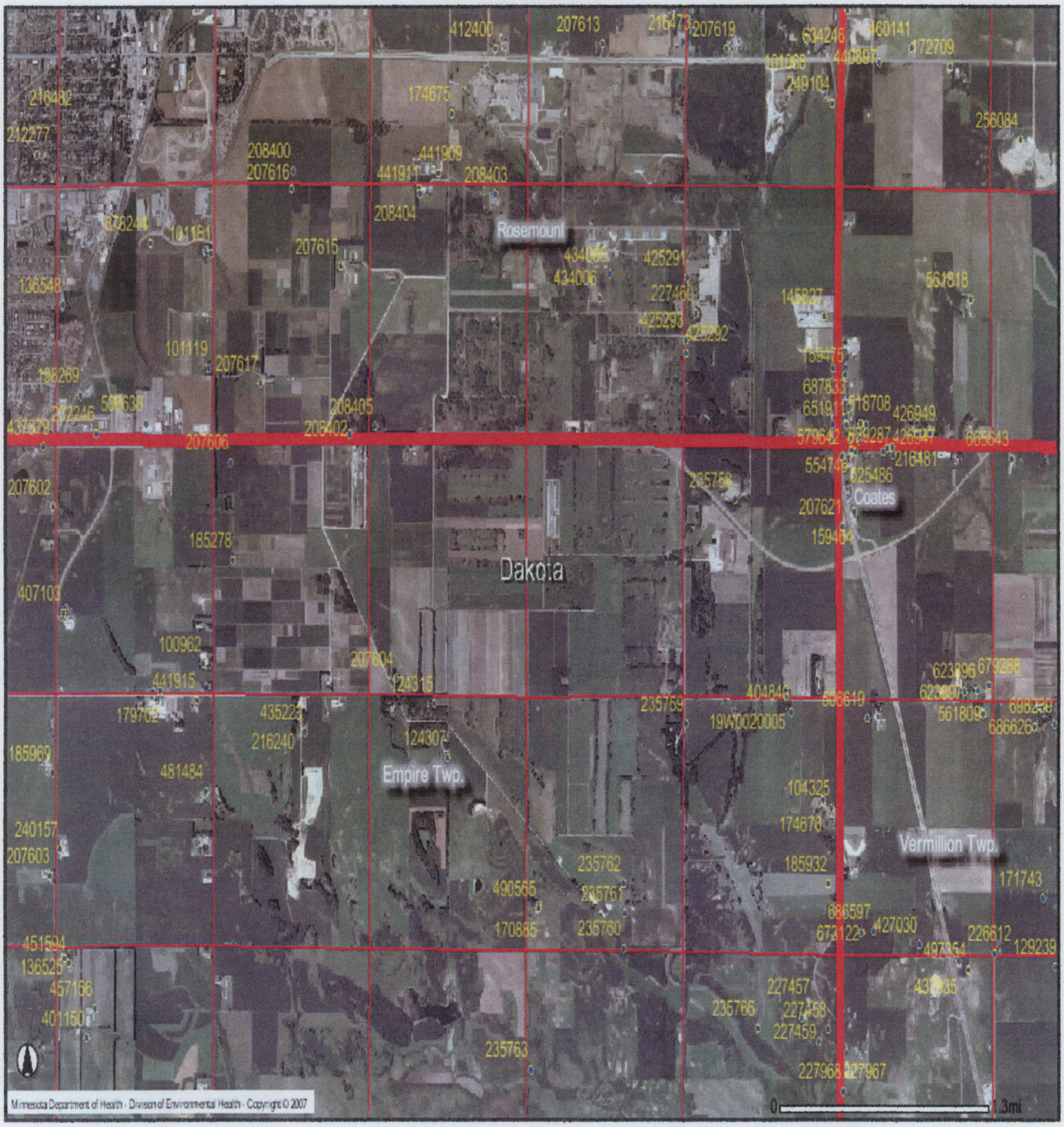
Appendix 1

Historical Well and Boring Logs

Appendix 1

Historical Documents

The Minnesota County Well Index



Highlighted records indicates a Field Verified Well Location

Click a Well Unique Number to generate a well log

Well List

Unique Number	Stratigraphy	County	Well Name	Township	Range	Dir	Section	Sub Sections	Depth (ft)	Use	Elevation (ft)	Depth Cased (ft)	SWL	Casing Diameter	Casing Material	Aquifer	Address
104325	Yes	Dakota	DECLOS, TONY	114	19	W	12	ADDACC	125	Abandoned	925	100	60	4	Steel (black or low carbon)	Prairie Du Chien Group	17461 81 CR , ROSEMOUNT
121082	Yes	Dakota	TIX, JIM	115	19	W	36	DDDDCC	365	Domestic	910	328	75	4	Steel (black or low carbon)	Jordan	15981 CLAYTON AV , ROSEMOUNT
124307	Yes	Dakota	OLSON, STEVE	114	19	W	10	BADDDD	130	Domestic	935	99	64	4	Steel (black or low carbon)	Prairie Du Chien Group	17110 STATION TR , FARMINGTON
124315	Yes	Dakota	BRODIL, GAYLE	114	19	W	10	BAABAC	135	Domestic	937	99	52	4	Steel (black or low carbon)	Prairie Du Chien Group	1210 170TH ST W , FARMINGTON
145827	Yes	Dakota	WESTIN, HAROLD J.	115	19	W	36	ADDCDC	320	Domestic	920	258	120	8	Steel (black or low carbon)	Jordan	52 HY , COATES
170826	Yes	Dakota	FRITZ, DALE	115	19	W	36	DDDACA	290	Domestic	912	273	78	4	Steel (black or low carbon)	Jordan	15915 COATES BL , COATES
170885	Yes	Dakota	ROSEMOUNT RESEARCH FARM	114	19	W	11	CCBDBB	305	Irrigation	970	134	106	8	Steel (black or low carbon)	Prairie Du Chien Group	, ROSEMOUNT
174676	Yes	Dakota	DUCLOS, KENNETH	114	19	W	12	ADDBCB	280	Domestic	920	250	70	4	Steel (black or low carbon)	Jordan	17461 CLAYTON AV , ROSEMOUNT
185932	Yes	Dakota	BOHN, TED JR.	114	19	W	12	DDAACD	320	Domestic	910	280	78	4	Steel (black or low carbon)	Jordan	17801 CLAYTON AV E , COATS
207604	Yes	Dakota	FARM RUINS	114	19	W	3	CCDBDD	935	Domestic	935						
208402	Yes	Dakota	UNIV. OF MN. OFFICE BLDG.	115	19	W	33	DDDCC	166	Domestic	950	161	75	4	Steel (black or low carbon)	Prairie Du Chien Group	1605 160TH' ST W , ROSEMOUNT
208405	Yes	Dakota	UNIV. OF MN. SUPERINTENDENT RES.	115	19	W	34	CCCCD	235	Domestic	953		75	4	Steel (black or low carbon)		, ROSEMOUNT
227456	Yes	Dakota	MURA PROJECT-BORING 1	114	19	W	13	AACC	20	Other (specify in remarks)	886						
227457	Yes	Dakota	MURA PROJECT-BORING 2	114	19	W	13	AACD	25	Other (specify in remarks)	897						
227458	Yes	Dakota	MURA PROJECT-BORING 3	114	19	W	13	ADAB	25	Other (specify in remarks)	904						
227459	Yes	Dakota	MURA PROJECT-BORING 4	114	19	W	13	ADBD	43	Other (specify in remarks)	889		30.5				
404840	Yes	Dakota	CLARK, KEVIN	114	19	W	12	ABABDD	160	Domestic	915	120	70	4	Steel (black or low carbon)	Prairie Du Chien Group	
425291	Yes	Dakota	U OF M.	115	19	W	36	BCBCCC	230	Test well	930	97	80	6	Steel (black or low carbon)	Prairie Du Chien Group	
425292	Yes	Dakota	U OF M.	115	19	W	36	CBCBCB	230	Test well	926	105	85	6	Steel (black or low carbon)	Prairie Du Chien Group	
425293	Yes	Dakota	U OF M.	115	19	W	36	CBBCCC	291	Abandoned	926	271	65	4	Steel (black or low carbon)	Jordan	
434005	Yes	Dakota	U OF M SE COMPLEX MW	115	19	W	35	ACBCCB	107	Abandoned	934	97	70	4	Steel (black or low carbon)	Prairie Du Chien Group	ROSEMOUNT
434006	Yes	Dakota	U OF M RESEARCH MW	115	19	W	35	BDDDBB	78	Abandoned	934	68	70	4	Steel (black or low carbon)	Quat. Buried Unconf. Aquife	ROSEMOUNT
435223	Yes	Dakota	HEIGH, CHUCK	114	19	W	9	ABCABD	320	Irrigation	962	130	60	12	Steel (black or low	Prairie Du Chien	1960 170TH ST W , ROSEMOUNT

															carbon)	Group	
490565	Yes	Dakota	WCAL TRANSMITTER BLDG.	114	19	W	11	CCBDB	370	Domestic	968	346	101	4	Steel (black or low carbon)	Jordan	17979 ANNETTE AV , ROSEMOUNT
19W0000043	No	Dakota	GROTN, HUGO	115	19	W	36	DA	130	Domestic	928	130	0				15640 CLAYTON AV ROSEMOUNT

25 Well Records Returned

A0C7

Minnesota Unique Well No.
425293

County Dakota
Quad Coates
Quad ID 88A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 03/30/1990
Update Date 03/27/2006
Received Date

Well Name U OF M.
Township Range Dir Section Subsections Elevation 926 ft.
115 19 W 36 CBBCCC **Elevation Method** 7.5 minute topographic map (+/- 5 feet)

Well Depth	Depth Completed	Date Well Completed
291 ft.	291 ft.	09/19/1986

Drilling Method Non-specified Rotary

Drilling Fluid --

Well Hydrofractured? ☐ Yes ☐ No
From Ft. to Ft.

Use Abandoned **Status** Sealed

Geological Material	Color	Hardness	From	To
CLAY	BROWN	HARD	0	10
GRAVEL	BROWN	HARD	10	71
SANDROCK	WHITE	HARD	71	94
LIMESTONE	YELLOW	HARD	94	259
SANDROCK	YELLOW	MEDIUM	259	291

Casing Type Steel (black or low carbon) **Joint** Welded **Drive Shoe?** ☑ Yes ☐ No **Above/Below** 1 ft.

Casing Diameter	Weight	Hole Diameter
8 in. to 94 ft.	18 lbs./ft.	14 in. to 94 ft.
4 in. to 271 ft.	11 lbs./ft.	8 in. to 271 ft.

Open Hole from 271 ft. to 291 ft.

Screen NO **Make** **Type**
Diameter **Slot/Gauze** **Length** **Set Between**

Static Water Level
65 ft. from Land surface Date Measured 09/19/1986

PUMPING LEVEL (below land surface)
90 ft. after 2 hrs. pumping 50 g.p.m.

Well Head Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☑ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

REMARKS
WELL SEALED 12-05-1998 BY 71677.
ORIGINAL USE TW - TEST WELL.

Located Minnesota Geological Survey **Method** Digitized - scale 1:24,000 or larger
Program COUNTY WELL INDEX **Date** N/A
Unique Number Verification Other, note in

Grouting Information Well Grouted? ☑ Yes ☐ No
Grout Material: Neat Cement from to 271 ft. 3 yrds.

