WELL #2

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

# WELL RECORD 62000

Permit No. 2006-030W

## Site identification

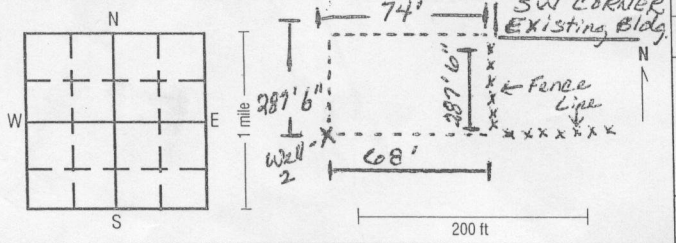
Property Owner Central Iowa Water Assn Well Number 2
Address 1224 230th St., Waverly, Iowa 50677
Tenant City of Waverly
Well Depth 175 ft Date completed 3 / 1 / 06

## Location

County Bremer

1/2 mi. N/S and 2 1/2 mi. E/W of intersection of Hwy 218 and Hwy 3
NE 1/4 of the NW 1/4 of the ____ 1/4 of Sec 9 TWP 91 RNG 14 E/W

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




☐ upland ☐ hillside ☐ valley Elevation (if known) ____

## Formation log

| From | To | Color | Hardness | Formation description |
|---|---|---|---|---|
| 0 | 20 | Grey | S | Clay |
| 20 | 30 | Brown | S | Sand |
| 30 | 40 | Gray | S | Clay |
| 40 | 45 | Brn/Gry | S | Clay Lenses/Coarse Snd. |
| 45 | 50 | Tan/Ylw | S | Limestone-Clay Layers |
| 50 | 60 | Tan/Ylw | S | Limestone/ Clay Layers-Shale |
| 60 | 65 | Tan | M-H | Limestone/Rock |
| 65 | 80 | Tan | H | Limestone |
| 80 | 85 | Lt. Brn | H | Limestone Shale-Clay Lenses |
| 85 | 90 | Brown | H | Limestone |
| 90 | 100 | Brn/Rd Wht/Gry | H | Limestone/Shale Layers |
| 100 | 120 | Brn/Red Gray | H | Limestone- Small Shale Lenses |
| 120 | 133 | Brown | H | Limestone-Shale Layers |
| 133 | 141 | Brown | H | Limestone-Shale Layers |
| 141 | 159 | Brn/Gry | H | Limestone-Shale Layers |
| 159 | 175 | Tan | H | Limestone |
| 175 | | Grn/Gray | H | Shale |

use additional sheets as needed

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

## Well use

☐ Domestic ☐ Municipal ☐ Commercial
☐ Livestock ☒ Public supply ☐ Monitoring
☐ Test well ☐ Irrigation ☐ Other ____ (explain)

## Drill method

☐ rotary ☐ auger ☒ cable other dual rotary

**Hole size** 24" Driven

24 inch from 0 ft to 65 ft
18 inch from 65 ft to 175 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) |
|---|---|---|---|---|
| 24" OD | Steel/94 | .63 0 | 65' | 65' |
| 18" OD | Steel/70 | .59 0 | 80' | 80' |
| | | | | |
| | | | | |

## Perforated or slotted casing? (yes / no)

Perforated / slotted from ____ ft to ____ ft
Perforated / slotted from ____ ft to ____ ft

## Casing grouted? (yes / no)

Placement method trim pipe

| Type | Depth Top | Depth bottom | Amount (vol/wt) |
|---|---|---|---|
| Portland Cement | 0 | 80' | 4 yds. |
| Portland Cement | 175' | 185' | 1 yd. |

## Well screen? (yes / no)

| Diameter | Slot size | Depth Top | Depth Bottom | Length | Material |
|---|---|---|---|---|---|
| | 0.___ | | | | |
| | 0.___ | | | | |

Bottom capped (yes / no) with ____
Seals / Packers (yes / no) kind ____ depth ____ ft
Gravel packed (yes / no) from ____ ft to ____ ft
type ____ amount ____

## Well developed? (yes / no)

Explain Air Lifted
(pumped, airlifted, bailed) for 27.75 hrs at 450 GPM.

## Pump installed? (yes / 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 80 ft to 175 ft ☐ seepage well
Static water level 71 ft (below / above) GL; ☒ tape ☐ airline ☐ E-line ☐ estimate
Pumping water level 71.3 ft below GL; ☒ tape ☐ airline ☐ E-line ☐ estimate
At yield of 450 GPM; ☐ orifice ☐ volumetric ☒ estimate
Measurements taken at 3 : 15 (AM / PM) Date 2 / 24 / 06

## Water quality test? (yes / no)

Date tested ____ / ____ / ____
Tested by ____

Contractor STEFL DRILLING & pump
Address willmar, MN
Driller Ed Feia & Tony Burroughs Certification no. 5280

white copy – **Iowa DNR, Geological Survey Bureau** blue copy – **Well Contractor** pink copy – **Customer** yellow copy – **County Health Officer**

