Sol

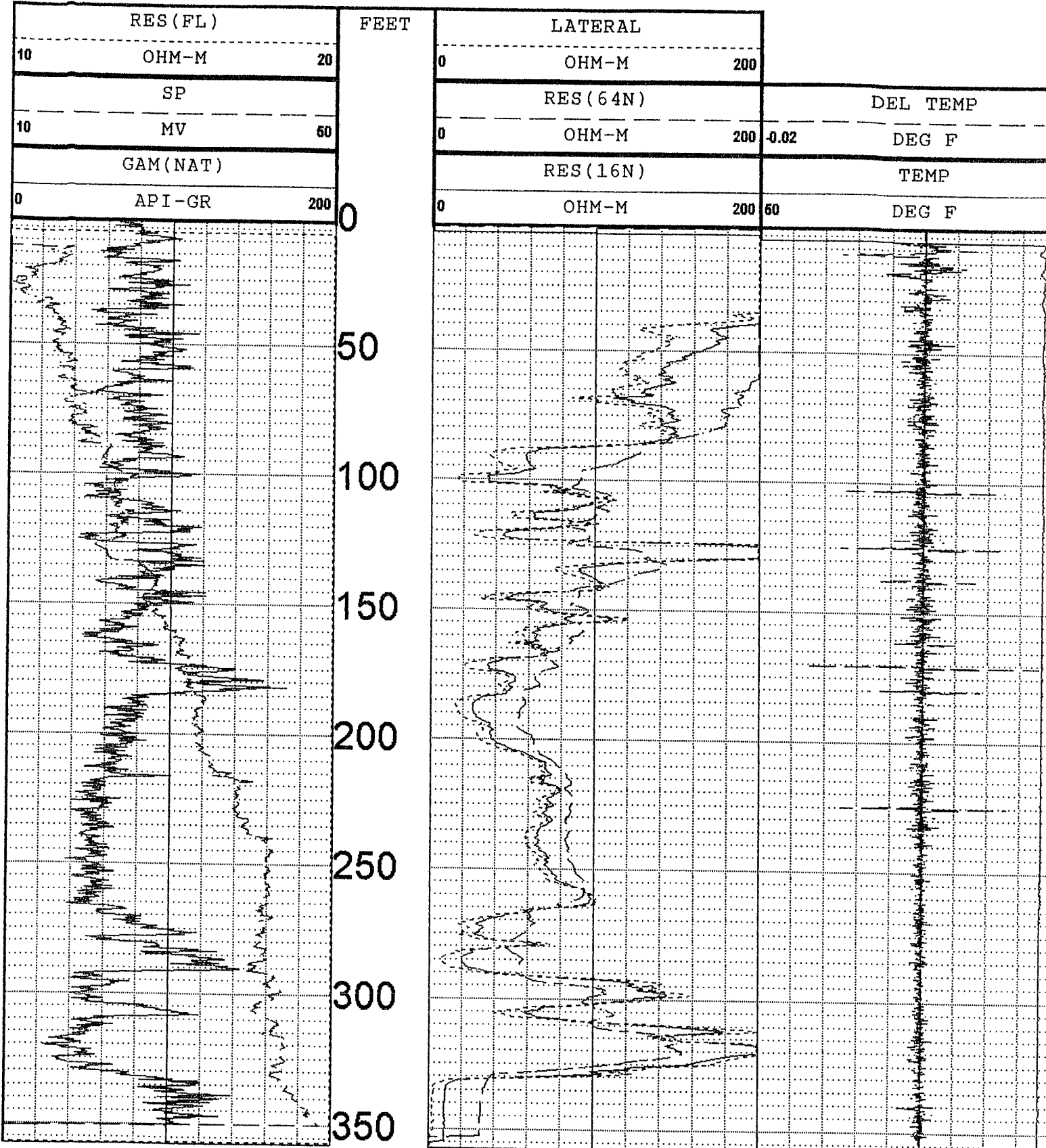
BIT SIZE : 5
MAGNETIC DECL. : 0
MATRIX DENSITY : 2.71
NEUTRON MATRIX : Dolomite

