#30179

September 13, 1989

Dennis Langstraat
Water and Wastewater Superintendent
City of Pella
P.O. Box 345
Pella, IA 50219

PELLA, IOWA
WATER SYSTEM IMPROVEMENTS
DEEP WELL PUMPING TEST

On Tuesday, September 5, 1989, test pumping of the new Jordan sandstone well was started at 5:00 P.M. and stopped at 12:00 midnight after the water drawdown level had stabilized for a period of 4-1/2 hours.

The elevation control stake for the top of the pump base was set at U.S.G.S. elevation 839.25 feet. As of this date, the as-constructed elevation of that pump base has not been verified. The pump and the air line for the water level measurements were set at a depth of 345 feet below the top of the pump base. The static water level was measured as being 112 feet above the air line or 233 feet below the top of the pump base or at U.S.G.S. elevation 606.25 feet. Pressure was measured at the pump discharge. Pump discharge rate was measured by use of an 8-inch diameter orifice mounted inside a 10-inch diameter pipe.

The well water level was measured by use of the air line to read in feet (ft.) above the pump setting. During the pumping test, the drawdown was determined by subtracting the water pumping level from the static water level before pumping. Pump discharge pressure was measured at a constant 13 pounds per square inch (psi) when the pump was running. The flow meter reading was made in inches of water column in a glass above the centerline of the pipe on the pump side of the orifice plate. From an orifice table, the height measurement was converted into flow in gallons per minute (gpm).

The following is a tabulation by time showing water level, drawdown, flow meter reading and the pumping rate.

Time	Water Level Above Pump (ft.)	Water Level Drawdown (ft.)	Flow Meter Reading (inches)	Flow Rate (gpm)	Comments
5:00 PM	112	0	0	0	----Test started
5:01 PM	97	15	45-1/2	2,033	
5:02 PM	97	15	44-3/4	1,993	
5:03 PM	98	14	44-3/4	1,993	
5:04 PM	99	13	44-1/2	2,010	
5:05 PM	99	13	44	1,999	
5:06 PM	99	13	44-1/2	2,033	----2 grains sand
5:07 PM	99	13	44	1,999	in test beaker
5:08 PM	99	13	44-1/2	2,010	
5:09 PM	99	13	44	1,999	
5:10 PM	99	13	44	1,999	
5:15 PM	99	13	44-3/4	1,993	
5:20 PM	99	13	43	1,976	
5:25 PM	98-1/2	13-1/2	44	1,999	
5:30 PM	98-1/2	13-1/2	44-1/4	2,005	
5:35 PM	98	14	44-1/4	2,010	
5:40 PM	98	14	44-1/4	2,005	
5:45 PM	98	14	44-1/4	2,005	
6:00 PM	98	14	44-3/4	2,016	
6:15 PM	98	14	45	2,021	----1 grain sand
6:30 PM	98	14	44-1/2	2,010	in test beaker
7:00 PM	98	14	44	1,999	
7:30 PM	97	15	44-3/4	2,016	
8:00 PM	97	15	44-3/4	2,016	
9:00 PM	97	15	44-1/4	2,005	
10:00 PM	97	15	44-1/4	2,005	
11:00 PM	97	15	44	1,999	
12:00 Midnight	97	15	44	1,999	----Test stopped
12:10 AM	110	0	0	0	
12:12 AM	111	0	0	0	
12:14 AM	112	0	0	0	

During the deep well pumping test, Dennis Osterhart was the representative of Layne-Western Company and Dale Sorensen was the representative from our firm witnessing the testing. The above tabulation indicates, that at a pumping rate of about 2,000 gpm, the water level drawdown was 15 feet for a yield of 133.33 gpm per foot of drawdown. After the pumping test was stopped at 12:00 midnight, the static water level returned to its beginning elevation in a period of 14 minutes.

In discussions subsequent to the test, we have discussed the possibility of increasing the capacity of the new pump from the specified 1,250 gpm to 1,500 gpm or possibly 1,750 gpm to match the flow capacity of the lime softening treatment system once the new filter is in place. We also discussed the need for measuring the pumping and static pressures in the existing raw water main at its connection to the new raw water main from the deep well. After the pressure measurements are made for specifying the pumping head requirements, a decision will need to be made on pump capacity specifications so that the information can then be forwarded to Layne-Western Company, Inc.. Any cost change for a larger pump will then need to be covered by a change order.

VEENSTRA & KIMM, INC.

H. R. Veenstra

HRV:jk
18152
cc: Douglas A. Clark
Dave Wombacher