Nearest Known Source of Contamination
1000 feet N direction Septic tank/drain field type

remarks **System** *UTM - Nad83, Zone15, Meters* **X:** 495652 **Y:** 4952197	Well disinfected upon completion? ☑ Yes ☐ No **Pump** ☐ Not Installed Date Installed Manufacturer's name Model number __ HP 0 Volts Length of drop Pipe __ft. Capacity __g.p.m Type Material
	Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No
	Variance Was a variance granted from the MDH for this well? ☐ Yes ☐ No
First Bedrock St.Peter **Aquifer** Jordan **Last Strat** Jordan **Depth to Bedrock** 71 **ft.**	**Well Contractor Certification** Kimmes-Bauer 19521 LES/STEVE License Business Name Lic. Or Reg. No. Name of Driller
County Well Index Online Report	**425293** Printed 4/13/2007 HE-01205-07

between AOC6+7

Minnesota Unique Well No.
434005

County Dakota
Quad Coates
Quad ID 88A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 01/04/1993
Update Date 03/27/2006
Received Date

Well Name U OF M SE COMPLEX MW

Township Range Dir Section Subsections Elevation 934 ft.
115 19 W 35 ACBCCB **Elevation Method** 7.5 minute topographic map (+/- 5 feet)

Well Depth	Depth Completed	Date Well Completed
107 ft.	107 ft.	07/17/1987

Drilling Method Non-specified Rotary

Well Address
ROSEMOUNT MN 55068

Geological Material	Color	Hardness	From	To
SILTY CLAY	BLACK	SOFT	0	15
SAND	BROWN	SOFT	15	35
COARSE GRAVEL	BROWN	MEDIUM	35	62
MEDIUM GRAVEL	GRAY	MED-HRD	62	71
VERY COARSE GRAVEL	GRY/GRN	HARD	71	91
LIMESTONE WEATHERED	ORN/YEL	HARD	91	100
LIMESTONE-DOLOMITE	ORN/YEL		100	107

Drilling Fluid Additive (+ Bentonite)

Well Hydrofractured? ☐ Yes ☐ No
From Ft. to Ft.

Use Abandoned **Status** Sealed

Casing Type Steel (black or low carbon) **Joint** Welded **Drive Shoe?** ☐ Yes ☐ No **Above/Below** 2 ft.

Casing Diameter	Weight	Hole Diameter
4 in. to 97 ft.	10.79 lbs./ft.	10 in. to 30 ft.
		8 in. to 107 ft.

Open Hole from ft. to ft.

Screen YES **Make** JOHNSON **Type** stainless steel

Diameter	Slot/Gauze	Length	Set Between
4	10	10	97 ft. and 107 ft.

Static Water Level
70 ft. from Land surface Date Measured 07/17/1987

PUMPING LEVEL (below land surface)
ft. after hrs. pumping g.p.m.

Well Head Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

REMARKS
WELL SEALED 12-05-1998 BY 71677.
ORIGINAL USE MW - MONITOR WELL.

Located Minnesota Geological Survey **Method** Digitization (Screen) - Map (1:24,000)
Program COUNTY WELL INDEX **Date** 07/27/2004
Unique Number Verification Other, note in remarks
System *UTM - Nad83, Zone15, Meters* **X:** 494870 **Y:** 4952612

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement	from 0 to 48 ft.	1 yrds.
Grout Material: Bentonite	from 48 to 84 ft.	1 yrds.

Nearest Known Source of Contamination
_feet _direction _type
Well disinfected upon completion? ☐ Yes ☑ No

Pump ☐ Not Installed Date Installed

	Manufacturer's name Model number ___ HP 0_ Volts Length of drop Pipe _ft. Capacity _g.p.m Type Material
	Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No
	Variance Was a variance granted from the MDH for this well? ☐ Yes ☐ No
First Bedrock Prairie Du Chien Group **Last Strat** Prairie Du Chien Group **Aquifer** Prairie Du Chien Group **Depth to Bedrock** 91 **ft.**	**Well Contractor Certification** Bergerson-Caswell / License Business Name 27058 / Lic. Or Reg. No. DEHN, D. / Name of Driller
County Well Index Online Report	**434005** Printed 4/13/2007 HE-01205-07

S AOC 2

Minnesota Unique Well No.
490565

County Dakota
Quad Coates
Quad ID 88A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 03/16/1993
Update Date 01/22/2003
Received Date

Well Name WCAL TRANSMITTER BLDG.
Township Range Dir Section Subsections Elevation 968 ft.
114 19 W 11 CCBDB **Elevation Method** 7.5 minute topographic map (+/- 5 feet)

Well Depth	Depth Completed	Date Well Completed
370 ft.	370 ft.	06/24/1991

Drilling Method Non-specified Rotary

Well Address
17979 ANNETTE AV
ROSEMOUNT MN 55068

Drilling Fluid Other

Well Hydrofractured? ☐ Yes ☐ No
From Ft. to Ft.

Geological Material	Color	Hardness	From	To
CLAY-MUSHY	BROWN	SOFT	0	20
SAND	BROWN	SOFT	20	32
CLAY	BLUE	MEDIUM	32	111
SHAKOPEE	GRAY	HARD	111	325
JORDAN	WHITE	MEDIUM	325	370

Use Domestic

Casing Type Steel (black or low carbon) **Joint** Welded **Drive Shoe?** ☑ Yes ☐ No **Above/Below** 1 ft.

Casing Diameter	Weight	Hole Diameter
8 in. to 113 ft.	28.55 lbs./ft.	12 in. to 113 ft.
4 in. to 346 ft.	10.79 lbs./ft.	8 in. to 346 ft.

Open Hole from 346 ft. to 370 ft.

Screen NO **Make** **Type**

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
101 ft. from Land surface Date Measured 06/24/1991

PUMPING LEVEL (below land surface)
ft. after hrs. pumping g.p.m.

Well Head Completion
Pitless adapter manufacturer MONITOR Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Boring ONLY)

REMARKS
ST.OLAF COLLEGE, NORTHFIELD, MN 55057

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement from 8 to 346 ft. 7 yrds.

Located Minnesota Geological Survey **Method** Digitization (Screen) - Map (1:24,000)
Program COUNTY WELL INDEX **Date** N/A
Unique Number Verification Address verification
System *UTM - Nad83, Zone15, Meters* **X:** 494143 **Y:** 4948607

Nearest Known Source of Contamination
50 feet South West direction Septic tank/drain field type
Well disinfected upon completion? ☑ Yes ☐ No

	Pump ☐ Not Installed Date Installed 06/25/1991 Manufacturer's name GRUNDFOS Model number 10S10015 __ HP 1 Volts 240 Length of drop Pipe 144 ft. Capacity 10 g.p.m Type Submersible Material Steel (black or low carbon)
	Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No
	Variance Was a variance granted from the MDH for this well? ☐ Yes ☐ No
First Bedrock Prairie Du Chien Group **Last Strat** Jordan **Aquifer** Jordan **Depth to Bedrock** 111 ft.	**Well Contractor Certification** Hartmann Well Co. / 40174 / JAECKELS, R. License Business Name / Lic. Or Reg. No. / Name of Driller
County Well Index Online Report	**490565** Printed 4/13/2007 HE-01205-07

NW AOC 4

Minnesota Unique Well No.
207604

County Dakota
Quad Coates
Quad ID 88A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 10/19/1990
Update Date 02/23/2006
Received Date

Well Name FARM RUINS
Township Range Dir Section Subsections Elevation 935 ft.
114 19 W 3 CCDBDD **Elevation Method** 7.5 minute topographic map (+/- 5 feet)

Well Depth	Depth Completed	Date Well Completed
935 ft.	935 ft.	

Drilling Method --

Drilling Fluid --

Well Hydrofractured? ☐ Yes ☐ No
From Ft. to Ft.

Geological Material	Color	Hardness	From	To
SAND AND GRAVEL			0	50
ST. PETER SANDSTONE			50	935

Use Domestic

Casing Type **Joint** No Information **Drive Shoe?** ☐ Yes ☐ No **Above/Below** **ft.**

Casing Diameter	Weight	Hole Diameter

Open Hole from ft. to ft.

Screen **Make** **Type**

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
ft. from Date Measured

PUMPING LEVEL (below land surface)
ft. after hrs. pumping g.p.m.

Well Head Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

REMARKS
SOURCE: SWARTZ (1936).

Located Minnesota Geological Survey **Method** Digitized - scale 1:24,000 or larger
Program COUNTY WELL INDEX **Date** N/A
Unique Number Verification N/A

Grouting Information Well Grouted? ☐ Yes ☐ No

Nearest Known Source of Contamination

System *UTM - Nad83, Zone15, Meters* **X:** 492679 **Y:** 4950066	_feet _direction _type Well disinfected upon completion? ☐ Yes ☐ No
	Pump ☐ Not Installed Date Installed Manufacturer's name Model number ___ HP _ Volts Length of drop Pipe _ft. Capacity _g.p.m Type Material
	Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No
	Variance Was a variance granted from the MDH for this well? ☐ Yes ☐ No
First Bedrock St.Peter **Last Strat** St.Peter **Aquifer** **Depth to Bedrock** 50 **ft.**	**Well Contractor Certification** License Business Name Lic. Or Reg. No. Name of Driller
County Well Index Online Report	**207604** Printed 4/13/2007 HE-01205-07

AOC 4

Minnesota Unique Well No.
124315

County Dakota
Quad Coates
Quad ID 88A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 03/30/1990
Update Date 02/23/2006
Received Date

Well Name BRODIL, GAYLE
Township Range Dir Section Subsections Elevation 937 ft.
114 19 W 10 BAABAC **Elevation Method** 7.5 minute topographic map (+/- 5 feet)

Well Depth	Depth Completed	Date Well Completed
135 ft.	135 ft.	00/00/1976

Drilling Method Cable Tool

Well Address
1210 170TH ST W
FARMINGTON MN 55068

Drilling Fluid --

Well Hydrofractured? ☐ Yes ☐ No
From Ft. to Ft.

Geological Material	Color	Hardness	From	To
SOIL	BLACK	SOFT	0	1
COARSE GRAVEL	BROWN	HARD	1	16
BLUE CLAY	BLUE	SOFT	16	39
CLAY	RED	SOFT	39	46
GRAVEL	BROWN	HARD	46	47
SANDSTONE	WHITE	SOFT	47	93
LIMESTONE	YELLOW	HARD	93	135

Use Domestic

Casing Type Steel (black or low carbon) **Joint** Threaded **Drive Shoe?** ☑ Yes ☐ No **Above/Below** 1 ft.

Casing Diameter	Weight	Hole Diameter
4 in. to 99 ft.	lbs./ft.	4 in. to 135 ft.

Open Hole from 99 ft. to 135 ft.

Screen NO **Make** **Type**
Diameter **Slot/Gauze** **Length** **Set Between**

Static Water Level
52 ft. from Land surface Date Measured 04/16/1976

PUMPING LEVEL (below land surface)
ft. after hrs. pumping g.p.m.

Well Head Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☑ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

REMARKS
FORMER OWNER WALTER CHRISTENSON.