BOREHOLE FLUID : 0
RM : 0
RM TEMPERATURE : 0
MATRIX DELTA T : 54

FILE : ORIGINAL
TYPE : 8043A

THRESH: 2500

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS



NOT TO SCALE
TH 5-UE-99 Site 1-99

Holt Co. 1988 Photo AA17
T-29-N R-10-W 50 Sec. 24

6183
~~5415~~
~~4125~~

117.5

3

117.5

HEL/NE

7365
~~6811~~
~~5419~~
~~517~~
~~1383~~

147.6

4

147.6

HEL/W

UE #60
UE #6M
UE #65

131.7
~~127.3~~
131.3

HEL

844
56

7

106.8

HEL

HEL/NW

1107

STATE OF NEBRASKA
DEPARTMENT OF WATER RESOURCES
WATER WELL REGISTRATION

FOR DEPARTMENT USE ONLY

Registration Date: _____ Sequence No. _____ Registration No. _____
Owner Code No. _____ Receipt No. _____ NRD

1. Well Owner Upper Elkhorn Natural Resource District Telephone Number (402) 336-3867
Address 301 North Harrison
City O'Neill State NE Zip Code 68763 +

2. Drilling Firm Sargent Irrigation Telephone Number (402) 887-4112
Address Box 9 Contractor's License No. 39194
City Neligh State NE Zip Code 68756 +

3. Permit Number(s)

4. Purpose of well (indicate one): Dewatering (over 90 days) Domestic Geothermal Ground Heat Exchanger
 Ground Water Source Heat Pump Industrial Injection Irrigation Livestock Monitoring
 Observation Public Water Supply (with spacing (46-638)) Public Water Supply (without spacing) Recovery
 Aquaculture Other
(indicate use)

5. Replacement and abandoned well information.

- A. Is this well a replacement well? Yes No
- B. Replacement well is _____ feet from abandoned well
- C. Original well pump column size: _____ inches.
- D. Abandoned well last operated _____,
- E. Location of water use of abandoned well:
- F. Completion of original well abandonment on _____,

6. A. Well location: SW 1/4 of the SW 1/4 of Section 24, Township 29 North, Range 10 East West, Holt County.
B. The well is 101 feet from the North or South section line and 27 feet from the East or West section line.
C. Street address or block, lot and subdivision, if applicable: Site UE 1-99; TH #5-UE-99
D. Location of water use, if applicable (give legal descriptions):
E. If for irrigation, the land to be irrigated is _____ acres.
F. Well reference letter(s), if applicable: Well UE #6S (South)

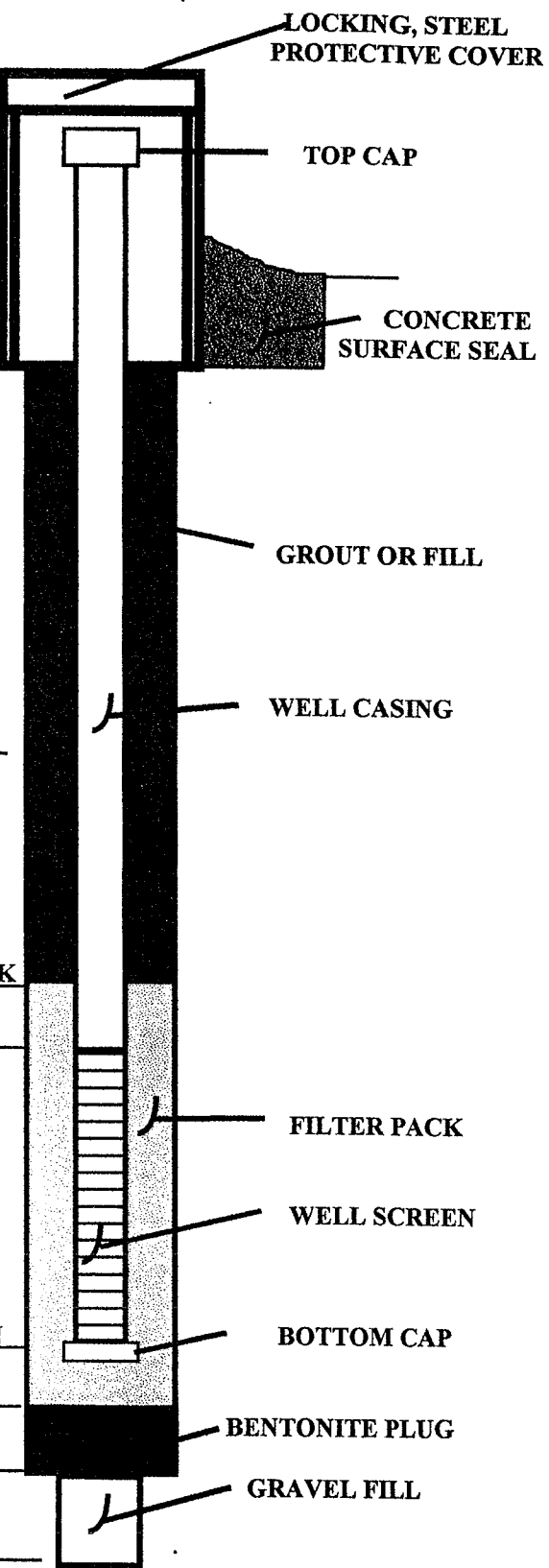
7. Pump Information.