# DEVELOPMENT REPORT



DRILLER: Ed Feia & Tony Burroughs NAME: CENTRAL IOWA WATER Job# 307270 Well #: 2

| DATE | TIME | PROCEDURE/METHOD | WATER QTY | SAND QTY | | GPM |
|---|---|---|---|---|---|---|
| 2/23/2006 | 7:15 AM | Pressurize & surge well at bottom, water is cloudy | | 1" | c/g | 450 |
| | | after 5 min. check sand - cloudy water | | 3/8" | c/g | 450 |
| | | cycle every 15 min. | | | | |
| | 7:00 PM | SWL 71' PWL 71.8' - Shut Down | | | | 450 |
| | | | | | | |
| 2/24/2006 | 7:15 AM | Start up - had a blockage at 130' drilled thru | | | | |
| | | Pressurize & surge well, cloudy water | | 3/4" | c/g | 450 |
| | | after 5 min. check sand, cloudy water | | 1/4" | c/g | 450 |
| | | after 10 min., cloudy water | | 1/8" | c/g | 450 |
| | | cycle every 15 min. | | | | |
| | 3:00 PM | Shut Down | | | | |
| | | | | | | |
| 2/27/2006 | 7:00 AM | Development | | | | |
| | | Pressurize and surge - remove pete gravel | | | | |
| | | blow and surge well, cloudy water at surge | | 3/4" | c/g | 450 |
| | 3:15 PM | After 5 min. Shut Down | | 1/4" | c/g | 450 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Well Drift Calculations
Project: CENTRAL IOWA WATER ASSO.
Project No: 307270
Driller: Ed Feia

DATE: 2/28/06

Diameter of Inner Casing 17 inches
Height of Apex Above Top of Well 10 feet
Static Water Level 71 feet

Plumb Bob O.D. 17.50
Depth of Well: Casing to 80' bottom at 175'

| Depth of Plummet Below Top of Well (feet) | Horizontal Deflection of Plumb Line (inches) | | | | Calculated Drift of Well (inches) | | | | Actual Drift (inches) | Allowed Drift (inches) |
|---|---|---|---|---|---|---|---|---|---|---|
| | North | South | East | West | North | South | East | West | | |
| 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000 | 120.700 |
| 20 | 0.031 | 0 | 0 | 0 031 | 0.093 | 0 | 0 | 0.093 | 0.132 | 241.400 |
| 30 | 0.031 | 0 | 0 | 0.031 | 0.124 | 0 | 0 | 0.124 | 0.175 | 362.100 |
| 40 | 0.125 | 0 | 0 | 0 | 0.625 | 0 | 0 | 0 | 0.625 | 482 800 |
| 50 | 0.125 | 0 | 0 | 0 | 0.75 | 0 | 0 | 0 | 0.750 | 603.500 |
| 60 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000 | 724.200 |
| 70 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000 | 844.900 |
| 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000 | 965.600 |




## VIDEO INSPECTION LOG

**CENTRAL IOWA WATER ASSOCIATION – Municipal Well No.** 2 **Date Video Logged** – March 10, 2006
**Address** – 1224 230th Street, Waverly **T.R.S.** – 91, 14, 9 **Quarter Section** – NE of NW
**Purpose** – New Construction Inspection **G.P.S.** – N42 deg. 42.765' W092 deg. 30.586'
**Aquifer** – Selurian – Devonian Cedar Valley **Depth Reference** – Grade
**Drilling Company** – Mark J. Traut Wells, Inc. **Drillers** – Mr. Ed Feia & Mr. Tony Burroughs
**Pump Setting** – n.a. **Reported 24 inch Casing** – 0 to 65 feet **Reported 18 inch Casing** – 0 to 80 feet
**Reported 18 inch Open Hole** – 80 to 185 feet **Reported Depth** – 175 feet
**Depth Reference** – Top of 18 inch Casing **Stickup** – 25 inches above Grade
**Water Level** – 75.0 feet **18 inch Casing** – 0 to 82.4 feet
**18 inch Open Hole** – 82.4 to 147.2 feet (Obstructed) **Depth Logged** – 147.2 feet
**Engineering Company** – McClure Engineering Company **Engineer / Project Manager** – Mr. Darin Jacobs
**Client** – Mark J. Traut Wells, Inc. **Representative** – Mr. Mike Konz
**Association Supply / Treatment Manager** – Mr. Dan McGinnis **Inspected By** - Jim H. Traen

| Recording Time | | Depths(in feet) | Remarks/Observations |
|---|---|---|---|
| | | | **Centering Guides @ 17 inches** |
| 08:49 | 0:00:00 | 006.0 | Start Inspection (18 inch Casing) |
| 08:53 | 0:03:38 | 019.8 | Casing Joint - Welded |
| 08:55 | 0:05:34 | 025.6 | Casing Joint - Welded |
| 08:57 | 0:07:44 | 040.4 | Casing Joint - Welded |
| 08:59 | 0:09:26 | 045.3 | Casing Joint – Welded |
| 09:01 | 0:12:28 | 060.3 | Casing Joint - Welded |
| 09:04 | 0:14:38 | 065.3 | Casing Joint - Welded |
| 09:06 | 0:16:33 | 075.0 | Static Water Level |
| 09:09 | 0:19:50 | 082.4 | End of 18 inch Casing |
| 09:15 | 0:25:30 | 090.6 | Semi-Vertical Fracture |
| 09:21 | 0:32:19 | 131.0 | Vertical Fracture |
| 09:24 | 0:35:15 | 146.2 | Obstructed |
| | | | Rock Partially Covering Remaining Hole |
| | | | **Camera Trapped in Hole** |
| 09:35 | 0:46:57 | 146 | Halt Recording |
| | | | **Attempting to Remove Camera** |
| 11:36 | 0:46:57 | 065.8 | Resume Recording |
| 11:39 | 0:50:10 | 011.1 | End of Inspection |

*fax: (763) 784-2244 · phone: (651) 238-1198 · residence: (763) 785-1876 · e-mail: marsabitt@aol.com*
*web site: www.downholewellservices.com · address: 8145 long lake rd., mounds view, mn 55112-6033*

PROJECT: Central Iowa
Test By: Mike K. & Mark Leither

Well # 2 Uniq #
Date: 3/8/2006 Job #: 307270
Meter Reading Beginning: -
Meter Reading Ending: -

