NOTE- BEFORE THIS SHEET IS DESTROYED, REMOVE DRILLER'S LOG (inside) AND PUT IT IN THE FILE FOLDER FOR THIS WELL.

W-3221

IOWA GEOLOGICAL SURVEY
In Cooperation with U. S. Geological Survey

RECORD OF WELL

Location:

Town: MANCHESTER (N E / S W): County DELAWARE

SE NE SE sec. 29 T 89 N., R. 5 E. W. Twp.

Well name and number Test No. 1 for Well No. 4

Owner City of MANCHESTER Address MANCHESTER

Tenant _____ Address _____

Contractor Hoag & Ames Address LINCOLN

Drillers W. H. WHITE

Drilling dates 5-11-1948 to 5-18-1948

Well data:
Elevations: Drilling curb 944 Pumphouse floor feet; Land surface _____ feet

Determined by _____

Topographic position Upland

Total depth: Reported 235 feet, Measured _____ feet

Drilling method Cable Tool

Hole and casing data 15' of 8" pipe from +2' to 13'.
6" hole 13' to 235'.

Original depth to water _____ ft. above/below _____ Date _____

Original elevation of water level _____ ft.; Source of data _____

Sources of water: Principal _____; Others _____

CASING DIAGRAM

Vertical scale

LOG

0 - 10' Subsoil Sandy

10' - 13' Red Clay Sandy

13-37' Brown lime - Crevices - water

37-54' Hard Brown Lime

54-56 Brown Shale

56-70 Brown lime with Red Shale in Crevices

70-75 Hard brown lime

75-81 Brown Lime & Sandstone

81-90 Brown Lime

90-100 Light brown lime

100-106 Sandstone

106-125 - Light brown lime

125-131 Light lime & Sandstone streaks

131-137 Light brown lime (Crevices)

137-158 Gray Lime

158-165 Light brown lime

165-179 Light brown lime & Crystal Rock

179-185 White Lime - Crystle Rock - Crevices

185-198 White Lime

198-201 Brown lime - pyrite -

201-210 Hard light gray lime

210-225 Dark gray lime - Shale Crevices

225-232 Dark gray lime

232-235 - Shale (TD)

Production data: Date May 19, 1948

Static depth to water 19.1 Measuring point Top 8" casing 2' above L.S.
Pumping level 30'± at 220 g.p.m.

Specific capacity 20.2 g.p.m. per ft. drawdown; Temperature 50 °F.

Pump data; Type pump Turbine Column Dia. 3½ Length 120
Cylinder or bowls: Dia. 5" Length 5' Suction pipe none
Power belt drive Airline no

Estimated rate of production: _____ g.p.m. for _____ hrs. a day

Use of water City Supply

WATER ALALYSES (in parts per million)

Date samples				
Sampled by				
Total solids				
Insoluble matter				
Alkalinity (Meo)				
Alkalinity (Phm)				
pH				
Fe_2O_3- Mn_2O_3-Al_2O_3				
Alkali as sodium				
Calcium				
Magnesium				
Iron (unfiltered)				
Manganese				
Nitrate				
Fluoride				
Chlordie				
Sulfate				
Bicarbonate				
Hardness (ppm)				
Hardness (gpg)				

Remarks _____

Laboratory data: Sample storage location C01-4

Sample range 0-235 No. spls. 48 No. dupls. & cond. 48 Fair-Good
Spls. prepared by RKS & WJB Washed range 13-235 by RKS & WJB
Driller's log and cond. _____

Insoluble residues: Prepared by _____ Studied by _____ Strip log _____
Microscopic study 0-235 strip log 6-19-48
Gen. log _____ Correl. by R. Wahrhaftig

CITY OF MANCHESTER, IOWA, WELL NO. 4

Hoeg & Ames Well Drilling Co.
Lincoln, Iowa

May 7, 1948 - Rig moved in - Horace White driller

May 11, 1948 - started and completed 25' test well — Test well

May 12, 1948 - 65' completed to water at 28' — " "

May 13, 1948 - to 115' today, lime getting lighter colored — " "

May 14, 1948 - to 155' today water level raised 1'

May 15, 1948 - to 180' water level raised 2'

May 17, 1948 - to 207' grey lime except crevice at 198'

May 18, 1948 - 232' Maquoketa shale at 11"00 A. M., static level to ground 17' 6", set test pump at 125'

May 19, 1948 - ran test pump from 2:10 to 5:36 p. m., 220 gals. level of 35'

May 20, 1948 - built bridge at 140' to top, set test pump at 100' pumping showed drawn down of about the same as before, decided to set permanent casing at 80'

May 21, 1948 - reset rig for 20" well

May 25, 1948 - completed setting rig

May 26, 1948 - drilled 20' of 20" well and set dirt casing. Permanent well

May 27, 1948 - to 30' going slow, this well drilled in same hole as test well

May 28, 1948 - to 50'

May 29, 1948 - to 65'

June 1, 1948 - completed to 80' the end of 20" hole

June 2, 1948 - set 16" casing and pumped cement around the outside filling from the bottom up. 125 sacks of cement used.