Is pump installed at this time? Yes No
If yes, complete items A through F.
If no, complete items A and D with estimated information for those wells in which pump will be installed.
A. Actual pumping rate, if applicable: _____ gallons per minute. Measured or Estimated
B. Pump column diameter: _____ inches. C. Length of pump column: _____ feet.
D. Pumping equipment-date installed: _____, _____. E. Brand/Type: _____
F. Pump installed by: Contractor Owner Pump Installer License No. _____

CONSERVATION AND SURVEY DIVISION--UNL			WELL COMPLETION LOG		
Project WENRD PII	Well Number 65	Date Drilled 10/1/99	Date Constructed 10/5/99	Ground Elevation 1937(L)	
County HOLT	Qtr/Qtr/Qtr SWSWSW	Section 24	Township 27N	Range 10W	
Drilling Co. SARGENT	Method MUD ROTARY	Driller TRAVIS	Log By P/gel	Total Depth 70	

Borehole Diameter 7-INCH
Survey Reference
Type/Size of Casing 2 1/2" ID SCH 40 THREADED/FUSH 59- FEET
Type/Size of Screen 2 1/2" ID SCH 40 10- FEET
Screen Slot Size 0.010
Filter Pack 10/20 Si Sd 9 BAGS
Type/Amount Grout/Fill BENSEAL/ERMUD 1.5+ BAGS
Type/Amount Seal Bottom N/A

Elevation	Depth From Reference	
2.63		TOP OF CASING
0		GROUND
		TOP OF GROUT/FILL
10/12/99 34.29		WATER LEVEL
53		TOP OF FILTER PACK
55.75		TOP OF SCREEN
65.75		BOTTOM OF SCREEN
70		SEAL TOP
N/A		SEAL BOTTOM
N/A		BOREHOLE DEPTH



101N 27E
Developed 10/4/99
1.5 BWS
SOUTH WELL

STATE OF NEBRASKA
DEPARTMENT OF WATER RESOURCES
WATER WELL REGISTRATION

FOR DEPARTMENT USE ONLY

Registration Date: _____ Sequence No. _____ Registration No. _____
Owner Code No. _____ Receipt No. _____ NRD

1. Well Owner Upper Elkhorn Natural Resource District Telephone Number (402) 336-3867
Address 301 North Harrison
City O'Neill State NE Zip Code 68763 +

2. Drilling Firm Sargent Irrigation Telephone Number (402) 887-4112
Address Box 9 Contractor's License No. 39194
City Neligh State NE Zip Code 68756 +

3. Permit Number(s)

4. Purpose of well (indicate one): Dewatering (over 90 days) Domestic Geothermal Ground Heat Exchanger
 Ground Water Source Heat Pump Industrial Injection Irrigation Livestock Monitoring
 Observation Public Water Supply (with spacing (46-638)) Public Water Supply (without spacing) Recovery
 Aquaculture Other
(indicate use)

5. Replacement and abandoned well information.

- A. Is this well a replacement well? Yes No
- B. Replacement well is _____ feet from abandoned well
- C. Original well pump column size: _____ inches.
- D. Abandoned well last operated _____,
- E. Location of water use of abandoned well:
- F. Completion of original well abandonment on _____,