Located Minnesota Geological Survey **Method** Digitized - scale 1:24,000 or larger
Program COUNTY WELL INDEX **Date** N/A
Unique Number Verification Information from owner
System *UTM - Nad83, Zone15, Meters* **X:** 493071 **Y:** 4949906

Grouting Information Well Grouted? ☐ Yes ☐ No

Nearest Known Source of Contamination
116 feet S direction Septic tank/drain field type
Well disinfected upon completion? ☑ Yes ☐ No

Pump ☑ Not Installed Date Installed 04/16/1976

	Manufacturer's name FAIRBANKS MORSE Model number 7511 HP 0.75 Volts 230 Length of drop Pipe 84 ft. Capacity 10 g.p.m Type Submersible Material Steel (black or low carbon)
	Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No
	Variance Was a variance granted from the MDH for this well? ☐ Yes ☐ No
First Bedrock St.Peter **Last Strat** Prairie Du Chien Group **Aquifer** Prairie Du Chien Group **Depth to Bedrock** 47 ft.	**Well Contractor Certification** Corcoran Well Co. 19163 SCHWANZ, M. License Business Name Lic. Or Reg. No. Name of Driller
County Well Index Online Report	**124315** Printed 4/13/2007 HE-01205-07

N ADC5

Minnesota Unique Well No.
208402

County Dakota
Quad Coates
Quad ID 88A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 09/15/1988
Update Date 03/24/2006
Received Date

Well Name UNIV. OF MN. OFFICE BLDG.
Township Range Dir Section Subsections Elevation 950 ft.
115 19 W 33 DDDCC **Elevation Method** 7.5 minute topographic map (+/- 5 feet)

Well Depth	Depth Completed	Date Well Completed
166 ft.	166 ft.	12/00/1957

Drilling Method --

Well Address
1605 160TH' ST W
ROSEMOUNT MN 55068

Drilling Fluid --

Well Hydrofractured? ☐ Yes ☐ No
From Ft. to Ft.

Geological Material	Color	Hardness	From	To
CLAY GRAVEL IN LAYERS			0	30
CLAY IN LAYERS			30	158
WATER BEARING SAND			158	161
LIMEROCK			161	166

Use Domestic

Casing Type Steel (black or low carbon) **Joint** No Information **Drive Shoe?** ☐ Yes ☐ No **Above/Below** 0 ft.

Casing Diameter	Weight	Hole Diameter
4 in. to 161 ft.	lbs./ft.	4 in. to 166 ft.

Open Hole from 161 ft. to 166 ft.

Screen NO **Make** **Type**
Diameter **Slot/Gauze** **Length** **Set Between**

Static Water Level
75 ft. from Land surface Date Measured 12/00/1957

PUMPING LEVEL (below land surface)
ft. after 4 hrs. pumping 14 g.p.m.

Well Head Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

REMARKS
WELL DRILLED BY BEAUDETTE WELL CO.

Grouting Information Well Grouted? ☐ Yes ☐ No

Located Minnesota Geological Survey **Method** Digitized - scale 1:24,000 or larger
Program COUNTY WELL INDEX **Date** N/A
Unique Number Verification Information from owner
System *UTM - Nad83, Zone15, Meters* **X:** 492206 **Y:** 4951607

Nearest Known Source of Contamination
_feet _direction _type
Well disinfected upon completion? ☐ Yes ☐ No

	Pump ☐ Not Installed Date Installed Manufacturer's name Model number ___ HP 0_ Volts Length of drop Pipe _ ft. Capacity _ g.p.m Type Material
	Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No
	Variance Was a variance granted from the MDH for this well? ☐ Yes ☐ No
First Bedrock Prairie Du Chien Group **Last Strat** Prairie Du Chien Group **Aquifer** Prairie Du Chien Group **Depth to Bedrock** 161 ft.	**Well Contractor Certification** License Business Name Lic. Or Reg. No. Name of Driller
County Well Index Online Report	**208402** Printed 4/13/2007 HE-01205-07

NE AOC 5

Minnesota Unique Well No.
208405

County Dakota
Quad Coates
Quad ID 88A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 09/15/1988
Update Date 03/24/2006
Received Date

Well Name UNIV. OF MN. SUPERINTENDENT RES.

Township Range Dir Section Subsections Elevation 953 ft.
115 19 W 34 CCCCD **Elevation Method** 7.5 minute topographic map (+/- 5 feet)

Well Depth	Depth Completed	Date Well Completed
235 ft.	235 ft.	03/00/1953

Drilling Method Cable Tool

Well Address
ROSEMOUNT MN 55068

Drilling Fluid --

Well Hydrofractured? ☐ Yes ☐ No
From Ft. to Ft.

Geological Material	Color	Hardness	From	To
CLAY TO NEARLY LOAM (LOWER)			0	140
SANDY CLAY			140	180
SAND-COARSE SAND & GRAVEL			180	195
GRAVEL TO LIMESTONE			195	235

Use Domestic

Casing Type Steel (black or low carbon) **Joint** No Information **Drive Shoe?** ☐ Yes ☐ No **Above/Below** 1.5 ft.

Casing Diameter	Weight	Hole Diameter
4 in. to ft.	lbs./ft.	4 in. to 235 ft.

Open Hole from ft. to ft.

Screen **Make** **Type**

Diameter **Slot/Gauze** **Length** **Set Between**

Static Water Level
75 ft. from Land surface Date Measured 03/00/1953

PUMPING LEVEL (below land surface)
ft. after hrs. pumping g.p.m.

Well Head Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

NO REMARKS

Grouting Information Well Grouted? ☐ Yes ☐ No

Located Minnesota Geological Survey
Method Digitized - scale 1:24,000 or larger
Program COUNTY WELL INDEX
Date N/A
Unique Number Verification Information from owner

Nearest Known Source of Contamination
_feet _direction _type
Well disinfected upon completion? ☐ Yes ☐ No

System *UTM - Nad83, Zone15, Meters* **X:** 492463 **Y:** 4951658	**Pump** ☐ Not Installed Date Installed Manufacturer's name Model number ___ HP _ Volts Length of drop Pipe _ ft. Capacity _ g.p.m Type Material
	Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No
	Variance Was a variance granted from the MDH for this well? ☐ Yes ☐ No
First Bedrock Prairie Du Chien Group **Last Strat** Prairie Du Chien Group **Aquifer** **Depth to Bedrock** 195 **ft.**	**Well Contractor Certification** Corcoran Well Co. 19163 License Business Name Lic. Or Reg. No. Name of Driller
County Well Index Online Report	**208405** Printed 4/13/2007 HE-01205-07

NE ADC1 South

Minnesota Unique Well No.
227456

County Dakota
Quad Coates
Quad ID 88A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 02/25/2003
Update Date 02/25/2003
Received Date

Well Name MURA PROJECT-BORING 1
Township Range Dir Section Subsections Elevation 886 ft.
114 19 W 13 AACC **Elevation Method** Surveyed

Well Depth	Depth Completed	Date Well Completed
20 ft.	20 ft.	03/08/1956

Drilling Method Jetted

Drilling Fluid –

Well Hydrofractured? ☐ Yes ☐ No
From Ft. to Ft.

Geological Material	Color	Hardness	From	To
SANDY LOAM	GRY/BRN		0	1
CLAY LOAM	LT. BRN		1	2
SAND	BRN/TAN		2	7
SANDSTONE	WHT/TAN		7	20

Use Other (specify in remarks)

Casing Type **Joint** No Information **Drive Shoe?** ☐ Yes ☐ No **Above/Below** ft.

Casing Diameter **Weight** **Hole Diameter**

Open Hole from ft. to ft.

Screen **Make** **Type**

Diameter **Slot/Gauze** **Length** **Set Between**

Static Water Level
ft. from Date Measured

PUMPING LEVEL (below land surface)
ft. after hrs. pumping g.p.m.

Well Head Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

REMARKS
USE-SOIL BORING BY TWIN CITY TESTING

Located Minnesota Geological Survey
Method Digitized - scale 1:24,000 or larger
Program COUNTY WELL INDEX
Date N/A
Unique Number Verification Information from owner

Grouting Information Well Grouted? ☐ Yes ☐ No

Nearest Known Source of Contamination
_feet _direction _type

Well disinfected upon completion? ☐ Yes ☐ No

System *UTM - Nad83, Zone15, Meters* **X:** 496846 **Y:** 4947918	**Pump** ☐ Not Installed Date Installed Manufacturer's name Model number ___ HP _ Volts Length of drop Pipe _ ft. Capacity _ g.p.m Type Material
	Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No
	Variance Was a variance granted from the MDH for this well? ☐ Yes ☐ No
First Bedrock St.Peter **Aquifer** **Last Strat** St.Peter **Depth to Bedrock** 7 **ft.**	**Well Contractor Certification** Minnesota Geological Survey MGS License Business Name Lic. Or Reg. No. Name of Driller
County Well Index Online Report	**227456** Printed 4/13/2007 HE-01205-07

NE Acc1 Sou

Minnesota Unique Well No.
227459

County Dakota
Quad Coates
Quad ID 88A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 02/25/2003
Update Date 02/25/2003
Received Date

Well Name MURA PROJECT-BORING 4
Township Range Dir Section Subsections Elevation 889 ft.
114 19 W 13 ADBD **Elevation Method** Surveyed

Well Depth	Depth Completed	Date Well Completed
43 ft.	43 ft.	03/08/1956

Drilling Method Jetted

Drilling Fluid –

Well Hydrofractured? ☐ Yes ☐ No
From Ft. to Ft.

Geological Material	Color	Hardness	From	To
SANDY LOAM	GRY/BRN		0	1
SANDY LOAM	DK. BRN		1	2
CLAY LOAM	BROWN		2	4
SANDY LOAM	LT. BRN		4	5
SANDSTONE	WHT/TAN		5	10
SANDSTONE	WHT/TAN		10	43

Use Other (specify in remarks)

Casing Type Joint No Information **Drive Shoe?** ☐ Yes ☐ No **Above/Below** ft.

Casing Diameter **Weight** **Hole Diameter**

Open Hole from ft. to ft.

Screen **Make** **Type**

Diameter **Slot/Gauze** **Length** **Set Between**

Static Water Level
30.5 ft. from Land surface Date Measured 03/08/1956

PUMPING LEVEL (below land surface)
ft. after hrs. pumping g.p.m.

Well Head Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

REMARKS
USE-SOIL BORING BY TWIN CITY TESTING.

Located Minnesota Geological Survey **Method** Digitized - scale 1:24,000 or larger
Program COUNTY WELL INDEX **Date** N/A
Unique Number Verification Information from owner
System *UTM - Nad83, Zone15, Meters* **X:** 497015 **Y:** 4947765

Grouting Information Well Grouted? ☐ Yes ☐ No

Nearest Known Source of Contamination
_feet _direction _type
Well disinfected upon completion? ☐ Yes ☐ No

	Pump ☐ Not Installed Date Installed Manufacturer's name Model number ___ HP _ Volts Length of drop Pipe _ ft. Capacity _ g.p.m Type Material
	Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No
	Variance Was a variance granted from the MDH for this well? ☐ Yes ☐ No
First Bedrock St.Peter **Last Strat** St.Peter **Aquifer** **Depth to Bedrock** 5 ft.	**Well Contractor Certification** Minnesota Geological Survey MGS License Business Name Lic. Or Reg. No. Name of Driller
County Well Index Online Report	**227459** Printed 4/13/2007 HE-01205-07

NE 3 A001 - South

Minnesota Unique Well No.
227457

County Dakota
Quad Coates
Quad ID 88A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 02/25/2003
Update Date 02/25/2003
Received Date

Well Name MURA PROJECT-BORING 2
Township Range Dir Section Subsections Elevation 897 ft.
114 19 W 13 AACD **Elevation Method** Surveyed

Well Depth	Depth Completed	Date Well Completed
25 ft.	25 ft.	03/08/1956

Drilling Method Jetted

Drilling Fluid –

Well Hydrofractured? ☐ Yes ☐ No
From Ft. to Ft.

