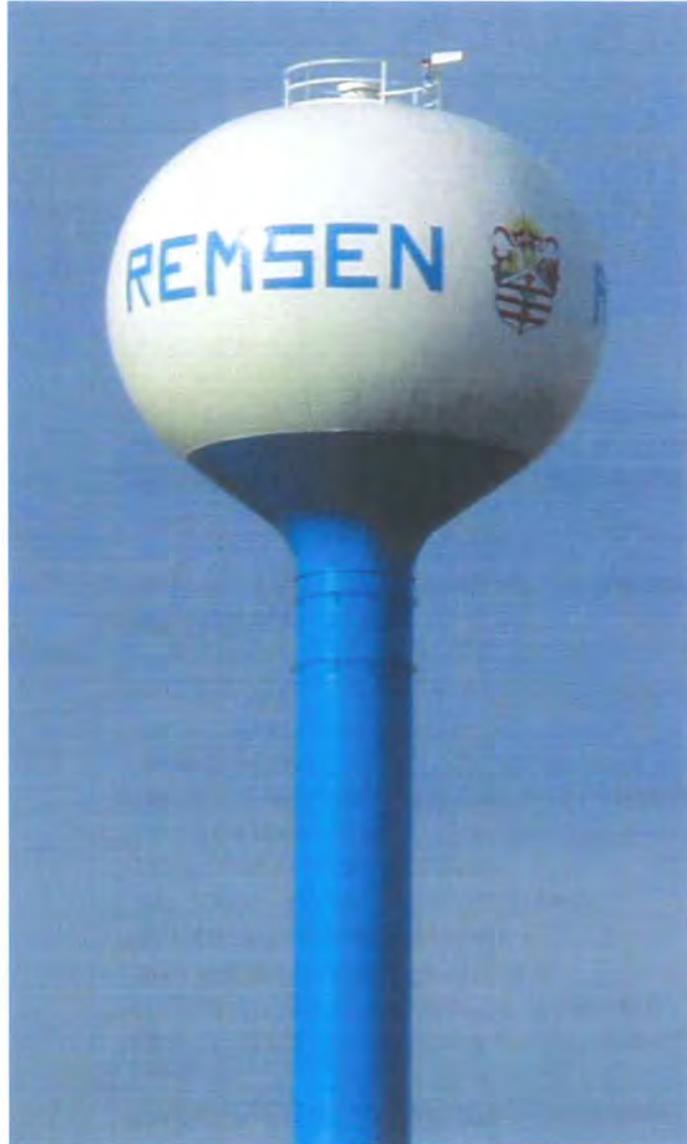


Remsen Municipal Utilities

PO Box 510 – 205 Fulton St
Remsen, IA 51050
PWSID: 7568079



June 2007

Source Water Protection Plan

The development of this Source Water Protection Plan document has been funded by the Iowa Department of Natural Resources through the use of Technical Assistance funds originated from the Federal Drinking Water State Revolving Fund Set Aside.

Remsen SWP Plan Team Members:

The first step in creating a Source Water Protection Plan is the formation of a team to work on the plan. The following people comprised the team:

Team Leader: Steven Pick, Director of Utility Operations

Team Members: Gary Whitfield, Water Plant Operator-in-Charge
Michael Ruden – Wastewater Treatment
Terry Maass – Utility Technician
Ron Mayer – Superintendent
Don Cook – Chairman of the Board
Tom Bacon – Board Director
Bob Groepper – City of Remsen Clerk
Clarence Harpenau – Farmer and Landowner (north of city wells)

NRCS/FSA Staff Assistance: Jeff Hoffmann, NRCS
Jim Lahn, Plymouth County NRCS District Conservationist

DNR Staff Assistance: Lois Benson, DNR Field Office 3 Environmental Specialist
Kathy Koskovich, DNR Private Lands Biologist
Becky Ohrtman, DNR Source Water Protection Coordinator

Remsen Contact Sheet

Remsen Director of Utility Operations	Steven Pick	Ctyremsen@midlands.net	712-786-2136
Water Operator	Gary Whitfield		712-786-2442
Field Office 3 (IDNR)	Lois Benson	Lois.Benson@dnr.state.ia.us	712-260-0587
Private Lands Biologist (IDNR)	Kathy Koskovich	katherine.koskovich@dnr.state.ia.us	712-276-2774 ext 108
Source Water Protection Coordinator (IDNR)	Rebecca Ohrtman	rebecca.ohrtman@dnr.state.ia.us	515-281-0932
Water Supply Environmental Engineer (IDNR)	Michael Anderson	michael.anderson@dnr.state.ia.us	515-725-0336
DNR – State Revolving Fund – 0% Loans	Patti Cale-Finnegan	patti.cale-finnegan@dnr.state.ia.us	515-725-0498
Plymouth County Sanitarian	Noel Ahmann	zoning@co.plymouth.ia.us	712-546-7516
ISU Extension	Joel DeJong	jldelong@iastate.edu	712-546-7835
Research Geologist (Iowa Geological Survey)	Chad Fields	chad.fields@dnr.iowa.gov	319-335-1575
SWCD Chairman (Soil & Water Conservation District)	Nancy Anderson		712-546-8858
District Conservationist (Natural Resources Conservation Service)	James Lahn	James.Lahn@ia.usda.gov	712-546-8858
NRCS	Jeff Hoffmann	Jeff.Hoffmann@ia.nacdnet.net	712-546-8858
CRP Sign-up Contact (FSA)	Leann Cooper	Leann.cooper@ia.usda.gov	712-546-4178
Water Services Specialist (IAMU)	Jessica Lillie	jlillie@iamu.org	515-289-1999
Water Services Coordinator (IAMU)	Jill Soenen	jsoenen@iamu.org	515-289-1999

Important Websites

Well Logs and well information

- <http://gsbdata.igsb.uiowa.edu/geosam/>

Source Water Protection Evaluation Copies

- <http://www.igsb.uiowa.edu/swp/>

Iowa Department of Natural Resources

- www.iowadnr.com

**Field Survey – Alluvial Aquifer
Well 1, 3, 5, 6, 8**

Site 1 & 3

Larry Rodesch
43626 160th Street
Remsen, IA 51050

Phone no. 712-786-2437

Description: Permitted Pesticide Applicator. Non-regulated Farm/residence <1100 gallon tank – removed or filled. One 560 gallon diesel tank and one 560 gallon kerosene tank were removed on 1/1/1988. Septic system in five year zone.

Site 2

Remsen Roller Mill, Inc.
109 W. Nothem
Remsen, IA 51050

Phone no.

Description: Section seven tracking – pesticide manufacturers. No longer a company.

Site 4

Veronica Peters
101 East Notham Avenue
Remsen, IA 51050

Phone number: 712-786-2821

Description: Non-regulated farm/residential <1100 gallon tank – removed/filled. One 500 gallon gasoline tank removed on 7/11/1990. Actual former location is outside the delineation.

Site 5

Remsen Body Shop
324 East Nothem
Remsen, IA 51050

Contact: Sod Dreckman

Phone number: 712-786-3270

Description: RCRA-Unknown Type. Body shop with car paint and detailing products. Site is in the wrong location on map. Its correct location is within the surface runoff zone.

Site 6

Remsen-Union Community School
511 Roosevelt St.
Remsen, IA 51050

Phone number: 712-786-1101

Description: Regulated tanks – removed/filled. One 10,000 gallon gasoline tank and one 1,000 diesel tank that were removed on 10/18/1990.

Site 7

City of Remsen
205 Fulton
Remsen, IA 51050

Phone no. 712-786-2136

Description: Regulated tanks – removed/filled. Two 21,000 gallon diesel tanks were removed on 9/10/1989/. Site is located northwest of its location on the map.

Site 8

Fids Feed Supply
326 East Hawkeye
Remsen, IA 51050

Phone no. 712-786-2247

Contact: Leon Fiedler

Description: Regulated tanks – removed/filled. One 550 gallon gasoline tank was removed on 4/26/1996.

Site 9

Brower Construction Company
NE Corner Hwy 3 and L14

Phone number:

Description: Portable asphalt plant located at NE corner of Hwy 3 and L14. Brower Construction is out of Sioux City and was doing a temporary reasphalt of HWY 3 project. Portable plant no longer in that location.

Site 10

Remsen Power Plant
125 East First Street
Remsen, IA 51050

Contact: City of Remsen Phone Number: 712-786-2136

Description: Non-regulated leaking site. DNR classified as No Action Required.

Site 11

Northern Natural Gas Phone no.

Description: Natural Gas Pipeline

Site 12

Illinois Central Phone no.

Description: Active railroad that hauls coal, grain, box cars etc.

Site 13

Larry Rodesch
43626 160th Street
Remsen, IA 51050 Phone no. 712-786-2437

Description: Hog manure application on field east of city's well fields. Manure application is in the two and five year zones by Rich Harpenau.

Site 14

Alvira Tentinger
43602 Hwy 3
Remsen, IA 51050 Phone number:

Description: Feed lot with 700 head of cattle and septic system in surface runoff zone.

The development of this Source Water Protection Plan document has been funded by the Iowa Department of Natural Resources through the use of Technical Assistance funds originated from the Federal Drinking Water State Revolving Fund Set Aside.

Site 15

Golden Pheasant Restaurant
44028 Hwy 3
Remsen, IA 51050

Contact: Larry Mullally Phone no. 712-786-9455

Description: Restaurant with septic system in the surface runoff zone.

Site 16

Dave Harpanau
17284 Hwy 140
Remsen, IA 51050

Phone no. 712-786-2888

Description: Household well and septic in the surface runoff zone.

Site 17

Damon Koontz
17708 Hwy 140
Remsen, IA 51050

Phone no. 712-786-3242

Description: Septic system in the surface runoff zone. Residence is on rural water.

Site 18

Jim Boever
44282 Hwy 3
Remsen, IA 51050

Phone no. 712-786-1550

Description: Septic system in the surface runoff zone. Residence is on rural water.

Site 19

Bill Ortman
44164 165th Street
Remsen, IA 51050

Phone no. 712-786-3190

Description: Feed lot with appx. 700 head of cattle and a septic system in the surface runoff zone. Residence is on rural water.

Site 20

Rented Property
43775 160th Street
Remsen, IA 51050

Contact: Rich Harpenau (owner) Phone no. 712-786-3350

Description: Hogs, 50 head of cattle, household well, potential livestock well, and septic system in the 5 year zone. Household well is in incorrect location and will be moved southeast near the house. Potential livestock well in wrong location and will be moved to be near cattle buildings.

Site 21

Jim Heuertz
15996 Quest Avenue
Remsen, IA 51050

Phone no.

Description: Septic system, many sheep, few pigs, and household well in 2 year zone.

Site 22

Rick Sudtelgte
43502 106th Street
Remsen, IA 51050

Phone no. 712-786-3260

Description: Septic system in ten year zone.

Site 23

Roy Steffen
43504 106th Street
Remsen, IA 51050

Phone no. 712-786-2197

Description: Septic system in five year zone.

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Site 24

Rich Harpenau
43506 106th Street
Remsen, IA 51050

Phone no. 712-786-3350

Description: Septic system in five year zone.

Site 25

Frontier Motel
44046 Hwy 3
Remsen, IA 51050

Phone no. 712-786-1419

Contact: Dave Steichen

Description: 5 unit motel and attached residence with a septic system.

Site 26

Keith Ahlers
302 East 4th Street
Remsen, IA 51050

Phone no. 712-786-2272

Description: Unused, Non-potable well. House is hooked to city water.

**Field Survey – Dakota Aquifer
Well 7 & 9**

Site 1

Veronica Peters
101 East Nothem Avenue
Remsen, IA 51050

Phone number: 712-786-2821

Description: Non-regulated farm/residential <1100 gallon tank – removed/filled.
One 500 gallon gasoline UST removed on 7/11/1990.

Site 2, 7 & 9

Remsen Farmers Cooperative
6 South Washington
Remsen, IA 51050

Phone no. 712-786-1134

Description: Section seven tracking – pesticide manufacturers.

Permitted pesticide applicator. Coop stores liquid (outside delineation) and dry fertilizer and also mixes it. Dry fertilizer storage location will be marked on map but is south of railroad tracks in the five year zone.

One 10,000 gallon diesel UST and one 2,000 gasoline UST removed on 9/8/1994.
Site was classified as High Risk but a reclassification to No Further Action was requested. No confirmation as to whether DNR accepted No Further Action reclassification. LUST site in wrong location and will be moved on the map.

Site 3

Remsen Power Plant
125 East First Street
Remsen, IA 51050

Contact: City of Remsen

Phone Number: 712-786-2136

Description: Non-regulated leaking site. DNR classified as No Action Required.

Site 4

The development of this Source Water Protection Plan document has been funded by the Iowa Department of Natural Resources through the use of Technical Assistance funds originated from the Federal Drinking Water State Revolving Fund Set Aside.

Charlie's Repair
2 Nothem Avenue
Remsen, IA 51050
Contact: Tom Bohnekamp Phone number: 712-786-2421

Description: Regulated tanks. Two 1,000 gallon gasoline USTs removed on 9/1/1988. Two 1,000 gallon gasoline USTs and one 1,000 gallon diesel UST currently active. LUST site is classified as High Risk by DNR.

Site 5, 10, & 18

Illinois Central Phone no.

Description: Active railroad that halls coal, grain, box cars etc.

Site 6

Remsen Roller Mill
109 West Nothem
Remsen, IA 51050 Phone number:

Description: Regulated tanks – removed/filled. One 500 gallon gasoline tank that was removed on 12/18/1990. Site is in wrong location and will be moved west to reflect its former location. Site is currently owned by Remsen Farmers Cooperative.

Site 8

Remsen Body Shop
324 East Nothem
Remsen, IA 51050

Contact: Sod Dreckman Phone number: 712-786-3270

Description: RCRA-Unknown Type. Body shop with car paint and detailing products. Site is in the wrong location on map. Its correct location is within the ten year zone.

Site 11

City of Remsen
205 Fulton

The development of this Source Water Protection Plan document has been funded by the Iowa Department of Natural Resources through the use of Technical Assistance funds originated from the Federal Drinking Water State Revolving Fund Set Aside.

Remsen, IA 51050

Phone no. 712-786-2136

Description: Regulated tanks – removed/filled. Two 21,000 gallon diesel USTs were removed on 9/10/1989/. Site is located northwest of its location on the map and went from the ten year zone to the two year zone.

Site 12

JW Tank Line
205 W. Nothem
Remsen, IA 51050

Contact: Wayne Heidesch Phone no. 712-786-2260

Description: One 2,000 gallon diesel UST removed on 10/4/1990. Site currently has two active ASTs (gasoline and diesel). Site was moved on the map southwest to the correct location. It still remains in the ten year zone.

Site 13

Jack Thiel, Inc.
267 South Washington
Remsen, IA 51050

Contact: Jack Thiel Phone no. 712-786-2235

Description: One 560 gallon UST was removed on 11/8/1994. The location of the site is incorrect. It will be moved southeast to its correct location.

Site 14

Remsen Roller Mill, Inc.
109 West Nothem
Remsen, IA 51050

Phone no.

Description: Section seven tracking – pesticide manufacturers. Purchased by Farmers Coop.

Site 15

Old Service Station
301 South Washington
Remsen, IA 51050

The development of this Source Water Protection Plan document has been funded by the Iowa Department of Natural Resources through the use of Technical Assistance funds originated from the Federal Drinking Water State Revolving Fund Set Aside.

Contact: Phone no.

Description: Four 1,000 gallon USTs were removed on 12/2/1989. LUST site is classified by DNR as No Action Required. Moved location of former site to it's correct location on the map.

Site 16

Farmer's Coop (Community Corner)
206 West First Street
Remsen, IA 51050

Contact: Mike Bonekamp Phone no. 712-786-1225

Description: Regulated Tanks – Active. Two 5,000 gallon gasoline USTs and one 5,000 gallon diesel UST. LUST site classified by DNR as No Action Required. Moved location of this active station to its correct location on the map.

Site 17

Ritz Super Service
14 W. 2nd Street
Remsen, IA 51050

Contact: Phil Ritz Phone no. 712-786-2135

Description: Regulated tanks – removed/filled. One 1,000 diesel UST, one 560 gallon diesel UST, two 2,000 gallon gasoline UST were removed on 1/1/1990. LUST site classified by DNR as No Action Required. Moved former LUST site north across the street on the map to reflect it's former location.

Site 19

Larry Rodesch
43626 160th Street
Remsen, IA 51050

Phone no. 712-786-2437

Description: Hog manure application by Rich Harpenau on the field east of city's wells. Manure application is in the ten year zone.

Site 20

Jim Heuertz
15996 Quest Avenue
Remsen, IA 51050

Phone no.

Description: Septic system, many sheep, few pigs, and household well in 10 year zone.

Site 21

Rick Sudtelgte
43502 106th Street
Remsen, IA 51050

Phone no. 712-786-3260

Description: Septic system in ten year zone.

Site 22

Roy Steffen
43504 106th Street
Remsen, IA 51050

Phone no. 712-786-2197

Description: Septic system in ten year zone.

Site 23

Rich Harpenau
43506 106th Street
Remsen, IA 51050

Phone no. 712-786-3350

Description: Septic system in five year zone.

Remsen Alluvial Field Survey Prioritization for the 2-year Time of Travel:

Identification of potential contaminant sources is a main element of a Source Water Protection Plan. The Source Water Protection Team completed a survey of the community and recorded potential contaminant sources. The sources were then scored using the criteria in tables 1-4.

The following chart lists the potential contaminants in the two-year time of travel zone from the delineation map. These potential contaminants are considered to be a high priority because of their vicinity to the water source.

Site no.	Land use Type	Land Risk Score	Distance Score	Well Vulnerability	Aquifer Vulnerability	Total
13	Larry Rodesch – Hog Manure Field Application	5	4	2	4	15
21	Jim Heuertz – Septic, sheep, pigs , well	5	4	2	4	15

Remsen Alluvial Field Survey Prioritization for the 5-year Time of Travel:

Identification of potential contaminant sources is a main element of a Source Water Protection Plan. The Source Water Protection Team completed a survey of the community and recorded potential contaminant sources. The sources were then scored using the criteria in tables 1-4.

The following chart lists the potential contaminants in the two-year time of travel zone from the delineation map. These potential contaminants are considered to be a high priority because of their vicinity to the water source.