6. A. Well location: SW 1/4 of the SW 1/4 of Section 24, Township 29 North, Range 10 East West, Holt County.
B. The well is 125 feet from the North or South section line and 27 feet from the East or West section line.
C. Street address or block, lot and subdivision, if applicable: Site UE 1-99; TH #5-UE-99
D. Location of water use, if applicable (give legal descriptions):
E. If for irrigation, the land to be irrigated is _____ acres.
F. Well reference letter(s), if applicable: Well UE #6M (Center)

7. Pump Information.

- Is pump installed at this time? Yes No
- If yes, complete items A through F.
- If no, complete items A and D with estimated information for those wells in which pump will be installed.
- A. Actual pumping rate, if applicable: _____ gallons per minute. Measured or Estimated
- B. Pump column diameter: _____ inches.
- C. Length of pump column: _____ feet.
- D. Pumping equipment-date installed: _____, _____.
- E. Brand/Type: _____
- F. Pump installed by: Contractor Owner Pump Installer License No. _____

8. Well Construction Information.

A. Total well depth: 120 feet.

B. Static water level: 34.4 feet.

C. Pumping water level: _____ feet.
 Estimated or Measured

D. Well Construction began: 10/1, 1999.

E. Well Construction completed: 10/4, 1999.

F. Bore hole diameter: 7 inches.

G. Plain Casing: Diameter 2.469 ID 2.875 OD inches. Type of material: PVC Schedule 40.

Wall thickness: 0.203 inch(es). Joints-- Welded Glued Threaded/Other:

Length(s) and placement(s) depth from +3 ft. to 106 ft. from _____ ft. to _____ ft.

H. Screen: 2.469 ID 2.875 OD in: type of material PVC Schedule 40

Screen Openings (slot size) 0.010 Trade Name Eagle

Length(s) and placement(s) depth from 106 ft. to 116 ft. from _____ to _____ ft. guides at 102 ft.

I. Gravel pack interval(s) from 103.5 ft. to 120 ft. from _____ ft. to _____ ft. Grade size: 10/20

J. Grouted/Sealed from 0 ft. to 3 ft., with steel cover in concrete
(type)

from 3 ft. to 103.5 ft., with Benseal/EZ mud
(type)

K. Drilling method: Mud Rotary

L. Drilling fluid: Premium Gel

M. Well development technique (total time and method): Air 1 hr

N. Will chemicals, fertilizer or antifreeze be injected or utilized in the system? Yes No

If yes, what will be used:

9. Geologic Materials Logged

Depth in Feet		Description
From	To	
<u>0</u>	<u>12</u>	<u>Silt, v.sandy, light brown</u>
<u>12</u>	<u>88</u>	<u>Gravel, coarse, some medium to coarse sand with silty clay lenses @ 42' & 68'</u>
<u>88</u>	<u>101</u>	<u>Silt, clayey, olive, slightly sandy</u>
<u>101</u>	<u>124</u>	<u>interbedded sand, fine & silt, clayey</u>
<u>124</u>	<u>131</u>	<u>sand, fine</u>
<u>131</u>	<u>143</u>	<u>sandstone/sand, olive</u>
<u>143</u>	<u>151</u>	<u>clay & silt, olive</u>
<u>151</u>	<u>183</u>	<u>sandstone, vf-f, some silt lenses</u>
<u>183</u>	<u>267</u>	<u>sand/sandstone, vf-f, some claystone lenses</u>
<u>267</u>	<u>291</u>	<u>silt, sandy, clayey, some vf-f sand</u>
<u>291</u>	<u>303</u>	<u>sand/sandstone, vf-f</u>
<u>303</u>	<u>308</u>	<u>clay, silty, with claystone</u>

Depth in Feet		Description
From	To	
<u>308</u>	<u>331</u>	<u>sand/sandstone, vf-f, olive</u>
<u>331</u>	<u>342</u>	<u>clay, shaley, yellow-red</u>
<u>342</u>	<u>360</u>	<u>Shale, clayey, light to dark gray</u>

(Additional sheets may be submitted)

