

**Collector Well Projects – Two Page Questionnaire**

Thank you for taking the time to help us in this effort to educate interested parties about collector well projects throughout the United States. A copy of this report will be provided to you within a couple months time. Please include references to reports or other documents regarding your project in Question C.2.

**A. General Project Information**

1. Name of project?  
*Wis. Rapids, Wis. Collector Well System*

2.

3. 1

4. Project location?  
 City/State: *Wis. Rapids, Wis.*

5. Project start date?  
 mm/dd/yy: \_\_\_\_\_

6. When did wells begin operating (or anticipated start)?  
 mm/dd/yy: *#1, 2, 3 - 1953 #4 - 1991*

7. Project objective(s)?
- Municipal water supply
  - Agricultural water supply
  - Conjunctive groundwater/surface water use
  - Others (please list)

8. Status of project?
- Planning
  - Small-Scale Testing
  - Large-Scale Testing
  - Full-scale operation
  - Other (please explain)

9. Project funding source(s)?
- Agency/owner out of pocket expense
  - Grant funds
  - Partnerships
  - Other (please list)

10. What was the primary reason for using collector well technology at this site?
- Environmental concerns
  - Water demand too great for ordinary production well
  - Water rights for a surface supply not available
  - Research
- Other: \_\_\_\_\_

11. Number of collector wells and periods of use (seasonal, year-round)? Check boxes that apply.

Well Name	Well Status		Use		Average Flow Production (gpm)
	Active	Proposed	Seasonal	Year-Round	
#1	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	550
#2	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	500
#3	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	1125
#4	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	1000

12. Describe the characteristics of your collector wells.

Well Name	Depth of Caisson	Diameter of Caisson	Depth of Laterals	Number of Laterals	Diameter of Laterals
#1	67'	13'	64'	4	12"
#2	69'	13'	66'	4	12"
#3	62'	13'	58'	4	12"
#4	70'	13'	64.5'	5	8"

13. Have you observed decreased flow from your collector wells over time? If so, what do you think is the cause?
- River migration away from well (please report approximate distance river has migrated: \_\_\_\_\_ ft)
  - Laterals clogging
  - Increased pumping from wells nearby (lowered groundwater elevation)
- Other: \_\_\_\_\_

14. What measures have you taken, if any, to increase yield of your wells?
- Well re-development
  - Lateral replacement
  - Added new laterals to existing system
- Other: \_\_\_\_\_

15. Do you have records indicating well yield with time?

No records available

Yes (please fill in the following table) See Attachment

Date	Event	Yield (indicate units)
0	Before operation	Designed capacity
1		Well start-up
2		
3		
4		
5		Most recent data

2. Describe aquifer geology.

Cobble

Well Sorted

Gravel

Poorly Sorted

Sand

Silt/Clay

Unknown

Other (please list)

16. What is the cost of your raw water (how much does it cost per unit volume for you to produce untreated water)?

\$74.42 per million

Number provided includes treatment costs

No records available

3. What is the closest distance to the nearest surface water body?

Feet or miles: 2 1/2 miles

Unknown

**B. Aquifer Characterization**

1. Describe regional aquifer characteristics.

Unconfined

Semi-confined

Confined

Unknown

Other (please list)

See Attachment

4. What is the number of monitoring wells if any?

16 wells

None

Other

Unknown

5. What is the frequency of groundwater level monitoring?

minutes/days/months: weekly

Unknown

**C. Additional Questions**

1. Do you have records indicating changes in yield upon re-development? How often do you re-develop your wells?

Yes, We clean laterals approx. every 8-10 years

2. Are any reports, technical memos, or other documentation available from your project activities? If so, who do we contact for copies?

Yes - Contact Jim Reinitt at address listed on page 1

Jim Reinolt, Water Superintendent - 41502  
 Water Works & Lighting Commission  
 September 20, 2002  
 Page 4

~~Boring B-01-4D was drilled on March 7, 2001, to a total depth of 109 feet. Brown sandstone was encountered at a depth of approximately 106 feet. Formation encountered above the sandstone bedrock was primarily sand and gravelly sand. Very fine, to fine grained runny sand was encountered from approximately 84 to 99 feet. The formation is particularly coarse in the interval of 93 to 100 feet. The formation encountered between 73 to 94 feet also is gravelly and relatively clean, but also has some interbedded fine sand.~~