Site no.	Land use Type	Land Risk Score	Distance Score	Well Vulnerability	Aquifer Vulnerability	Total
13	Larry Rodesch – Hog Manure Field Application	5	3	2	4	14
20	Rich Harpenau – Septic, well, hogs, cattle	5	3	2	4	14
23	Roy Steffen - Septic	5	3	2	4	14
24	Rich Harpenau - septic	5	3	2	4	14

Remsen Alluvial Field Survey Prioritization for the 10-year Time of Travel:

Identification of potential contaminant sources is a main element of a Source Water Protection Plan. The Source Water Protection Team completed a survey of the community and recorded potential contaminant sources. The sources were then scored using the criteria in tables 1-4.

The following chart lists the potential contaminants in the two-year time of travel zone from the delineation map. These potential contaminants are considered to be a high priority because of their vicinity to the water source.

Site no.	Land use Type	Land Risk Score	Distance Score	Well Vulnerability	Aquifer Vulnerability	Total
22	Rick Sudtelgte - Septic	5	2	2	4	13

Alluvial Field Survey Prioritization for the Surface Runoff Time of Travel:

Identification of potential contaminant sources is a main element of a Source Water Protection Plan. The Source Water Protection Team completed a survey of the community and recorded potential contaminant sources. The sources were then scored using the criteria in tables 1-4.

The following chart lists the potential contaminants in the two-year time of travel zone from the delineation map. These potential contaminants are considered to be a high priority because of their vicinity to the water source.

Site no.	Land use Type	Land Risk Score	Distance Score	Well Vulnerability	Aquifer Vulnerability	Total
14	Alvira Tentinger – Feet Lot, septic system	5	1	2	4	12
15	Golden Pheasant Restaurant – septic	5	1	2	4	12
16	Dave Harpanau – septic, well	5	1	2	4	12
17	Damon Koontz - Septic	5	1	2	4	12
18	Jim Boever - Septic	5	1	2	4	12
19	Bill Ortman – Septic, Feed lot	5	1	2	4	12
25	Frontier Motel - Septic	5	1	2	4	12
26	Keith Ahlers – Non-potable well	5	1	2	4	12

Remsen Dakota Field Survey Prioritization for the 5-year Time of Travel:

Identification of potential contaminant sources is a main element of a Source Water Protection Plan. The Source Water Protection Team completed a survey of the community and recorded potential contaminant sources. The sources were then scored using the criteria in tables 1-4.

The following chart lists the potential contaminants in the two-year time of travel zone from the delineation map. These potential contaminants are considered to be a high priority because of their vicinity to the water source.

Site no.	Land use Type	Land Risk Score	Distance Score	Well Vulnerability	Aquifer Vulnerability	Total
23	Rich Harpenau – Septic	5	3	0	1	9

Remsen Dakota Field Survey Prioritization for the 10-year Time of Travel:

Identification of potential contaminant sources is a main element of a Source Water Protection Plan. The Source Water Protection Team completed a survey of the community and recorded potential contaminant sources. The sources were then scored using the criteria in tables 1-4.

The following chart lists the potential contaminants in the two-year time of travel zone from the delineation map. These potential contaminants are considered to be a high priority because of their vicinity to the water source.

Site no.	Land use Type	Land Risk Score	Distance Score	Well Vulnerability	Aquifer Vulnerability	Total
19	Rich Harpenau – Hog Manure Application	5	2	0	1	8
20	Jim Heuertz – Septic, sheep, pigs, well	5	2	0	1	8
21	Rick Sudtelgte - Septic	5	2	0	1	8
22	Roy Steffen - Septic	5	2	0	1	8

**Source Water Protection Team Meeting
March 28, 2007
Remsen, IA
9:00 am**

1. Introductions

The following were in attendance:

Gary Whitfield – Water Plant Operator in Charge
Michael Ruden – Waste Water Treatment
Terry Maass – Utility Technician
Ron Mayer – Superintendent
Steve Pick – Utility of Operations Director
Lois Benson – Environmental Specialist (IDNR)
Jessica Lillie – IAMU Water Services Specialist

Remsen Municipal Utilities is governed by a Utility Board.

2. Overview of Source Water Protection Plans

Discussed goals and the steps involved in completing a SWP plan.

City uses wells 1, 3, 5, 6, 7, 8, and 9. Wells 2 and 4 have been plugged. Wells 1, 3, 5, 6, and 8 are shallow wells drilled into the alluvial aquifer. Wells 7 and 9 are deep wells drilled into the Dakota aquifer. The shallow wells have high nitrates and the two deep wells have high levels of combined radium so Remsen is on a 50% blending restriction with the deep wells. The blended nitrate level was the highest it has been since 2004 at 7.4 mg/L on February 14, 2007.

3. Review of Potential Contaminant Sources and Ground Truth Locations

The team discussed the list of potential contaminant sources; addresses, names, and locations were compiled. All locations of potential contaminants were ground truthed and contaminants in the wrong place will be moved on the GIS map to reflect their correct location.

4. Schedule Next Meeting

Next meeting is scheduled for April 17, 2007 at 9:00 am.

Table 3: WELL VULNERABILITY WORKSHEET	
(Wells 7 and 9)	
7. Has your well ever yielded water with nitrate concentrations higher than 5 mg/l as N (half the MCL)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
8. Does your well have a history of water quality detects for man-made chemicals or contaminants (excluding trihalomethanes (THMs))?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
9. Does raw water from the well have a history of fecal coliform bacteria?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
10. Does surface drainage flow toward the well, or has it been determined by DNR to be groundwater under the influence of surface water?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
11. Is the well casing leaking?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Don't Know
12. Is the well ungrouted or is the grout seal in poor condition?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Don't Know
<p>Choose only one of the following:</p> <p style="text-align: right;">If <i>any</i> "Yes" box was marked, mark this box: <input type="checkbox"/> 2</p> <p style="text-align: right;">If <i>all</i> "No" boxes were marked, mark this box: <input checked="" type="checkbox"/> 0</p> <p>If "No" was marked for questions 1, 2, 3, <i>and</i> 4 and a "Don't Know" was marked for questions 5 <i>or</i> 6, mark this box: <input type="checkbox"/> 1</p> <p>Insert the number to the right of the marked box into Figure 4 in the column for well vulnerability.</p>	

Source: Iowa Department of Natural Resources, Iowa Wellhead Protection Plan, 1998.

Table 4: AQUIFER VULNERABILITY WORKSHEET	
<p>If a public water supply uses more than one aquifer (per well or by multiple wells), use one Aquifer Vulnerability Worksheet <u>for each aquifer</u>.</p> <p>Aquifer name: Dakota (Hydrogeologic name)</p> <p>What is the thickness of the confining materials, such as glacial till or shale, above the aquifer in the WHPA?</p> <p style="text-align: right;"> < 25' <input type="checkbox"/> 4 25' – 50' <input type="checkbox"/> 3 51' – 100' <input type="checkbox"/> 2 >100' <input checked="" type="checkbox"/> 1 </p> <p>Insert the number to the right of the marked box into Figure 4 in the column for aquifer vulnerability.</p>	

Source: Iowa Department of Natural Resources, Iowa Wellhead Protection Plan, 1998.

Source Water Team Meeting Minutes
April 17, 2007
Remsen, IA
9:00 am

1. Introductions

The following were in attendance:

Gary Whitfield – Water Plant Operator in Charge
Michael Ruden – Waste Water Treatment
Terry Maass – Utility Technician
Ron Mayer – Superintendent
Steve Pick – Utility of Operations Director
Don Cook – Chairman of the Board
Tom Bacon – Board Director
Bob Groepper – City of Remsen Clerk
Lois Benson – Environmental Specialist (IDNR)
Jeff Hoffman – Plymouth County NRCS
Becky Ohrtman – DNR Source Water Protection Coordinator
Jessica Lillie – IAMU Water Services Specialist

2. Review Potential Contaminant GIS Map for corrections/additions

A list of contaminants, including a map, were handed out to all attendees with the goal of them looking over the information outside of the meeting for changes/additions. Steve Pick will compile any corrections and call me to make those additions/changes.

3. 9 Step Planning Process

The 9 step planning process was implemented to include all possible strategies to manage Remsen's source water.

4. Discuss Workplan activities and goals to achieve

There is concern regarding a cattle operation just south of Highway 3. When it rains, water washes soil and manure off the land, under the highway, and over to the school's ball fields. There is a waterway that runs through town past Remsen's wellfield. There is concern that this runoff is affecting Remsen's nitrate levels. The city owns 34 acres around the wellfield that is currently covered in alfalfa, which is rented out and hayed by the renter. Well 6 is approximately 200' away from row cropping. Well 7 is located in town.

Lois Benson (DNR FO2) discussed terracing with the landowner on a recent visit. Since this operation has less than 1,000 head of cattle, there is not much that can be done regulatory wise to prevent the runoff. If the operation had over 1,000 head of cattle they would be required to have containment. Jim Lahn (NRCS DC) has also paid this operation a visit to discuss their options to prevent this runoff.

The biggest concerns to Remsen are their nitrate levels, which run around 6.0 mg/L but have been as low as 3.0 mg/L at times and their capacity. Remsen is consistently drawing the same amount of water out of each shallow well except for well 5, which may be a little less

than the others. They are blending the water with deep wells (50% blending restriction do to combined radium) but do not have a lot of raw water nitrate data. The goal is to have them collect more raw water nitrate samples from the shallow wells and, if cost effective, two samples for radium in the deep wells for some baseline data. The committee agreed to complete the extra sampling before the next meeting. Becky Ohrtman added that she may be able to get the city funding for this extra sampling. She will check on it and get back with them on this funding.

Becky Ohrtman also suggested the possibility of Remsen getting test wells through IGS for additional nitrate monitoring in the area but would check on the possibility of this option.

Remsen's source water delineation includes large portions of the town. There is concern that the nitrates can also come from residential lawn fertilizers. An article will be published in Remsen's next newsletter that discusses best management practices for fertilizer application.

Several activities discussed and agreed on by the committee will be put into the workplan format.

5. Jeff Hoffmann (NRCS) - CRP and other eligible programs for landowners

Jeff Hoffmann discussed the various programs available to landowners in the area of Remsen's wellfield. For those landowner who are eligible for wellhead CRP and have ground that has a cropping history of 4 out of the last 6 years there are rental rates available (based on soil type) that range from \$85.60 – \$170.80. Jeff added that hopefully by August rental rates for 10 to 15 year CRP contracts will be increased. The case rental rate in this area is around \$180/acre. There are approximately 5 landowners within the 2,000 foot buffer area.

Jeff also discussed other programs available outside of wellhead CRP. One is the Plymouth County Pheasants Forever is offering \$200/acre for filterstrip installation plus the USDA is offering a \$100/acre bonus on top of the \$200/acre and an annual rental rate that is based on soil type.

6. Schedule next meeting

The next meeting is scheduled for Monday, May 21st at 9:00 am.

**Source Water Team Meeting
May 21, 2007
Remsen, IA
9:00 am**

1. Introductions

The following were in attendance:

Clarence Harpenau – Farmer and Landowner (north of city wells)
Gary Whitfield – Water Plant Operator in Charge
Terry Maass – Utility Technician
Ron Mayer – Superintendent
Steve Pick – Utility of Operations Director
Bob Groepper – City of Remsen Clerk
Kathy Koskovich – Private Lands Biologist (IDNR)
Jim Lahn – Plymouth County NRCS District Conservationist
Becky Ohrtman – DNR Source Water Protection Coordinator
Jessica Lillie – IAMU Water Services Specialist

2. Review final maps and 11x17 version

One change was noted on the Dakota Aquifer Potential Contaminant Map. Potential contaminant 17 needs to be moved across the street from its current location on the map. The change will be made and the final maps will be printed.

3. Review workplan – additions/corrections

Becky Ohrtman discussed the monthly sampling plan that will be completed by Remsen. The fine details will be discussed with Steve Pick following the meeting. The plan is to have Remsen collect monthly nitrate samples from the shallow wells (wells 1, 3, 5, 6, 8) for one year and send them off to UHL for analysis. The goal is to correlate the results, find a source of nitrates, and develop a workplan to handle the source. At this time, a preliminary work plan will be started and implemented and after the year of sampling, activities will be added to the preliminary work plan to enhance the management of the nitrates. An electronic copy of the workplan will be given to Remsen for updating and adding to it in the future since it is a living document.

Bob Groepper brought up the cattle lot in city limits and the continued soil and water runoff concern. Pictures were taken and developed from the most recent rain storm (last week) to show the runoff from the lot. There are culverts underneath the highway that the soil and water runoff drain to on the surface. There are also approximately 3 tile lines that run underneath Highway 3, through town, and surface just south of the wells (north side of town) in a waterway that flows through the wellfield and drains into the Deep Creek.

Jim Lahn (NRCS DC) discussed that it is not in his jurisdiction to force the cattle lot to prevent soil and water runoff from their lot. He had spoken with Lois Benson (DNR field office 3) who

discussed at the last meeting that cattle lots with less than 1,000 head of cattle are not required to comply with any regulations for best management plans. Jim discussed he does handle soil loss complaints however, the law doesn't require terracing. He talked with the owner of the cattle lot in the past about their soil loss. His suggestion to the City of Remsen and the Utility Board is to work with the owner of the cattle lot owner to get a solid settling structure in place. The solid settling structure is made up of sieves that filter out soil and particles, however will not stop the water run off. There is currently a 50% cost share available and Jim suggests that the city/utility board also contribute a percentage of money to the cost and the lot owner will contribute the remaining portion of money. Steve Pick commented the Utility Board and city will be having a joint meeting on Wednesday May 23 and would discuss this option. Steve also wanted to know how to get started and Jim said he could go speak with the cattle lot owner at anytime. Steve and Jim exchanged contact information.

Jim also discussed other options the city would have in working with landowners around their well field. He discussed best management practices and applying fertilizer at the right rates. Nitrogen is getting costly and most farmers don't want to apply more than they have to. Jim talked about anhydrous ammonia application and how very few farmers side dress it. If it is being applied in the fall, the soil temperature needs to be 50° F or less because nitrates are more leachable at soil temps above 50°F. Jim suggested to also work with Joel De Jong with ISU extension on doing field day presentations to educate landowners in the area about best management practices. His contact information will be added the SWP plan. NRCS may also have some funding to do test plots for fertilizer application to show farmers what are the most effective fertilizer application rates. Jim said he could assist with any articles that Remsen would like to print in the newspaper.

Also discussed was the city owned land, which is approximately 34 acres. It is currently planted in alfalfa, which is hayed by a renter. Alfalfa is a nitrogen fixing legume that could be contributing nitrates to the soil, so it was determined by the committee that it may not be the best ground cover for the city's well field. Kathy Koskovich interjected that there is a cost share REAP program for the city to reseed the area in native grasses. The native grasses can be hayed once a year before nesting season. The city will have to let the renter know by September 1st should they change the ground cover on those acres. Even if the city decides not to enroll in a program, Kathy suggested they at least plant the field in brome grass.

Jim talked about Wellhead CRP and Clarence Harpenau, local landowner, did not think that farmers would be interested in the Wellhead CRP because they can get higher rates for cash rent than CRP rental rates. Wellhead CRP rental rates may go up approximately 20% in August, but it is not guaranteed at this point.

There is a private, unused well within city limits and the condition of the well is unknown. Steve was given information about private well abandonment. The Plymouth County Sanitarian, Noel Ahman, was contacted regarding the options for this well to be plugged should the owner agree. There is a cost share program of up to \$200 for abandoning and plugging this well. Noel is a Remsen resident and can drop the application and information off to the city or well owner. His contact information is in the contact information table in this plan.

4. Review source water plan – additions/corrections

A draft of the Remsen's SWP plan was presented and discussed. Joel DeJong's contact information will be added to the contact list.

5. Discuss any final concerns or questions

Becky Ohrtman will be working with Remsen on the implementation the sampling over the next year. After that time, the nitrate problem will be revisited to find a source. The workplan will be changed and adapted to manage the source of nitrates. The SWP plan will be submitted to the DNR Technical Advisory Committee with the preliminary workplan.

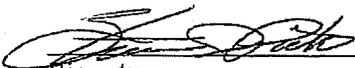
Public Water Supply Contingency / Emergency Plan Affidavit

The Safe Drinking Water Act amendments of 1986 and 1996 established the concept of wellhead protection, and subsequently the Source Water Protection program. The program is overseen by the Iowa Department of Natural Resources (IDNR) and attempts to prevent potential contaminants from entering source waters and prepare for situations in which drinking water may be impaired through contamination, power outage and treatment or distribution system interruptions. In order to ensure a public water supply's preparedness, a Contingency/Emergency Plan has been required in every approved Source Water Protection Plan (SWPP) or Wellhead Protection Plan (WHPP). Due to recent and growing concerns over water system security and due to many systems having previously prepared such a plan under the provisions of the 2002 Bioterrorism Act, the IDNR is now allowing an affidavit in lieu of including a completed Contingency/Emergency Plan within the submitted SWPP/WHPP.

Although public water supplies do not need to send IDNR completed plans, each must have an accessible and up-to-date plan in case a catastrophic event occurs within their system. It is necessary for the completed water supply Contingency/Emergency Plan to contain the following information, at a minimum:

- Contact information for the city's mayor, city clerk, water/wastewater operator.
- Contact information for the city's power company, a professional electrician, a professional plumber and an equipment repair company.
- System's critical users must be identified and a plan for immediate notification must be created. (i.e. hospitals, nursing homes, schools, etc.)
- Contact information for local media, including newspaper, radio and television.
- Contact information for a certified laboratory, local emergency contacts, state and local public health departments and the National Guard.
- Contact information for the IDNR's 24 hour emergency contact and the local IDNR field office.

I, Steven J. Pick, representing Remsen Municipal Utilities certify that a Contingency / Emergency Plan has been created for our public water supply system and that this information can be presented to the IDNR upon request.