June 3, 1948 - finished off cement on top of well

June 7, 1948 - began drilling 16" hole, cleared away steel and cement at bottom of casing

June 8, 1948 - to 120'

June 9, 1948 - to 155' water coming up

June 10, 1948 - to 180' No. 3 off. Gain between 155 and 170' of 15'

June 11, 1948 - to 200'

June 14, 1948 - to 215'

June 15, 1948 - well completed at 231' static level of 17' measurement checked by M. V. Stephenson of State Dept. of Health. Installed test pump and broke suction at 115' at 300 g. p. m.

June 16, 1948 - test pump set at 175' started at 1:30 p. m. broke suction at 400 g. p. m. Pumped at 350 g. p. m. at 129', stopped pump at 4:30 p. m. Decided to acidize at a cost of about $800.00

June 17, 1948 - pulled test pump

June 21, 1948 - White arrived at 7:00 a. m., Ken at 8:00 a. m., Whitey and crew of five men at 10:00 a. m. 3 of which left at 2:30 p. m.

June 21, 1948 - acid pump installed and turned on at 12:40 p. m. Acid reaction started at 1:25 p. m., acid completely in well at 2:10 p. m. About 1500 gals. of muratic acid were used. Acid pressure was maintained at about 25 - 30 lbs. Acid was piped into well at 120'. Seal broken on well at 4:45 and started to install the test pump. Pump installed and test by 6:30 p. m. Pump test started at 7:15 p. m. Operated at 400 g. p. m. with water level at 78'. Operated at 457 g. p. m. with water level at 87'.
Chlorides dropped to about 100 PPM by midnight.
Pump on No. 3 started with cloudy water and solids, chlorides reached 240 PPM. by 7:30 p. m.

5

June 22, 1948 - test pump operated continuously during the night at 400 g. p. m. and until 11:00 a. m. Then the impellers were lowered and the rate was 515 g. p. m. with 93.5 water level. Very dirty. Pump shut off at 5:15 p. m. for the day - (22 hrs. con.)

June 23, 1948 - Test pump started at 6:30 a. m. and operated at 515 g. p. m., or thereabouts until 8:30 p. m., when pump wasstopped. Water cleared in fair shape, cloudy only on occasions.

June 24, 1948 - Started pulling test pump at 7:00 a. m. and finished pulling at 11:00 a. m. Started loading rig afternoon and moved out at 2:30 p. m.

Francis N. Hoag,
City Manager

Office copy: Sent to
Hoeg & Ames
Francis Hoag, City Mgr. Manchester
M. V. Stephenson, Manchester
Delaware 6.

RESULTS OF PUMPING TEST MADE ON MANCHESTER

TEST HOLE NO. 1 FOR CITY WELL NO. 4

Manchester, Iowa

May 19, 1948

NAME: Manchester Test Hole No. 1 for City Well No. 4.

LOCATION: NW¼ NW¼ SW¼ Sec. 28, T. 89 N., R. 5 W.

OWNER: City of Manchester.

CONTRACTOR: Hoeg & Ames, Lincoln, Iowa.

ELEVATION: Top of 8-inch pipe, 946 feet above sea level and about 2 feet above land surface.

DRILLER: Horace White.

DRILLING DATES: May 11 to May 18, 1948.

TOTAL DEPTH: 235 feet.

CASING AND HOLE DATA: 15 feet of 8-inch pipe from 2 feet above land surface to 13 feet. 6-inch open hole from 13 feet to 235 feet.

TEST PUMP: Turbine, setting 120 feet of 3½-inch column with 5 feet of bowls. Powered with 30 hp. belt-driven motor.

TEMPERATURE MEASUREMENTS: Water temperature measurements made at end of 10 feet of 4-inch discharge pipe.

DISCHARGE MEASUREMENTS: Rate of flow was measured by timing discharge of water into a 55 gallon barrel.

WATER LEVEL MEASUREMENTS: Depth to water measurements were made by electric line method and were referred to top of 8-inch casing.

REMARKS: Test Hole No. 1 for city well No. 4 is located 287 feet south of city well No. 3. Well No. 3 was pumped at approximately 400 g.p.m. during part of the test. Well No. 2 is located 21 feet northwest of well No. 3 and was pumped approximately 20 minutes during test. Depth to water measurements in well No. 2 were made during pumping test of Test Hole No. 1.