~~Groundwater was encountered in Boring B-01-4D at a depth of approximately 10 feet below the ground surface. Boring B-01-4D was abandoned on March 7, 2001.~~

## DATA EVALUATION

### Saturated Thickness and Potential Yield

### Aquifer Characteristics

Formation encountered in the borings drilled in Area 4 appears to be similar to the formation encountered in other high-capacity wells in the general area and consists primarily of medium to coarse sand and gravel. The lower part of the formation contains much gravelly sand and likely was deposited by meltwater streams. The upper part of the formation consists of medium to coarse grained sand and likely was deposited by lower energy streams as offshore sediment in Glacial Lake Wisconsin.

Borings drilled in Area 4 are within a few hundred feet of each other, and it appears that the gravelly sand formation encountered below a depth of approximately 60 to 70 feet is laterally extensive. Sketches in Appendix C show the general formation encountered in each boring.

It is estimated that the hydraulic conductivity of the aquifer materials in the vicinity of most existing high-capacity wells in the Wisconsin Rapids area range from 134 ft/day (1,000 gallons per day per foot<sup>2</sup> (gpd/ft<sup>2</sup>)) to 214 ft/day (1,600 gpd/ft<sup>2</sup>). The hydraulic conductivity of the formation in the vicinity of Collector Well 4 is approximately 192 ft/day (1,436 gpd/ft<sup>2</sup>). These are relatively high values and indicate the formation readily transmits water. It is believed that the hydraulic conductivity of the formation encountered in Area 4 would be within the range estimated at other wells, if not higher.

There appears to be approximately 90 feet of usable saturated thickness at each of the test boring sites.

Collector well yield was estimated using an equation by Hantush and Papadopoulos (1962) for sites that exist under water table conditions and have no source of induced infiltration. Assumptions and values used to determine potential yield of a collector well installed in



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**TABLE 2**  
 Summary of Performance Test Results  
 City of Wisconsin Rapids, Wisconsin

Well	Distance from Collector (1) (feet)	Measuring Point Elevation (1) (feet msl.)	Static Water Level			Pumping Level												
			Date/Time	Depth to Water (feet)	Water Elevation (feet msl.)	Date/Time	Depth to Water (feet)	Water Elevation (feet msl.)	Drawdown after 24 hrs. Pumping (feet)	Pumping Rate (gpm)	Specific Capacity (gpm/ft)	Drawdown Differential (ft/1000 gpm)						
Collector 1	---	1030.67																
RW1-OW-W	76	1026.88	04/17/02 14:08	37.46	993.21	04/18/02 14:50	46.55	984.12	9.09	1090	119.9	---						
RW1-OW-E	43		04/17/02 14:08	33.34	993.55	04/18/02 14:45	41.16	985.73	7.82			1.48						
			04/17/02 14:12	33.28		04/18/02 14:47	41.61											
Collector 2	---	1031.77																
RW2-OW-W1	57	1031.20	04/02/02 9:38	30.81	1000.96	04/03/02 15:30	39.96	991.81	9.15	930	101.6	---						
RW2-OW-W2	206		04/02/02 9:36	30.20	1001.00	04/03/02 15:30	37.29	993.91	7.09			2.26						
RW2-OW-E	87					04/03/02 8:16	29.83											
						04/03/02 8:23	33.28											
Collector 3	---	1034.75																
RW3-OW-W1	50	1032.21	04/02/02 13:39	25.46	1009.29	04/03/02 13:41	33.28	1001.47	7.82	740	94.6	---						
RW3-OW-W2	197		04/02/02 13:30	23.05	1009.16	04/03/02 13:41	28.89	1003.32	5.84			2.50						
RW3-OW-E	96																	
Collector 4	---	1035.11																
RW4-OW-NE	56	1034.57	04/16/02 14:30	17.82	1017.29	04/17/02 14:12	28.66	1006.45	10.84	2000	184.5	---						
RW4-OW-W	87	1034.77	04/17/02 14:30	17.56	1017.01	04/17/02 14:12	25.71	1008.86	8.15			1.20						
RW4-OW-E	152	1034.12				04/17/02 13:47	24.45	1010.32				1.94						
						04/17/02 13:50	21.15	1012.97				3.26						

1) Values for distance from collector well and measuring point elevations are taken from Ranney Division (May 2001).