10. I am familiar with the information submitted on this registration, and to the best of my knowledge it is true.

Water Well Contractor's Signature

Date

Water Well Owner's Signature

Date

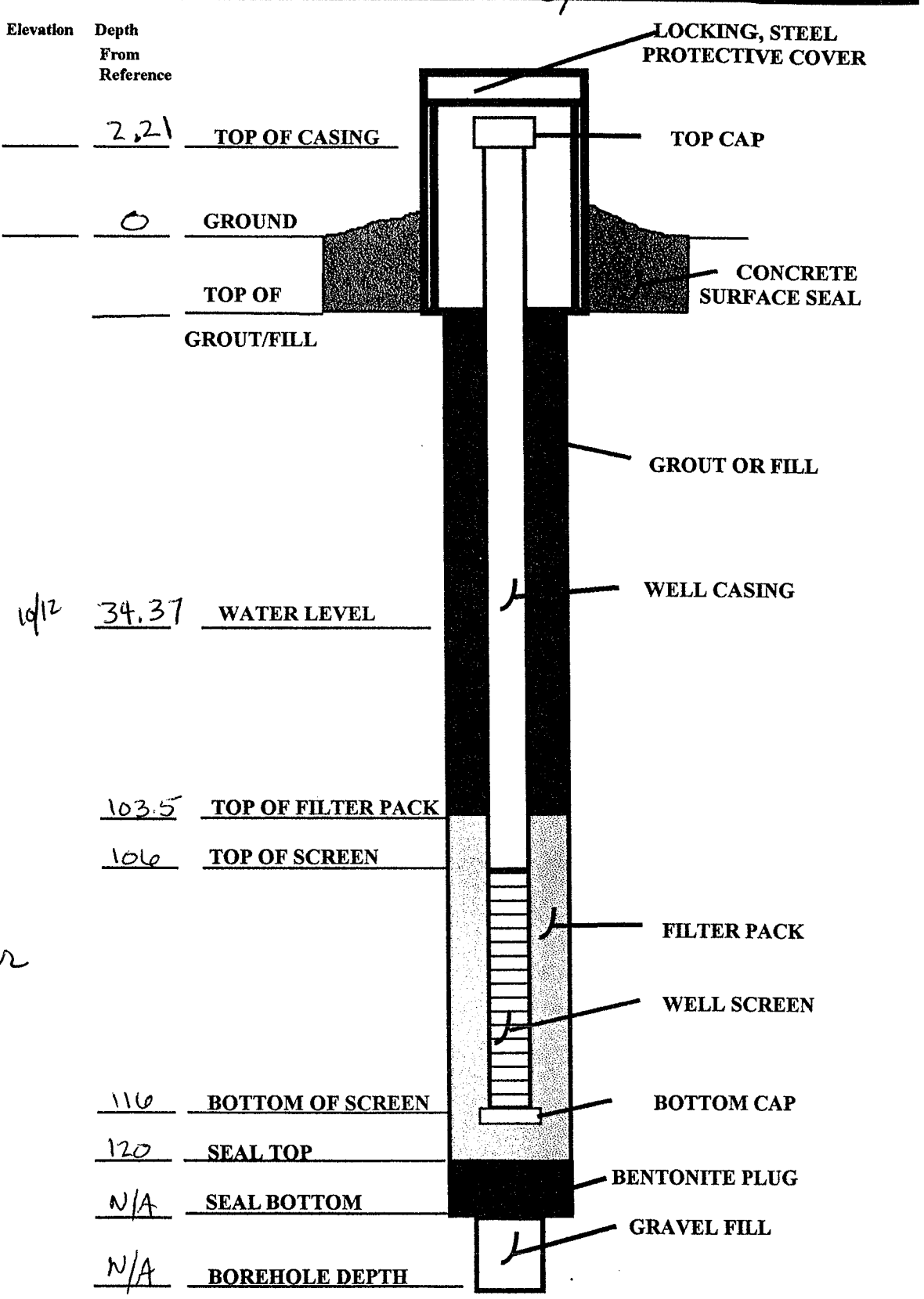
SITE 1-99

TH # 5-0E-99

CONSERVATION AND SURVEY DIVISION--UNL WELL COMPLETION LOG

Project <i>UNED PII</i>	Well Number <i>6M</i>	Date Drilled <i>10/1/99</i>	Date Constructed <i>10/1/99</i>	Ground Elevation <i>1937(6)</i>
County <i>HOLT</i>	Qtr/Qtr/Qtr <i>SW SW SW</i>	Section <i>24</i>	Township <i>27N</i>	Range <i>10W</i>
Drilling Co. <i>SARGENT</i>	Method <i>MUD ROTARY</i>	Driller <i>TRAVIS</i>	Log By <i>Jel</i>	Total Depth