Well Information:

| | | | | | |
|---|---|---|---|---|---|
| Length of Casing | 80' | | Hp of Pump | 125 | |
| Length of Screen | n/a | | Model of Pump | 14TLC | |
| Total Well Depth | 175' | | Specific Capacity | - | |
| Static Water Level | 12.82 | 78.6 | Take Readings From Grade | | |
| Well Capacity | - | GPM @ | - PWL | - | G.P.F.D.D. |

*Notes:

STEP TEST Page 1 of 6

| Date | Time | AM | PM | GPM | PWL | Sand/Gal | Comments |
|---|---|---|---|---|---|---|---|
| *1/2/2001* | 12:34 | X | X | 123 | 12'3" | 4" c/g | This is a sample |
| 3/8/2006 | 12:22 | | X | 600 | Start Up | | |
| | 12:23 | | X | 600 | 73.48 | 3/4" c/g | |
| | 12:24 | | X | 600 | 73.49 | 3/4" c/g | |
| | 12:25 | | X | 600 | 73.5 | 3/4" c/g | |
| | 12:26 | | X | 600 | 73.53 | 1/8" c/g | |
| | 12:27 | | X | 600 | 73.57 | 1/8" c/g | |
| | 12:28 | | X | 600 | 73.59 | 1/4" c/g | |
| | 12:29 | | X | 600 | 73.59 | 1/4" c/g | |
| | 12:30 | | X | 600 | 73.59 | 1/4" c/g | |
| | 12:31 | | X | 600 | 73.59 | 3/8" c/g | |
| | 12:32 | | X | 600 | 73.59 | 3/8" c/g | |
| | 12:35 | | X | 600 | 73.59 | 3/8" c/g | 2.99 200.67 |
| | 12:36 | | X | 1200 | - | - | |
| | 12:37 | | X | 1200 | 74.51 | 1/4" c/g | |
| | 12:38 | | X | 1200 | 74.61 | 1/4" c/g | |
| | 12:39 | | X | 1200 | 74.68 | 1/4" c/g | |
| | 12:40 | | X | 1200 | 74.71 | 1/4" c/g | |
| | 12:41 | | X | 1200 | 74.72 | 1/4" c/g | |
| | 12:42 | | X | 1200 | 74.76 | 1/4" c/g | |
| | | | | | | | |

The data stated above is representative of the time spent pumping at the capacities stated. Deviation from either time spent pumping or both could change the outcome if these results.

**NOTE**: On RECOVERY need: 5-1 minute checks
5-5 minute checks
2-30 minute checks
1-per hour as needed

***Transducer #2 set 94' from top of casing at 1 min. intervals.**

PROJECT: Central Iowa
Test By: Mike K. & Mark Leither

Well #: 2 Uniq # 0
Date: 3/8/2006 Job #: 307270
Meter Reading Beginning: -
Meter Reading Ending: -

Well Information:

| | | | |
|---|---|---|---|
| Length of Casing | 80' | Hp of Pump | 125 |
| Length of Screen | n/a | Model of Pump | 14TLC |
| Total Well Depth | 175' | Specific Capacity | - |
| Static Water Level | 12.82 | Take Readings From Grade | |
| Well Capacity | - GPM @ | - PWL | - G.P.F.D.D. |

*Notes:

**STEP TEST** Page 2 of 6

| Date | Time | AM | PM | GPM | PWL | Sand/Gal | Comments |
|---|---|---|---|---|---|---|---|
| *1/2/2001* | 12:34 | X | X | 123 | 12'3" | 4" c/g | This is a sample |
| 3/8/2006 | 12:43 | | X | 1200 | 74.78 | 1/8" c/g | |
| | 12:44 | | X | 1200 | 74.79 | 1/8" c/g | |
| | 12:45 | | X | 1200 | 74.8 | 1/8" c/g | |
| | 12:50 | | X | 1200 | 74.84 | 1/8" c/g | 4.34 276.5 |
| | 12:51 | | X | 1800 | - | - | |
| | 12:52 | | X | 1800 | 76.19 | | |
| | 12:53 | | X | 1800 | 76.38 | 1/4" c/g | |
| | 12:54 | | X | 1800 | 76.45 | 1/4" c/g | |
| | 12:55 | | X | 1800 | 71.52 | 1/4" c/g | |
| | 12:56 | | X | 1800 | 71.58 | 1/4" c/g | |
| | 12:57 | | X | 1800 | 76.62 | 1/8" c/g | |
| | 12:58 | | X | 1800 | 76.67 | 1/8" c/g | |
| | 12:59 | | X | 1800 | 76.71 | 1/8" c/g | |
| | 1:00 | | X | 1800 | 76.74 | 1/8" c/g | |
| | 1:05 | | X | 1800 | 76.82 | 1/8" c/g | |
| | 1:10 | | X | 1800 | 76.91 | 1/8" c/g | |
| | 1:15 | | X | 1800 | 76.97 | 1/8" c/g | 6.47 278.2 |
| | 1:16 | | X | 2400 | - | - | |
| | 1:17 | | X | 2400 | 78.18 | 1/4" c/g | |
| | | | | | | | |

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**NOTE**: On RECOVERY need: 5-1 minute checks
5-5 minute checks
2-30 minute checks
1-per hour as needed

PROJECT: Central Iowa
Test By: Mike K. & Mark Leither

Well #: 2 Uniq # 0
Date: 3/8/2006 Job #: 307270
Meter Reading Beginning: -
Meter Reading Ending: -