Signature

5/21/07
Date

**Remsen Municipal Utilities
Source Water Protection Workplan
PWS ID# 7568079**

Developed by: Steven J. Pick
Operations Director

Activity	Start Date	Completion Date	Personnel	Completion %	Comments
Compile and review latest data from two most recently drilled wells (well 8, shallow and well 9, deep)	5-21-07	5-21-07	Gayrey	100%	Well 8 (drilled in 2001) had a raw water nitrate level of 16.4 mg/L. Well 9 had a raw water combined radium level of 5.2 pCi/L.
Collect monthly nitrate samples for a year from the shallow wells and if feasible collect samples from the deep wells to be tested for combined radium to get some baseline data.	Monthly	Continuous	Gayrey	Ongoing	Monthly nitrate samples to be collected from wells 1, 3, 5, 6, 8. Combined radium samples collected from wells 7 and 9.
Compile a list of landowner contact information for CRP	4-17-07	4-23-07	Steve	100%	Landowners and renters were added to the CRP GIS map.
Hold meeting for landowners and renters and have information available covering BMPs and CRP	3/28/07 4/17/07 5/21/07 10/8/08	Ongoing	Committee	90%	Future meetings to be held as needed
Check berms around the wells for sloughing and repair needs	Monthly	Monthly	Terry Maass	100%	Well condition will be checked monthly during monthly water drawdown tests
Print BMPs for residential fertilizing in the newspaper and quarterly newsletter	Scheduled for Spring/Summer	Ongoing	Steve	80%	A fertilizer BMP sample article is on file to be placed in newspaper or newsletter
Assist USDA, NRCS with landowners in the 2,000 foot radius regarding land enrollment into CRP - contact DNR after SWP plan approval	4/17/07	10/08/08	Committee	100%	The City will continue to provide information to landowners who haven't signed up to date.

Activity	Start Date	Completion Date	Personnel	Completion %	Comments
Provide interested landowners an extra incentive to enroll their land into CRP.	01/07	12/08	Committee	100%	Committee will consider this as an option if any landowners are interested
Discuss with homeowner in city limits regarding plugging the non-potable well in their yard. Discuss the cost share funding available to pay for the cost of abandoning the well and give them the County Sanitarian's contact information	4/17/07	06/07	Steve/ Committee	100%	Any inquiries made concerning well plugging issues are forwarded to area companies who plug wells as well as information on funding assistance
Assist NRCS in working with Tentinger cattle lot to manage soil runoff	3/28/07	11/07	Steve/ Committee	100%	Tentingers switched to contour farming and moved their feedlots further away from waterway
Conduct a ground water assessment	5/08	10/08	IDNR Source Water	100%	Very helpful in acquiring land and eliminating manure and commercial fertilizer
Contact NRCS to work with local farmers for best management practices and education.	5/21/07	Ongoing	Steve/ Committee	80%	
Update emergency plan yearly with any changes	5/21/07	Annual Update	Steve	100%	
0% interest SRF funding for land or easement purchase	12/08	3/09	Steve, IDNR, NRCS, SWCD, RC&D	90%	The team is currently working on this type of funding for potential future use
Team to meet on an annual basis to discuss any changes or concerns	03/07	Ongoing	Committee	100%	During meetings discussion will cover: new acres enrolled into CRP, work plan status, map updates, SWP plan updates

Activity	Start Date	Completion Date	Personnel	Completion %	Comments
Review water monitoring results yearly and compare them to previous years for significant increases or changes	01/08	Ongoing	Committee	80%	Will maintain charts to simplify visual and understanding of well results
Update GIS maps yearly with changes – contact DNR for future changes	12/08	Ongoing	Steve, NRCS RC&D IDNR	80%	Will review each year and implement changes
Convert cropland to native grasses on land bordering well field	10/08	08/09	Steve, NRCS, Pheasants Forever, SWCD, RC&D, Ply.Co. Conservation	20%	As land is obtained, grasses will be planted
Research grants/loans to develop and implement BMP's	11/08	Ongoing	Steve, IDNR, NRCS, RC&D	50%	In the process to obtain a WIRB grant and SRF 0% loan

**REMSEN MUNICIPAL UTILITIES
W.I.R.B. GRANT WORKPLAN
AGREEMENT NO. 8025-015**

Developed by: Steven J. Pick
Operations Director

REPORT PERIOD: _____

Activity	Start Date	Completion Date	Personnel	Completion %	Comments
Land Acquisition (Rodesch) (14.4 acres)	4-8-09	4-15-09	Utility Board of Trustees/ Steve Pick Operations Director	80%	Have on file a purchase option. Have contacted after grant notification. Hope to execute option 4/1/09
Land Acquisition (Harpenau) (5.7 acres)	4-8-09	Ongoing	Utility Board of Trustees/ Steve Pick Operations Director	10%	Have verbal agreement. Land owner mandating other restrictions. Will try to work out within grant time-frame.

Wellhead Monitoring	07/07	Ongoing thru 3/2012	Water distribution personnel/ University Hygienic Lab. & Iowa DNR SW	35%	Will chart testing results to simplify analysis. Chart seeding, groundwork, etc. Present updated graph of nitrate levels
Land conversion	5/09	Ongoing	Pheasants Forever & Utility Personnel	10%	A commitment has been made w/ Pheasants Forever to start conversion this spring ASAP
Public updates on progress with project	3/2009	Ongoing thru 2012	Steve Pick Operations Director	10%	Articles have appeared in the Remsen Bell-Enterprise as well as the LeMars Daily Sentinel highlighting this project. Additional updates will be placed in the quarterly newsletters as well as the newspapers
Develop educational opportunities. Mow trails throughout area.	4/2009	Ongoing	Steve Pick	20%	Have made contacts with the school systems as well as the Plymouth County Conservation Naturalist. Have received excited desire to use land when developed.
Progress reporting	10/09	6-month Annual Final	Steve Pick	0%	Submit project updates as required for above listed items

Activity	Start Date	Completion Date	Personnel	Completion %	Comments
Land Acquisition (Rodesch) (14.4 acres)	4-8-09	4-15-09	Utility Board of Trustees/ Steve Pick Operations Director	90%	Have on file a purchase option. Have contacted after grant notification. Hope to execute option 4/8/09 4/13/08 – Have sent Rodesch notice on 4/7/09 that the City is exercising option to purchase
Land Acquisition (Harpenau) (5.7 acres)	4-8-09	Ongoing	Utility Board of Trustees/ Steve Pick Operations Director	80%	Have verbal agreement. Land owner mandating other restrictions. Will try to work out within grant time-frame. 4/13/09 Have obtained a signed option to purchase on 4/8/09

Wellhead Monitoring	07/07	Ongoing thru 3/2012	Water distribution personnel/ University Hygienic Lab. & Iowa DNR SW	39%	Will chart testing results to simplify analysis. Chart seeding, groundwork, etc. Present updated graph of nitrate levels 4/13/09 Have sent results for testing for March/April 09 to UHL. Results are compiled and included on DNR/EPA STORET site
Land conversion	5/09	Ongoing	Pheasants Forever & Utility Personnel	20%	A commitment has been made w/ Pheasants Forever to start conversion this spring ASAP 4/13/09 Met w/PF on seeding blends. Started fence removal
Public updates on progress with project	3/2009	Ongoing thru 2012	Steve Pick Operations Director	20%	Articles have appeared in the Remsen Bell-Enterprise as well as the LeMars Daily Sentinel highlighting this project. Additional updates will be placed in the quarterly newsletters as well as the newspapers 4/13/09 Sent newsletter 4/1/09 with lawn fertilizer recommendations
Develop educational opportunities. Mow trails throughout area.	4/2009	Ongoing	Steve Pick	20%	Have made contacts with the school systems as well as the Plymouth County Conservation Naturalist. Have received excited desire to use land when developed.
Progress reporting	10/09	6-month Annual Final	Steve Pick	10%	Submit project updates as required for above listed items 4/13/09 Submitted funding request

**REMSEN MUNICIPAL UTILITIES
W.I.R.B. GRANT WORKPLAN
AGREEMENT NO. 8025-015**

Developed by: Steven J. Pick

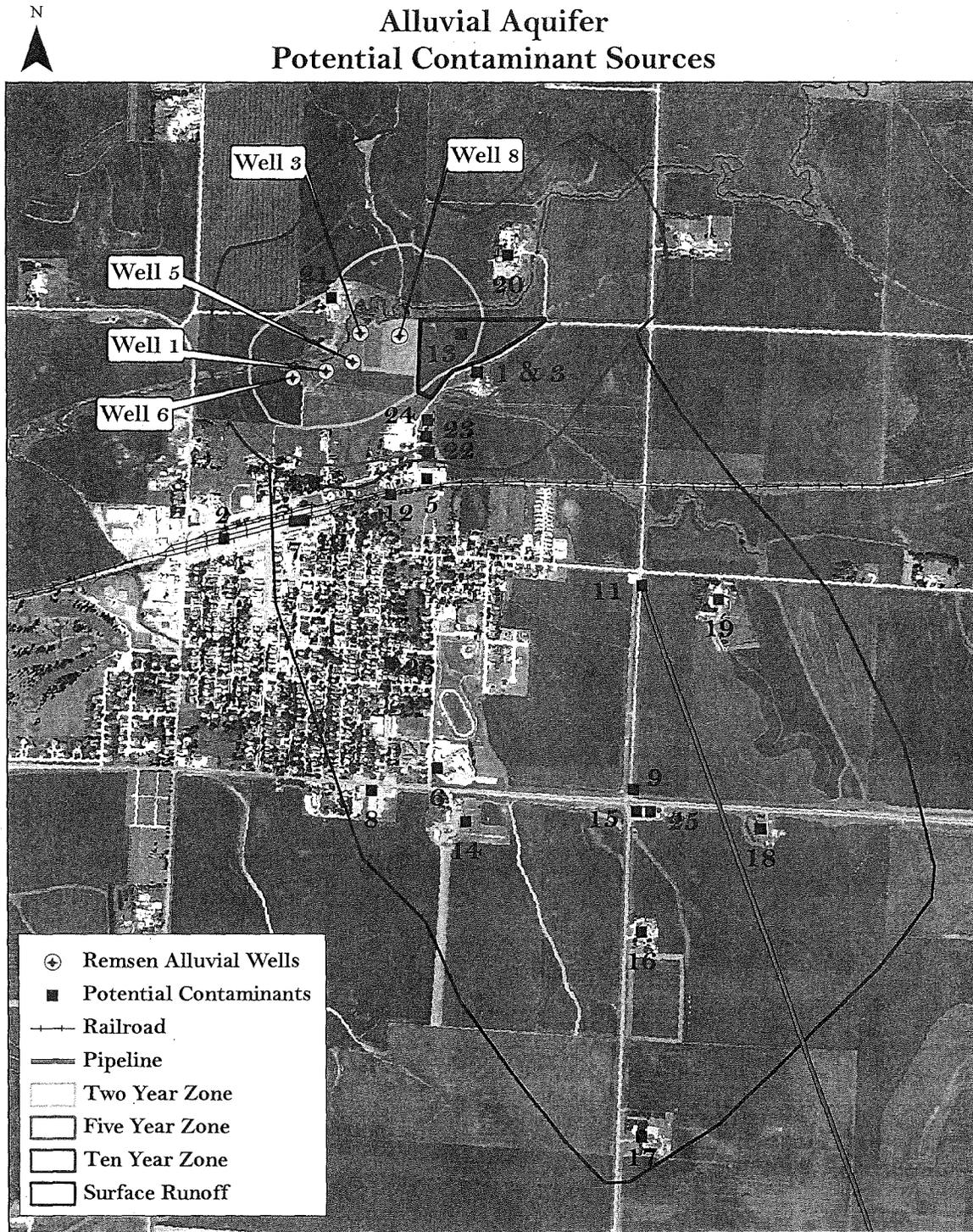
REPORT PERIOD: June 30, 2010

Operations Director

Activity	Start Date	Completion Date	Personnel	Completion %	Comments
Land Acquisition (Rodesch) (14.4 acres)	4-8-09	8-15-09	Utility Board of Trustees/ Steve Pick Operations Director	100%	Have on file a purchase option. Have contacted after grant notification. Hope to execute option 4/8/09 4/13/08 – Have sent Rodesch notice on 4/7/09 that the City is exercising option to purchase A check has been issued to the trust fund of Rodesch for the purchase of property. Warranty deed issued COMPLETE
Land Acquisition (Harpenau) (5.7 acres)	4-8-09	12/28/09	Utility Board of Trustees/ Steve Pick Operations Director	100%	Have verbal agreement. Land owner mandating other restrictions. Will try to work out within grant time-frame. 4/13/09 Have obtained a signed option to purchase on 4/8/09 A request is being made for this purchase this period Land purchased and warrantee deed issued COMPLETE
Wellhead Monitoring	07/07	Ongoing thru 3/2012	Water distribution personnel/ University Hygienic Lab. & Iowa DNR SW	50%	Will chart testing results to simplify analysis. Chart seeding, groundwork, etc. Present updated graph of nitrate levels 4/13/09 Have sent results for testing for March/April 09 May and June samples have been taken with results listed. Tests continued monthly thru Dec. '09. Results listed Monthly water tests cont.
Land conversion	5/09	Ongoing	Pheasants Forever & Utility Personnel	98%	A commitment has been made w/ Pheasants Forever to start conversion this spring ASAP 4/13/09 Met w/PF on seeding blends. Started fence removal All land has been planted to native grasses with the exception of the farm stead. Two mowings of property w/building site being cleared of bldgs/debris Area mowed once in 2010 and entire building site cleared. Need to remove cement pile and plant.

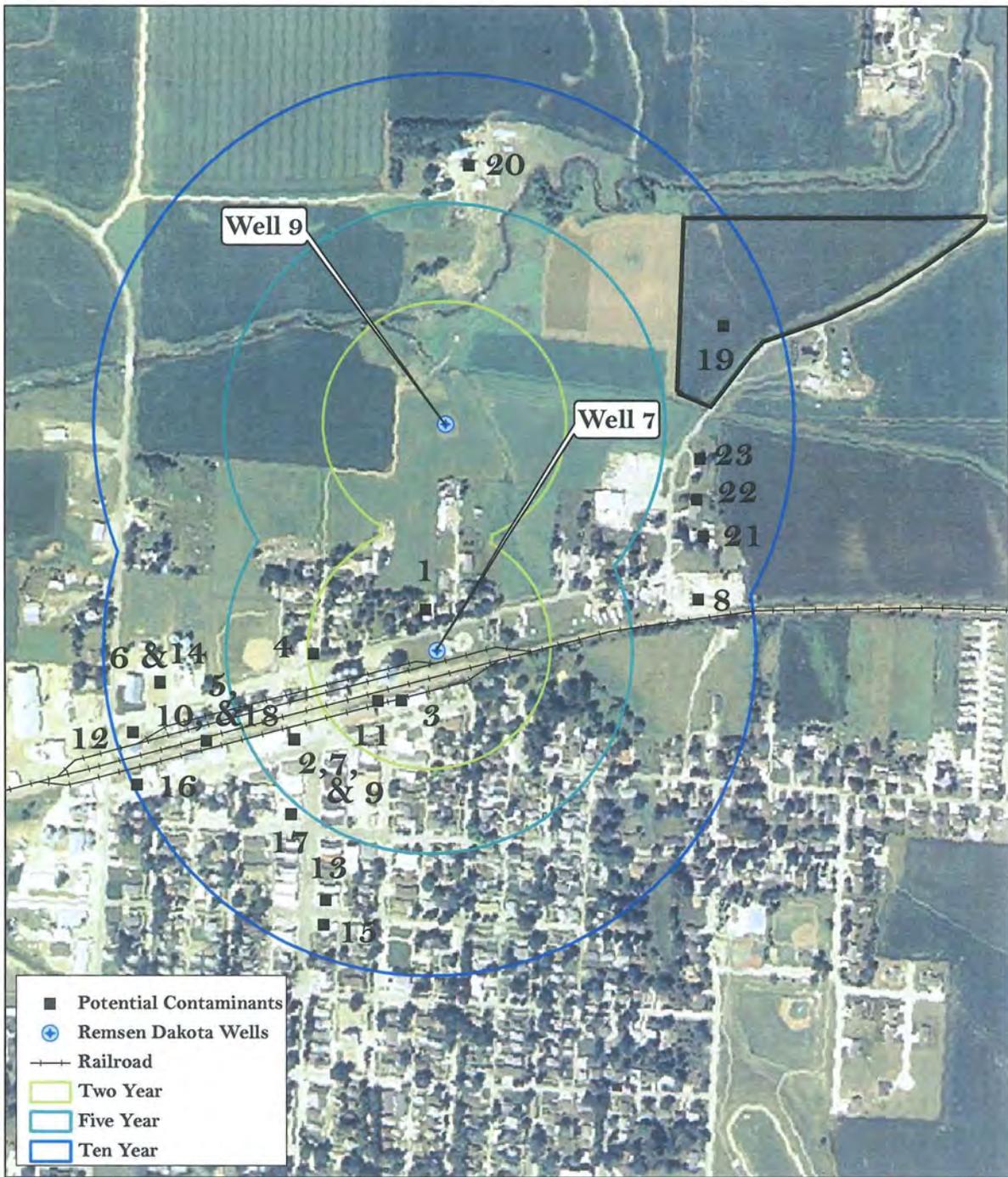
Public updates on progress with project	3/2009	Ongoing thru 2012	Steve Pick Operations Director	50%	<p>Articles have appeared in the Remsen Bell-Enterprise as well as the LeMars Daily Sentinel highlighting this project. Additional updates will be placed in the quarterly newsletters as well as the newspapers</p> <p>4/13/09 Sent newsletter 4/1/09 with lawn fertilizer recommendations</p> <p>An article has been drafted with Pheasants Forever for national magazine. Pheasants Forever article published in Fall 2009 national issue. Other local articles printed.</p> <p>Project highlighted in the 2009 Watershed Improvement Successes in Iowa. Received AWWA Exemplary Source Water Protection Award for small-sized systems in N. America</p>
Develop educational opportunities. Mow trails throughout area.	4/2009	Ongoing	Steve Pick	60%	<p>Have made contacts with the school systems as well as the Plymouth County Conservation Naturalist. Have received excited desire to use land when developed. Mowed weeds on site. Too early for trail development</p> <p>2nd mowing of area. Areas of grasses and wild flowers taking place.</p> <p>Mowed once in 2010. Working w/Plymouth Co. Conservator Naturalist developing a burn plan, trails etc.</p>
Progress reporting	10/09	6-month Annual Final	Steve Pick	35%	<p>Submit project updates as required for above listed items</p> <p>4/13/09 Submitted funding request</p> <p>7/8/09 Submitting reports and funding request. Progress and 2009 annual reports submitted.</p> <p>6-Month report for 2010 submitted.</p>