Borehole Diameter <i>7-INCH</i>
Survey Reference
Type/Size of Casing <i>2 1/2" ID SCH 40 THREADED/FLUSH</i>
<i>108- FEET</i>
Type/Size of Screen <i>2 1/2" ID SCH 40</i>
<i>10-FOOT</i>
Screen Slot Size <i>0.010</i>
Filter Pack <i>10/20 Si Sd</i>
<i>8 BAGS</i>
Type/Amount Grout/Fill <i>BENSEAL/EZ-MUD</i>
<i>4.5 BAGS</i>
Type/Amount Seal <i>BOTTOM N/A</i>



*125N 27E
DEVELOPED 1.0R
10/4/99
CENTER WELL*

STATE OF NEBRASKA
DEPARTMENT OF WATER RESOURCES
WATER WELL REGISTRATION

FOR DEPARTMENT USE ONLY

Registration Date: _____ Sequence No. _____ Registration No. _____
Owner Code No. _____ Receipt No. _____ NRD

1. Well Owner Upper Elkhorn Natural Resource District Telephone Number (402) 336-3867
Address 301 North Harrison
City O'Neill State NE Zip Code 68763 +

2. Drilling Firm Sargent Irrigation Telephone Number (402) 887-4112
Address Box 9 Contractor's License No. 39194
City Neligh State NE Zip Code 68756 +

3. Permit Number(s)

4. Purpose of well (indicate one): Dewatering (over 90 days) Domestic Geothermal Ground Heat Exchanger
 Ground Water Source Heat Pump Industrial Injection Irrigation Livestock Monitoring
 Observation Public Water Supply (with spacing (46-638)) Public Water Supply (without spacing) Recovery
 Aquaculture Other
(indicate use)

5. Replacement and abandoned well information.

- A. Is this well a replacement well? Yes No
- B. Replacement well is _____ feet from abandoned well
- C. Original well pump column size: _____ inches.
- D. Abandoned well last operated _____,
- E. Location of water use of abandoned well:
- F. Completion of original well abandonment on _____,

6. A. Well location: SW 1/4 of the SW 1/4 of Section 24, Township 29 North, Range 10 East West, Holt County.
B. The well is 147 feet from the North or South section line and 27 feet from the East or West section line.
C. Street address or block, lot and subdivision, if applicable: Site UE 1-99; TH 5-UE-99
D. Location of water use, if applicable (give legal descriptions):
E. If for irrigation, the land to be irrigated is _____ acres.
F. Well reference letter(s), if applicable: Well UE #6D (North)

7. Pump Information.

- Is pump installed at this time? Yes No
- If yes, complete items A through F.
- If no, complete items A and D with estimated information for those wells in which pump will be installed.
- A. Actual pumping rate, if applicable: _____ gallons per minute. Measured or Estimated
- B. Pump column diameter: _____ inches.
- C. Length of pump column: _____ feet.
- D. Pumping equipment-date installed: _____, _____.
- E. Brand/Type: _____
- F. Pump installed by: Contractor Owner Pump Installer License No. _____