Well Information:

| | | | |
|---|---|---|---|
| Length of Casing | 80' | Hp of Pump | 125 |
| Length of Screen | n/a | Model of Pump | 14TLC |
| Total Well Depth | 175' | Specific Capacity | - |
| Static Water Level | 12.82 | Take Readings From Grade | |
| Well Capacity | - GPM @ | - PWL | - G.P.F.D.D. |

*Notes:

**STEP TEST** Page 3 of 6

| Date | Time | AM | PM | GPM | PWL | Sand/Gal | Comments |
|---|---|---|---|---|---|---|---|
| *1/2/2001* | 12:34 | X | X | 123 | 12'3" | 4" c/g | This is a sample |
| | 1:18 | | X | 2400 | 78.45 | 1/4" c/g | |
| | 1:19 | | X | 2400 | 78.59 | 1/4" c/g | |
| | 1:20 | | X | 2400 | 78.67 | 1/4" c/g | |
| | 1:21 | | X | 2400 | 78.74 | 1/4" c/g | |
| | 1:22 | | X | 2400 | 78.79 | 1/4" c/g | |
| | 1:23 | | X | 2400 | 78.86 | 1/4" c/g | |
| | 1:24 | | X | 2400 | 78.87 | 1/4" c/g | |
| | 1:25 | | X | 2400 | 78.49 | 1/4" c/g | |
| | 1:30 | | X | 2400 | 79.5 | 1/4" c/g | 9 266.67 |
| | 1:31 | | X | 3000 | 80 | 3/4" c/g | Brown |
| | 1:32 | | X | 3000 | 80.86 | 3/4" c/g | |
| | 1:33 | | X | 3000 | 81.13 | 3/4" c/g | |
| | 1:34 | | X | 3000 | 81.28 | 3/4" c/g | |
| | 1:35 | | X | 3000 | 81.35 | 1/2" c/g | Brown |
| | 1:36 | | X | 3000 | 81.42 | 1/2" c/g | |
| | 1:37 | | X | 3000 | 81.46 | 1/2" c/g | |
| | 1:38 | | X | 3000 | 81.48 | 1/2" c/g | |
| | 1:39 | | X | 3000 | 81.55 | 1/2" c/g | Brown |
| | 1:40 | | X | 3000 | 81.61 | 1/2" c/g | |
| | | | | | | | |

The data stated above is representative of the time spent pumping at the capacities stated. Deviation from either time spent pumping or both could change the outcome if these results.

**NOTE**: On RECOVERY need: 5-1 minute checks
5-5 minute checks
2-30 minute checks
1-per hour as needed

PROJECT: Central Iowa
Test By: Mike K. & Mark Leither

Well #: 2 Uniq # 0
Date: 3/8/2006 Job #: 307270
Meter Reading Beginning: -
Meter Reading Ending: -

Well Information:

| | | | |
|---|---|---|---|
| Length of Casing | 80' | Hp of Pump | 125 |
| Length of Screen | n/a | Model of Pump | 14TLC |
| Total Well Depth | 175' | Specific Capacity | - |
| Static Water Level | 12.82 | Take Readings From Grade | |
| Well Capacity | - GPM @ | - PWL | - G.P.F.D.D. |

*Notes:

STEP TEST Page 4 of 6

| Date | Time | AM | PM | GPM | PWL | Sand/Gal | Comments |
|---|---|---|---|---|---|---|---|
| *1/2/2001* | 12:34 | X | X | 123 | 12'3" | 4" c/g | This is a sample |
| | 1:45 | | X | 3000 | 81.79 | 1/2" c/g | |
| | 1:50 | | X | 3000 | 81.92 | 1/2" c/g | |
| | 1:55 | | X | 3000 | 82.04 | 1/2" c/g | |
| | 2:00 | | X | 3000 | 82.12 | 1/2" c/g | 11.62 2582 |
| | SHUT DOWN | | | Off from 2:00 pm to 2:30 pm 3/8/06 | | | |
| 3/8/2006 | 2:30 | | X | 2400 | Start Up | - | |
| | 2:31 | | X | 2400 | 77.41 | 1/2" c/g | |
| | 2:32 | | X | 2400 | 77.79 | 1/2" c/g | |
| | 2:33 | | X | 2400 | 78.08 | 1/2" c/g | |
| | 2:34 | | X | 2400 | 78.32 | 1/2" c/g | |
| | 2:35 | | X | 2400 | 78.45 | 1/4" c/g | |
| | 2:36 | | X | 2400 | 78.53 | 1/4" c/g | |
| | 2:37 | | X | 2400 | 78.66 | 1/4" c/g | |
| | 2:38 | | X | 2400 | 78.75 | 1/4" c/g | |
| | 2:39 | | X | 2400 | 78.83 | 1/4" c/g | |
| | 2:40 | | X | 2400 | 78.87 | 1/4" c/g | 2:41 Throttle Back to 2200 |
| | 2:45 | | X | 2200 | 78.53 | 1/8" c/g | |
| | 2:50 | | X | 2200 | 78.62 | 1/8" c/g | |
| | 2:55 | | X | 2200 | 78.72 | 1/8" c/g | |
| | | | | | | | |

The data stated above is representative of the time spent pumping at the capacities stated. Deviation from either time spent pumping or both could change the outcome if these results.