Geological Material	Color	Hardness	From	To
SANDY LOAM	GRY/BRN		0	1
SANDY LOAM	DK. BRN		1	2
SANDY LOAM	BROWN		2	3
SANDSTONE	WHT/TAN		3	25

Use Other (specify in remarks)

Casing Type Joint No Information **Drive Shoe?** ☐ Yes ☐ No **Above/Below** ft.

Casing Diameter **Weight** **Hole Diameter**

Open Hole from ft. to ft.

Screen **Make** **Type**

Diameter **Slot/Gauze** **Length** **Set Between**

Static Water Level
ft. from Date Measured

PUMPING LEVEL (below land surface)
ft. after hrs. pumping g.p.m.

Well Head Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

REMARKS
USE-SOIL BORING BY TWIN CITY TESTING.

Located Minnesota Geological Survey
Method Digitized - scale 1:24,000 or larger
Program COUNTY WELL INDEX
Date N/A
Unique Number Verification Information from owner

Grouting Information Well Grouted? ☐ Yes ☐ No

Nearest Known Source of Contamination
_feet _direction _type
Well disinfected upon completion? ☐ Yes ☐ No

System *UTM - Nad83, Zone15, Meters* **X:** 496945 **Y:** 4947993	**Pump** ☐ Not Installed Date Installed Manufacturer's name Model number ___ HP _ Volts Length of drop Pipe _ ft. Capacity _ g.p.m Type Material
	Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No
	Variance Was a variance granted from the MDH for this well? ☐ Yes ☐ No
First Bedrock St.Peter **Last Strat** St.Peter **Aquifer** **Depth to Bedrock** 3 **ft.**	**Well Contractor Certification** Minnesota Geological Survey MGS License Business Name Lic. Or Reg. No. Name of Driller
County Well Index Online Report	**227457** Printed 4/13/2007 HE-01205-07

AOC 1

Minnesota Unique Well No.
425292

County Dakota
Quad Vermillion
Quad ID 87B

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 12/09/1992
Update Date 03/27/2006
Received Date

Well Name U OF M.
Township Range Dir Section Subsections Elevation 926 ft.
115 19 W 36 CBCBCB **Elevation Method** 7.5 minute topographic map (+/- 5 feet)

Well Depth	Depth Completed	Date Well Completed
230 ft.	230 ft.	09/18/1986

Drilling Method Non-specified Rotary

Drilling Fluid --

Well Hydrofractured? ☐ Yes ☐ No
From Ft. to Ft.

Geological Material	Color	Hardness	From	To
CLAY	BROWN	MEDIUM	0	10
GRAVEL	BROWN	SOFT	10	75
CLAY	BROWN	SOFT	75	99
LIME	BROWN	MEDIUM	99	230

Use Test well

Casing Type Steel (black or low carbon) **Joint** Welded **Drive Shoe?** ☑ Yes ☐ No **Above/Below** 1 ft.

Casing Diameter	Weight	Hole Diameter
6 in. to 105 ft.	18.97 lbs./ft.	12 in. to 105 ft.
		6 in. to 230 ft.

Open Hole from 105 ft. to 230 ft.

Screen NO **Make** **Type**
Diameter **Slot/Gauze** **Length** **Set Between**

Static Water Level
85 ft. from Land surface Date Measured 09/18/1986

PUMPING LEVEL (below land surface)
115 ft. after 2 hrs. pumping 50 g.p.m.

Well Head Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☑ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

NO REMARKS

Located Minnesota Geological Survey **Method** Digitized - scale 1:24,000 or larger
Program COUNTY WELL INDEX **Date** N/A
Unique Number Verification Other, note in

Grouting Information Well Grouted? ☑ Yes ☐ No
Grout Material: Neat Cement from 0 to 105 ft. 3 yrds.

Nearest Known Source of Contamination
500 feet S direction Septic tank/drain field type

remarks

System *UTM - Nad83, Zone15, Meters* **X:** 495654 **Y:** 4952117

Well disinfected upon completion? ☑ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name Model number ___ HP 0 Volts
Length of drop Pipe _ ft. Capacity _ g.p.m Type Material

Abandoned Wells Does property have any not in use and not sealed well(s)? ☐
Yes ☑ No

Variance Was a variance granted from the MDH for this well? ☐ Yes ☐ No

First Bedrock Prairie Du Chien Group
Last Strat Prairie Du Chien Group
Aquifer Prairie Du Chien Group
Depth to Bedrock 99 **ft.**

Well Contractor Certification

Kimmes-Bauer	19521	BAUER, S.
License Business Name	Lic. Or Reg. No.	Name of Driller

County Well Index Online Report **425292** Printed 4/13/2007
HE-01205-07

AOC 7

Minnesota Unique Well No.
425291

County Dakota
Quad Coates
Quad ID 88A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 03/30/1990
Update Date 03/27/2006
Received Date

Well Name U OF M.
Township Range Dir Section Subsections Elevation 930 ft.
115 19 W 36 BCBCCC **Elevation Method** 7.5 minute topographic map (+/- 5 feet)

Well Depth	Depth Completed	Date Well Completed
230 ft.	230 ft.	09/17/1986

Drilling Method Non-specified Rotary

Drilling Fluid Bentonite

Well Hydrofractured? ☐ Yes ☐ No
From Ft. to Ft.

Use Test well

Geological Material	Color	Hardness	From	To
CLAY	BROWN	MEDIUM	0	10
GRAVEL	BROWN	MEDIUM	10	89
SANDROCK	YELLOW	HARD	89	92
LIMESTONE	BLUE	HARD	92	110
LIMESTONE	YELLOW	HARD	110	230

Casing Type Steel (black or low carbon) **Joint** Welded **Drive Shoe?** ☐ Yes ☑ No **Above/Below** 2 ft.

Casing Diameter	Weight	Hole Diameter
6 in. to 97 ft.	18 lbs./ft.	12 in. to 97 ft.
		6 in. to 230 ft.

Open Hole from 97 ft. to 230 ft.

Screen NO **Make** **Type**

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
80 ft. from Land surface Date Measured 09/17/1986

PUMPING LEVEL (below land surface)
95 ft. after 2 hrs. pumping 20 g.p.m.

Well Head Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☑ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

NO REMARKS

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement	from	to 97 ft.	2
Grout Material: Cuttings	from	to ft.	

Located Minnesota Geological Survey
Method Digitized - scale 1:24,000 or larger
Program COUNTY WELL INDEX
Date N/A
Unique Number Verification Other, note in remarks

Nearest Known Source of Contamination
150 feet W direction type

System *UTM - Nad83, Zone15, Meters* **X:** 495665 **Y:** 4952591	Well disinfected upon completion? ☐ Yes ☑ No
	Pump ☐ Not Installed Date Installed Manufacturer's name Model number ___ HP 0 Volts Length of drop Pipe _ ft. Capacity _ g.p.m Type Material
	Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No
	Variance Was a variance granted from the MDH for this well? ☐ Yes ☐ No
First Bedrock St.Peter **Aquifer** Prairie Du Chien Group **Last Strat** Prairie Du Chien Group **Depth to Bedrock** 89 **ft.**	**Well Contractor Certification** Kimmes-Bauer 19521 STEVE/LES License Business Name Lic. Or Reg. No. Name of Driller
County Well Index Online Report	**425291** Printed 4/13/2007 HE-01205-07

EE/AOC 1-Southern

Minnesota Unique Well No.
227968

County Dakota
Quad Coates
Quad ID 88A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 03/10/1994
Update Date 06/27/2006
Received Date

Well Name

Township Range Dir Section Subsections Elevation 860 ft.
114 18 W 18 CBBBCB **Elevation Method** 7.5 minute topographic map (+/- 5 feet)

Well Depth	Depth Completed	Date Well Completed
25 ft.	24 ft.	11/29/1989

Drilling Method Power Auger

Drilling Fluid –

Well Hydrofractured? ☐ Yes ☐ No
From Ft. to Ft.

Use Monitor well

Geological Material	Color	Hardness	From	To
LOAM	BLACK	SOFT	0	4
CLAY	BROWN	MEDIUM	4	5
COARSE SAND, DIRTY	BROWN	SOFT	5	12
MED. COARSE SAND, DIRTY	LT. BRN	SOFT	12	18
GRAVEL	LT. BRN		18	20
FINE/COARSE GRAVEL, CLEAN	LT. BRN		20	24
FINE SAND & LARGE CHUNCKS REFUSAL	YELLOW	HARD	24	25

Casing Type Galvanized **Joint** Threaded **Drive Shoe?** ☐ Yes ☐ No **Above/Below** 3.8 ft.

Casing Diameter	Weight	Hole Diameter
2 in. to 21 ft.	lbs./ft.	4 in. to 25 ft.

Open Hole from ft. to ft.

Screen YES **Make** JOHNSON **Type** stainless steel

Diameter	Slot/Gauze	Length	Set Between
2	10	3	21 ft. and 24 ft.

Static Water Level
8.8 ft. from Land surface Date Measured 11/29/1989

PUMPING LEVEL (below land surface)
ft. after hrs. pumping g.p.m.

Well Head Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☑ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

REMARKS
REFUSAL AT 24-25 FT. POSSIBLY ST. PETER SANDSTONE.

Located United States Geological Survey **Method** Public Land Survey - QQQQQQ Section
Program COUNTY WELL INDEX **Date** N/A
Unique Number Verification Information from owner
System *UTM - Nad83, Zone15, Meters* **X:** 497270 **Y:** 4947451

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement	from 0 to ft.	0
Grout Material: Bentonite	from 0 to ft.	0

Nearest Known Source of Contamination
80 feet S direction Body of water type
Well disinfected upon completion? ☐ Yes ☑ No

	Pump ☐ Not Installed Date Installed Manufacturer's name Model number ___ HP 0_ Volts Length of drop Pipe _ ft. Capacity _ g.p.m Type Material
	Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No
	Variance Was a variance granted from the MDH for this well? ☐ Yes ☐ No
First Bedrock **Last Strat** Sand-yellow **Aquifer** Quat. Water Table Aquifer **Depth to Bedrock** ft.	**Well Contractor Certification** U.s. Geol Survey M0113 License Business Name Lic. Or Reg. No. Name of Driller
County Well Index Online Report	**227968** Printed 4/13/2007 HE-01205-07

Appendix 2

Photographs

Appendix 2
Photographs
Former Gopher Ordnance Works
Sampling and Analysis Plan

Source: Selected photographs of each AOC are from Bay West Site visits conducted on October 10, 2006[1] and February 21, 2007[2], from the USACE PA Report[3], and the 2007 Focused SI field investigations[4].