PUMPING TEST MADE ON MANCHESTER TEST HOLE NO. 1 FOR CITY WELL NO. 4

Date	Depth to Water (feet)	Discharge: Seconds to Fill 55 Gal. Barrel	Discharge: G.P.M.	Temp. °F.	Nearby City Wells	Remarks
May 19						
11:30 am					No. 3 on	
12:30 pm	20.8					
12:50	20.9					
1:40					No. 3 off	
2:00	19.4					
2:07	19.1					
2:10						Test pump started.
2:11	21.4	26	127			
2:12	24.4					Water very rusty.
2:13	27.1	20	165			
2:14	27.7					
2:15	28.0	19	174			
2:17	28.4					
2:20	28.7	19	174			
2:25	29.1					
2:30	29.2			51		
2:35	29.5					
2:40	29.65			50		
2:45	29.75					
2:50	30.0	20	165			
3:00	29.8					
3:04	29.9					
3:05						Test pump stopped.
3:06	21.5					
3:06:30	21.1					Water clearing.
3:08	20.25					
3:10	20.0					
3:11						Change pulley and start test pump.
3:11:30	23.25					
3:12						Belt off, test pump stopped.
3:14						Test pump started.
3:16	25.5					
3:19						Test pump stopped.
3:20						Test pump started.
3:21						Test pump stopped.
3:23						Test pump started.
3:24						Test pump stopped.
3:27					No. 3 on	
3:27+						Test pump started.
3:29	28.5					
3:30	30.3					
3:31	33.6	15	220			Water rusty color.
3:33	34.2					
3:35	34.9					
3:40	35.4			50		
3:47	36.3					
4:00	36.1					
4:05	36.7					

Date	Depth to Water (feet)	Discharge Seconds to Fill 55 Gal. Barrel	Discharge G.P.M.	Temp. °F.	Nearby City Wells	Remarks
May 19						
4:25 pm	37.3					
4:26					No. 3 off	
4:27	36.7				No. 2 on	
4:29		16	210			Test pump slowed down.
4:31	33.4	18	183			
4:33		17	194			Water clearing, fine rock cuttings.
4:35	37.8	15	220			
4:36					No. 2 off	Belt slipped off test pump.
4:38	23.7					
4:39						Test pump started.
4:41	32.7				No. 2 on	
4:42½						Belt slipped. Test pump stopped.
4:44	22.7					
4:45						Test pump started.
4:51	[illegible]				No. 2 off	
4:56	35.8				No. 3 on	
5:08	36.2					
5:15	36.5					
5:24	36.4			50		Gallon sample obtained.
5:29	36.5					
5:29+						Test pump stopped.
5:31	24.2					Recovery measurements.
5:33	23.7					
5:36	23.1					
5:50	22.4					

Affix Copy. Sent to:
Hoag & Lowe
Francis Hoag, City Mgr., Manchester
M. V. Stephenson, Manchester

RESULTS OF PUMPING TEST MADE ON MANCHESTER TEST HOLE NO. 1 FOR CITY WELL NO. 4 AFTER PLUGGING HOLE FROM 140 FEET TO 155 FEET. TO SEAL OUT LOWER WATER.

Manchester, Iowa

May 20, 1948

REMARKS: All measurements referred to same datum as pumping test of May 19, 1948

Date	Depth to Water (feet)	Discharge: Seconds to Fill 55 Gallon Barrel	Discharge: G.P.M.	Temp. °F.	Nearby City Wells	Remarks
May 20						
12:24 pm	21.1					
1:47	18.5					
1:49	23.4					Test pump started.
1:50	27.1					
1:50½	28.4					Water very muddy.
1:51	29.0					
1:51½	30.0					
1:52½	30.4					
1:54	30.9					
1:55	31.1					Water rusty.
1:56	31.3					
1:57	31.5					
1:58		16	210			
2:00	32.0	15	220			
2:05	32.4					Water clearing.
2:11	32.5					
2:15	32.7	16	210	50		
2:17						Belt slipping. Slowed discharge.
2:21						Belt off. Test pump stopped.
2:23						Belt on test pump started.
2:25		15	220			
2:32	34.0	15	220			
2:46	33.8					
2:57	34.9					
3:10	35.1					
3:24	35.25					
3:43	35.25					
3:52	35.2					
3:56	35.2					
4:00					No. 3 on	
4:01½	35.8					
4:02	36.1					
4:03	36.6					
4:04	37.0					
4:05	37.2					
4:06	37.4					