Remsen Alluvial Aquifer Potential Contaminant Sources



<u>Alluvial Sources</u>		0 1,500 3,000 Feet	June 2007
<p>1 & 3 Larry Rodesch Permitted Pesticide Applicator Removed UST</p> <p>2 Remsen Roller Mill, Inc. Section 7 Tracking - Pesticide Manufacturers. No longer in business. Actual location outside of delineation.</p> <p>4 Veronica Peters Removed UST</p> <p>5 Remsen Body Shop RCRA - Unknown Type Body shop, car paint, detailing products</p> <p>6 Remsen-Union Community School Removed USTs</p> <p>7 City of Remsen Removed USTs</p> <p>8 Fids Feed Supply Removed UST</p>	<p>9 Brower Construction Company Portable asphalt plant. Temporary location and is no longer there.</p> <p>10 Remsen Power Plant Removed LUST DNR classified No Action Required</p> <p>11 Norther Natural Gas Natural Gas Pipeline</p> <p>12 Illinois Central Active railroad - hauls coal, grain, box cars, etc.</p> <p>13 Larry Rodesch Hog Manure Application - applied by Rich Harpenau</p>	<p>14 Alvira Tentinger Feed lot 700 head of cattle</p> <p>15 Golden Pheasant Restaurant Septic System</p> <p>16 Dave Harpenau Septic, Private well</p> <p>17 Damon Koontz Septic System</p> <p>18 Jim Boever Septic System</p> <p>19 Bill Ortman Feed Lot 700 Head of Cattle, Septic System</p>	<p>20 Rich Harpenau - Owner Hogs, 50 head cattle, household well, potential livestock well</p> <p>21 Jim Heuertz Septic system, household well few pigs, many sheep</p> <p>22 Rick Sudtelgte Septic System</p> <p>23 Roy Steffen Septic System</p> <p>24 Rich Harpenau Septic System</p> <p>25 Frontier Motel Septic System</p> <p>26 Keith Ahlers Private well House connected to city water</p>

Remsen Dakota Aquifer Potential Contaminant Sources

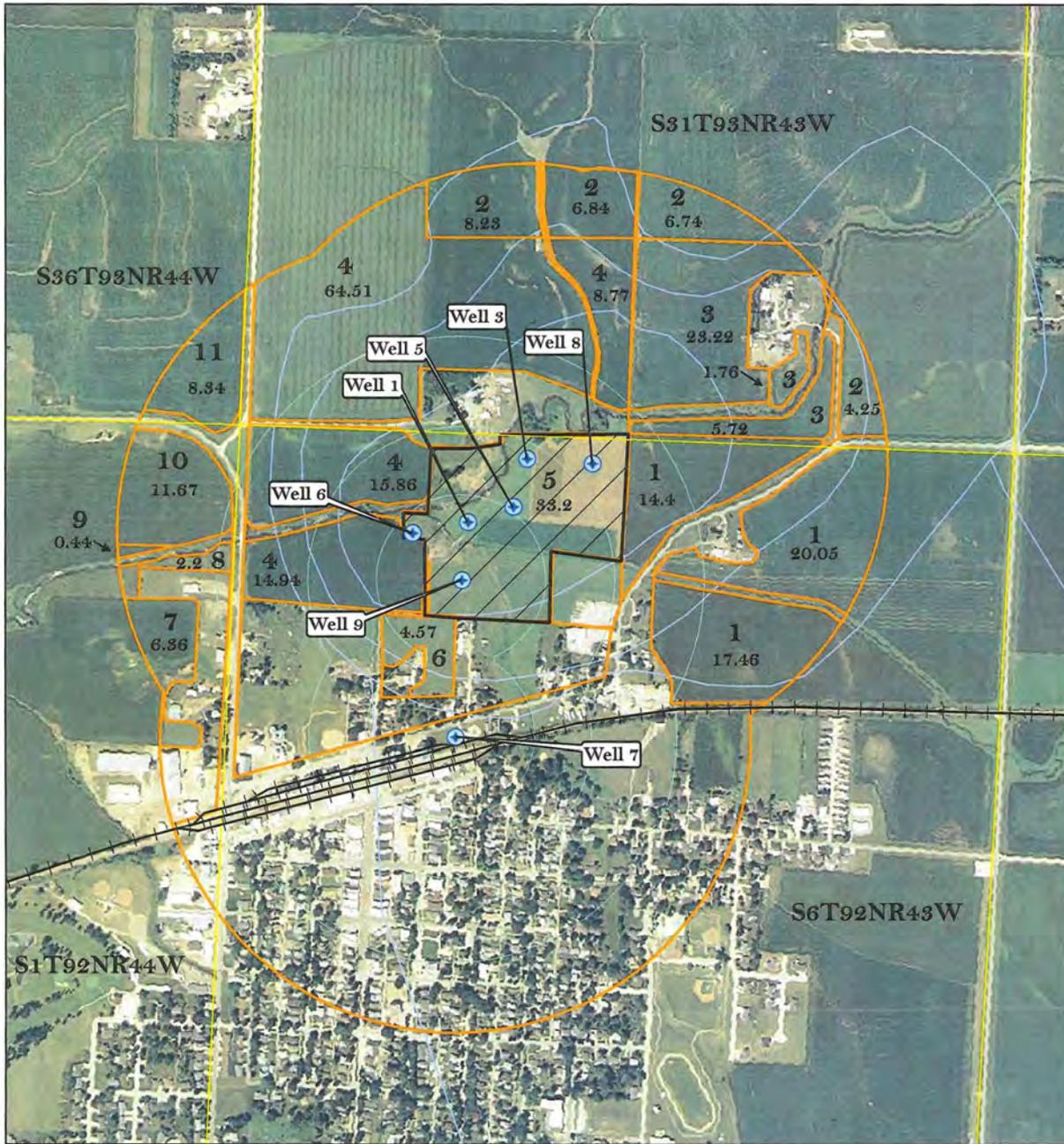


Dakota Sources			0 500 1,000 Feet	June 2007
<p>1 Veronica Peters Removed UST</p> <p>2, 7, & 9 Remsen Farmers Cooperative Section 7 Tracking - Pesticide Manufacturers (Site 2). Permitted Pesticide Applicator - (Site 7). LUST site - request for DNR to reclassify from High Risk to No Further Action - No reclassification confirmation. USTs removed.</p> <p>3 Remsen Power Plant Removed LUST DNR classified No Action Required</p> <p>4 Charlie's Repair LUST site - classified as High Risk - Two Active USTs</p>	<p>5, 10, & 18 Illinois Central Active railroad - hauls coal, grain, box cars, etc.</p> <p>6 & 14 Remsen Roller Mill (bought by Farmers Coop) Removed UST (Site 6)</p> <p>Section seven tracking pesticide manufacturers - no longer in business (Site 14)</p> <p>8 Remsen Body Shop RCRA - Unknown Type Body shop, car paint, detailing products</p> <p>11 City of Remsen Removed USTs</p>	<p>12 JW Tank Line USTs removed - Two Active ASTs</p> <p>13 Jack Thiel, Inc. Removed UST</p> <p>15 Old Service Station LUST site classified by DNR as No Action Required. USTs removed.</p> <p>16 Community Corner (Formerly Farmer's Coop) Active USTs LUST site classified by DNR as No Action Required</p> <p>17 Ritz Super Service Removed USTs. LUST site classified by DNR as No Action Required</p> <p>19 Larry Rodesch Hog Manure Application - applied by Rich Harpenau</p> <p>20 Jim Heuertz Septic system, household well few pigs, many sheep</p> <p>21 Rick Sudtelgte Septic System</p> <p>22 Roy Steffen Septic System</p> <p>23 Rich Harpenau Septic System</p>		

Remsen

Source Water Protection Map

Eligible CRP Acres



June 2007

Landowners / Renters

- | | | | |
|--|---|---|---|
| <p>1 Larry Rodesch
43626 160th Street
Remsen, IA 51050</p> <p>2 Veronica &
Clarence Harpenau
318 Lincoln Street
Remsen, IA 51050</p> <p>3 Richard Harpenau
43506 160th Street
Remsen, IA 51050</p> <p>4 John Freking (owner)
c/o Betty Ryba
10905 X Street
Omaha, NE 68137</p> <p>Jim Heuertz (renter)
15996 Quest Avenue
Remsen, IA 51050</p> | <p>5 City of Remsen (owner)
205 Fulton Street
Remsen, IA 51050</p> <p>Jim Heuertz (renter)
15996 Quest Avenue
Remsen, IA 51050</p> <p>6 LeRoy Bunkers (owner)
12 North Washington Street
Remsen, IA 51050</p> <p>Jim Heuertz (renter)
15996 Quest Avenue
Remsen, IA 51050</p> | <p>7 Michael Beelner
41704 Hwy 3
Remsen, IA 51050</p> <p>8 Mrs. Elmer Klein
c/o Janet Klein
501 Fulton Street
Box 80
Remsen, IA 51050</p> <p>9 Paul Poeckes (Owner)
213 Jefferson Street
Remsen, IA 51050</p> <p>Jim Heuertz (renter)
15996 Quest Avenue
Remsen, IA 51050</p> | <p>10 Jim Heuertz
15996 Quest Avenue
Remsen, IA 51050</p> <p>11 Richard Gengler (owner)
405 West 5th Street
Remsen, IA 51050</p> <p>Bill Scheitler Farms (renter)
40751 140th Street
Remsen, IA 51050</p> |
|--|---|---|---|

0 1,250 2,500 Feet

- Remsen Wells
- Railroad
- City Owned Land
- Section, Township, Range
- 2,000 Foot CRP Buffer
- Alluvial Delineation
- Dakota Delineation



STATE OF IOWA

CHESTER J. CULVER, GOVERNOR
PATTY JUDGE, LT. GOVERNOR

DEPARTMENT OF NATURAL RESOURCES
RICHARD A. LEOPOLD, DIRECTOR

August 20, 2007

Mr. Steve Pick, Director of Utilities Operations
P.O. Box 510 – 205 Fulton St.
Remsen, IA 51050

Subject: Source Water Protection Plan Approval

Dear Mr. Pick,

The Iowa DNR Source Water Protection (SWP) Program is in receipt of Remsen's source water protection plan. The SWP plan meets IDNR's state fiscal year 2008 criteria and is approved. The plan will be kept in the SWP Program files at the IDNR Contaminated Sites Section. As the SWP assessments are completed the SWP plan will need to be updated to reflect the assessment results and move the plan forward. As practices are identified for implementation the plan will be utilized to track the source water protection advancements and provide information for the IDNR sanitary survey. We strongly encourage you to regularly review and update your SWP workplan and the accompanying GIS SWP map.

The Remsen SWP planning team has developed a workable plan which should help prevent potential drinking water contamination. I appreciate the opportunity to work with your community.

Please call me at 515/281-0932 with any questions or concerns related to the Source Water Protection program.

Sincerely,

A handwritten signature in cursive script that reads "Rebecca K. Ohrtman".

Rebecca K. Ohrtman, Source Water Protection Program Coordinator
Watershed Improvement Section, Iowa Department of Natural Resources

cc: Lois Benson, Field Office 3, Spencer
Jill Soenen, Iowa Association of Municipalities
Mike Anderson, Water Supply, SW 7th



STATE OF IOWA

CHESTER J. CULVER, GOVERNOR
PATTY JUDGE, LT. GOVERNOR

DEPARTMENT OF NATURAL RESOURCES
RICHARD A. LEOPOLD, DIRECTOR

January 19, 2009

Steven J. Pick, Operations Director
Remsen Municipal Utilities
P.O. Box 510-205 Fulton St.
Remsen, Iowa 51050

Dear Steve Pick,

The purpose of this letter is to express support by the Iowa Department of Natural Resources (IDNR) Source Water Protection (SWP) Program for the activities proposed in the WIRB grant application *Remsen Source Water Protection Project*.

The IDNR SWP Program believes that the activities proposed in the Remsen application to the WIRB board can make a significant contribution to the sustainability of the Remsen water supply. Historically, the primary SWP land use option within a capture zone area of a municipal well was to enroll land in the Conservation Reserve Program (CRP). To date, less than 3% of eligible Iowa land has been enrolled in the wellhead protection CRP program, indicating this may not be a viable long term land use solution for decreasing nitrates in the Remsen source water. Remsen's application addresses sustainable land use options for their municipal water supply.

More than 200 community water supplies in Iowa are susceptible to high nitrates potentially derived from non-point sources (NPS). These water supplies are at risk of exceeding the 10 mg/L nitrate drinking water standard. Viable land use solutions are needed to address these NPS nitrate risks. Remsen's application identifies solutions for long term sustainability of their community's water supply.

The activities proposed in the Remsen grant application to the WIRB board can make a significant contribution to protecting Remsen's sources water. The SWP program supports the efforts to assist the Iowa farming communities in remaining sustainable both in farming practices as well as in sustaining the local municipal water supply. Please contact me for additional information or with any questions regarding the IDNR SWP Program's support for the proposed application.

Sincerely,

Rebecca Ohrtman, Source Water Protection Coordinator
Watershed Improvement Section

Le Mars Newspaper Articles

Habitat and clean water -- they go together

Friday, February 13, 2009

By Magdalene Landegent

The city of Remsen and the Remsen municipal utilities are working with the local chapter of Pheasants Forever to turn 70 or more acres of land north of Remsen into habitat.

The city is taking this unusual approach to helping keep Remsen's water supply pure.

The land in question includes Remsen's well field north of town plus about 35 acres the city recently purchased. That land includes some of the underground watershed surrounding the well field.

Planting native grasses on the land and taking it out of crop production will help limit the amount of nitrates seeping into the water supply and keep the supply cleaner, explained Steve Pick, the Remsen utilities operations director.

"We're working closely with the Iowa DNR, Sioux Rivers RCND, Plymouth County and the USDA on this project to head off our high nitrate problem before it gets to a point where something drastically needs to be done," Pick said.

The water that Remsen residents receive has about 5-6 parts per million of nitrates, he said. The maximum level is ten.

If a community reaches that maximum, a nitrate removal system might have to be installed, Pick said.

Changing land near the well field to habitat, Pick added, is the "cheapest route we see in this to reduce our nitrate level."

The total size of the land to be turned over to habitat is yet to be decided.

(Advertisement)

The planners are still waiting to hear back whether they will receive a grant to buy 21 acres to the east of the well field.

Changing that land to habitat could decrease the flow of nitrate's to Remsen's well No. 8, which currently has Remsen's highest level of nitrates, Pick said.

"If we would take Well 8 out of commission, it would just filter into our other well fields," he explained.



At least 70 acres around the Remsen well field will be transformed in to native habitat starting this spring. The center block on the map is the well field, and to the left is the city's recently purchased acres to turn to habitat. To the right is another 21 acres that may also be purchased.

[\[Click to enlarge\]](#)

Mike Slota, a member of Plymouth County's chapter of the Pheasants Forever, said this project fits the club's mission "to a T."

"Part of Pheasants Forever's mission statement is to enhance pheasant and wildlife population plus habitat restoration through improvement to the land and water conservation," Slota said. "We'll enhance the habitat, of course, but we'll also clean up the groundwater."

The habitat will be open to the public, but not for hunting.

Slota said it could also be used for students.

"It'll be a 70 acre classroom," he said. "One of the programs I'd like to see it used for is to have the high school biology teachers take it over and do water samples every month. That way they can track and see how this is actually cleaning up the water."

Pick agreed.

"There could be endless possibilities of what we can do with is as far as a nature preserve," he said.

Slota even threw out the possibility of planting wildflowers along the road where it runs by the habitat.

"It benefits everyone," Slota said of creating the habitat. "Remsen will have cleaner water. We'll be able to use it for classroom. Plus if there's any activity we want to use it for down the road, it will be available."

The city takes possession of the recently purchased land March 1. They won't hear back about the 21 additional acres until March as to whether their grant application to the Water Improvement Review Board was approved.

Pheasants Forever will begin planting the native grasses for habitat this spring.

"Whenever Pheasants Forever can work it out, it will be available to them," Pick said of the land.

"It'll be winter cover, nesting cover, and some other tall grasses," Slota said. "We'll probably put some food plots in there, too."

In Remsen's current well field, some alfalfa will be taken down and reseeded with native grasses.

Slota also hopes to put in some dogwood along the Deep Creek that runs through the land to catch the snow.

The Pheasants Forever local youth council will also help with the project to gain experience, he said.

The impact on Remsen's water supply wouldn't be immediate, Pick said.

"We're looking at probably a year or so before we would really see some results," he said.

"I have no doubt you're going to notice the difference in five years," Pick said. "As a hunter, when you see buffer strips upstream, you see how clean that water is. Buffer strips clean up water."

Grant provides big step to improve Remsen water

Monday, March 9, 2009

By Renee Nyhof

The City of Remsen received a \$160,800 grant from the Watershed Improvement Review Board to help improve the town's water quality.

The money will be used to purchase an additional 21 acres east of the city's well No. 8 as part of a project that will turn a total of nearly 90 acres north of Remsen into habitat.

(Advertisement)

That land includes the city's well field and 35 acres purchased last fall.

Taking the land out of production around the well could help limit the amount of nitrates filtering from fertilizers through the soil and into Remsen's water supply, explained Steve Pick, Remsen utilities operation director.

Well No. 8, north of Remsen, has a nitrate level near 20 according to Pick. The Remsen residents currently receive water mixed from a variety of wells with a 5-6 mg/L nitrate level.

The EPA sets the maximum drinking level at 10.

Anything over that can cause problems according to Richard Langel, a representative of the Iowa Department of Natural Resources (DNR) watershed monitoring and assessment program. Langel further explained that high nitrate levels could interfere with the blood's ability to carry oxygen, especially in infants and young kids resulting in "Blue baby" syndrome. With that syndrome, babies are born with hemoglobin with a decreased oxygen carrying capability which can lead to death.

"This project is a big step in guaranteeing cleaner water," said Pick. "Currently, monthly water samples are taken from all the Remsen wells. We hope to see an improvement in the sample for this well within the year coming and then, within two to three years, to see a significant decline in nitrate levels."

While a meeting has not yet been held to outline specific details, Pick said the three-year project will begin this spring with the aid of the Remsen Pheasants Forever chapter. The organization is sponsoring the seeding of the native grasses throughout the acres.

"The first two years will focus on establishing the grasses," said Pick. "The final year of the project will most likely focus on establishing the trails and the walkways through the habitat."

Once established, the habitat will be open to the public but hunting will be prohibited.

In order to be approved for the grant, the City of Remsen had to complete a watershed assessment to identify water source areas in need of improvement.

The Remsen Municipal Utilities and the City of Remsen began working a year and a half ago with the Iowa DNR, Sioux Rivers RCND, Plymouth County and the USDA to make the proper assessments for the project.

Last fall's purchase of 35 acres was a joint venture by the Remsen municipal utilities and the City of Remsen. This initiated the writing of the grant proposal to acquire more land.

The prairie returns: Pheasants Forever seeds Remsen habitat

Wednesday, May 20, 2009

By Magdalene Landegent

Seed by seed, row by row, a field just north of Remsen was transformed Tuesday.