Photo 1. AOC 1. Looking generally south. Walking down drainage ditch towards primary settling basin. [1]

Photo 2. AOC 1. Looking Southeast. Entering Primary Settling Basin from drainage ditch. [1]

Photo 3. AOC 1. Looking north at remnants of the dam/weir at toe of primary settling basin.[2]

Photo 4. AOC 1. Looking South along the drainage ditch/low area where the drainage enters into the secondary settling basin (darker color vegetation). [1]

Appendix 2
Photographs
Former Gopher Ordnance Works
Sampling and Analysis Plan

Photo 5. AOC 1. Remnants of gated weir/dam structure at the Southeastern end of the Secondary Settling Basin. (1)

Photo 6. AOC 2. Looking East. Crops: Soybeans, wheat, corn fields and rows of trees.(1)

Photo 7. AOC 2. Soybean fields. Foreground possible former building location. (1)

Photo 8. AOC 3, Drainage Area DA1. South and adjacent to AOC 5. (3)

Photo 9. AOC 4. Looking south from 170th Street.(1)

Photo 10. AOC 5. Looking east.DNT storage bunker with trash inside. (1)

Appendix 2
Photographs
Former Gopher Ordnance Works
Sampling and Analysis Plan

Photo 11. AOC 5. Looking north at a drainage area south of the DNT storage bunkers and north of AOC 3 Drainage Area DA1. (1)

Photo 12. AOC 5. Looking East. DNT storage bunker. (1)

Photo 13. AOC 6. Looking northeast, standing at Bottom of 154th Street Disturbed Area (3)

Photo 14. AOC 7A. Possible Transformer storage pad on the south side of Pump House.(2)

Photo 15. AOC 7A. Looking east. Water Chemical Inlet house attached to the North side of Building 402-A. (2)

Photo 16. AOC 7B. Looking northeast.(2)

Appendix 2
Photographs
Former Gopher Ordnance Works
Sampling and Analysis Plan

Photo 17. AOC 7C. Looking south at the location of the former Coal Storage Area. (2)

Photo 18. AOC 7C. Looking northeast at a culvert located in the northeast corner of AOC 7C.(2)

Photo 19. AOC 7D. Looking southeast at stockpiled soil. The toe end of the stockpile on the left side of the photograph is in AOC 7C. (2)

Photo 20. AOC 7D. Looking northeast at the former location of Building 401-A. (2)

Photo 21. AOC 7D. Looking northeast at the former Fuel Oil Tank location east of Building 401-A.(2)

Photo 22. AOC 7D. Looking east at the former Ash Disposal Pit, south and adjacent to the Fuel Oil Tanks located east of Building 401-A.(2)

Appendix 2
Photographs
Former Gopher Ordnance Works
Sampling and Analysis Plan

Photo 23. AOC 7D. Two of four of the possible transformer storage pads on the southwest side of Building 401-A. (2)

Photo 24. AOC 1S. Upgradient surface water and sediment sampling location.(4)

Photo 25. AOC 1S. Sediment sampling(4)

Photo 26. AOC 1S. Downgradient surface water and sediment sampling location. (4)

Photo 27. AOC 6. Test Pit TP1(4)

Photo 28. AOC 6. Test Pit TP1(4)

Photo 29. AOC 6. Test Pit TP2(4)

Photo 30. AOC 6. Test Pit TP2(4)

Photo 31. AOC 6. Test Pit TP2(4)

Photo 32. AOC 6. Test Pit TP2(4)

Photo 33. AOC 6. Test Pit TP2(4)

Photo 34. AOC 6. Test Pit TP2(4)

Appendix 2
Photographs
Former Gopher Ordnance Works
Sampling and Analysis Plan

Photo 35. AOC 6. Test Pit TP2[(4)]

Photo 36. AOC 6. Test Pit TP3[(4)]

Photo 37. AOC 6. Test Pit TP3[(4)]

Photo 38. AOC 6. Test Pit TP3[(4)]

Photo 39. AOC 6. Test Pit TP3[(4)]

Photo 40. AOC 6. Test Pit TP3[(4)]

Photo 41. AOC 6. Test Pit TP3(4)

Photo 42. AOC 6. Test Pit TP3(4)

Photo 43. AOC 6. Test Pit TP3(4)

Photo 44. AOC 6. Test Pit TP4(4)

Photo 45. AOC 6. Test Pit TP4(4)

Photo 46. AOC 6. TP4(4)

Appendix 2
Photographs
Former Gopher Ordnance Works
Sampling and Analysis Plan

Photo 47. AOC 6. TP5(4)

Photo 48. AOC 6. Test Pit TP5(4)

Photo 49. AOC 6. Test Pit TP5(4)

Photo 50. AOC 6. Test Pit TP5(4)

Photo 51. AOC 6. Test Pit TP5(4)

Photo 52. AOC 6. Test Pit TP5(4)

Photo 53. AOC 6. Test Pit TP5[(4)]

Photo 54. AOC 6. Test Pit TP6[(4)]

Photo 55. AOC 6. Test Pit TP6[(4)]

Photo 56. AOC 6. Test Pit TP6[(4)]

Photo 57. AOC 6. Test Pit TP6[(4)]

Photo 58. AOC 7A. Discarded small arms practice munitions found next to former transformer pads.[(4)]

Appendix 2
Photographs
Former Gopher Ordnance Works
Sampling and Analysis Plan

Photo 59. AOC 7A. Discarded small arms practice munitions found next to former transformer pads.[4]

Photo 60. Background Sample BG-1[4]

Photo 61. Background Sample BG-1[4]

Photo 62. Background Sample BG-2[4]

Photo 63. Background Sample BG-2[4]

Photo 64. Background Sample BG-4[4]

Photo 65. Background Sample BG-4(4)

Appendix 4

Data Verification and Validation Summaries

TECHNICAL MEMORANDUM

DATE: November 26, 2007

TO: Brenda Winkler, Project Manager
Bay West

FROM: Marcia A. Kuehl
Chemical QC Officer

SUBJECT: Data Verification for Former Gopher Ordnance Works, Rosemount, Minnesota
Sampling Events August-September, 2007

OVERVIEW

Analytical results for all of the data packages (except D7H300206, D7H230183 which were validated) collected from the Former Gopher Ordnance Works in August and September, 2007 have been verified. This process consisted of review of the Case Narrative, the supporting quality control forms and chain-of-custody forms. The appropriateness of the assigned data qualifiers was assessed and additional qualifiers added as detailed below by data package.

The verification was based on the data reports and QC results supplied by the analytical laboratories, Test America, located in Denver, Colorado and Sacramento, California. Any additional data qualifiers assigned to the data are described below. A hard copy of the verified data is also attached to this memorandum.

D7I060355

The case narrative was supported by the QC results. All qualifiers added by TestAmerica were appropriate.

D7I130251

Samples collected and shipped for DRO analysis were not aliquoted according to Wisconsin method requirements. Action taken was to qualify all DRO results as estimated with a J code from this method non-compliance. The case narrative was supported by the QC results. All qualifiers added by TestAmerica were appropriate.

D7I070382

Samples collected and shipped for DRO analysis were not aliquoted according to Wisconsin method requirements. Action taken was to qualify all DRO results as estimated with a J code from this method non-compliance. Any E qualified results should not be used, the lowest dilution that

results in a value within the linear calibration range should be considered the most quantitative result. The case narrative was supported by the QC results. All qualifiers added by TestAmerica were appropriate.

D7H310262

Re-analysis of samples FOGW-AOC7D-SS-SS3, FOGW-AOC7D-SS-SS 4 and FOGW-AOC7D-SS-SS5 due to out of limit surrogate recoveries was done outside the holding time. Data was qualified as estimated from this holding time exceedance. The case narrative was supported by the QC results. All qualifiers added by TestAmerica were appropriate.

D7I010154

The case narrative was supported by the QC results. All qualifiers added by TestAmerica were appropriate.

D7I200237

The case narrative was supported by the QC results. All qualifiers added by TestAmerica were appropriate.

D7I150223

Re-analysis of sample FOGW-AOC2-S-GP1(8-10') due to out of limit surrogate recovery was done outside the holding time. Data was qualified as estimated from this holding time exceedance. The case narrative was supported by the QC results. All qualifiers added by TestAmerica were appropriate.

D7I220193

The case narrative was supported by the QC results. All qualifiers added by TestAmerica were appropriate.

D7I120319

Samples FGOW-AOC4-S-GP1(8-10') and FOGW-AOC4-SS-SS2(0-6") were received for GRO analysis with no methanol present. TestAmerica added methanol and the results for these two samples should be considered estimates due to this sampling non-compliance. The case narrative was supported by the QC results. All qualifiers added by TestAmerica were appropriate.

D7I290189

The soil lab method blank contained detectable nitrocellulose at 1.1 mg/kg. Action taken was to qualify detected nitrocellulose in samples with a concentration less than 5 X the method blank as undetected with a U code as the concentration reported is not significantly different from lab background. Nitrocellulose in FOGW-AO1CM-SS-SS3(0-6") was qualified as undetected. The case narrative was supported by the QC results. All qualifiers added by TestAmerica were appropriate.

D7J060158

The soil lab method blank contained detectable nitrocellulose at 1.1 mg/kg. Action taken was to qualify detected nitrocellulose in samples with a concentration less than 5 X the method blank as undetected with a U code as the concentration reported is not significantly different from lab background. Nitrocellulose in FOGW-AOC1S-SS-SS2(0-6") and FOGW-AOC1S-SS-SS3(0-6") was qualified as undetected. The case narrative was supported by the QC results. All qualifiers added by TestAmerica were appropriate.

D7I260277

Sample FGOW-AOC1S-W-GP1 was re-extracted outside the holding time for semivolatiles due to low surrogate recoveries. Action taken was to qualify all sample data for FGOW-AOC1S-W-GP1 extracted on 10/7/07 as estimated with a J code from this holding time exceedance. The case narrative was supported by the QC results. All qualifiers added by TestAmerica were appropriate.

D7I150223

The re-extraction for sample FOGW-AOC2-S-GP1(8-10') for explosives due to low surrogate recovery was done outside the holding time. Action taken was to qualify explosives results for FOGW-AOC2-S-GP1(8-10') as estimated with a J code from this holding time exceedance. The case narrative was supported by the QC results. All qualifiers added by TestAmerica were appropriate.

D7H240251

The soil lab method blank contained detectable nitrocellulose at 1.1 mg/kg. Action taken was to qualify detected nitrocellulose in samples with a concentration less than 5 X the method blank as undetected with a U code as the concentration reported is not significantly different from lab background. Nitrocellulose in FOGW-AOC7C-SS-GP7(0-6") was qualified as undetected. The case narrative was supported by the QC results. All qualifiers added by TestAmerica were appropriate.

D7H250161

The soil lab method blank contained detectable nitrocellulose at 1.1 mg/kg. Action taken was to qualify detected nitrocellulose in samples with a concentration less than 5 X the method blank as undetected with a U code as the concentration reported is not significantly different from lab background. All detected nitrocellulose in the samples in this data package were qualified as undetected. The case narrative was supported by the QC results. All qualifiers added by TestAmerica were appropriate.

D7H090291

The case narrative was supported by the QC results. All qualifiers added by TestAmerica were appropriate.

D7H180125

Samples collected and shipped for DRO analysis were not aliquoted according to Wisconsin method requirements. Action taken was to qualify all DRO results as estimated with a J code from

this method non-compliance. Bis(2-ethylhexyl)phthalte was detected in the water lab blank analyzed with the project samples at 1.9 ug/L. Action taken was to qualify detected bis(2-ethylhexyl)phthalate in samples with a concentration less than 10 X the method blank as undetected with a U code as the concentration reported is not significantly different from lab background. Bis(2-ethylhexyl)phthalate in FOGW-AOC7B-W-GP1 was qualified as undetected. The case narrative was supported by the QC results. All qualifiers added by TestAmerica were appropriate.

