WELL RECORD

70761 PWTS Permit No. 2007-105W

Iowa Department of Natural Resources – Geological Survey
109 Trowbridge Hall, Iowa City, IA 52242-1319 PH (319) 335-1575

PWTS Well No. W2006918

County Permit No. N/A

Site identification

Property Owner Mid-American-Neal Energy Center South Other ID Well#8

Address 2761 Port Neal Cir., Salix, IA 51052

Tenant Brain Williams

Well Depth 140 ft Date completed 1 / 5 / 07

Location

County Woodbury

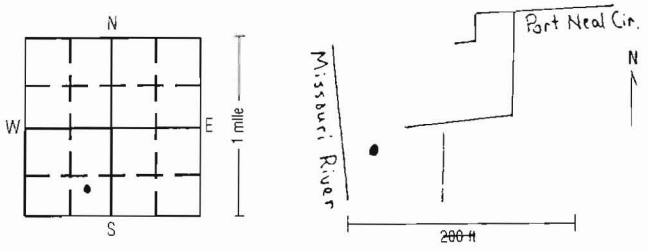
____ mi. N/S and ____ mi. E/W of intersection of _____ and _____

SW 1/4 of the SW 1/4 of the ____ 1/4 of Sec 31 TWP 87 RNG 47 E/W

GPS Coordinates (NAD83 datum only) decimal degrees:

_____ . _____ N. Latitude _____ . _____ W. Longitude.

Show exact location of well in section grid with a dot (●). Sketch map of well location on property.



☐ upland ☐ hillside ☐ valley ☐ level surface Elevation (if known) _____

Formation log

From	To	Color	Hardness	Formation description
0	1			Clay
1	66			Fine Sand
66	82			Fine Med. Sand
82	127			Med. Sand w/ Gravel
127	143			Gravel w/ Cobbles

use additional sheets as needed

Remarks (including depth of lost drilling fluids, materials, or tools)

Drill method

☐ rotary ☐ auger ☐ cable other Rev.

Hole size

32 inch from 0 ft to 147 ft

____ inch from ____ ft to ____ ft

hole size continued

____ inch from ____ ft to ____ ft

____ inch from ____ ft to ____ ft

Record all depth measurements from ground level (GL). Use (+) for above GL measurements.

Casing

Drive shoe (yes / no) Pitless adapter (yes / no)

Size (ID/OD)	Type / Wt	Depth top	Depth bottom	Amount (length)
20"		+1'	110'	111'

Perforated or slotted casing? (yes / no) No

Perforated / slotted from _____ ft to _____ ft

Perforated / slotted from _____ ft to _____ ft

Casing grouted? (yes / no) Placement method _____

Type	Depth top	Depth bottom	Amount (vol/wt)
Sand/Gravel	0	20	4yds.
Grout (plug)	20	25	40 bags

Well screen? (yes / no)

Diameter	Slot size	Depth top	Depth bottom	Length	Material
20"	0.100	110	140	30'	SST
	0.___				

Bottom capped (yes / no) Yes with 20" plate

Seals / Packers (yes / no) No kind _____ depth _____ ft

Gravel packed (yes / no) Yes from 25 ft to 147 ft

type AA amount 48 ton

Well developed? (yes / no) No

Explain _____

(pumped, airlifted, bailed) for _____ hrs at _____ GPM

Pump installed? (yes / no) NO Date ____ / ____ / ____

Installer's name _____

Type of pump _____ Depth to intake _____ ft

Pump diameter _____ Rated capacity _____ GPM

Water information

Aquifer: ☒ sand / gravel ☐ limestone ☐ sandstone

Main water-supply zone from 110 ft to 140 ft ☐ seepage well

Static water level _____ ft (below / above) GL; ☐ tape ☐ airline ☐ E-line ☐ estimate

Pumping water level _____ ft below GL; ☐ tape ☐ airline ☐ E-line ☐ estimate

At yield of _____ GPM; ☐ orifice ☐ volumetric ☐ estimate for _____ hours

Measurements taken at _____ : _____ (AM / PM) Date ____ / ____ / ____

Water quality test? (yes / no) Date tested ____ / ____ / ____

Tested by _____

Well use

☐ Domestic ☐ Livestock ☐ Test well
☐ Heat pump ☐ Municipal ☒ Public supply ☐ Irrigation
☐ Commercial ☐ Monitoring ☐ Other _____

Contractor Layne Western Co.