Land used to grow field corn last year has a new purpose: to provide habitat and help keep Remsen water clean.

About 60 acres near the Remsen wells were tilled under and seeded as prairie Tuesday, thanks to a joint effort between the City of Remsen and Pheasants Forever. Local farmers donated time and equipment to help plant the seed.

"We're seeding native grasses -- tall and short bluestem, Canadian wild rye, flowering plants," said Mike Slota, of Pheasants Forever. "It will start greening up in about a month, but it will take three years to fully develop."

The field will have grasses ranging from knee-high to waist-high.

The project began in 2007, when the Department of Natural Resources (DNR) identified Remsen as a priority city in terms of water quality, with high nitrate levels of 5 or more parts per billion in the city's well water.

The DNR proposed a pilot project with Remsen. The goal was to find the source acres of those nitrates in the water and take that land out of crop production.

That land was identified, and Tuesday was planted with native grasses. The change cuts down the fertilizer used on those acres, thus lowering nitrate levels seeping into the ground water.

The land is now owned by the City of Remsen.

Pheasants Forever designed the habitat and coordinated Tuesday's planting.

Local farmers used their own tractors to pull the seeders, owned by the Plymouth County chapter of Pheasants Forever. The seeder is a specific piece of equipment designed for large scale grass and flower planting.

"The seeder drills it in 7 inch rows as opposed to 30-inch rows on a planter," said Richard Beelner, one of the farmers who spent Tuesday volunteering his time. "A seeder is 8 feet wide and a planter can be around 40 feet."



(Sentinel photo by Magdalene Landegent) Cara Beelner finishes a former crop field to prepare it for seeding with native grass. Beelner was one of the Remsen farmers donating their time and equipment, under the coordination of Pheasants Forever, to seed about 60 acres of farmland north of Remsen into native grasses Tuesday. The aim of the project: help keep Remsen's water source cleaner and provide habitat for pheasants and other wildlife.

[\[Click to enlarge\]](#)

The group started at 9 a.m. and hoped to have the seeding done by night.

Slota said this kind of project is the reason he's part of Pheasants Forever.

"We're helping the community get the ground water cleaned up, and it also promotes habitat, plus the schools will use it as an outdoor classroom, so that helps with the education part," Slota said. "We (Pheasants Forever) were formed to put habitat into the ground and help with youth education."

SIOUX CITY JOURNAL

(REMSEN, IA) - The Iowa Department of Natural Resources says many area waterways face a whole array of water problems. One is high levels of nitrates, which can cause serious health problems for those who drink the water.

A major factor in nitrate levels is fertilizer use on land near wells. During the last 30 years as a cornfield, the stretch of land around Remsen's wells has seen a lot of fertilizer.

"After 30 years of fertilizing heavily, it seeped into the shallow wells," says Mike Slota with Plymouth County's Pheasants Forever. Remsen city staff say nitrate levels are on the rise, but still well within state guidelines.

Steve Pick, Utility Operations Director for Remsen approached Pheasants Forever about planting dozens of acres of natural grasses around its wells. With the help of state money, Remsen bought 70 acres surrounding the wells and Pheasants Forever donated \$15,000 in seed and labor to create a prairie to naturally absorb nitrates from the soil.

Pick says a filtration plant to do the same thing could cost between two and three million dollars.

Slota and farmers who have donated their time and equipment are working for two days to plant and pack the field. He says the field will take three to five years to fully grow, and should start impacting nitrate levels in about four years.

It's a project that could set the bar for managing nitrates naturally in Iowa. "There are 90 communities in Iowa that are having shallow well problems with nitrates," Slota explains, adding that many of them are following the Remsen project as an idea for their communities.

Once the field is grown, Pick says, local schools will use the field as a biology lab, studying the grasses and wildlife that move into the new neighborhood.

Reported by Jeremy Maskel. You can reach Jeremy at jmaskel@kmeg.com.

SOURCE WATER PROGRAM

SITE ASSESSMENT RESULTS

For the

**REMSEN MUNICIPAL WATER SUPPLY
MUNICIPAL WELL #8
(REMSEN MUNICIPAL UTILITIES)**

REMSEN, PLYMOUTH COUNTY, IOWA

SEPTEMBER 5, 2008

IOWA DEPARTMENT OF NATURAL RESOURCES



Prepared by

**Daniel Cook
Environmental Specialist Senior
IDNR Project Manager
Contaminated Sites Section**

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1. INTRODUCTION

At the request of the Iowa Department of Natural Resources, Source Water Program, the Iowa Department of Natural Resources, Contaminated Sites Section (IDNR), has conducted an environmental assessment in and around the municipal water well field for Remsen, Plymouth County, Iowa. The purpose of this investigation was to evaluate the sites hydrological profile and identify possible source(s) for the elevated nitrate levels found in Municipal Well Number 8.

2. SITE DESCRIPTION

2.1 Location

The Remsen well field is located in the NE $\frac{1}{4}$ of the NW $\frac{1}{4}$ of Section 6, Tier 92 North, Range 43 West, Plymouth County, Iowa. The site is found within the city limits of Remsen, Iowa on the north side of town along Deep Creek. (Figure 1).

2.2 Site Description

Remsen, Iowa is located within the land form region known as the Northwest Iowa Plains with Pleistocene Series loess, till, gravel, and sand seams found from the surface down to approximately 250 feet deep. This Quaternary Period material overlays the Cretaceous Period, Fort Benton (Lower Colorado) Group, Dakota Formation shales and sandstone locally known as the Dakota Sandstone and includes both the Woodbury Member (250 feet to 450 feet deep) followed by the Nishnabotna Member (450 feet to 640 feet deep). Galena Group dolomite of the Ordovician Period was found below the Nishnabotna Member.

The City of Remsen Municipal Well Number 8 is located in an alluvial setting just south of Deep Creek. The driller's log for Well Number 8 indicates that it's a shallow well bored to 32.5 feet deep. The screen is located from 24.5 feet to 32.5 feet deep. The log also indicated that till and sandy areas were found from the surface down to 11 feet deep followed by coarse sand and gravel to the bottom of the boring. Both wells Number 5 and 6 are close to Well Number 8 and have similar logs but both noted a dense gray till layer starting at 31 feet deep for well Number 5 and 30 feet deep for well Number 6. It is assumed that Well Number 8 would have found the gray till layer if it was drilled any deeper. Figure 2 shows the locations of the municipal wells in the Deep Creek alluvium.

2.3 Operational History and Waste Characteristics

For the most part the area surrounding the well field is agricultural land with the exception of the city burn pile between Well Number 6 and 9, and a former borrow pit located directly southeast of Well Number 8. The burn pile is designated as an area for burning tree limbs and brush only but there is evidence that household garbage has also been burned as well. Incomplete combustion of plastics can produce polycyclic aromatic hydrocarbons (PAHs) which if ingested can be health concern.

The borrow pit is visible in a 1930s aerial photograph but has since been filled in (Figure 3). It is unclear what was used to fill in the pit but it was thought to have been used for household trash before it was capped. Sink holes routinely open up in the area of the former borrow pit suggesting that solid waste was at one time placed in the pit then covered with soil. As the solid waste decays it leaves voids that collapse and cause sink holes.

2.4 Nitrates and Nitrites

Nitrates and nitrites are nitrogen-oxygen chemical units which combine with various organic and inorganic compounds. Once taken into the body, nitrates are converted into nitrites. The greatest use of nitrates is as a fertilizer.

In 1974, Congress passed the Safe Drinking Water Act. This law requires the US Environmental Protection Agency (EPA) to determine safe levels of chemicals in drinking water which are known to or may cause health problems. These non-enforceable levels, based solely on possible health risks and exposure, are called Maximum Contaminant Level Goals. The MCLG for nitrates has been set at 10 parts per million (ppm), and for nitrites at 1 ppm, because EPA believes this level of protection would not cause any of the potential health problems described below.

Based on this MCLG, EPA has set an enforceable standard called a Maximum Contaminant Level (MCL). MCLs are set as close to the MCLGs as possible, considering the ability of public water systems to detect and remove contaminants using suitable treatment technologies. The MCL for nitrates has been set at 10 ppm, and for nitrites at 1 ppm, because EPA believes, given present technology and resources, this is the lowest level to which water systems can reasonably be required to remove this contaminant should it occur in drinking water. These drinking water standards and the regulations for ensuring these standards are met, are called National Primary Drinking Water Regulations. All public water supplies must abide by these regulations.

Short-term: Excessive levels of nitrate in drinking water have caused serious illness and sometimes death. The serious illness in infants is due to the conversion of nitrate to nitrite by the body, which can interfere with the oxygen-carrying capacity of the child's blood. This can be an acute condition in which health deteriorates rapidly over a period of days. Symptoms include shortness of breath and blueness of the skin (Blue Baby Syndrome).

Long-term: Low to moderate levels of nitrates and nitrites have the potential to cause diuresis, increased starchy deposits and hemorrhaging of the spleen from a lifetime exposure at levels above the MCL.

The regulation for nitrates and nitrites became effective in 1992. Between 1993 and 1995, EPA required your water supplier to collect water samples at least once

a year and analyze them to find out if nitrates and or nitrites are present above 50 percent of their MCLs. If it is present above this level, the system must continue to monitor this contaminant every 3 months. If contaminant levels are found to be consistently above their MCLs, your water supplier must take steps to reduce the amount of nitrates/nitrites so that they are consistently below that level. Ion exchange, Reverse Osmosis, Electro-dialysis are treatment methods that have been approved by EPA for removing nitrates/nitrites.

If the levels of nitrates/nitrites exceed their MCLs, the system must notify the public via newspaper, radio, TV and other means. Additional actions, such as providing alternative drinking water supplies, may be required to prevent serious risks to public health.

3. COLLECTION OF NON-SAMPLING DATA

The area around the well field was modeled using the three dimensional groundwater flow and transportation modeling program called Visual MODFLOW (Modflow). Modflow allows you to input values for different types of surface conditions, soil conditions, and availability of groundwater. Well logs were used to define the different soil horizons and porosity levels. Well field pumping data was used to determine drawdown conditions around the wells and how much of an influence the wells have on the aquifer. And, as with any modeling program, some of the required input data is not known and values are chosen using your best professional judgment. For instance Deep Creek is not monitored by U.S. Geological Survey and no stream flow data was available so estimated values were used.

First the model was ran with all the municipal wells turned off and the aquifer in a steady state. An area of nitrate contamination was introduced in the location suspected as the source area (Figure 4). The blue arrows show the modeled groundwater flow direction and the red arrows show the modeled flow of the nitrate contamination.

Then the model was ran using five different steady state scenarios, all wells on (Figure 5), only well No.8 on (Figure 6), only well No.5 on (Figure 7), only well No.3 on (Figure 8), and finally, wells No.3 and 5 on (Figure 9). In reviewing the different scenarios you see that well No. 8 can capture the nitrate contamination by its self but well No. 3 alone and well No. 5 alone can not. This is most likely because well No 3 and 5 are located in a narrow area of the deep Creek flood plain and the groundwater moves faster through this region. With the faster flowing groundwater it takes more pumping action to influence the groundwater flow direction as noted in Figure 9, both wells No.3 and 5 pumping.

Overall, the model indicates the following:

- Deep Creek, at normal flow levels, does not have a significant impact on the alluvium sand and gravel aquifer flow direction. The modeled

contaminant plume runs parallel to Deep Creek which is most likely a losing stream.

- Well Number 8 is capable of capturing the majority of the contamination from the suspected source area.
- Wells Number 3 and 5 would be susceptible to increasing nitrate levels if Well Number 8 were to be shut down.

4. COLLECTION OF SAMPLING DATA

4.1 Soil Samples

No soil samples were collected during this sampling event.

4.2 Groundwater Samples

Twenty-six (26) groundwater samples were collected from thirteen (13) locations identified on Figure 10. Two (2) samples were collected from each of the thirteen (13) locations, one from the top of the aquifer (shallow) and the other from near the interface between the sand/gravel aquifer and the lower till unit (deep). Samples were analyzed for nitrates and ammonia using the HACH DR2800 Spectrophotometer serial number 1254017. HACH Sample Method 10206 was utilized for the nitrate analysis and was capable of measuring nitrate levels in water from 0.3 to 30.0 mg/L. HACH Sample Method 10205 was used to measuring nitrogen, ammonia levels in water within a range of 2 to 47 mg/L. The results for the groundwater samples are found in Table 1 and the sample collection information sheets are located in Appendix C. Nitrate sample results ranged from below the lower method detection limit to greater than the upper method detection limit. None of the samples had ammonia detections above the lower ammonia detection limit.

4.3 Surface Water Samples

Four (4) surface water samples were collected from the site, three (3) from Deep Creek and one (1) from a small feeder creek (Figure 10). The results for the surface water samples are found in Table 1 and the sample collection information sheets are located in Appendix C.

4.4 Sample Collection Method

All groundwater samples were collected in a manor utilizing the procedures in ASTM D6001-96e1, *Standard Guide for Direct-Push Water Sampling for Geo-Environmental Investigations*, for direct push groundwater sampling. All groundwater collecting equipment was decontaminated after sample collection was complete at each location in accordance with Quality Assurance Project Plan for Iowa Department of Natural Resources Land Quality Bureau Contaminated Sites Section.

The Geoprobe® samples were collected with the following SOPs and manuals;

- Geoprobe® FC4000 Field Instrument (Conductivity Probe) User's Guide; Manual No. 20777
- Geoprobe® Screen Point 15 Groundwater Sampler SOP; Technical Bulletin No. 95-1500

5. FIELD ACTIVITIES

Field personnel traveled to the site on July 29th, 30th and 31st, 2008. Field activities were performed in Level D personal protective equipment that consisted of steel-toed boots, safety glasses, hearing protection and hard hats. Iowa One Call was contacted at least 48 hours prior to the site visit in order to have all underground utilities located before the field work started. Access agreements were pre-arranged by IDNR Source Water Program staff and City of Remsen staff.

6. CONCLUSIONS

6.1 Modeling Results

Prior information collected about the City of Remsen alluvium well field indicated the parcel of land (area of concern) directly east of the well field could potentially be the source area for the elevated level of nitrates in well No.8. This parcel of land receives commercially applied fertilizer as well as manure from a nearby cattle feed lot. The surface topography for this parcel lends itself to rapid surface water infiltration in the lower elevation portion found on the north central and north eastern side. This information was used to create a nitrate source area for the Modflow software for predicting the fate and transport models. Only Municipal Wells No. 3, 5 and 8 were used in the modeling, well No.6 was disregarded. A source area was also added to the small cattle feed lot just to the north east of Municipal Well No.8 but the model predicted little if any impact on the well field.

Modflow outputs were generated to predict the following conditions; all wells off (Figure 4), all wells on (Figure 5), only well No.8 (Figure 6), only well No.5 (Figure 7), only well No.3 (Figure 8), and well No.3 and 5 (Figure 9). All outputs were run at 'steady state' showing the maximum impact the contaminated source area would have on the aquifer.

Figure 5 and 6 both show that well No.8 is in a unique position to capture most of the nitrate contamination plume coming from the area of concern. With well No.8 off well No.3 or 5 alone can not capture the nitrate plume, in stead it take both 3 and 5 working together (Figure 9). If well No.8 is no longer pumping the model predicts well No.3 and 5 would see an increase in nitrate levels.

6.2 Groundwater Results

Background groundwater sample locations, GP-16, 17, and 19, were selected out side and up gradient of the area of concern. The deep nitrate sample results for GP-16, 17, and 19 (28 to 32 feet deep) ranged from non-detect at GP-16 and 19 to 4.3 mg/L at GP-17. The shallow nitrate samples (16 to 20 feet deep) for the

same locations were below method detection limits at GP-19, 6.5 mg/L at GP -17 and 27 mg/L at GP-16. Overall this is an indication that the groundwater moving into the area of concern does have low levels of nitrate but not enough to account for the high levels found in Municipal Well No.8. The higher level of nitrates found in the shallow sample from GP-16 is most likely coming from the source area.

Groundwater was collected from GP-18 located at the southwest corner of the feedlot just to the northeast of Municipal Well No.8. GP-18 was collected to see what, if any, impact the feed lot was having on the alluvium aquifer. The results of the deep and shallow samples both exceeded the maximum method detection limits of 30 mg/L for nitrate. Sample point GP-19, just up gradient of GP-18 had no detectable levels of nitrate in the deep or shallow samples. As noted above, this area was considered a source in the modeling but was predicted to have little impact to the well field. Further sampling is required to determine how much impact the feed lot has on the alluvium well field.

A series of groundwater samples were collected around Municipal Well No.8 as shown on Figure 10. Again shallow and deep samples were collected at each location as noted above. The results of the analysis were plotted to show the shallow levels of nitrate around Municipal Well No.8 on Figure 11 and the deep levels on Figure 12. As seen in Figure 11, Figure 11A, Figure 12, and Figure 12A far more nitrates are detected leaving than entering the area of concern. Also, Figure 11 and 12 implies the nitrates are for the most part being captured by the pumping action of Municipal Well No.8 corresponding with the modeled results. The parcel of land directly east of Municipal Well No.8 appears to be the main source for the high nitrate levels found in well No.8.

6.3 Surface Water Results

Surface water samples were collected a four (4) locations across the site (Figure 10). This information was collected to see if stream conditions could be a source of the nitrates found in Municipal Well No.8. SW-01 was the upper most sample collected with nitrate levels found at 4.6 mg/L, SW-02 was the mid-stream location with nitrates at 4.8mg/L, and SW-04 the down stream location with nitrate levels at 5.3mg/L. SW-03 was collected from the small feeder stream that runs past the city burn pile near Municipal Wells No.1 and 6 and had a nitrate level of 17.9 mg/L.

The levels of nitrate found in Deep Creek (SW-01, SW-02 and SW-04) may be contributing to but does not appear to be the source causing the high levels of nitrates found in Municipal Well No.8. The high levels of nitrate found in the feeder creek are to far south to be a factor in the nitrate levels for well No.8.