D7H170199

Samples collected and shipped for DRO analysis were not aliquoted according to Wisconsin method requirements. Action taken was to qualify all DRO results as estimated with a J code from this method non-compliance. The case narrative was supported by the QC results. All qualifiers added by TestAmerica were appropriate.

D7H220190

Samples collected and shipped for DRO analysis were not aliquoted according to Wisconsin method requirements. Action taken was to qualify all DRO results as estimated with a J code from this method non-compliance. The case narrative was supported by the QC results. All qualifiers added by TestAmerica were appropriate.

D7H110169

The soil lab method blank contained detectable nitrocellulose at 1.1 mg/kg. Action taken was to qualify detected nitrocellulose in samples with a concentration less than 5 X the method blank as undetected with a U code as the concentration reported is not significantly different from lab background. Nitrocellulose in FOGW-AOC1S-SED-SED2(0-4") was qualified as undetected. The case narrative was supported by the QC results. All qualifiers added by TestAmerica were appropriate.

D7H290237

Aromatic volatiles in FOGW-AOC7D-W-GP1were qualified as estimated with a J code as the sample was not received and analyzed at pH < 2 and the sample was analyzed after 7 days. Samples collected and shipped for DRO analysis were not aliquoted according to Wisconsin method requirements. Action taken was to qualify all DRO results as estimated with a J code from this method non-compliance. Re-analysis of DRO samples FGOW-AOC7D-W-GP1 and FGOW-AOC7D-W-GP2 due to non-compliant LCS/LCSD was accomplished outside the holding time and were qualified appropriately by TestAmerica as estimated. The case narrative was supported by the QC results. All qualifiers added by TestAmerica were appropriate.

CONCLUSION

Data as reported by TestAmerica was well supported by the attendant QC results and the case narratives were thorough and accurate. Additional qualification of data was only needed for lab blank contamination and holding time exceedances.

If you have any questions regarding the data validation process, please contact me at 920-469-9113.

Attachments:
Verified Data Sheets-hard copy

TECHNICAL MEMORANDUM

DATE: November 26, 2007

TO: Brenda Winkler, Project Manager
Bay West

FROM: Marcia A. Kuehl
Chemical QC Officer

SUBJECT: Data Validation for Former Gopher Ordnance Works, Rosemount, Minnesota
Sampling Event August, 2007
SDGs D7H300206 and D7H230183

1.0 OVERVIEW

Analytical results for a randomly selected 10 % of the data packages (D7H300206, D7H230183) collected from the Former Gopher Ordnance Works on August 21 and 29, 2007 have been evaluated using the EPA guidance documents "National Functional Guidelines for Organic Data Review", dated October 1999, EPA-540/R-99/008, "National Functional Guidelines for Inorganic Data Review", dated October, 2004, EPA-540/R-04-004 and the Department of Defense Quality Systems Manual for Environmental Laboratories, Version 3, January 2006. The requirements detailed in "Final Sampling and Analysis Plan Focused Site Inspection, Former Gopher Ordnance Works, Rosemount, Minnesota, dated July 2007" were also used in the validation.

The review was based on the Level IV full CLP data packages supplied by the analytical laboratories, Test America, located in Denver, Colorado and Sacramento, California. The validation qualifiers assigned to the data are described below. A hard copy of the validated data is also attached to this memorandum.

Data Qualification Summary

Volatile Organics
All volatile organic data was usable as reported, or usable and estimated or undetected. Detected 2-butanone in FGOW-AOC7C-SS-GP3(0-6"), FGOW-AOC7C-S-GP4(2-4') and FGOW-AOC7C-S-GP5(2-4') and detected methylene chloride in FGOW-AOC7D-S-GP3(6-8'), FGOW-AOC7D-SS-GP8(0-6"), FGOW-AOC7D-S-GP8(2-4') and FGOW-AOC7D-SS-GP11(0-6") was qualified as undetected as the concentration is not significantly different from lab background.

Semivolatile Organics
All semivolatile organic data was usable as reported without qualification, or usable and qualified as estimated. Benzidine qualified by TestAmerica with a Q qualifier was further qualified as estimated with a J code from a low calibration bias.

Explosives
All explosives data was usable as reported without qualification. No detectable explosives were present in any of the project samples.

PCBs
All PCB data was usable as reported without qualification. All detectable PCBs were based on at least a four peak match with the standard and confirmed on a second column.

Metals
All metals data were usable as reported without qualification.

Nitrocellulose
Detected nitrocellulose in FGOW-AOC7C-SS-GP4(0-6"), FGOW-AOC7C-SS-GP2(0-6") and FGOW-AOC7C-SS-GP6(0-6") was undetected as the concentration reported is not significantly (> 5X) lab background.

2.0 VOLATILE ORGANICS

Test America utilized EPA SW846 Methods 5030B, 5035 and 8260B. No deviations from these reference methods were apparent from the data reviewed. No action was needed to qualify validated sample data.

2.1 Completeness Assessment

The data packages received for volatile organic analysis was complete, and all samples collected were analyzed.

2.2 Compliance Assessment

2.2.1 Holding Times/Preservation

All validated samples and dilutions were originally analyzed within the 14 day holding time, and were received at 4 ± 2 EC. Verification of sample pH upon analysis indicated that all aqueous samples were adequately preserved to pH < 2. No action was needed to qualify validated sample data.

2.2.2 Initial Calibration/Tuning

A six point initial calibration with concentrations ranging from 5- 200 ug/L associated with the samples were analyzed in accordance with method 8260B on 7/4/07 and 9/2/07. Tuning using bromofluorobenzene (BFB) was done at the start of the analysis and every 12 hours. All tuning criteria in the method and data validation protocols were met.

Method System Performance Check Compounds (chloromethane, 1,1-dichloroethane, bromoform, 1,1,2,2-tetrachloroethane, chlorobenzene) met the EPA method data validation criteria of mean RRF > 0.30 for 1,1,2,2-tetrachloroethane and chlorobenzene and > 0.10 for chloromethane, 1,1-dichloroethane, and bromoform. The minimum Relative Response Factor (RRF) of > 0.05 used by EPA Region V for data validation as proof of acceptable system response was met for all reported

volatile organic compounds. All Calibration Check Compounds (vinyl chloride, 1,1-dichloroethene, chloroform, 1,2-dichloropropane, toluene) and System Performance Check Compounds (chloromethane, 1,1-dichloroethane, bromoform, 1,1,2,2-tetrachloroethane, chlorobenzene) met the method data validation criteria of < 30 % Relative Standard Deviation (RSD). The mean RSD for all reported volatile organic compounds met the method criteria of < 15 % RSD. No action was needed to qualify sample data.

Naphthalene was qualified with an E qualifier to indicate a calibration exceedance in FGOW-AOC7D-S-GP3(2-4'). The diluted (1.23X) naphthalene result should be considered the most valid for the sample.

2.2.3 Continuing Calibration

A 0 ug/L continuing calibration standard (CCAL) was analyzed according to method 8260B every 12 hours. Method System Performance Check Compounds RRF_{10} values (chloromethane, 1,1-dichloroethane, bromoform, 1,1,2,2-tetrachloroethane, chlorobenzene) met the EPA method data validation criteria of > 0.30 for 1,1,2,2-tetrachloroethane and chlorobenzene and > 0.10 for chloromethane, 1,1-dichloroethane, and bromoform. The minimum Response Factor (RF5) of > 0.05 used by EPA Region V for data validation as proof of acceptable system response was met for all reported volatile organic compounds. All Calibration Check Compounds RRF_{10} values (vinyl chloride, 1,1-dichloroethene, chloroform, 1,2-dichloropropane, toluene) and System Performance Check Compounds (chloromethane, 1,1-dichloroethane, bromoform, 1,1,2,2-tetrachloroethane, chlorobenzene) met the EPA Region V data validation criteria of < 30 % difference and method 8260B limits of < 20 % difference. No action was needed to qualify sample data.

2.2.4 Laboratory Blanks

Detectable 2-butanone was present above the Method Detection Limit but below the Reporting Limit in the lab blanks analyzed with soil samples in D7H230183 at 9.1 and 9.2 ug/kg. Action taken was to qualify detected 2-butanone in samples at concentrations less than 5 X the associated lab blank as undetected with a U code as the concentration reported is not significantly different from lab background (FGOW-AOC7C-SS-GP3(0-6"), FGOW-AOC7C-S-GP4(2-4'), FGOW-AOC7C-S-GP5(2-4')).

Detectable methylene chloride was present above the Method Detection Limit but below the Reporting Limit in the lab blanks analyzed with soil samples in D7H300206 at 0.98 ug/kg. Action taken was to qualify detected methylene chloride in samples at concentrations less than 5 X the associated lab blank as undetected with a U code as the concentration reported is not significantly different from lab background (FGOW-AOC7D-S-GP3(6-8'), FGOW-AOC7D-SS-GP8(0-6"), FGOW-AOC7D-S-GP8(2-4'), FGOW-AOC7D-SS-GP11(0-6")).

2.2.5 Surrogate Recoveries

Surrogate recoveries in the samples were not within the TestAmerica limits, data validation and method 8260B limits. Sample FGOW-AOC7D-S-GP3(2-4') was extracted and analyzed on 9/11/07 and again on 9/12/07 at a dilution due to a high level of naphthalene. Low surrogate recoveries for all three surrogates were present in the re-extracted sample and TestAmerica qualified all the sample data with a J qualifier. As no surrogate recoveries were extremely low, no further action was taken to qualify sample data.

Low bromofluorobenzene and high d_8-toluene recovery was measured in FGOW-AOC7C-SS-GP4(0-6") and TestAmerica qualified all sample data as estimated with a J code. This sample was re-analyzed with similar out of limit surrogate recoveries and was also qualified by TestAmerica as estimated with a J code. No further action was needed to qualify sample data as a matrix effect was proven by the re-analysis.

2.2.6 Matrix Spike/Matrix Spike Duplicate

As non-project samples were used for the MS/MSD analyses, no action was taken to qualify project sample data due to outlier recoveries and RPD values, as the sample source and matrix is not equivalent.

2.2.7 Laboratory Control Standard (LCS)

An LCS and LCS Duplicate (LCSD) was prepared and analyzed at the required method 8260B frequency. All recoveries were within TestAmerica, data validation and method limits, except for acetone 173 %) in the method blank analyzed with the re-analysis of sample FGOW-AOC7D-S-GP3(2-4'). TestAmerica qualified the undetected acetone in the sample with a Q code to indicate the out of limit LCS recovery. No further action was needed, as no acetone was present in the sample and no high bias was possible.

2.2.8 Internal Standards

All internal standards retention times were within $\pm$ 30 seconds of the last calibration standard. All internal standard areas were within the -50 % to +100 % method and validation limits, except for 1,4-dichlorobenzene-d_4 in FGOW-AOC7C-SS-GP4(0-6"). Low area count just under the limit was measured and verified by re-analysis. A matrix effect was therefore proven and data from both analyses was qualified by TestAmerica as estimated with a J code and with a Q code to indicate the failed internal standard recovery. No further action was needed to qualify sample data.