Manchester, Iowa Test Hole No. 1 For City Well No. 4 May 20, 1948

Date	Depth to Water (feet)	Discharge Seconds to Fill 55 Gallon Barrel	G.P.M.	Temp. °F.	Nearby City Wells	Remarks
May 20						
4:07 pm	37.5					
4:08	37.7					
4:09	37.8					
4:10	37.85					
4:11	37.9					
4:12	38.0					
4:13	38.0					
4:14	38.1					
4:15	38.2	15	220			
4:20	38.4					
4:26	38.6					
4:30	38.75					
4:35	39.0					
4:40	39.3					
4:45	39.4					
4:50	39.45					
5:00	39.7					Gallon sample obtained.
5:10	39.85					
5:16	39.9					Recovery measurements.
5:20	40.0					
5:21	[illegible]					Test pump stopped.
5:30	23.3					
5:38	22.9					
5:43	22.7					
6:14	22.4					

office copy: Sent to Delaware

Hoeg & Emer
Francis Hoeg, City Mgr., Manchester
M. V. Stephenson, Manchester

DEPTH TO WATER MEASUREMENTS MADE ON CITY WELL NO. 2 DURING TEST PUMPING OF TEST HOLE NO. 1 FOR CITY WELL NO. 4

Manchester, Iowa

May 19 and 20, 1948

LOCATION: City well No. 2 located in pump house on Prospect Street 21 feet northwest of city well No. 3 and approximately 295 feet northwest of test hole No. 1 for city well No. 4.

ELEVATION: Floor of pump house at well is 944 feet above sea level.

WATER LEVEL MEASUREMENTS: Depth to water measurements were referred to hole in pump base which is 1.7 feet above pump house floor.

AIR GAGE MEASUREMENTS: Observations were made of air gage readings on city wells Nos. 2 and 3.

REMARKS: Measuring points of test hole No. 1 for city well No. 4 and city well No. 2 are approximately the same elevation above sea level.

DEPTH TO WATER MEASUREMENTS MADE ON CITY WELL NO. 2 - MANCHESTER, IOWA

Time	Depth to Water (feet)	Air Gage No.3	Air Gage No.2	Remarks
May 19				
3:27 pm				Pump No. 3 started.
3:42	29.85			
3:43	30.07			
3:45	30.24			
3:58	31.10			
4:05	31.10	32		
4:21	32.09			
5:12	32.72	31.5		
May 20				
12:28 pm				Pump No. 3 off.
12:31	24.35			
12:33		50		
12:40	22.30	52		
12:53	21.30	53		
1:00	20.55			
1:10	20.45		64	
1:23	20.10			
1:42	19.70	54		
1:48				Pump No. 4 started.
1:50	19.85			
1:53	20.08			
1:56	20.20			
2:00	20.28	52.5		
2:05	20.34			
2:10	20.40			
2:15	20.40			
2:17				Belt slipping Pump No. 4.
2:21				Belt off Pump No. 4 (Pump stopped).
2:23				Pump started Pump No. 4.
2:30	20.30			
2:45	20.35			
3:00	20.39	52.5		
3:30	20.35	52.5		
3:51	20.30	52.5		
3:59	20.30			
4:00				Start Pump No. 3.
4:01			60	
4:01:30	21.00			
4:02		35	59	
4:05	27.70	32	56	
4:10	30.15	32	55.5	
4:15	30.80	32	54	
4:20	31.20	32	53.5	
4:30	31.88			
4:45	32.75			
5:05	33.26			
5:17	33.55			
5:20				Pump No. 4 shut off.
5:24	33.10			
5:30	32.80	31		

DEPTH TO WATER MEASURMENTS MADE ON CITY WELL NO. 2 - MANCHESTER, IOWA

Time	Depth to Water (feet)	Air Gage No. 3	Air Gage No. 2	Remarks
May 20				
5:35 pm	32.70			
5:40	32.70			
5:45	32.70	32		
6:04	32.70	32		

OBSERVATIONS MADE ON MANCHESTER CITY WELL FIELD IN CONNECTION WITH CITY WELL NO. 4

NAME: Manchester City well No. 4.

LOCATION: SE¼ NE¼ SE¼ Sec: 29 T89N R5W

OWNER: City of Manchester.

CONTRACTOR: Hoeg & Ames, Lincoln, Iowa.

ELEVATION: 944 feet

DRILLER: Horace White

DRILLING DATES: May 24, 1948 to June 15, 1948

TOTAL DEPTH: 231 Feet

CASING AND HOLE DATA: 16 in. O.D. pipe from [redacted] to 79 ft 7 in. open 15.25 in. hole from 79 ft 7 in. to 231 ft.

TEST PUMP: Turbine setting 175 ft. powered with belt drive from gasoline engine.

TEMPERATURE MEASUREMENTS: Measured at end of 6.5 ft. of discharge pipe

DISCHARGE MEASUREMENTS: Discharge rate at well No 4 by use of 5 in. orifice on 6 in. pipe.