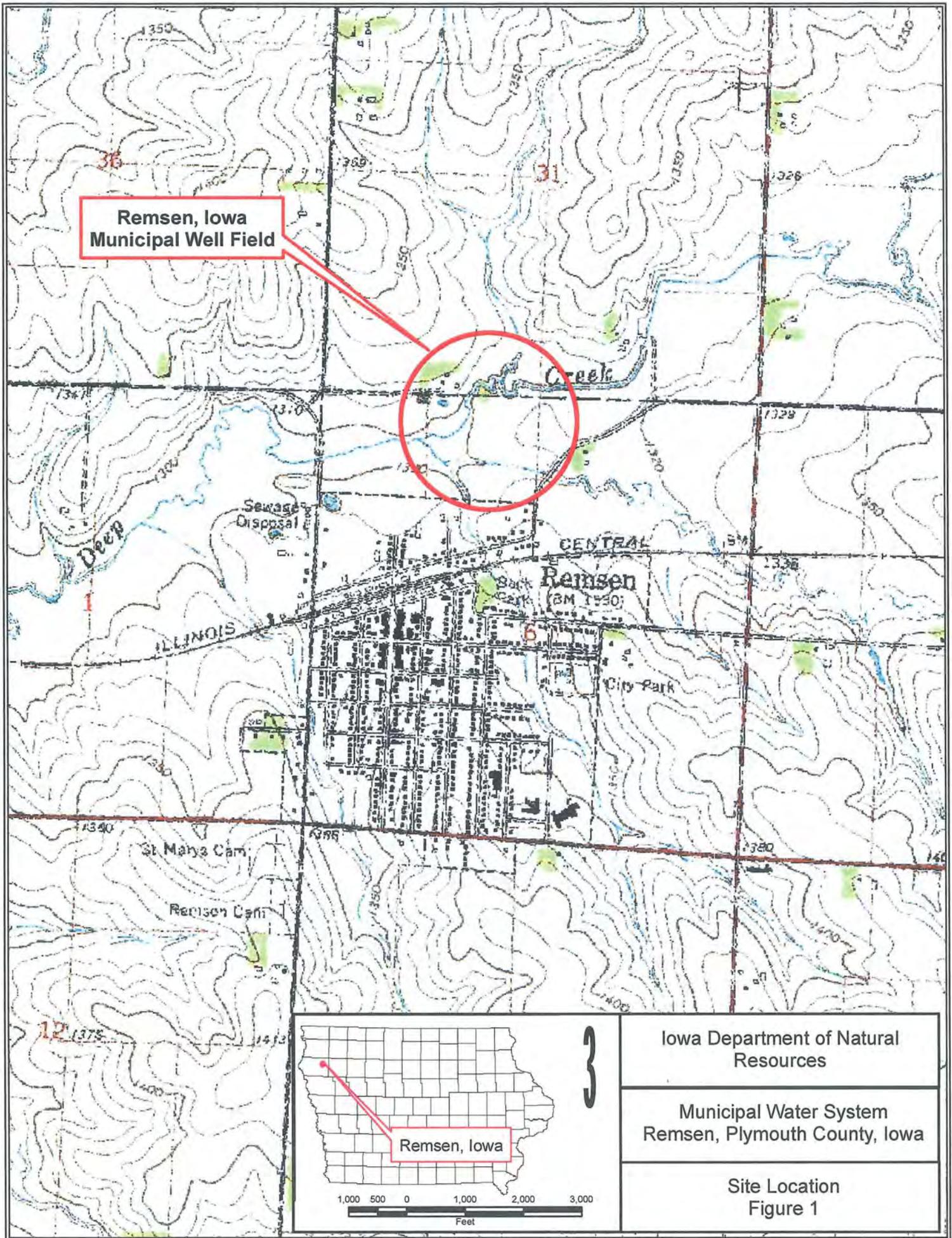
**SOURCE WATER PROGRAM
SITE ASSESSMENT RESULTS**

For the

**REMSEN MUNICIPAL WATER SUPPLY
MUNICIPAL WELL #8**

APPENDIX A

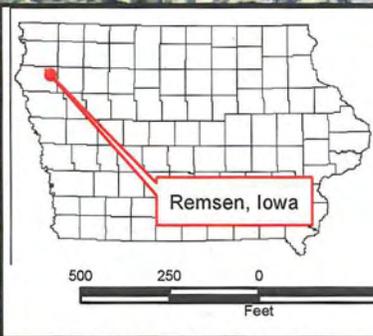
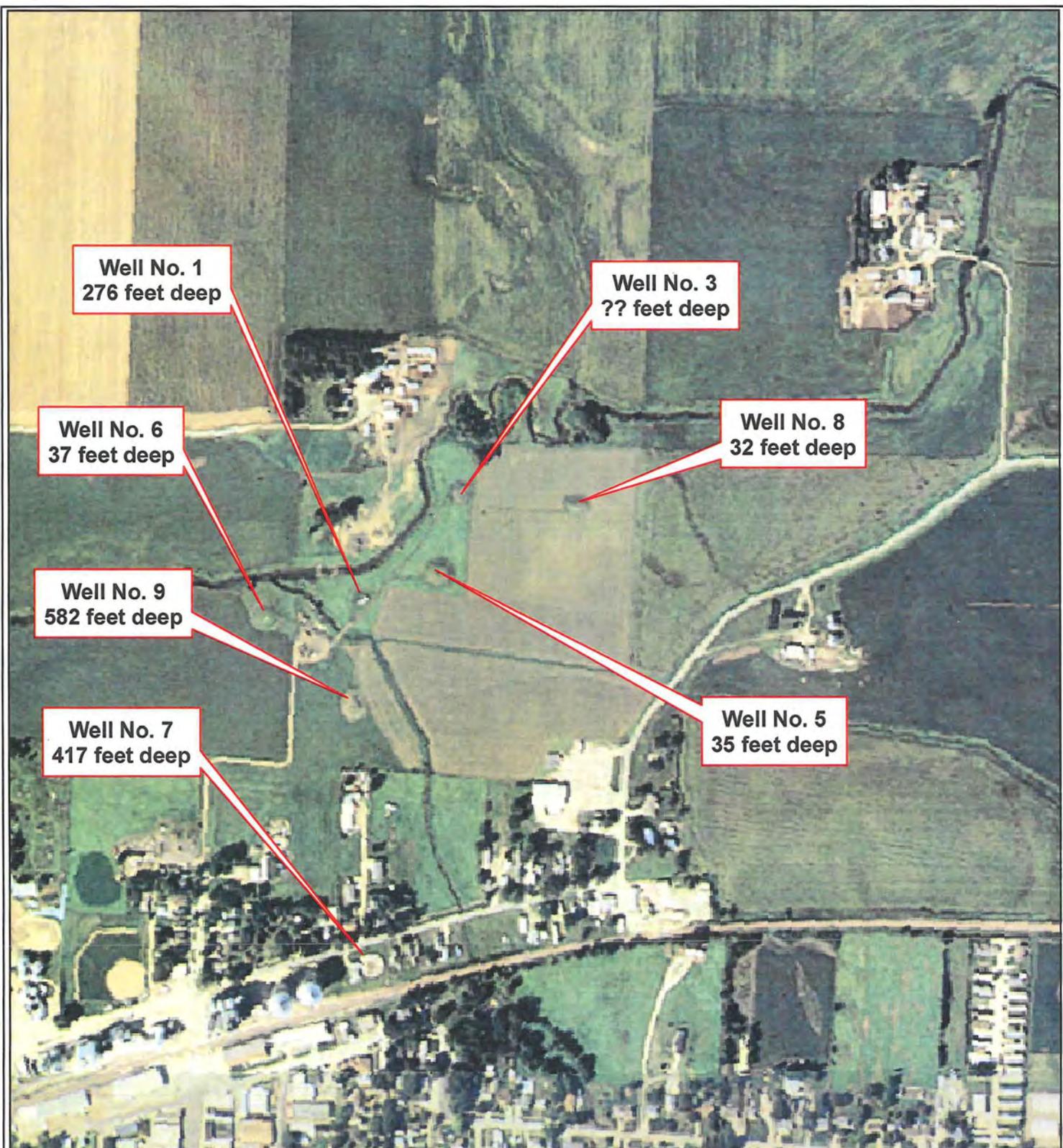
FIGURES



Iowa Department of Natural Resources

Municipal Water System
Remsen, Plymouth County, Iowa

Site Location
Figure 1

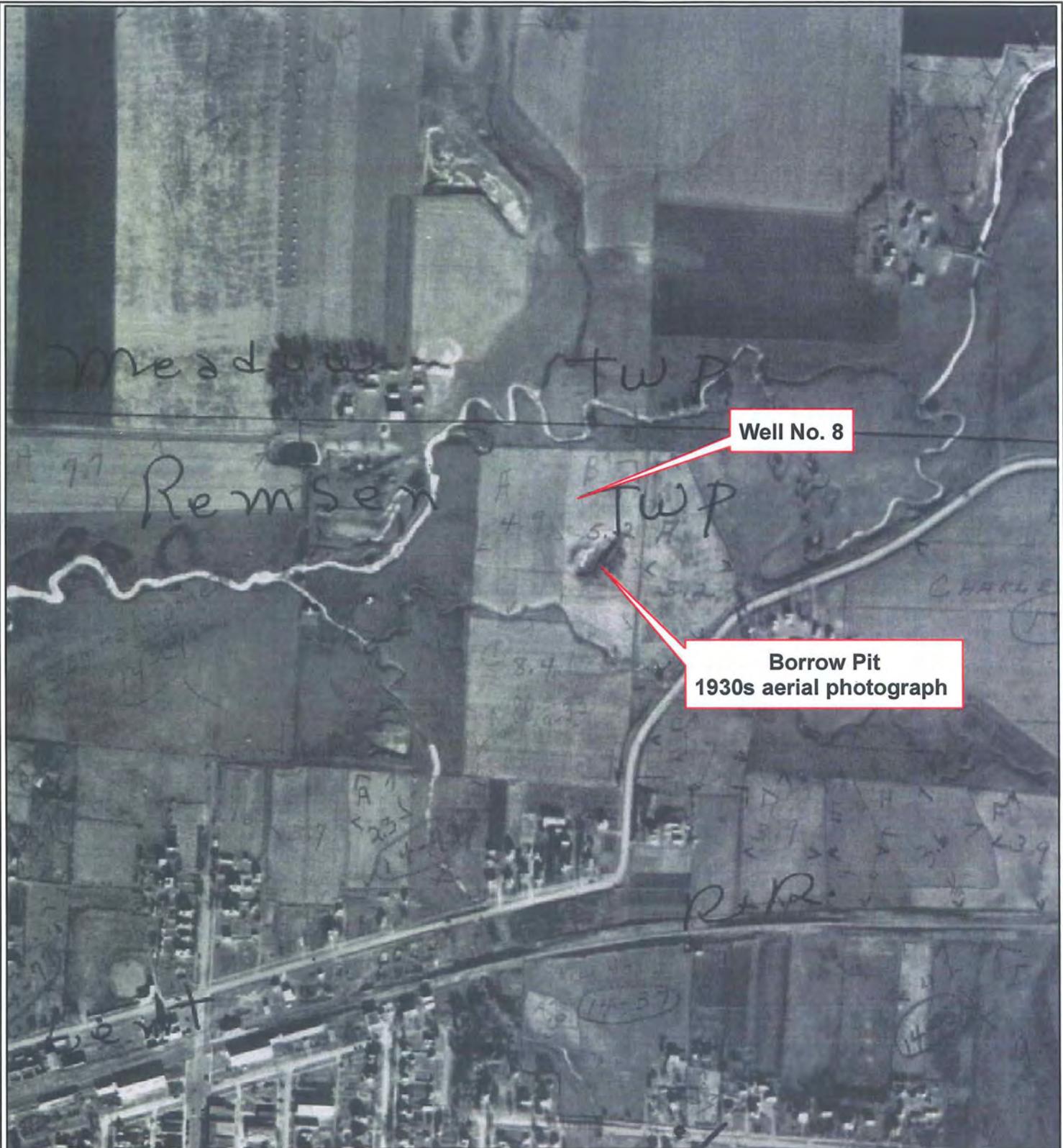


3

Iowa Department of Natural Resources

Municipal Water System
Remsen, Plymouth County, Iowa

Municipal Well Location
Figure 2

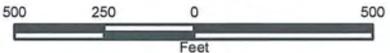


Well No. 8

Borrow Pit
1930s aerial photograph



Remsen, Iowa



3

Iowa Department of Natural Resources

Municipal Water System
Remsen, Plymouth County, Iowa

Borrow Pit Location
Figure 3

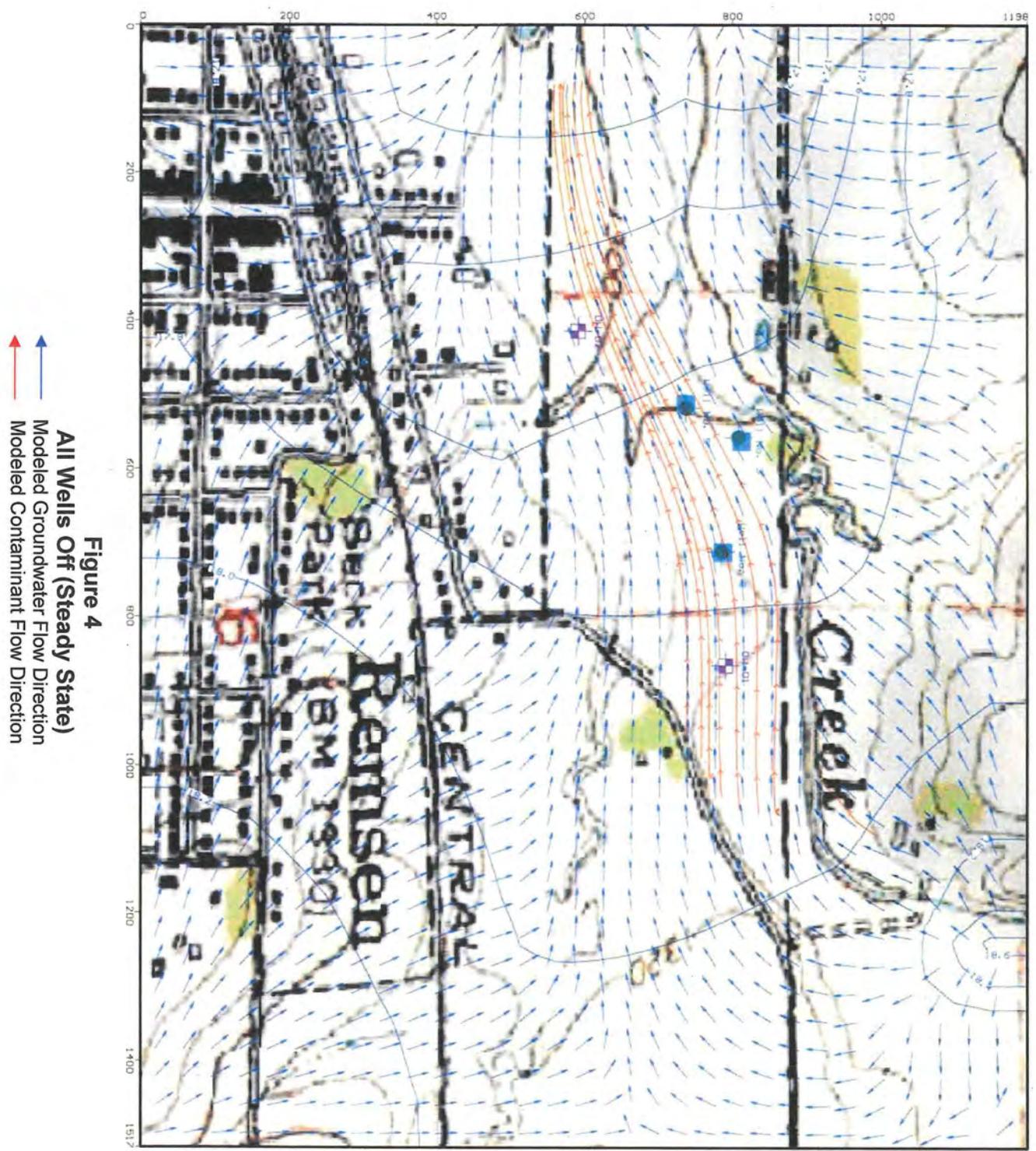


Figure 4
All Wells Off (Steady State)
 Modeled Groundwater Flow Direction
 Modeled Contaminant Flow Direction

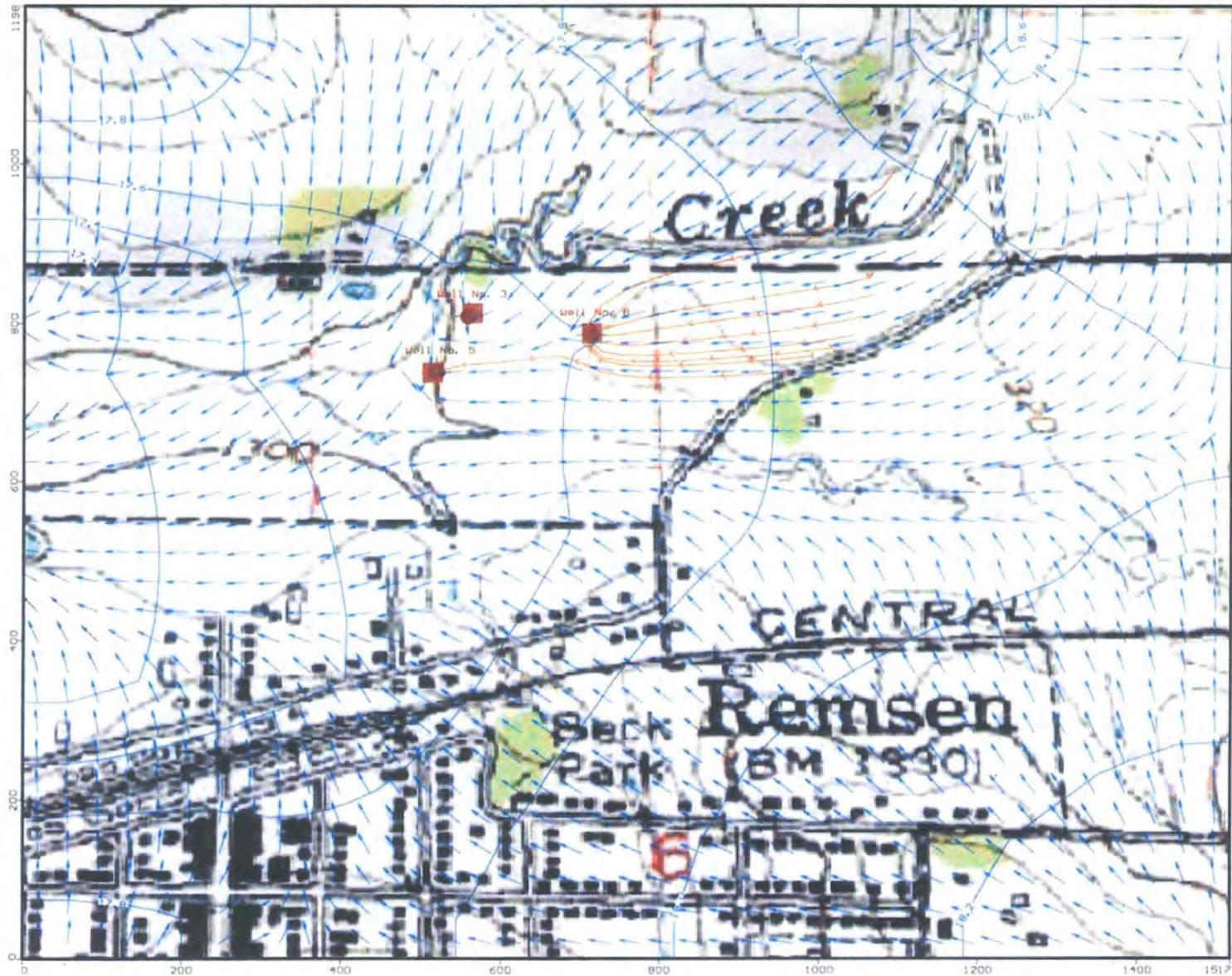


Figure 5

All Wells On (Steady State)