2.3 Field QC Results

The trip blank collected on 8/22/07 (FGOW-W-TB(8/22/07) with the project samples contained detectable acetone at 3.1 ug/L and chloroform at 0.43 ug/L. No action was needed to qualify detected acetone and chloroform in project soil samples, as taking into account water vs. soil density, all reported detected acetone and chloroform was significantly different (> 5X) the trip blank concentration.

Any blind field duplicates in the two data packages were not evaluated for precision as their identities were not known to the validator.

2.4 Data Usability

All volatile organic data was usable as reported, or usable and estimated or undetected. Detected 2-butanone in FGOW-AOC7C-SS-GP3(0-6"), FGOW-AOC7C-S-GP4(2-4') and FGOW-AOC7C-S-GP5(2-4') and detected methylene chloride in FGOW-AOC7D-S-GP3(6-8'), FGOW-AOC7D-SS-GP8(0-6"), FGOW-AOC7D-S-GP8(2-4') and FGOW-AOC7D-SS-GP11(0-6") was qualified as undetected as the concentration is not significantly different from lab background.

No false negatives or false positives were noted during review of the raw data. Major and molecular ions were present and the relative intensities agreed reasonably with the reference spectrum for the reported detected volatile organic compounds.

3.0 SEMIVOLATILE ORGANICS DATA

TestAmerica Laboratories utilized EPA methods 3520C, 3550B and 8270C for semivolatile analysis in water. No deviations from these reference methods were apparent from the data reviewed. No action was needed to qualify sample data.

3.1 Completeness Assessment

The data packages received for semivolatile organic analysis were complete.

3.2 Compliance Assessment

3.2.1 Holding Times/Preservation

All water samples were extracted within 7 days of collection and analyzed within 40 days after extraction. All soil samples were extracted within 14 days of collection and analyzed within 40 days after extraction. Validated samples were received at TestAmerica within the acceptable temperature range of 2-6EC. No action was needed to qualify sample data.

3.2.2 Initial Calibration and Tuning

Decafluorotriphenylphosphine (DFTPP) tuning and calibration data was included in the data package. Tuning was done at the start of the analysis and every 12 hours. All DFTPP tuning criteria in method 8270 were met the day the initial calibration was analyzed and on the day the samples were analyzed. No action was needed to qualify sample data.
The minimum Relative Response Factor (RRF) criteria in method 8270 and the EPA Region V data validation guidelines (>0.05) was met for all reported semivolatile organic compounds in the initial calibration. An eight point calibration curve ranging from 4-200 ug/mL was analyzed on 9/2/07 and a seven point calibration curve ranging from 10-200 ug/mL was analyzed on 8/30/07. The allowable method 15 % rsd or curve correlation coefficient $\geq$ 0.990 criteria and minimum RRF criteria for initial calibration were met for all reported compounds. No action was needed to qualify sample data.

Low benzidine recovery in the initial calibration verification (ICV) solution was measured at 69 % (limit 75 %). Associated samples were qualified by TestAmerica with a Q qualifier and further qualified as estimated with a J code from this low calibration bias.

3.2.3 Continuing Calibration

A 80 ug/L continuing calibration standard was analyzed with the validated samples every 12 hours according to the method. The minimum Relative Response Factor (RRF) of > 0.05 used by EPA Region V for data validation as proof of acceptable system response was met for all compounds. The percent difference (% D) between the initial calibration average RRF and the continuing calibration RRF was within the 20 percent criteria in the method and the Region V data validation criteria of percent difference < 25 % for all reported compounds. No action was needed to qualify sample data.

3.2.4 Laboratory Blanks

Method blanks were prepared and analyzed at the required method frequency. No detectable semivolatile organics were present in the lab blanks analyzed with the project samples. No action was needed to qualify sample data.

3.2.5 Surrogate Recoveries

Surrogate recoveries were within the method limits in all of the project samples. No action was needed to qualify sample data.

3.2.6 Matrix Spike/Matrix Spike Duplicate

Recoveries and RPD values in one project sample used for MS/MSD analysis (FGOW-AOC7D-SS-GP3(0-6") were all within method limits except for several compounds due to a very high native concentration that overwhelmed the spike level. No action was needed to qualify sample data.

3.2.7 Internal Standards

All internal standard areas were within the -50 % to +100 % method and validation limits. All internal standards retention times were within ± 20 seconds of the last calibration standard. No action was needed to qualify sample data.

3.3 Field QC Results

No field blanks were identified as being collected with the samples. No action was taken to qualify sample data.

Any blind field duplicates in the two data packages were not evaluated for precision as their identities were not known to the validator.

3.4 Data Usability

All semivolatile organic data was usable as reported without qualification, or usable and qualified as estimated. Benzidine qualified by TestAmerica with a Q qualifier was further qualified as estimated with a J code from a low calibration bias.

Benzo(b)fluoranthene and benzo(k)fluoranthene could not be resolved in samples FGOW-AOC7D-SS-GP3(0-6"), FGOW-AOC7D-S-GP3(2-4'), FGOW-AOC7D-S-GP3(6-8'), FGOW-AOC7D-SS-GP11(0-6") and FGOW-AOC7C-S-GP3(2-4'). TestAmerica qualified the sample results with a K qualifier to indicate that the reported benzo(b)fluoranthene may consist of both benzo(b)fluoranthene and benzo(k)fluoranthene. No further action was taken to qualify sample data.

No false negatives or false positives were noted during review of the raw data. Major and molecular ions were present and the relative intensities agreed reasonably with the reference spectrum for the reported detected compounds.

4.0 EXPLOSIVES DATA

TestAmerica utilized EPA methods 3535 and 8330. No deviations from these reference methods were apparent from the data reviewed. No action was needed to qualify sample data.

4.1 Completeness Assessment

The data package received for explosives was complete.

4.2 Compliance Assessment

4.2.1 Holding Times/Preservation

All soil samples were extracted within 14 days of collection and analyzed within 40 days after extraction. Validated samples were received at TestAmerica within the acceptable temperature range of 2-6EC. No action was needed to qualify sample data.

4.2.2 Initial Calibration

An eight point calibration curve ranging from 0.01-25 applicable to the samples was analyzed on 8/20/07. The method allowable 15 % relative standard deviation (rsd) criteria for initial calibration was met for all reported explosives. No action was needed to qualify sample data.

4.2.3 Continuing Calibration

A midlevel continuing calibration standard was analyzed according to the method every 12 hours. All reported explosives met the method criteria of percent difference < 15 % . No action was needed to qualify sample data.

4.2.4 Laboratory Blanks

Method blanks were prepared and analyzed at the required method frequency. No detectable target explosives were present in the lab blank analyzed with the project samples. No action was needed to qualify sample data.

4.2.5 Surrogate Recoveries

Surrogate recoveries of 1,2-dinitrobenzene in all samples were within TestAmerica's statistically determined method limits. No action was needed to qualify sample data.

4.2.6 Matrix Spike/Matrix Spike Duplicate

Recoveries and RPD values in the project sample used for MS/MSD analysis were all within testAmerica's statistically determined method limits. No action was needed to qualify sample data.

4.2.8 Laboratory Control Standard (LCS)

Recoveries of target explosives in the LCS sample extracted and analyzed with the project samples were all within TestAmerica's limits. No action was needed to qualify sample data.

4.3 Field QC Results

No field blanks were identified as being collected with the samples. No action was taken to qualify sample data.

Any blind field duplicates in the two data packages were not evaluated for precision as their identities were not known to the validator.

4.4 Data Usability

All explosives data was usable as reported without qualification. No detectable explosives were present in any of the project samples.

5.0 PCB DATA

TestAmerica utilized EPA method 8082 for PCB analysis. No deviations from this reference method were apparent from the data reviewed. No action was needed to qualify sample data.

5.1 Completeness Assessment

The data package received for PCBs was complete.

5.2 Compliance Assessment

5.2.1 Holding Times/Preservation

All validated samples were extracted within 7 days of collection and analyzed within 40 days after extraction. Validated samples were received at TestAmerica within the acceptable temperature range of 2-6EC. No action was needed to qualify sample data.

5.2. Initial Calibration

A six point calibration curve applicable to the samples ranging from 50-1000 was analyzed on 7/30/07. The Region V allowable 30 % relative standard deviation (rsd) criteria for initial calibration was met for all PCBs. The allowable method 20 % rsd or curve correlation coefficient $\geq$ 0.990 criteria were met for all reported compounds. No action was needed to qualify sample data.

5.2.3 Continuing Calibration

A midlevel continuing calibration standard was analyzed according to the method every 12 hours. All PCBs met the EPA Region V and National Functional Guidelines data validation criteria of percent difference < 25 % . The method criteria of < 15 % difference was met for all PCBs. No action was needed to qualify sample data.

5.2.4 Laboratory Blanks

Method blanks were prepared and analyzed at the required method frequency. No detectable target PCBs were present in the lab blank analyzed with the project samples. No action was needed to

qualify sample data.

5.2.5 Surrogate Recoveries

Decachlorobiphenyl recoveries in all samples were within the TestAmerica statistically determined method limits. No action was needed to qualify sample data.

5.2.6 Matrix Spike/Matrix Spike Duplicate

Recoveries and RPD values in the project sample used for MS/MSD analysis were all within method limits and TestAmerica's limits. No action was needed to qualify sample data.

5.2.7 Laboratory Control Standard (LCS)

Recovery of Aroclor 1016 and 1260 in the LCS sample was within the TestAmerica limit. No action was needed to qualify sample data.

5.3 Field QC Results

No field blanks were identified as being collected with the samples. No action was taken to qualify sample data.

Any blind field duplicates in the two data packages were not evaluated for precision as their identities were not known to the validator.

5.4 Data Usability

All PCB data was usable as reported without qualification. All detectable PCBs were based on at least a four peak match with the standard and confirmed on a second column.

6.0 METALS

TestAmerica utilized EPA SW846 method 3010A, 3050B, 6010B, 7470A and 7471A. No significant deviations from these reference methods that affected data quality were evident from the documentation supplied. No action was taken to qualify sample data.

6.1 Completeness Assessment

The data packages received for metals were complete.

6.2 Compliance Assessment

6.2.1 Holding Time/Preservation

All samples were analyzed within the 6 month holding time for metals (28 days for mercury) and preservation pH was all acceptable at pH < 2.0. No action was needed to qualify sample data.

6.2.2 Calibration and Interference Check

All method calibration and interference check criteria were met. No exceptions to the method requirements for initial, continuing calibration frequency and stability and method of standard additions calibration coefficient requirements were noted for the project samples. Any exceptions to recovery limits for calibration standards resulted in the affected samples being reanalyzed with a compliant calibration. No action was needed to qualify sample data.

Trace levels of cadmium was present in the Interference Check Standard A and noted by the manufacturer as an impurity. As no sample matrix interference was the cause, no action was needed to qualify sample data.

6.2.3 Laboratory Blanks

The preparation blanks (PB), initial calibration blanks (ICB) and continuing calibration blanks (CCB) associated with the project samples did not contain and detctable metals above the method detection limit. No action was needed to qualify sample data.

6.2.4 Matrix Spike (MS) Sample Recovery and RPD

All recoveries and RPD values in project samples used for MS/MSD analysis were within TestAmerica and data validation limits. No action was needed to qualify sample data.