WATER LEVEL MEASUREMENTS: Reference point for well No. 2 is hole in pump base [redacted] 1.66 ft above pump house floor. Reference point for well No. 4 was top of 16 in. pipe. .25 ft below pumphouse floor.

REMARKS:

Well No 3 was pumped intermittently at about 400 GPM during the testing period. [redacted]

Observations made by W. E. Hale & C. W. Lane

9-230

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

File No. { Washington 2
District .....

Some Observations made on Manchester City Well Field in Connection with Development of City Well No 4 - June 16, 1948

Time	Depth to water Well 2	Well 3	Well 4	Inches	Discharge GPM		Remarks
June 16							
8:28 AM			17.66				No. 3 well shut down about 7:45 AM
8:31			17.63				[Ref. point is .25 ft. below pump
8:34:30	20.68						house floor]
8:36:30		53					No. 3 is airline reading
8:41			17.52				
8:42:40	20.47						[Measuring point at top of
8:44	20.44						breather hole 20 in. above
8:45			17.47				pump house floor]
8:47:15	20.39						
8:49:10	20:33						
8:50:30	20.30						
8:52	20.32						
8:53:50	20.26						
8:55	20.23						
8:56			17.38				
8:56:30	20.20						
8:58	20.18						
9:00	20.15						
9:05			17.33				
9:36			17.14				
9:39:30	19.67						
9:42		54.10					
9:52	19.56						
9:56			17.08				
10:02	19.46						
10:05			17.03				
10:12	19.40						
10:15			16.99				
10:22	19.32						
10:24			16.97				

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UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

File No. { Washington ..... / District ..... } 3

Time	Depth to Water Well 2	Well 3	Well 4	Inches	Discharge GPM		Remarks					
June 16												
10:30AM			16.94									
10:32	19.25											
10:36:30							No 3	start	pumping	at 400±	gpm	
10:38			17.66									
10:39	24.55		18.16									
10:40			18.50									
10:41	27.58		18.82									
10:42			19.00									
10:43	28.17		19.17									
10:44			19.33									
10:45	28.67		19.42									
10:47	29.03											
10:49	29.25											
10:50			19.82									
10:51	29.63											
10:53	29.70											
10:55	30.00		20.00									
10:57	29.94											
11:00			20.13									
11:10			20.28									
11:15	30.90		20.37									
11:20			20.46									
11:25	31.25											
11:26			20.52									
12:07PM			20.78									
12:41	32.35											
12:56			20.97									
1:00			21.00									
1:00:45	32.09											
1:11			21.01									

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UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

File No. { Washington ..... / District .....

Time	Depth to Water Well 2	Well 3	Well 4	Inches	Discharge GPM		Remarks
June 16							
1:20 PM	32.50		21.01				
1:24:30							Pump started at well No 4
1:26	33.00			14	465		water very dirty grey
1:28	33.45		95.00				
1:29				12	430		water dirty yellow
1:30	33.92		107.00	12	430		
1:32	34.20		124.00	11½	420		water dirty yellow
1:33							pump stopped at No 4
1:34	34.44						
1:35			73.00				
1:36			53.00				
1:37	34.32		40.00				
1:38			31.50				
1:39	34.13		27.68				
1:40			24.59				
1:41	34.05		23.50				
1:42							Pumping resumed at No 4
1:43	34.15		55.00	13½	457		
1:44			72.00	8½	361		
1:45	33.96						Pumping stopped at No 4
1:47	34.19						Pumping resumed at No 4
1:50	34.23						
1:51							Pumping stopped at No 4
1:53	34.45						
1:55			28.00				Pumping resumed at No 4
1:58			70.00				
1:59	34.30		82.00	14	465		
2:00			97.00	13½	457		
2:01	34.49		108.00				
2:02			126.00	13½	457		

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UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

File No. { Washington ..... / District .....

5

Time	Depth to Water Well 2	Well 3	Well 4	Inches	Discharge GPM		Remarks					
June 16												
2:03	34.78		140.00	12	430							
2:04			150.00	11 1/2	421							
2:05	35.05		158.00									
2:06			165.00									
2:07	35.18		172.00	10 1/2	402							
2:08			175.00	10	393		Broke suction at No 4					
2:09	35.28											
2:11	35.35											
2:13	35.50											
2:15	35.54		170.00	6	305							
2:16			167.00	6 1/2	316							
2:17			163.00									
2:18			161.50	6 1/2	316							
2:19	35.66		159.00									
2:20			156.00	7	328							
2:21			153.4									
2:22							No 3 pump turned off					
2:23	29.64		149.00									
2:25			144.80				Water very dirty					
2:27	28.00		141.50	7 1/2	339		Water Temp 50 1/2 °F					
2:29	27.49											
2:30			137.00	7 3/4	345							
2:31	27.13											
2:32			134.5									
2:33		47.00										
2:35	26.58											
2:37	26.33											
2:38			129.00	7 3/4	345							
2:39	26.15											
2:44	25.50											

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UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

File No. { Washington ..... District .....