Address 4601 N. 252nd St., Valley, NE 68064

Driller Duane Trask Certification no. 5509

Send original form to: Iowa Department of Natural Resources – Geological Survey

Make photocopies for: Well Contractor, Customer, and County Health Department

70761

Layne-Western

A Division of Layne Christensen Company
4601 N. 252nd Street, PO Box 597
Valley, Nebraska 68064
(402) 359-2042

WELL INFORMATION

1. Contact: **Mid American-Neal South** Date: **1/5/2007**
2. City and State: **Salix, IA** Driller: **Duane Trask**
3. Well No. **8** at test hole No. **2006-01** Well location (attach map) **West of Plant**
4. Work completed: _____ Number of man-hours as charged to job on daily report: _____

5. Materials:

	Length	Diameter	Gauge or Wall Thickness	Material	Type	Number of Openings
6. Screen:	30	20"	.375	SST	Johnson HI-Q	.100
7. Inner Casing:	110	20"	.375	Carbon Steel	Livingston	
8. Outer Casing:						

9. **48** tons of gravel used in the well. Size: **LM "AA"**
10. Well Test. Did you use test or permanent pump? **Test** Bowl Size: _____ Stages: _____
11. Size of orifice: **6** inch by **5** inch. Orifice tube reading: _____ inches.
12. Pumping test (measurements from ground-level):

Time	Gallons Per Minute (GPM)	Static	Drawdown	Pumping Level
8 Hrs	**1000**	**23'**	**2'-4"**	**25'-4"**

13. Recovery in 5-minutes: **Yes**, in 30-minutes: _____
14. Did you seal bottom of well? **Yes**. Thickness: **.375** inches. Material: **SST**
15. Well under-reamed? From _____ feet to _____ feet, _____ feet to _____ feet.
16. If all screen was not placed at bottom, state how is was spaced.
    From _____ feet to _____ feet; from _____ feet to _____ feet; from _____ feet to _____ feet.
17. Depth of well from ground level to top of plug: **140'**. Size of drilled hole: **32** inches.
18. Was cement placed around or between any of the casings? **Yes**. If so, state where, how much **0'-20'** and method used: **4 yards by the Tremie Method**

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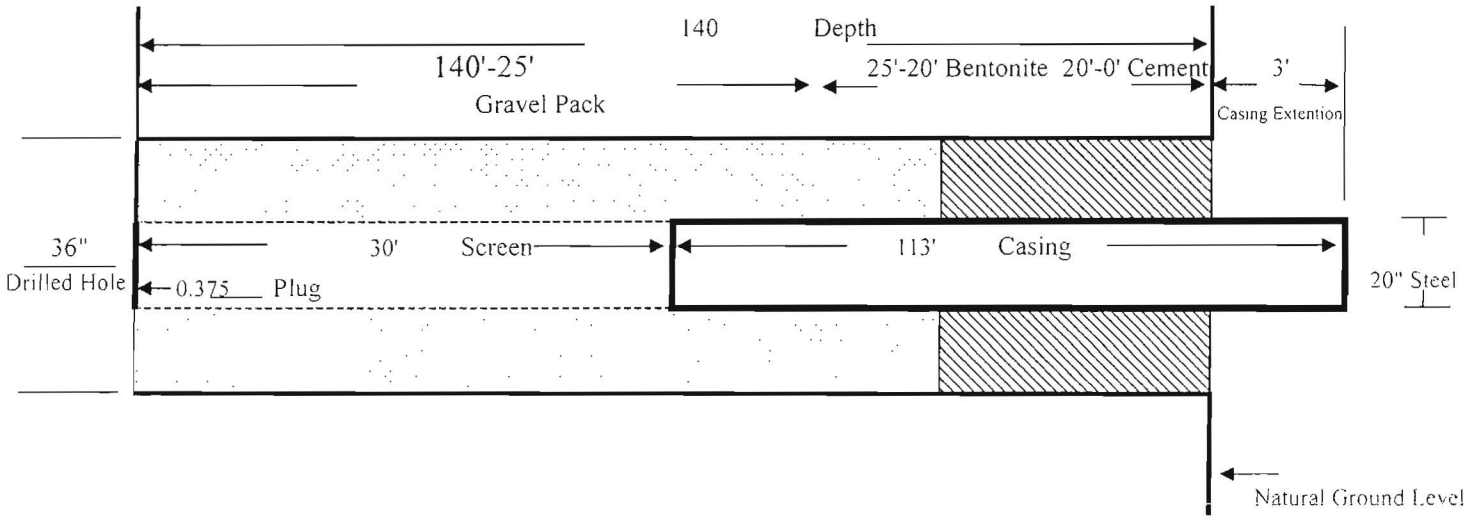
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WELL INFORMATION

CONTRACT Mid American Energy-Neal South WELL No. 8

Log of well from ground level: Date Installed: 1/5/07

Feet		Feet	Formation
0	to	1	Clay
1	to	66	Fine Sand
66	to	82	Fine/Medium Sand
82	to	127	Medium Sand with Gravel
127	to	143	Gravel with Cobbles
	to		
	to		
	to		
	to		
	to		
	to		
	to		
	to		
	to		
	to		
	to		
	to		
	to		



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PUMPING TEST

Job	Mid American Energy	Well No.	#8	Date Tested	1/12/2007
Location	West of Plant			Tested By	J.Guevara/B. Watkins
Diameter of Well	20"			Driver	75HP Sub motor
Depth of Well	140 1/2	Pump Used:		Column and Shaft	
Length of Airline				Bowls	10 L Crown
Non-Pumping Level	23			Manufacturer	Crown
Orifice Size	10 x 7 1/2			Well #7 was off at start of constant test	