**NOTE:** On RECOVERY need: 5-1 minute checks
5-5 minute checks
2-30 minute checks
1-per hour as needed

PROJECT: Central Iowa
Test By: Mike K. & Mark Leither

Well #: 2 Uniq # 0
Date: 3/8/2006 Job #: 307270
Meter Reading Beginning: -
Meter Reading Ending: -

Well Information:

| | | | |
|---|---|---|---|
| Length of Casing | 80' | Hp of Pump | 125 |
| Length of Screen | n/a | Model of Pump | 14TLC |
| Total Well Depth | 175' | Specific Capacity | - |
| Static Water Level | 12.82 | Take Readings From Grade | |
| Well Capacity | - GPM @ | - PWL | - G.P.F.D.D. |

*Notes:

**STEP TEST** Page 5 of 6

| Date | Time | AM | PM | GPM | PWL | Sand/Gal | Comments |
|---|---|---|---|---|---|---|---|
| *1/2/2001* | 12:34 | X | X | 123 | 12'3" | 4" c/g | This is a sample |
| 3/8/2006 | 3:00 | | X | 2200 | 78.81 | 1/8" c/g | |
| | 3:10 | | X | 2200 | 78.89 | 1/8" c/g | |
| | 3:20 | | X | 2200 | 78.98 | 1/8" c/g | |
| | 3:30 | | X | 2200 | 79.06 | 1/8" c/g | |
| | 3:45 | | X | 2200 | 79.14 | 1/8" c/g | |
| | 4:00 | | X | 2200 | 79.22 | 1/8" c/g | |
| | 4:30 | | X | 2200 | 79.29 | 1/8" c/g | |
| | 5:00 | | X | 2200 | 79.35 | 1/16" | |
| | 5:30 | | X | 2200 | 79.40 | 1/16" | |
| | 6:00 | | X | 2200 | 79.45 | 1/16" | |
| | 6:30 | | X | 2200 | 79.5 | 1/16" | |
| | 7:00 | | X | 2200 | 79.56 | 1/16" | |
| | 7:30 | | X | 2200 | 79.62 | 1/16" | |
| | 8:00 | | X | 2200 | 79.64 | Trace | |
| | 8:30 | | X | 2200 | 79.66 | Trace | |
| | 9:00 | | X | 2200 | 79.68 | Trace | |
| | 9:30 | | X | 2200 | 79.69 | Trace | |
| | 10:00 | | X | 2200 | 79.70 | Trace | |
| | 10:30 | | X | 2200 | 79.70 | Trace | |
| | | | | | | | |

The data stated above is representative of the time spent pumping at the capacities stated. Deviation from either time spent pumping or both could change the outcome if these results.

NOTE: On RECOVERY need: 5-1 minute checks
5-5 minute checks
2-30 minute checks
1-per hour as needed

PROJECT: Central Iowa
Test By: Mike K. & Mark Leither

Well #: 2 Uniq # 0
Date: 3/8/2006 Job #: 3E+05
Meter Reading Beginning: -
Meter Reading Ending: -

Well Information:

| | | | |
|---|---|---|---|
| Length of Casing | 80' | Hp of Pump | 125 |
| Length of Screen | n/a | Model of Pump | 14TLC |
| Total Well Depth | 175' | Specific Capacity | - |
| Static Water Level | 12.82 | Take Readings From Grade | |
| Well Capacity | - GPM @ | - PWL | - G.P.F.D.D. |

*Notes:

**STEP TEST** Page 6 of 6

| Date | Time | AM | PM | GPM | PWL | Sand/Gal | Comments |
|---|---|---|---|---|---|---|---|
| *1/2/2001* | 12:34 | X | X | 123 | 12'3" | 4" c/g | This is a sample |
| 3/8/2006 | 11:00 | | X | 2200 | 79.71 | Trace | |
| | 11:30 | | X | 2200 | 79.71 | Trace | |
| 3/9/2006 | 12:01 | X | | 2200 | 79.71 | Trace | |
| | 1:00 | X | | 2200 | 79.71 | Trace | |
| | 2:00 | X | | 2200 | 79.71 | Trace | |
| | 3:00 | X | | 2200 | 79.71 | Trace | |
| | 4:00 | X | | 2200 | 79.71 | 1/16" c/g | |
| | 5:00 | X | | 2200 | 79.71 | 1/16" c/g | |
| | 6:00 | X | | 2200 | 79.71 | 1/16" c/g | |
| | 7:00 | X | | 2200 | 79.71 | 1/16" c/g | |
| Shutdown at 7:13 am. Needed to replace fuel | | | | | | | |
| | Filter on generator Started back up at 7:15 pm | | | | | | |
| | 8:00 | X | | 2200 | 79.74 | 1/8" c/g | |
| | 9:00 | X | | 2200 | 79.82 | 1/8" c/g | |
| | 10:00 | X | | 2200 | 79.82 | 1/8" c/g | |
| | 11:00 | X | | 2200 | 79.82 | 1/2" c/g | |
| | 12:00 | X | | 2200 | 79.82 | 1/8" c/g | |
| | 1:00 | | X | 2200 | 79.82 | 1/16" c/g | 9.32 236.05 |
| | Shut Down | | | | | | |
| | | | | | | | |

The data stated above is representative of the time spent pumping at the capacities stated. Deviation from either time spent pumping or both could change the outcome if these results.