Time	Depth to Water Well 2	Well 3	Well 4	Inches	Discharge GPM		Remarks					
June 16												
2:45PM			127.50	7 2/8	348							
2:48	25.55											
2:55			127.70	7 2/8	348							
3:00	25.06											
3:06			128.82	8	350							
3:10	24.75											
3:15			129.66	7 2/8	348		Water cloudy					
3:22	24.46											
3:26			114.20	7 1/8	334							
3:30			103.80	7 3/8	337		Pump speed increased					
3:32			122.00	11	412							
3:33			130.00	10 1/8	398							
3:35	24.19		143.00	10 1/2	402							
3:37			156.00	10	393							
3:38			165.00	10 1/8	398							
3:39			168.00	9 4/8	391							
3:40			173.00	9 3/8	381							
3:44			176.00	9	372							
3:46							Broke suction at No 4					
3:47	24.05											
3:58			170.00	7 5/8	342							
4:01	23.90											
4:05			164.35	7 2/8	348		Water cloudy					
4:18	23.72											
4:22			166.00	8 1/8			Water cloudy					
4:27							Pumping resumed at No 3					
4:28							Pump stopped at No 4					
4:35							Pump started at No 4					
4:37							Pump stopped at No 4					
4:40							Pump started at No 4					

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9-230

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

File No. { Washington 7
District .....

Time	Depth to Water Well 2	Well 3	Well 4	Inches	Discharge GPM		Remarks					
June 16												
4:49			119.00	10 3/4	407							
4:52			36.50	12	430		Shut down (water milky during pumping period					
4:55							Pump started at No 4					
5:00							Shut down					
5:39			25.2									

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COPIES SENT TO FRANCIS HOAG, CITY MGR., MANCHESTER, IOWA: M. V. STEVENSON, HEALTH DEPT, MANCHESTER, IOWA: ERNEST E. SCHENK, WATERLOO, IOWA: HOEG & AMES, LINCOLN, IOWA 6/3/48

RESULTS OF ACIDIZING AND PRODUCTION TEST ON MANCHESTER CITY WELL NO. 4

Manchester, Iowa
June 21-22, 1948

NAME: Manchester City Well No. 4.

LOCATION: SE¼ NE¼ SE¼ Sec. 29, T. 89 N., R. 5 W.

OWNER: City of Manchester.

CONTRACTOR: Hoeg & Ames, Lincoln, Iowa.

ELEVATION: 944 feet.

DRILLER: Horace White

DRILLING DATES: May 24, 1948 to June 15, 1948.

TOTAL DEPTH: 231 feet.

CASING AND HOLE DATA: 16-inch O. D. pipe from 0 to 79 feet 7 inches. Open 15.25-inch hole from 79 feet 7 inches to 231 feet.

TEST PUMP: Turbine setting 175 feet powered with belt drive from gasoline engine.

TEMPERATURE MEASUREMENTS: Measured at end of 6.5 feet discharge pipe.

DISCHARGE MEASUREMENTS: Discharge rate measured at well No. 4 by use of 5-inch orifice on 6-inch pipe.

WATER LEVEL MEASUREMENTS: Reference point for well No. 2 is hole in pump base 1.66 feet above pumphouse floor. Reference point for well No. 4 was top of 16-inch pipe coupled to casing 1.37 feet above pumphouse floor.

REMARKS: Well No. 4 is located approximately 287 feet south of well No. 3. Well No. 2 is located 21.1 feet northwest of well No. 3. Acidizing done by Whitney Pump Company, Cedar Rapids, Iowa. Attached is a copy of chloride determinations made in connection with acidizing and pumping of well No. 4. Observations made by W. E. Hale and C. H. Lane.

OBSERVATIONS ON ACIDIZING OF MANCHESTER CITY WELL NO. 4 - June 21, 1948

TIME	PRESSURE LBS/sq.in.	REMARKS
June 21		
12:38 pm		Start pumping in 1500 gallons of Muriatic acid under pressure.
1:22	2	Releasing pressure.
1:27	5	" "
1:30	10	" "
1:35	13	" "
1:45	10	" "
1:55	12	" "
2:02	15	" "
2:08	14	Acid in flushing with water.
2:11	14	Water in, stop pumping.
2:16	23	
2:20	28	
2:25	32	
2:30	26	
2:40	27	
2:50	27	
3:00	27	
3:10	28	
3:20	27	
3:30	25	
~~4:00~~		~~Start pumping Well No. 3 to waste.~~
4:25		Pressure down, removing cap.
4:45		Started setting pump.