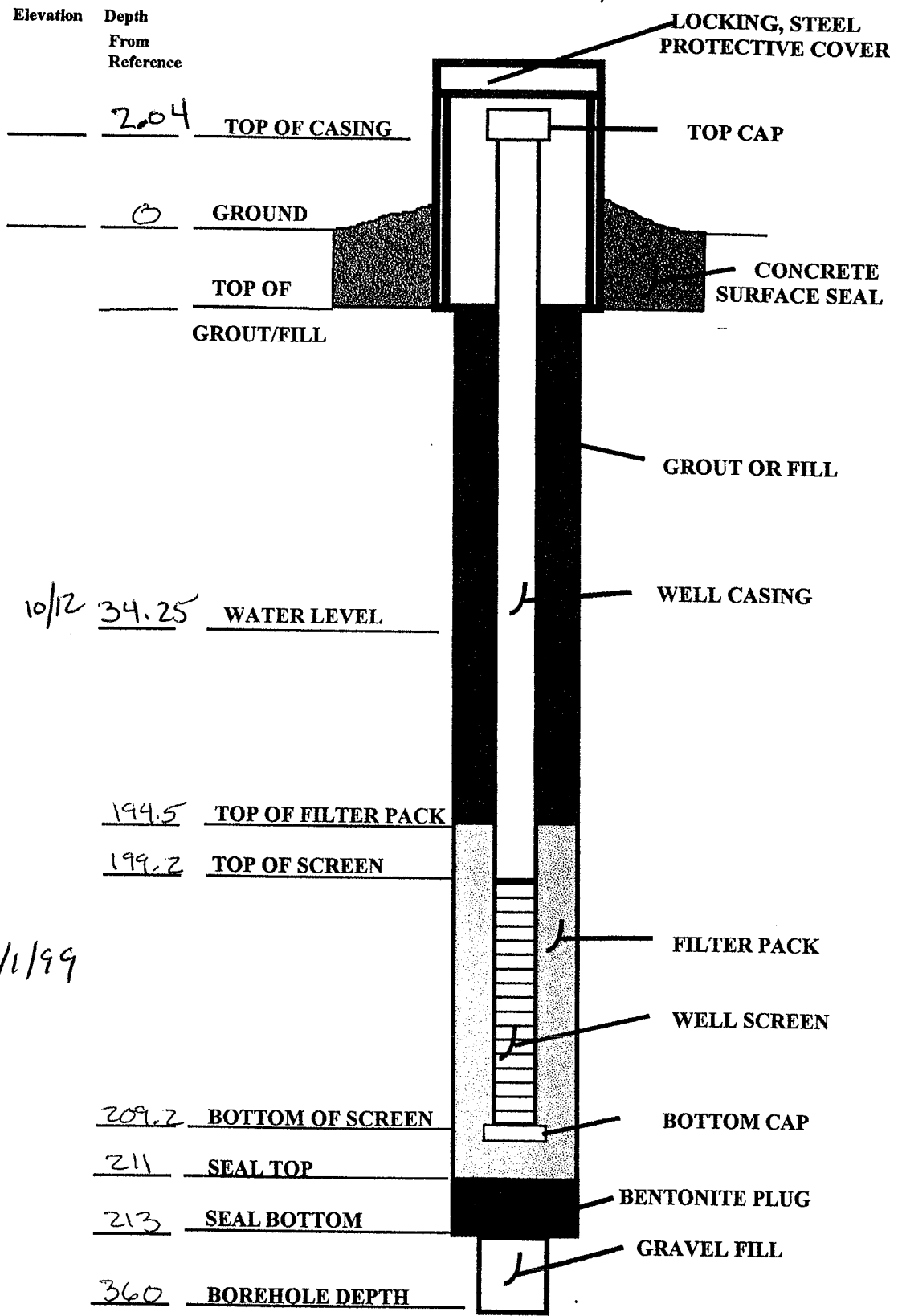
SITE 1-99

TH # 5-012-99

CONSERVATION AND SURVEY DIVISION--UNL **WELL COMPLETION LOG**

Project UENRD P.H	Well Number 6D	Date Drilled 9/30/99	Date Constructed 9/30/99	Ground Elevation 1937(E)
County HOLT	Qtr/Qtr/Qtr SW SW SW	Section 24	Township 27N	Range 10W
Drilling Co. SARGENT	Method MUD ROTARY	Driller TRAVIS	Log By JPL	Total Depth

Borehole Diameter 7-INCH
Survey Reference
Type/Size of Casing 2 1/2" ID SCH 40 THREADED/FLUSH 202- FEET
Type/Size of Screen 2 1/2" ID SCH 40 10- FOOT
Screen Slot Size 0.010
Filter Pack 10/20 Si Sd 9 BAGS
Type/Amount Grout/Fill BENSEAL/1/2-MUD 9 BAGS
Type/Amount Seal BOTTOM 1/4 BAGS CHUNK



147 N 27 E
DEVELOPED 10/1/99
1 1/2" T
NORTH WELL