**NOTE:** On RECOVERY need: 5-1 minute checks
5-5 minute checks
2-30 minute checks
1-per hour as needed

PROJECT: Central Iowa
Test By: Mike Konz & Mark Leither

Well # 2 Uniq #
Date: 3/9/2006 Job #: 307270
Meter Reading Beginning: -
Meter Reading Ending: -

Well Information:

| | | | |
|---|---|---|---|
| Length of Casing | 80' | Hp of Pump | - |
| Length of Screen | n/a | Model of Pump | - |
| Total Well Depth | 175' | Specific Capacity | - |
| Static Water Level | 72.82 | Take Readings From Grade | |
| Well Capacity | - GPM @ | - PWL | - G.P.F.D.D. |

*Notes:

Recovery Page 1 of 2

| Date | Time | AM | PM | GPM | PWL | Sand/Gal | Comments |
|---|---|---|---|---|---|---|---|
| *1/2/2001* | 12:34 | X | X | 123 | 12'3" | 4" c/g | This is a sample |
| 3/9/2006 | 1 min. | | X | | 75.73 | | |
| | 2 min. | | X | | 75.37 | | |
| | 3 min. | | X | | 75.15 | | |
| | 4 min. | | X | | 75 | | |
| | 5 min. | | X | | 74.88 | | |
| | 6 min. | | X | | 74.72 | | |
| | 7 min. | | X | | 74.69 | | |
| | 8 min. | | X | | 74.61 | | |
| | 9 min. | | X | | 74.54 | | |
| | 10 min. | | X | | 74.47 | | |
| | 11 min. | | X | | 74.41 | | |
| | 12 min. | | X | | 74.38 | | |
| | 13 min. | | X | | 74.32 | | |
| | 14 min. | | X | | 74.28 | | |
| | 15 min. | | X | | 74.24 | | |
| | 16 min. | | X | | 74.2 | | |
| | 17 min. | | X | | 74.18 | | |
| | 18 min. | | X | | 74.13 | | |
| | 19 min. | | X | | 74.1 | | |
| | 20 min. | | X | | 74.07 | | |

The data stated above is representative of the time spent pumping at the capacities stated. Deviation from either time spent pumping or both could change the outcome if these results.

**NOTE**: On RECOVERY need: 5-1 minute checks
5-5 minute checks
2-30 minute checks
1-per hour as needed

PROJECT: Central Iowa
Test By: Mike Konz & Mark Leither

Well #: 2 Uniq # 0
Date: 3/9/2006 Job #: 307270
Meter Reading Beginning: -
Meter Reading Ending: -

Well Information:

| | | | |
|---|---|---|---|
| Length of Casing | 80' | Hp of Pump | - |
| Length of Screen | n/a | Model of Pump | - |
| Total Well Depth | 175' | Specific Capacity | - |
| Static Water Level | 72.82 | Take Readings From Grade | |
| Well Capacity | - GPM @ | - PWL | - G.P.F.D.D. |

*Notes:

**Recovery** Page 2 of 2

| Date | Time | AM | PM | GPM | PWL | Sand/Gal | Comments |
|---|---|---|---|---|---|---|---|
| *1/2/2001* | 12:34 | X | X | 123 | 12'3" | 4" c/g | This is a sample |
| 3/9/2006 | 25 min. | | X. | | 73.98 | | |
| | 30 min. | | X | | 73.86 | | |
| | 35 min. | | X | | 73.78 | | |
| | 40 min. | | X | | 73.68 | | |
| | 50 min. | | X | | 73.59 | | |
| | 1 hr. | | X | | 73.48 | | |
| | 1 hr. 15 min. | | X | | 73.39 | | |
| | 1 hr. 30 min. | | X | | 73.27 | | |
| | 2 hr. 15 min. | | X | | 73.12 | | |
| | End of manual recovery | | | | | | |

The data stated above is representative of the time spent pumping at the capacities stated. Deviation from either time spent pumping or both could change the outcome if these results.

**NOTE:** On RECOVERY need: 5-1 minute checks
5-5 minute checks
2-30 minute checks
1-per hour as needed

PROJECT: Central Iowa
Test By: Mike Konz & Mark Leither

Well # Well by Shop Uniq # Used as Monitor
Date: 3/7/2006 Job #: 307270
Meter Reading Beginning:
Meter Reading Ending:

Well Information:

| | | | |
|---|---|---|---|
| Length of Casing | | Hp of Pump | |
| Length of Screen | | Model of Pump | |
| Total Well Depth | | Specific Capacity | |
| Static Water Level | 84' 7 3/4" | Take Readings From Grade | |
| Well Capacity | GPM @ | PWL | G.P.F.D.D. |

*Notes:



| Date | Time | AM | PM | GPM | PWL | Sand/Gal | Comments |
|---|---|---|---|---|---|---|---|
| *1/2/2001* | 12:34 | X | X | 123 | 12'3" | 4" c/g | This is a sample |
| 3/7/2006 | 4:55 | | X | 7 1/2 | Start Up | | |
| | 5:25 | | X | 7 1/2 | 85' | | |
| | Shut Down | | | | | | |
| 3/9/2006 | 9:10 | X | | 7 1/2 | Start Up | | |
| | 9:40 | X | | 7 1/2 | 85' 9 3/4" | | |
| | Shut Down | | | | | | |

The data stated above is representative of the time spent pumping at the capacities stated. Deviation from either time spent pumping or both could change the outcome if these results.

NOTE: On RECOVERY need: 5-1 minute checks
5-5 minute checks
2-30 minute checks
1-per hour as needed

PROJECT: Central Iowa
Test By: Mike Konz & Mark Leither

Well #: 8 Uniq # Used as Monitor
Date: 3/8/2006 Job #: 307270
Meter Reading Beginning: -
Meter Reading Ending: -

Well Information:

| | | | |
|---|---|---|---|
| Length of Casing | - | Hp of Pump | - |
| Length of Screen | - | Model of Pump | - |
| Total Well Depth | - | Specific Capacity | - |
| Static Water Level | 117.78 | Take Readings From Grade | |
| Well Capacity | - GPM @ | - PWL | - G.P.F.D.D. |

*Notes:

Page 1 of 1

| Date | Time | AM | PM | GPM | PWL | Sand/Gal | Comments |
|---|---|---|---|---|---|---|---|
| *1/2/2001* | 12:34 | X | X | 123 | 123" | 4" c/g | This is a sample |
| 3/8/2006 | 11:15 | X | | 1000 | Start Up | | |
| | 11:45 | X | | 1000 | 118.8 | | |
| | Shut Down | | | | | | |
| | | | | | | | |
| 3/9/2006 | 10:45 | X | | 1000 | Start Up | | 116.9 Static before |
| | 11:15 | X | | 1000 | | | startup of well #8. |
| | | Shut Down | | | | | |

The data stated above is representative of the time spent pumping at the capacities stated. Deviation from either time spent pumping or both could change the outcome if these results.