Time	Piezometer Reading (in.)	G.P.M.	Sand Readings	Pumping Level	Drawdown	Disch. Pressure		Total Pumping Head	Orifice
						Lbs.	Feet		
9:00	Start	1000							
9:01:00				25' 4"		44		84'	10 x 7 1/2
9:02				25' 4"					
9:03:00				25' 4"					
9:04				25' 4"					
05:00				25' 4"					
9:06				25' 4 1/2"					
9:07:00				25' 4 1/2"					
9:08				25' 4 1/2"					
9:09:00				25' 4 1/2"					
9:10				25' 4 1/2"					
9:15				25' 4 1/2"					
9:20				25' 4 1/2"					
9:25				25' 4 1/2"					
9:30				25' 4 1/2"					
9:45				25' 4 1/2"		44		84'	10 x 7 1/2
10:00				25' 4 1/2"					
10:20				25' 4 1/2"					
10:40		1000		25' 4 1/2"					
11:00				25' 4 1/2"					
11:20				25' 4 1/2"					
11:40				25' 4 1/2"					
12:00				25' 4 1/2"					
12:30			No Reading	25' 4 1/2"					
1:00			Trace	25' 4 1/2"					
1:30		1000		25' 4 1/2"		44		84'	10 x 7 1/2

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Length of Airline				Bowls	10 L Crown
Non-Pumping Level	23			Manufacturer	Crown
Orifice Size	10 x 7 1/2			Well #7 was off at start of constant test	

Time	Piezometer Reading (in.)	G.P.M.	Sand Readings	Pumping Level	Drawdown	Disch. Pressure		Total Pumping Head	Orifice
						Lbs.	Feet		
2:00		1000	Sand	25' 4 1/2"		44		84'	10 x 7 1/2
2:30:00				25' 4 1/2"					
3:00				25' 4 1/2"					
3:30:00				25' 4 1/2"					
4:00				25' 4 1/2"					
:30:00									
5:00		1000	Trace			44		84'	10 x 7 1/2
Recovery:									
5:01				23' 4 1/4"					
5:02:00				23' 4 1/4"					
5:03				23' 4 1/4"					
5:04				23' 4 1/4"					
5:05				23' 4 1/4"					
5:06				23' 4 1/4"					
5:07				23' 4 1/4"					
5:08				23' 4 1/4"					
5:09				23' 4 1/4"					
5:10				23' 4 1/4"					
5:15				23' 4 1/4"					
5:20				23' 4 1/4"					
5:25				23' 4 1/4"					
5:30				23' 3"					
5:45				23' 3"					
6:00				23' 3"					

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PUMPING TEST

RECOVERY

Job Mid American Enery | Well No. 8 | Date Tested 1/11/2007

Location West of Plant | Tested By J. Guevara/B. Watkins

Diameter of Well 20" | Driver

Depth of Well 140' 1/2" | Pump Used: | Column and Shaft

Length of Airline N/A | Bowls Crown

Non-Pumping Level 23' 3" | Manufacturer

Orifice Size | Serial No.

Time	Piezometer Reading (in.)	G.P.M.	Specific Capacity	Pumping Level	Drawdown	Disch. Pressure		Total Pumping Head	Orifice
						Lbs.	Feet		
3:05									
3:10:00		558		24' 6"				84'	10 x 7 1/2
3:15		558		24' 6"					
3:20:00		558		24' 6"					
3;25		558		24' 6"					
3:30:00		558		24' 6"					
3:35		558		24' 6"					
3:40:00		750		24' 10 1/2"					
3:45		750		24' 10 1/2"					
3:50:00		750		24' 10 1/2"					
3:55		750		24' 10 1/2"					
4:00		750		24' 10 1/2"					
4:05		750		24' 10 1/2"					
4:10		1504		26' 8"					
4:20		1504		26' 8"					
4:30		1504		26' 8"					
4:40		1504		26' 8 1/4"					
4:50		1504		26' 8 1/4"					
5:00		1504		26' 8 1/4"					
5:10		1504		26' 8 1/4"					

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PLUMBNESS & ALIGNMENT TESTING

LAYNE-WESTERN

A Division of Layne Christensen Company

CUSTOMER: Mid American Energy

WELL NO.: 8

FOREMAN: Jesus Guevara

DATE COMPELTED: 1/16/2007

	NORTH/SOUTH	EAST/WEST
0	10 1/6	9 9/16
10	10 3/8	9 5/8
20	10 7/16	9 11/16
30	10 7/16	9 3/4
40	10 3/8	9 7/8
50	10 3/8	9 7/8
60	10 5/16	9 13/16
70	10 5/16	9 11/16
80	10 7/16	9 11/16
90	10 7/16	9 9/16
100	10 1/2	9 9/16
110	10 9/16	9 9/16
120	10 5/8	9 1/2
130	10 11/16	9 7/16
140		
150		
160		
170		
180		
190		
200		
210		
220		
230		
240		
250		
260		
270		
280		