- ← Blue arrow: Modeled Groundwater Flow Direction
- ← Red arrow: Modeled Contaminant Flow Direction

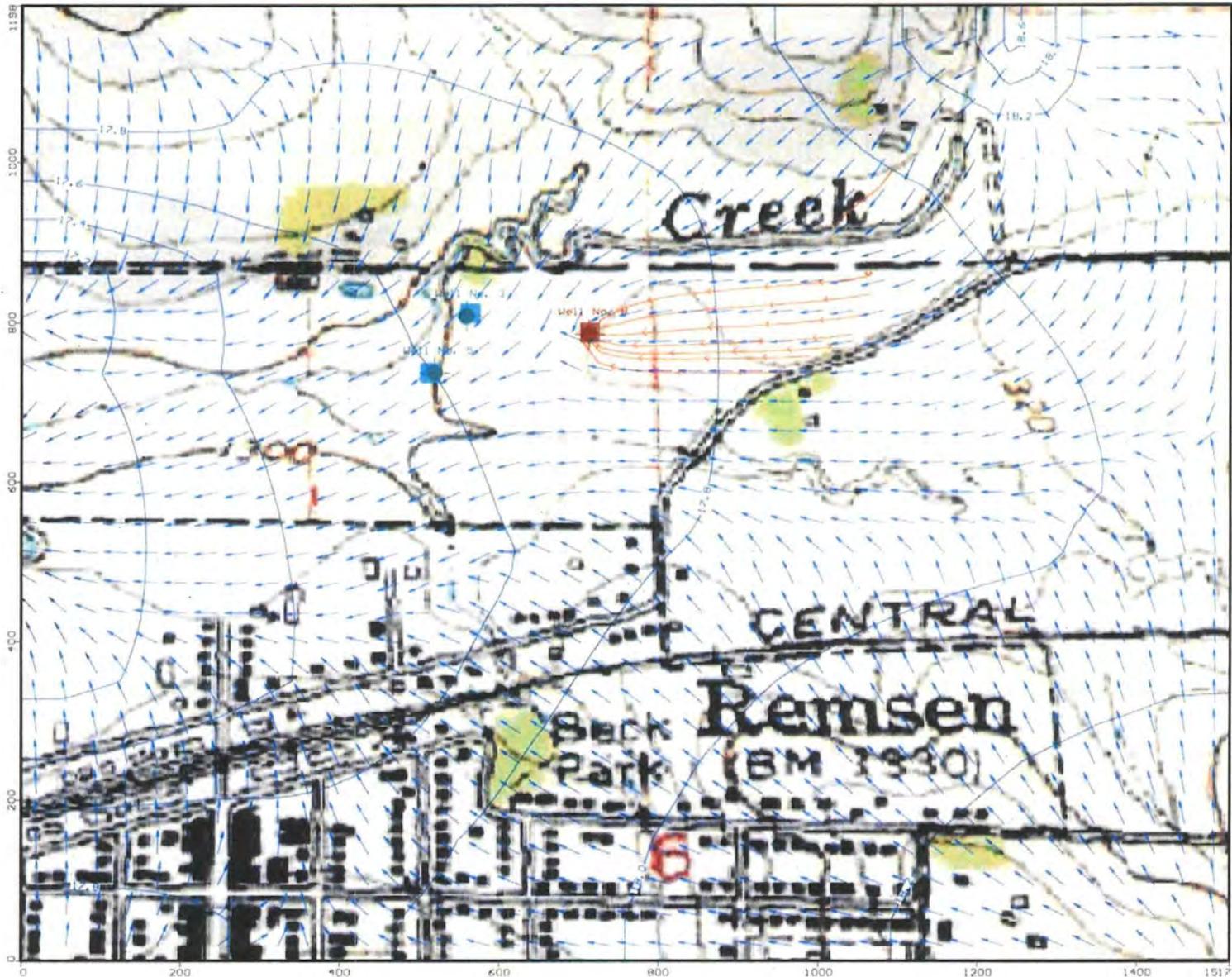


Figure 6
Well 8 On (Steady State)

- ← Modeled Groundwater Flow Direction
- ← Modeled Contaminant Flow Direction



Figure 7

Well 5 On (Steady State)

- Modeled Groundwater Flow Direction
- Modeled Contaminant Flow Direction

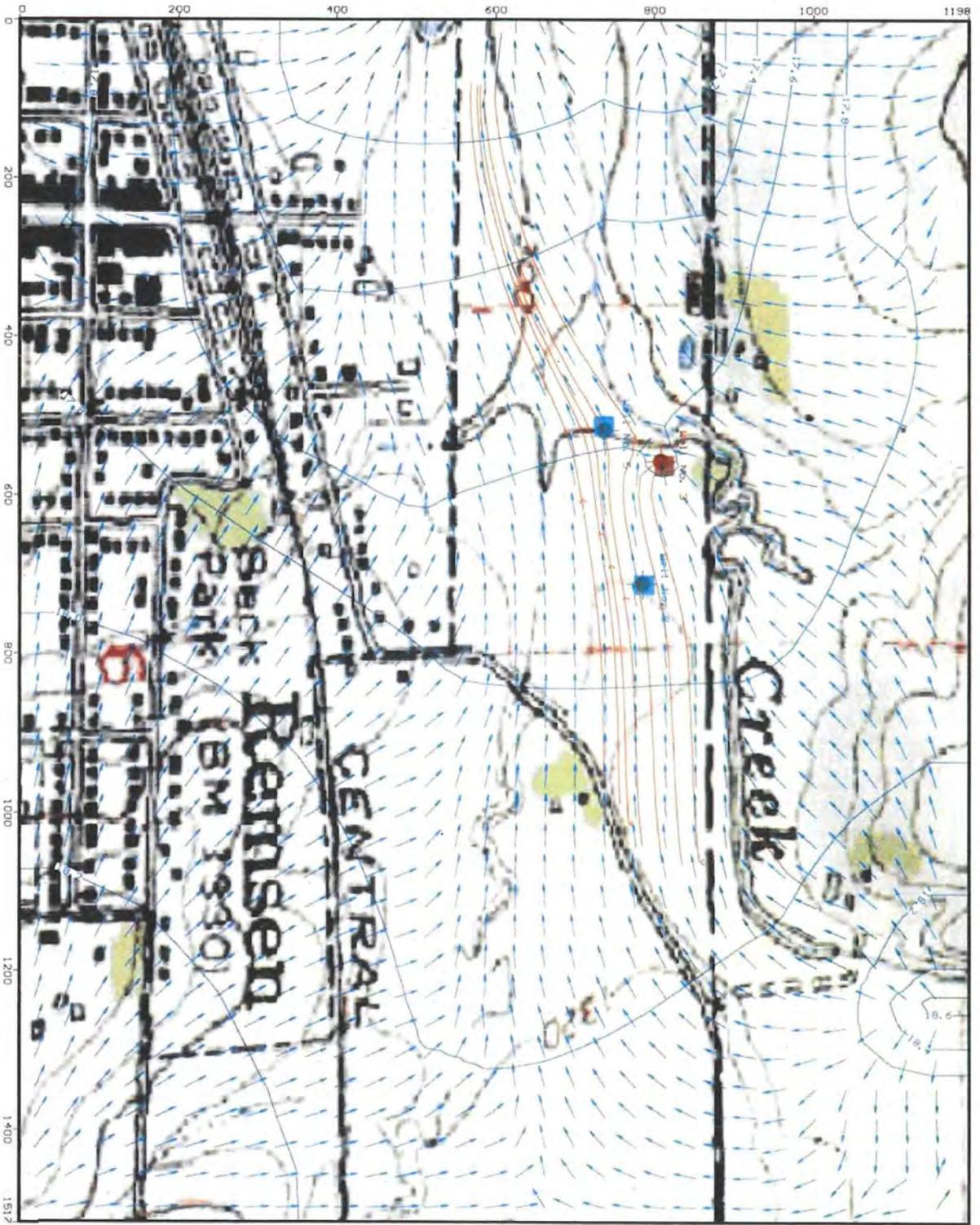
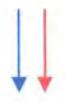


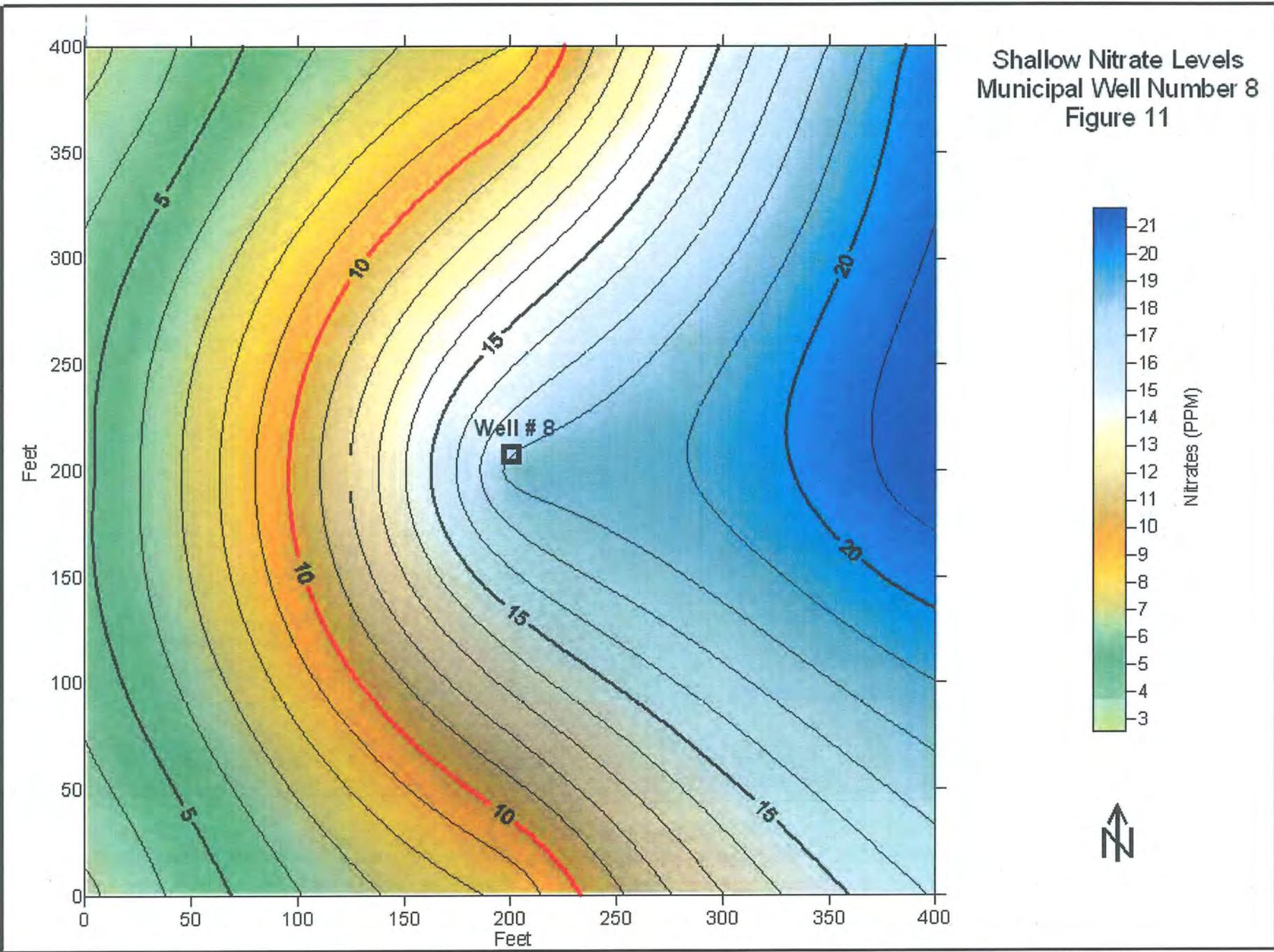


Figure 9

Wells 3 And 5 On (Steady State)
 Modeled Groundwater Flow Direction
 Modeled Contaminant Flow Direction



Shallow Nitrate Levels
Municipal Well Number 8
Figure 11



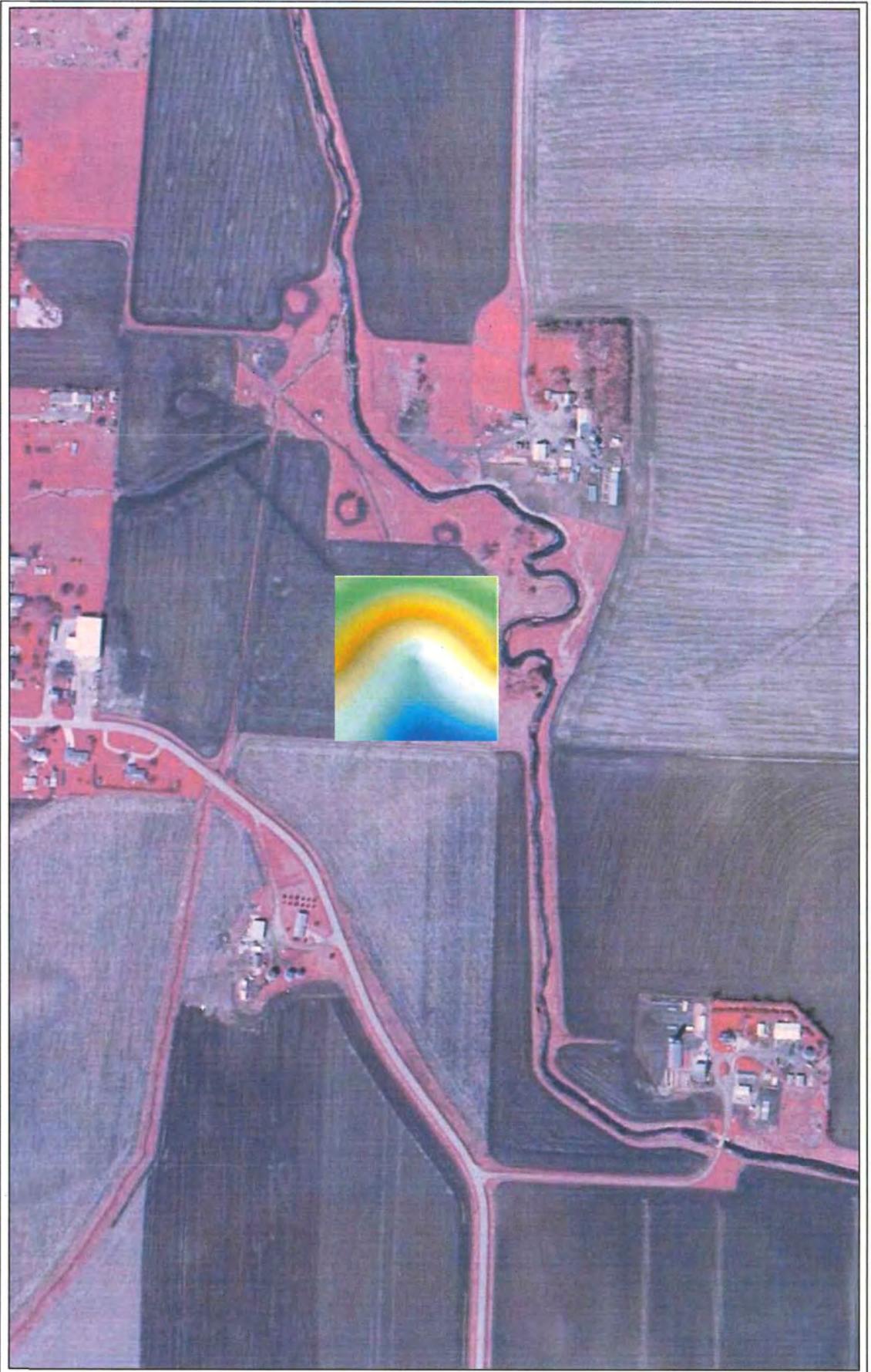
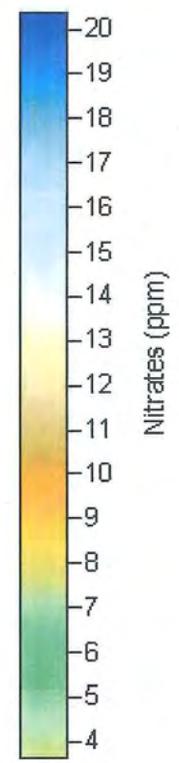
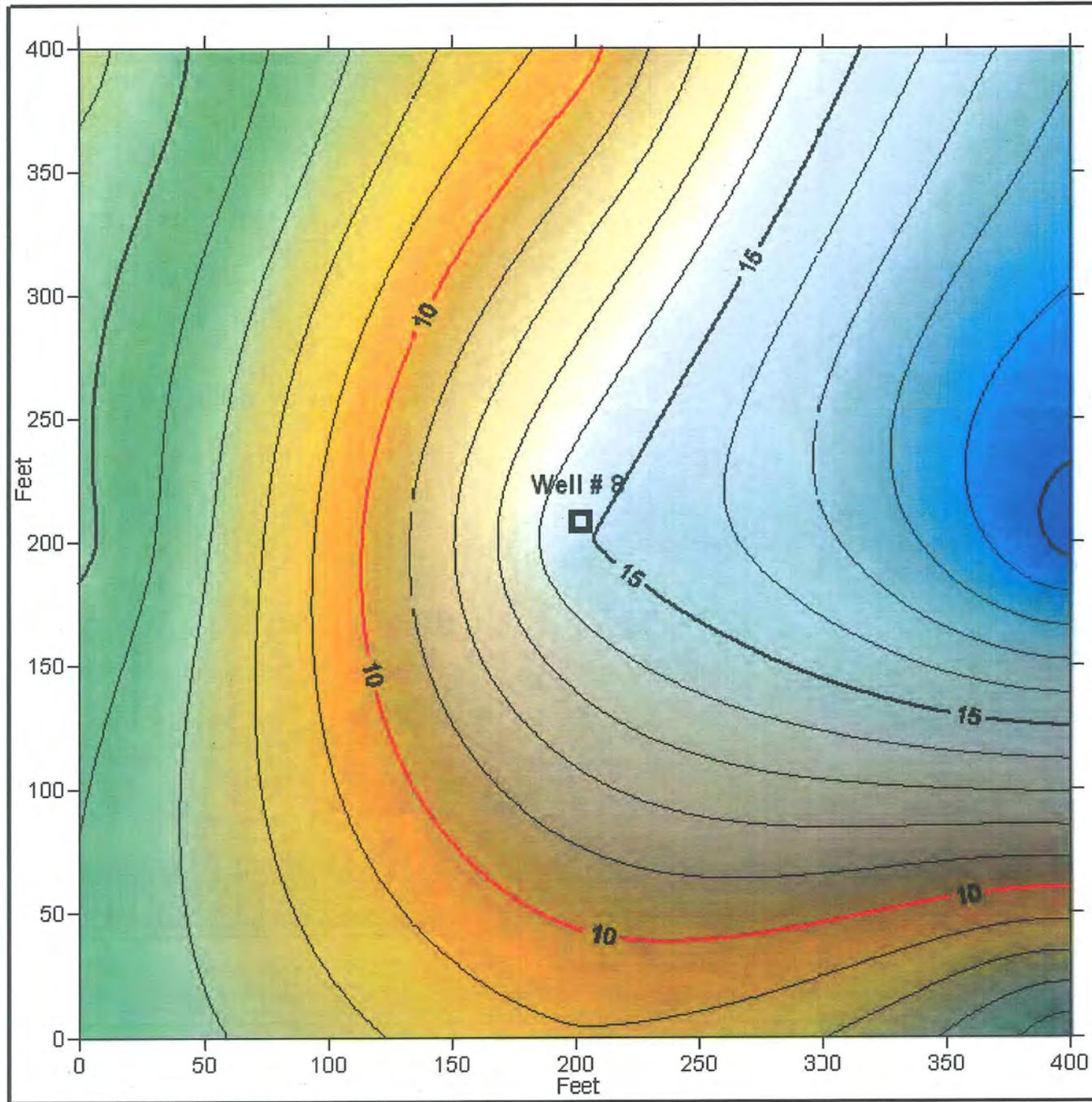