**NOTE**: On RECOVERY need: 5-1 minute checks
5-5 minute checks
2-30 minute checks
1-per hour as needed

PROJECT: Central Iowa
Test By: Mike Konz & Mark Leither

Well #: 1st drilled well Uniq # Used as Monitor
Date: 3/8/2006 Job #: 307270
Meter Reading Beginning: -
Meter Reading Ending: -

Well Information:

| | | | |
|---|---|---|---|
| Length of Casing | - | Hp of Pump | - |
| Length of Screen | - | Model of Pump | - |
| Total Well Depth | - | Specific Capacity | - |
| Static Water Level | 49.2 | Take Readings From Grade | |
| Well Capacity | - GPM @ | - PWL | - G.P.F.D.D. |

*Notes: **Took satic just before startup of #2**



| Date | Time | AM | PM | GPM | PWL | Sand/Gal | Comments |
|---|---|---|---|---|---|---|---|
| *1/2/2001* | 12:34 | X | X | 123 | 12'3" | 4" c/g | This is a sample |
| 3/8/2006 | 11:00 | X | | | 49.2 | | Done before on |
| | | | | | | | production well 2 |
| | | | | | | | |
| 3/9/2006 | 9:30 | X | | | 49.52 | | Done 20 hrs. into |
| | | | | | | | pumping on #2 at |
| | | | | | | | 2200 gpm |
| | | | | | | | |
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The data stated above is representative of the time spent pumping at the capacities stated. Deviation from either time spent pumping or both could change the outcome if these results.

**NOTE:** On RECOVERY need: 5-1 minute checks
5-5 minute checks
2-30 minute checks
1-per hour as needed

PROJECT: Central Iowa
Test By: Mike Konz & Mark Leither

Well #: White House East Uniq # Used as Monitor
Date: 3/7/2006 Job #: 307270
Meter Reading Beginning: -
Meter Reading Ending: -

Well Information:

| | | | |
|---|---|---|---|
| Length of Casing | - | Hp of Pump | - |
| Length of Screen | - | Model of Pump | - |
| Total Well Depth | - | Specific Capacity | - |
| Static Water Level | 106' 8 3/4 | Take Readings From Grade | |
| Well Capacity | - GPM @ | - PWL | - G.P.F.D.D. |

*Notes:



| Date | Time | AM | PM | GPM | PWL | Sand/Gal | Comments |
|---|---|---|---|---|---|---|---|
| *1/2/2001* | 12:34 | X | X | 123 | 12'3" | 4" c/g | This is a sample |
| 3/7/2006 | 4:00 | | X | 8 1/2 | Start Up | | |
| | 4:30 | | X | 8 1/2 | 106' 11 1/8" | | |
| | Shut Down | | | | | | |
| | | | | | | | |
| 3/9/2006 | 10:00 | X | | 8 1/2 | Start Up | | 107' 3/4" Static before |
| | 10:30 | X | | 8 1/2 | 107' 1 1/8" | | startup |
| | Shut Down | | | | | | |
| | | | | | | | |
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The data staled above is representative of the time spent pumping at the capacities stated. Deviation from either time spent pumping or both could change the outcome if these results.

**NOTE**: On RECOVERY need: 5-1 minute checks
5-5 minute checks
2-30 minute checks
1-per hour as needed

PROJECT: Central Iowa
Test By: Mike Konz & Mark Leither

Well #: Methodist Church Uniq # Used as Monitor
Date: 3/7/2006 Job #: 307270
Meter Reading Beginning: 0
Meter Reading Ending: 0

Well Information:

| | | | |
|---|---|---|---|
| Length of Casing | 0 | Hp of Pump | 0 |
| Length of Screen | 0 | Model of Pump | 0 |
| Total Well Depth | 0 | Specific Capacity | |
| Static Water Level | 69.33 | Take Readings From Grade | |
| Well Capacity | 0 GPM @ | 0 PWL | 0 G.P.F.D.D. |

*Notes:

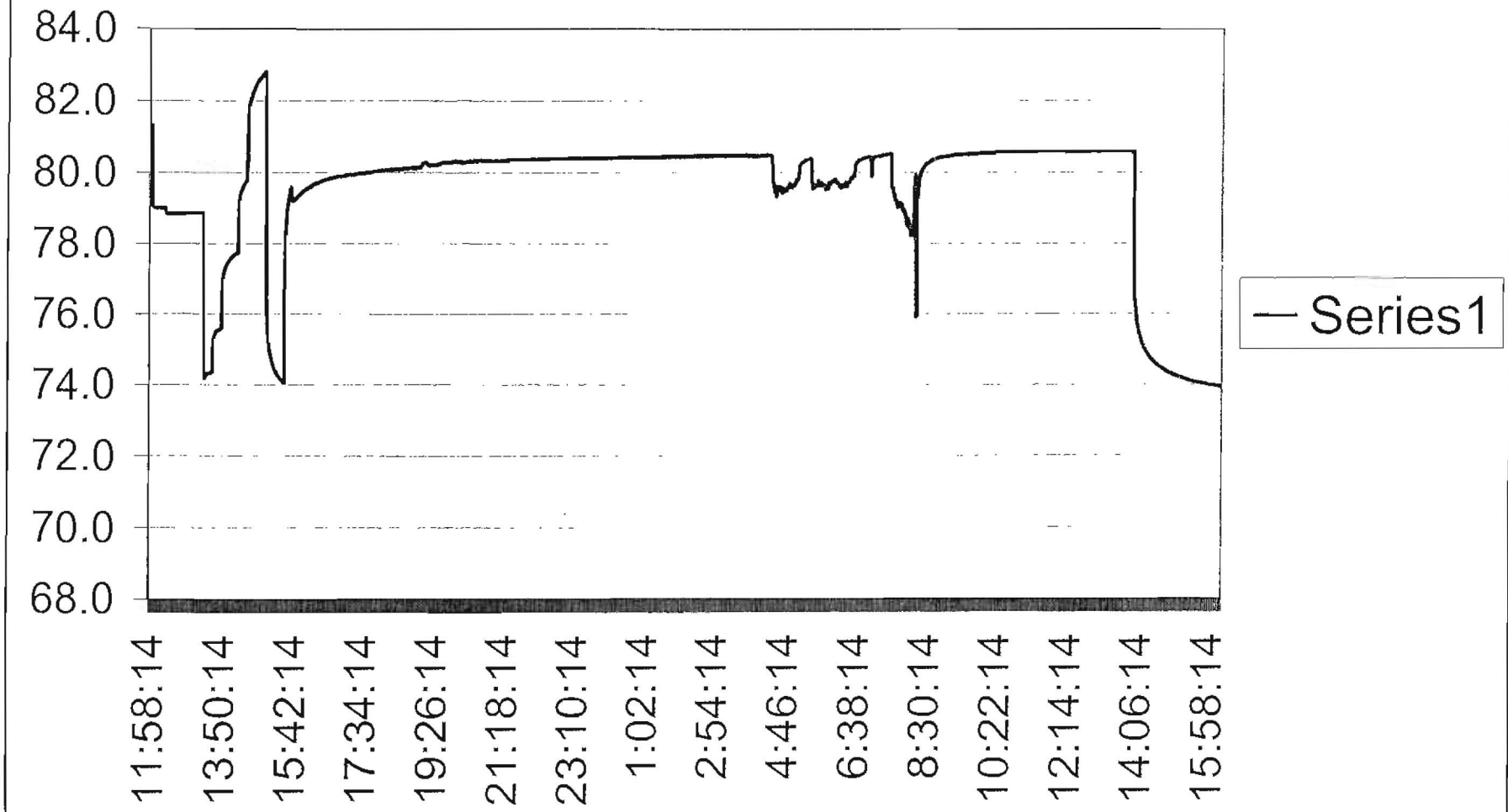


| Date | Time | AM | PM | GPM | PWL | Sand/Gal | Comments |
|---|---|---|---|---|---|---|---|
| *1/2/2001* | 12:34 | X | X | 123 | 12'3" | 4" c/g | This is a sample |
| 3/7/2006 | 4:30 | | X | 15 | Start Up | | |
| | 5:00 | | X | 15 | 69.51 | | |
| | | Shut Down | | | | | |
| | | | | | | | |
| | 9:15 | X | | 15 | Start Up | | 69.62' Static before |
| | 9:45 | X | | 15 | 69.67 | | startup of pump |
| | | Shut Down | | | | | |

The data stated above is representative of the time spent pumping at the capacities stated. Deviation from either time spent pumping or both could change the outcome if these results.

NOTE: On RECOVERY need: 5-1 minute checks
5-5 minute checks
2-30 minute checks
1-per hour as needed

# CENTRAL IOWA WATER DISTRICT WELL 2 STEP & 24HR TEST PUMP



BOREHOLE GEOPHYSICS & HYDROPHYSICS
COLOG
A DIVISION OF LAYNE CHRISTENSEN COMPANY

MIDWEST REGION
PO Box 81864
Lincoln, Nebraska 68501
Telephone: 402.466.5997
Fax: 402.466.6019

| | |
|---|---|
| Client: | Central Iowa Water |
| Project: | Well Field Study |
| Location: | Waverly, Iowa |
| Well ID: | Test Well |
| Date: | 1/27-28/06 |

Delta T: 0 us/ft 400
Near Receiver - Amplitude: 0 255
Far Receiver - Amplitude: 0 300
Natural Gamma: 0 CPS 100
Depth: 1ft:120ft
Near Receiver: 100 900
Far Receiver: 200 1000
Near Receiver 1st Arrival: 100 us 900
Far Receiver 1st Arrival: 200 us 1000

Grey clay soft
brown sand, soft
Light grey clay, soft
Brown grey clay, heavy c. sand.
Tan Lm/ yellow clay layers - soft
Tan Lm yellowed
Tan lm rock hard
Tan Lm hard
Lt brn lm brn el tan grey sh
brn Lm hard
brn Lm/ brn med. white - grey sh layers
To 120 brn Lm / brn Shale
Wtd s/s tan lm med hard

40.5
47.5
Gamma Counts around 50cps

0
10
20
30
40
50
60
70
80
90
100
110

Natural Gamma: 0 CPS 100
Far Receiver - Amplitude: 0 300
Near Receiver - Amplitude: 0 255
Delta T: 0 us/ft 400
Depth: 1ft:120ft
Near Receiver 1st Arrival: 100 us 900
Far Receiver 1st Arrival: 200 us 1000
Near Receiver: 100 900
Far Receiver: 200 1000