CHLORIDE DETERMINATIONS MADE IN CONNECTION WITH ACIDIZING AND PUMPING

WELL NO. 4, MANCHESTER, IOWA - June 21-22, 1948

Time	Chlorides in Parts Per Million Well 3	Well 4	Remarks
June 21			
12:38 pm			Started acidizing well No. 4, City Well Nos. 2 and 3 shut down.
2:05			Finished putting in 1500 gallons of acid at well No. 4.
4:00			Start pumping Well No. 3 to waste.
4:45	10		
4:46			Top water prior to pumping water into mains 8 p.p.m. chlorides.
4:52	13		
5:06	28		
5:22	43		Start pumping Well No. 3 into city mains.
5:37	62		
5:52	76		
7:18	240		
7:19			Start pumping Well No. 4. Water too dirty to make chloride determinations.
8:00	104		
8:20	64		
8:44	46		
9:43	25		Well No. 3 pumping at rate of 350 g.p.m.
9:50		1250	Well No. 4 pumping at rate of 400± g.p.m.
10:25		1030	
11:03		910	
11:50		620	
June 22			
1:05 am		500	
7:55		104	
8:06	8		
9:05		83	
10:30		70	
12:30 pm		64	
1:30		56	

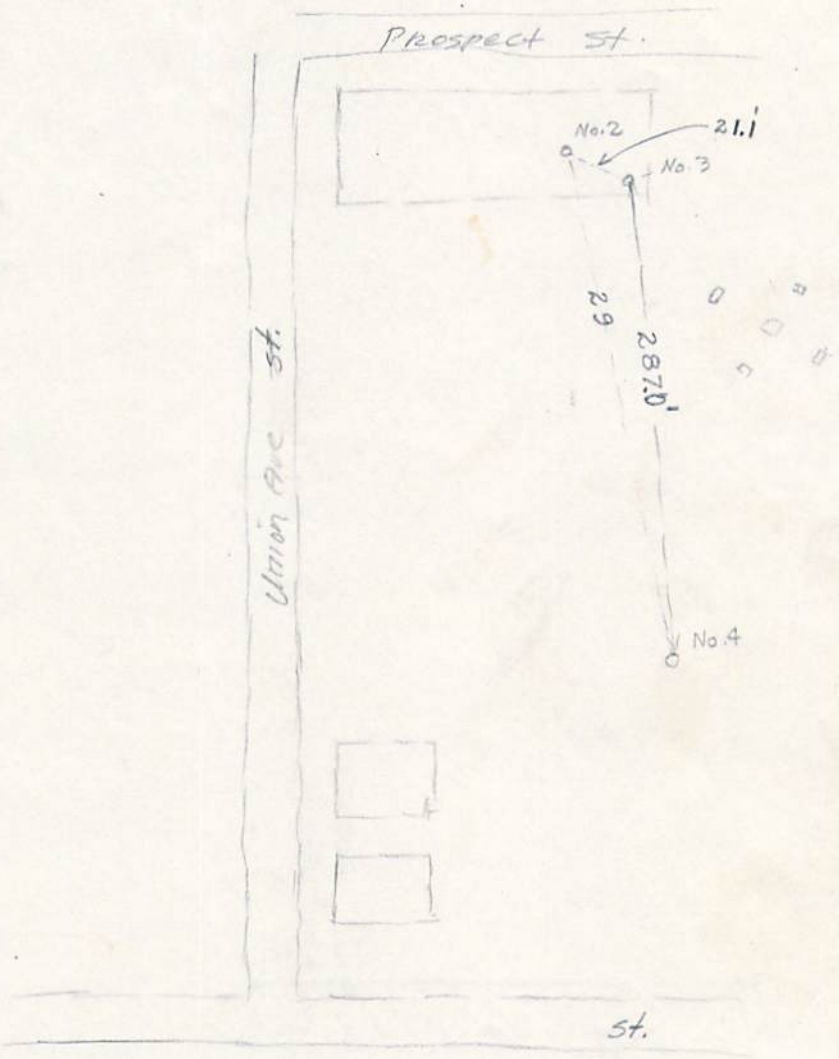
PRODUCTION TEST ON MANCHESTER CITY WELL NO. 4 - June 21-22, 1948