Figure 11A
Shallow Nitrate Levels
(From Figure 11)

Deep Nitrate Levels
Municipal Well Number 8
Figure 12



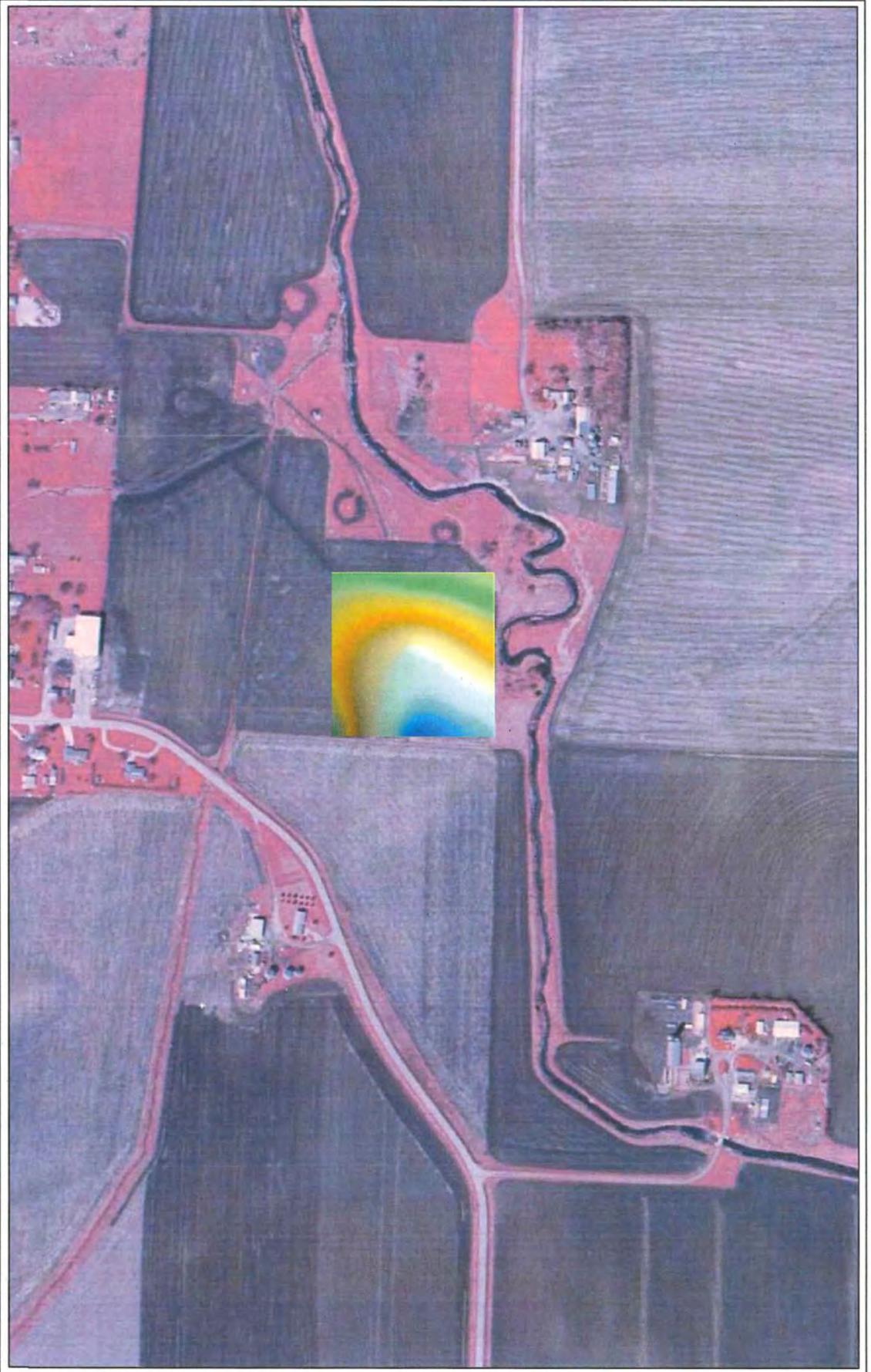


Figure 12A
Deep Nitrate Levels
(From Figure 12)

SOURCE WATER PROGRAM

SITE ASSESSMENT RESULTS

For the

**REMSEN MUNICIPAL WATER SUPPLY
MUNICIPAL WELL #8**

APPENDIX B

TABLES

Iowa Department of Natural Resources
Source Water Program
Remsen Municipal Water Supply
Groundwater/Surface Water Sample Results
All results in mg/L

Table 1

Sample	Nitrate	Ammonia
GP-01S	2.6	ND
GP-01D	3.6	ND
GP-03S	4.8	ND
GP-03D	4.7	ND
GP-05S	2.8	ND
GP-05D	6.1	ND
GP-06S	8.0	ND
GP-06D	9.4	ND
GP-08S	18.3	ND
GP-08D	14.9	ND
GP-10S	8.2	ND
GP-10D	8.9	ND
GP-11S	20.7	ND
GP-11D	17.9	ND
GP-13S	21.7	ND
GP-13D	20.4	ND
GP-15S	16.1	ND
GP-15D	5.3	ND
GP-16S	27.0	ND
GP-16D	ND	ND
GP-17S	6.5	ND
GP-17D	4.3	ND
GP-18S*	30+	ND
GP-18D*	30+	ND
GP-19S	ND	ND
GP-19D	ND	ND
SW-01	4.6	ND
SW-02	4.8	ND
SW-03	17.9	ND
SW-04	5.3	ND

* Samples exceeded method detection limit

ND - Not detected, analyte below method detection limit.

S - Shallow sample

D - Deep sample

Samples analyzed with a HACH DR 2800 Spectrophotometer

**SOURCE WATER PROGRAM
SITE ASSESSMENT RESULTS**

For the

**REMSEN MUNICIPAL WATER SUPPLY
MUNICIPAL WELL #8**

APPENDIX C

SAMPLE COLLECTION SHEETS

Sample Collection Field Sheet
Iowa Department of Natural Resources
Des Moines, Iowa

Project Name: Renssen Municipal Water Supply Project Manager: Dan Cook
Address: Municipal Well Field Program: SWP Site Assessment
City, State: Renssen, Iowa

Sample Number: GP-19S & 19D Sample Matrix: Groundwater
Latitude: 95° 57' 44.87" N Collection Date: July 29, 2008
Longitude: 42° 49' 33.04" W Collection Time: 2:30 pm

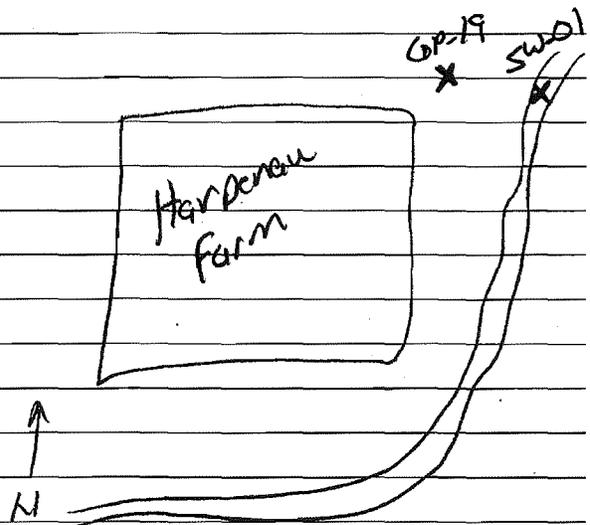
Container: 40 ml Vial Analysis: Nitrogen, Ammonia HACH Method 10205
 Nitrates, HACH Method 8039

Collection Notes:
Started GP-19 by pushing to 40 feet but hit refusal
at 37 feet deep - was going deeper because this location
is elevated. Dry hole at 37 feet so came up 9
feet and found water at 28 feet deep. Collected the
deep sample then pulled up 8 feet so the screen
was 16-20 feet deep and collected the shallow sample.
Pulled up all equipment and decon-ed.

DR-2800 Results

	<u>Nitrate</u>	<u>Ammonia</u>
<u>GP-19S</u>	<u>ND</u>	<u>ND</u>
<u>GP-19D</u>	<u>ND</u>	<u>ND</u>
<u>SW-01</u>	<u>4.6ppm</u>	<u>ND</u>

Collected SW-01 at this
location



Sample Collection Field Sheet
Iowa Department of Natural Resources
Des Moines, Iowa

Project Name: Renssen Municipal Water Supply
Address: Municipal Well Field
City, State: Renssen, Iowa

Project Manager: Dan Cook
Program: SWP Site Assessment

Sample Number: GP-16S + 16D

Sample Matrix: Groundwater

Latitude: 42° 49' 14.7" N

Collection Date: July 29, 2008

Longitude: 95° 57' 57.35" W

Collection Time: 5:10 pm

Container: 40 ml Vial

Analysis: Nitrogen, Ammonia HACH Method 10205

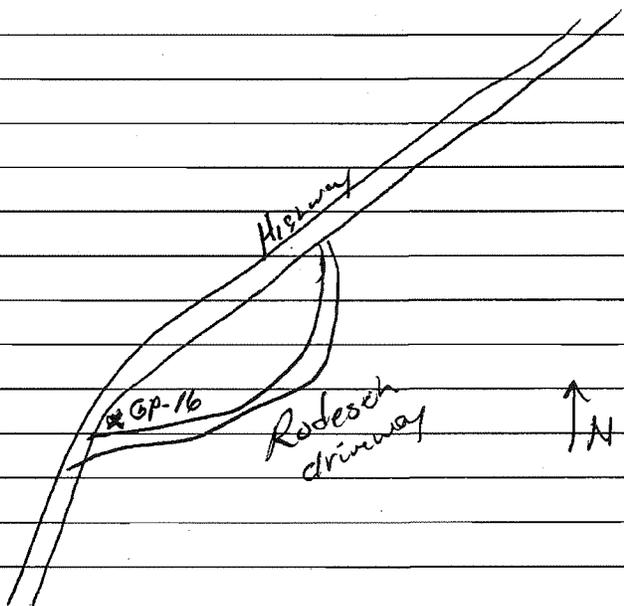
Nitrates, HACH Method 8039

Collection Notes:

Pushed GP-16 down to refusal at 33 feet deep and collected the Deep sample. Then pulled up to place the screen at 16 to 20 feet deep and collected the shallow sample. Pulled up all equipment and decon-ed.

DR-2800 Sample Results

	Nitrate	Ammonia
GP-16S	27ppm	ND
GP-16D	ND	ND



Sample Collection Field Sheet
Iowa Department of Natural Resources
Des Moines, Iowa

Project Name: Remsen Municipal Water Supply Project Manager: Dan Cook
Address: Municipal Well Field Program: SWP Site Assessment
City, State: Remsen, Iowa

Sample Number: GP-155 + 15D Sample Matrix: Groundwater
Latitude: 42° 49' 17.41" N Collection Date: July 30, 2008
Longitude: 95° 58' 1.9" W Collection Time: 9:45pm

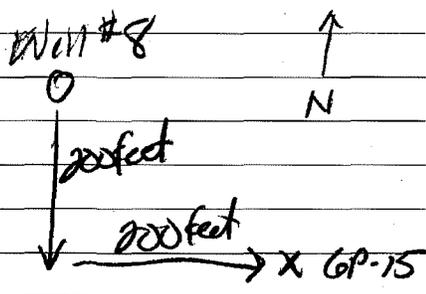
Container: 40 ml Vial Analysis: Nitrogen, Ammonia HACH Method 10205
 Nitrates, HACH Method 8039

Collection Notes:
Pushed GP-15 down to 30 feet deep and purged
3 gallons of water then collected the deep sample. Pulled
up to place the screen at 16 to 26 feet deep, purged
3 gallons and collected the shallow sample. Pulled
up all equipment and deaired.

DR-2800 Sample Results

Nitrate Ammonia

GP-155 16.1ppm ND
GP-15D 5.3ppm ND



Sample Collection Field Sheet
Iowa Department of Natural Resources
Des Moines, Iowa

Project Name: Remsen Municipal Water Supply
Address: Municipal Well Field
City, State: Remsen, Iowa

Project Manager: Dan Cook
Program: SWP Site Assessment

Sample Number: GP-035 + 03D

Sample Matrix: Groundwater

Latitude: 42° 49' 19.32" N

Collection Date: July 30, 2008

Longitude: 95° 58' 7.23" W

Collection Time: 2:15pm

Container: 40 ml Vial

Analysis: Nitrogen, Ammonia HACH Method 10205

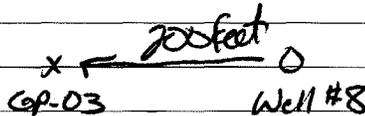
Nitrates, HACH Method 8039

Collection Notes:

Pushed GP-03 down to 32 feet purged 3 gallons of water then collected the deep sample. Pulled up the rod to place the screen at 16 to 20 feet deep. Purged 3 gallons then collected the shallow sample. Pulled up all the rods and de-aired.

DR-2800 Sample Results

	<u>Nitrate</u>	<u>Ammonia</u>
<u>GP-035</u>	<u>4.8 ppm</u>	<u>ND</u>
<u>GP-03D</u>	<u>4.7 ppm</u>	<u>ND</u>



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Sample Collection Field Sheet
Iowa Department of Natural Resources
Des Moines, Iowa

Project Name: Remsen Municipal Water Supply
Address: Municipal Well Field
City, State: Remsen, Iowa

Project Manager: Dan Cook
Program: SWP Site Assessment

Sample Number: GP-08S & 08D Sample Matrix: Groundwater
Latitude: 42° 49' 19.44" N Collection Date: July 30, 2008
Longitude: 95° 58' 4.75" W Collection Time: 3:00pm

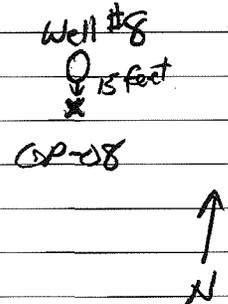
Container: 40 ml Vial Analysis: Nitrogen, Ammonia HACH Method 10205
 Nitrates, HACH Method 8039

Collection Notes:

Pushed GP-08 down to 38 feet deep (upon a rise),
purged 3 gallons of water, then collected the deep sample.
Pulled up the rods to place the screen at 16 to 20
feet deep, purged 3 gallons of water and collected the
shallow sample. Pulled up all rods and decontaminated.

DR-2800 Sample Results

	Nitrate	Ammonia
GP-08S	18.3 ppm	ND
GP-08D	14.9 ppm	ND



Sample Collection Field Sheet
Iowa Department of Natural Resources
Des Moines, Iowa

Project Name: Remsen Municipal Water Supply Project Manager: Dan Cook
Address: Municipal Well Field Program: SWP Site Assessment
City, State: Remsen, Iowa

Sample Number: GP-05S & 05 Sample Matrix: Groundwater
Latitude: 42° 49' 17.24" N Collection Date: July 30, 2008
Longitude: 95° 58' 7.12" W Collection Time: 3:45 pm

Container: 40 ml Vial Analysis: Nitrogen, Ammonia HACH Method 10205
 Nitrates, HACH Method 8039

Collection Notes:
Pushed GP-05 down to 32 feet deep, purged 3 gallons of water and collected the deep sample. Pulled up the rods until the screen was 16 to 20 feet deep. Purged 3 gallons of water then collected the shallow sample. Pulled up all the equipment and deaired.

DR-2800 Sample Results

	<u>Nitrate</u>	<u>Ammonia</u>
<u>GP-05S</u>	<u>2.8 ppm</u>	<u>ND</u>
<u>GP-05D</u>	<u>6.1 ppm</u>	<u>ND</u>