Time	Depth to Water Well 4	Well 2	Inches	Discharge in G.P.M.	Remarks
June 21					
7:12 pm	27.32				Well No. 3 pumping.
7:15	27.20				
7:19	27.18				Pump started at No. 4.
7:26	59.30			400±	Water very dirty yellow, foamy.
7:27	61.60				
7:28	67.50				
7:29	69.50				
7:30	71.00			400±	Water very dirty yellow, foamy.
7:31	71.50				
7:32	76.50				
7:34	77.50				Unable to measure discharge rate.
7:36	77.65				Water very dirty and foamy.
7:39	77.90				Water clearing somewhat.
7:41	78.05				
7:45	78.20		10½±	400±	Water dirty buff but less foamy.
7:47	78.15				
7:49	78.05		10½±	400±	Water dirty buff less foamy.
7:51	78.03		10½±	400±	
7:53	77.80				
7:55			10-3/4	407	
7:58	77.68		10-3/4	407	
8:03	77.45		10-3/4	407	
8:08	77.40				
8:13	77.45		10-3/4	407	
8:18	77.25		10-7/8	400+	
8:23	77.10		10-7/8	400+	Water clearing, pale dirty yellow, foamy.
8:28	76.20				
8:30					Pumping rate increased.
8:31	81.00		14½	470	Water has very bitter taste.
8:33	83.50				
8:36	86.75		14		Water very dirty yellow.
8:41	87.00		13½	457	
8:45	86.85		13-3/4	460+	Water very bitter.
8:50	87.00				
8:57	86.00		13¾	450	Water dirty buff.
9:14	86.50		13½	457	Water dirty buff but clearing.
9:25	85.00		13¾	450	
9:32			10½	400±	
10:35	78.95		10½	400±	

Time	Depth to Water Well 4	Depth to Water Well 2	Inches	Discharge in G.P.M.	Remarks
June 21					
9:50 pm	75.40		10-3/4		Water cloudy.
10:08	75.18		10½	400±	Water slightly cloudy, yellow.
10:15					Well No. 3 shut down.
10:17	74.00		10-3/4	407	Water almost clear.
10:42	72.18		10-7/8		Water almost clear.
11:02	71.50		10¾		Water almost clear.
11:45	70.50		10-3/4	407	Water almost clear.
June 22					
12:17 am	70.33		10		Water clear.
12:50	70.00		10½	400±	Water clear.
1:00	69.90		10½	400±	Water clear.
1:30	70.00		10½	400±	Water clear.
1:37		24.95			
3:00	69.15		10½	400±	
4:00	71.50		10½	400±	Water clear, Well No. 3 pumping to waste.
4:05					No. 3 pump turned on.
4:30	72.10		10		
5:00	72.75		10		Water clear.
5:20					No. 3 turned into city lines.
5:30	69.50		11¼		
6:00	74.60		11	412	
6:46	73.25		11½		Pump stopped at No. 4.
6:47					Pumping resumed at No. 4.
6:49			12		
7:10	73.00		11½		Water clear, trace of dolomite grains.
7:49	72.9		11¼		
8:00					No. 3 pump turned on.
8:13	75.00		11¼		
8:51	76.50		11	412	
9:00	76.25		11	412	
9:24	76.33	39.35	11	412	
9:29	76.33		11	412	
9:53	77.20		11	412	
10:22	76.50		11¼		
10:40					No. 3 pump stopped.
10:43	89.80		14½		
10:45					No. 4 pump shut down.
10:52	25.00				Pumping resumed at No. 4.
10:55	78.30		19	536	Water cloudy, yellow.
10:57	83.50		18¼	527	
10:59	88.00		17-7/8	522	Water dirty yellow.
11:00	90.00		17½	517	Water becoming more dirty.
11:02	91.42		17½	517	
11:04	92.66		17½	517	Water dirty buff, bitter taste.

Time	Depth to Water Well 4	Depth to Water Well 2	Inches	Discharge in G.P.M.	Remarks
June 22					
11:06	93.15		17½	517	
11:09	93.55		17-3/8	515	
11:11	93.85		17-3/8	515	Water very dirty buff.
11:16	94.85		17-3/8	515	
11:18	94.75				
11:25	95.42		17½	517	
11:32	94.30		17	512	
12:16 pm	92.42		17¼	514	Water cloudy buff, some sediment.
12:23	91.17		16-3/4	507	
12:35	91.00		16-3/4	507	
1:00	90.30		16½	503	Water clearing.
1:05					No. 3 pump turned on.
1:29	93.08		16	495	Water cloudy yellow, some sediment.
1:30					Shut down No. 4 to surge.

City Well Field Manchester – Delaware Co.



1. Meas. dist. between well centers to nearest .5 foot
2. Obtain Relative elev. of Meas. points of wells 2'd 4' with Respect to Main pump house floor.
3. Obtain Location + elevation (ENGR may have this - Get plat of town if available)
4. ASK Sylvan about H_2O Sample yesterday.
5. Send in more Wooden Samples