6.3 Field QC Results

No field blanks were identified as being collected with the samples. No action was taken to qualify sample data.

Any blind field duplicates in the two data packages were not evaluated for precision as their identities were not known to the validator.

6.4 Data Usability

All metals data were usable as reported without qualification.

7.0 NITROCELLULOSE DATA

TestAmerica utilized EPA method 353.2 for nitrocellulose analysis. No deviations from this reference method were apparent from the data reviewed. No action was needed to qualify sample data.

7.1 Completeness Assessment

The data package received for nitrocellulose was complete.

7.2 Compliance Assessment

7.2.1 Holding Times/Preservation

All validated samples were analyzed within 28 days of collection. Validated samples were received at

TestAmerica within the acceptable temperature range of 2-6EC. No action was needed to qualify sample data.

7.2. Initial Calibration

A six point calibration curve applicable to the samples ranging from 0.05-2 mg/L was analyzed with the project samples and the correlation coefficient was acceptable. No action was needed to qualify sample data.

7.2.3 Continuing Calibration

A midlevel continuing calibration standard at 1 mg/L was analyzed according to the method every 10 samples. All recoveries were within 90-110 %. No action was needed to qualify sample data.

7.2.4 Laboratory Blanks

Method blanks were prepared and analyzed at the required method frequency. Detectable nitrocellulose at 1.1 mg/kg was present in the soil blank analyzed with FGOW-AOC7C-SS-GP4(0-6"), FGOW-AOC7C-SS-GP2(0-6") and FGOW-AOC7C-SS-GP6(0-6"). Action taken was to qualify detected nitrocellulose in FGOW-AOC7C-SS-GP4(0-6"), FGOW-AOC7C-SS-GP2(0-6") and FGOW-AOC7C-SS-GP6(0-6") as undetected with a U code as the concentration reported is not significantly (> 5X) lab background.

7.2.5 Matrix Spike/Matrix Spike Duplicate

Recoveries and RPD values in the project sample used for MS/MSD analysis were all within method limits and TestAmerica's limits. No action was needed to qualify sample data.

7.2.6 Laboratory Control Standard (LCS)

Recovery of nitrate in the LCS sample was within the TestAmerica limit. No action was needed to qualify sample data.

7.3 Field QC Results

No field blanks were identified as being collected with the samples. No action was taken to qualify sample data.

Any blind field duplicates in the two data packages were not evaluated for precision as their identities were not known to the validator.

7.4 Data Usability

Detected nitrocellulose in FGOW-AOC7C-SS-GP4(0-6"), FGOW-AOC7C-SS-GP2(0-6") and FGOW-AOC7C-SS-GP6(0-6") was undetected as the concentration reported is not significantly (> 5X) lab background.

If you have any questions regarding the data validation process, please contact me at 920-469-9113.

Attachments:
Validated Data Sheets-hard copy

TECHNICAL MEMORANDUM

DATE: April 24, 2008

TO: Brenda Winkler, Project Manager
Bay West

FROM: Peter Jacobs

SUBJECT: Data Verification for Former Gopher Ordnance Works, Rosemount, Minnesota
Field Duplicate Precision Calculations
Bay West Project Number J060361

As a supplement to the data verification and data validation memoranda by Marcia Kuehl, Project Chemical QC Officer, dated November 26, 2007, this memorandum presents the relative percent difference (RPD) calculations for blind field duplicates and associated data qualification.

Data Qualification Rationale

Measurement Quality Objectives for field duplicate RPDs were not specified in the QAPP, so general values of 50% for soils and 25% for waters were used based on the MPCA Laboratory Data Checklist. Generally, high RPDs were not qualified for estimated values that were below the reporting limits (RLs) - exceptions were made in cases where one value was greater than the RL, one was less than the RL, and the difference was large (i.e. if the RL was substituted for the lower value and it would still result in a high RPD). Due to the large overall number of acceptable RPD results for various parameters, RPD results that were outside criteria were considered to be sample-specific and only used to qualify the parent samples, not other samples in the group.

Attached are RPD calculation tables for each Area of Concern (AOC) from which field duplicates were obtained. The attached RPD tables also include results for analytes that were undetected in both the sample and duplicate, because these results qualitatively demonstrate precision although the RPDs could not be calculated.

Based on these tables and the rationale described above, the following results were qualified as estimated:

Analyte	Samples Qualified		Flag
bis(2-Ethylhexyl) phthalate	FGOW-AOC1N-W-GP1	FGOW-AOC1N-W-GP2	J
Arsenic	FGOW-AOC4-SS-GP2(0-6INCHES)	FGOW-AOC4-SS-GP3(0-6INCHES)	J
Diesel Range Organics	FGOW-AOC5-SS-GP6(0-6INCHES)	FGOW-AOC5-SS-GP13(0-6INCHES)	J
Anthracene	FGOW-AOC6-SS-TP1(0-.5FT)	FGOW-AOC6-S-TP7(6FT)	J
Benzo(a)anthracene	FGOW-AOC6-SS-TP1(0-.5FT)	FGOW-AOC6-S-TP7(6FT)	J
Benzo(a)pyrene	FGOW-AOC6-SS-TP1(0-.5FT)	FGOW-AOC6-S-TP7(6FT)	J
Benzo(b)fluoranthene	FGOW-AOC6-SS-TP1(0-.5FT)	FGOW-AOC6-S-TP7(6FT)	J
Benzo(ghi)perylene	FGOW-AOC6-SS-TP1(0-.5FT)	FGOW-AOC6-S-TP7(6FT)	J
Chrysene	FGOW-AOC6-SS-TP1(0-.5FT)	FGOW-AOC6-S-TP7(6FT)	J
Fluoranthene	FGOW-AOC6-SS-TP1(0-.5FT)	FGOW-AOC6-S-TP7(6FT)	J
Indeno(1,2,3-cd)pyrene	FGOW-AOC6-SS-TP1(0-.5FT)	FGOW-AOC6-S-TP7(6FT)	J
Phenanthrene	FGOW-AOC6-SS-TP1(0-.5FT)	FGOW-AOC6-S-TP7(6FT)	J
Pyrene	FGOW-AOC6-SS-TP1(0-.5FT)	FGOW-AOC6-S-TP7(6FT)	J
Mercury	FGOW-AOC7D-S-GP9(2-4FT)	FGOW-AOC7D-S-GP11(2-4FT)	J
Fluoranthene	FGOW-AOC7D-SS-GP8(0-6INCHES)	FGOW-AOC7D-SS-GP11(0-6INCHES)	J
Phenanthrene	FGOW-AOC7D-SS-GP8(0-6INCHES)	FGOW-AOC7D-SS-GP11(0-6INCHES)	J
Pyrene	FGOW-AOC7D-SS-GP8(0-6INCHES)	FGOW-AOC7D-SS-GP11(0-6INCHES)	J

The J-flags have been added to the data summary tables prepared for the Remedial Investigation Report.

\ttachments:
RPD calculation tables

NOTES FOR FIELD RPD TABLES

Data Flags - Laboratory

U - undetected at the limit of detection
J - estimated
B - blank contamination above the method detection limit
Q - One or more quality control criteria failed
E - estimated because value is above linear calibration range
K - the reported benzo(b)fluoranthene may consist of both benzo(b)fluoranthene and benzo(k)fluoranthene

In some cases multiple flags of the same type (e.g. J Q J) indicate the value was qualified as estimate for two different reasons (e.g. below RL and a QC issue such as low LCS recovery).
Electronic Data Deliverable (EDD) upon which these tables are based did not contain flags for non-detect results (e.g. UJ) - refer to laboratory report for details on qualification of non-detect results.

DUPLICATE RPDs
Field duplicate RPDs were not specified in the QAPP, so general values of 50% for soils and 25% for waters were used based on the MPCA Laboratory Data Checklist.

Generally high RPDs were not qualified for values that were below the reporting limits - exceptions were made in cases where one value was < RL and one was >RL and the difference was large (i.e. if the RL was substituted for the lower value and it still resulted in a high RPD).
Due to the large number of acceptable RPD results for varoius parameters, RPD results that were outside criteria were only used to qualify the parent samples, not other samples in the group.

Reviewer notes in Qualification Columns:
J - flag analyte in both parent samples as J estimated in sample results table
OK - RPD high but value(s) used are estimated because they are <RL
NA - RPD could not be calculated because one or more results was ND or not reported.

Field Duplicate RPD Calculation Table - Former Gopher Ordnance Works
Background Samples

Field Sample ID:		FGOW-BG-SS-GP13(0-6INCHES)		FGOW-BG-SS-GP15(0-6INCHES)				FGOW-BG-SS-GP14(0-6INCHES)		FGOW-BG-SS-GP16(0-6INCHES)			
Lab Sample ID:		D7I290189012		D7I290189014		RPD	Qualification	D7I290189013		D7I290189015		RPD	Qualification
Sample Matrix:		SOLID		SOLID				SOLID		SOLID			
Analyte:	Unit												
Metals													
Arsenic	mg/kg	5.5		5.9		7%		2.8	J	3.2		13%	
Barium	mg/kg	93		99		6%		79		80		1%	
Cadmium	mg/kg	<0.58		<0.63		NA		<0.60		<0.59		NA	
Chromium	mg/kg	17		17		0%		15		12		22%	
Lead	mg/kg	12		11		9%		6.6	J	6.7	J	49%	
Mercury	mg/kg	0.017	J	0.023	J	30%		<0.040		<0.039		NA	
Selenium	mg/kg	<3.5		<3.8		NA		<3.6		<3.5		NA	
Silver	mg/kg	<1.8		<1.9		NA		<1.8		<1.8		NA	
Percent Moisture	%	14		20		35%		17		15		29%	

Field Duplicate RPD Calculation Table - Former Gopher Ordnance Works
Area AOC1 Solid Samples

Field Sample ID:		FGOW-AOC1N-SS-SS1(0-6INCHES)		FGOW-AOC1N-SS-SS2(0-6INCHES)				FGOW-AOC1M-SS-SS1(0-6INCHES)		FGOW-AOC1M-SS-SS3(0-6INCHES)				FGOW-AOC1S-SS-GP1(0-6INCHES)		FGOW-AOC1S-SS-GP3(0-6INCHES)			
Lab Sample ID:		D7I290189001		D7I290189002		RPD	Qualification	D7I290189003		D7I290189005		RPD	Qualification	D7I290189009		D7I290189011		RPD	Qualification
Sample Matrix:		SOLID		SOLID				SOLID		SOLID				SOLID		SOLID			
Analyte:	Units																		
Explosives																			
2,4-Dinitrotoluene	mg/kg	0.55		0.4		32%		<0.25		<0.25		NA		<0.25		<0.25		NA	
2,6-Dinitrotoluene	mg/kg	0.12	J J	<0.25		NA		<0.25		<0.25		NA		<0.25		<0.25		NA	
						NA						NA							
Metals						NA						NA							
Arsenic	mg/kg	3.7		2.7	J	31%		3.8		4.5		17%		6.5		9		32%	
Barium	mg/kg	58		50		15%		81		89		9%		230		260		12%	
Cadmium	mg/kg	0.14	J	0.11	J	24%		<0.60		<0.62		NA		0.18	J	0.11	J	48%	
Chromium	mg/kg	19		19		0%		13		13		0%		23		27		16%	
Lead	mg/kg	78		67		15%		6.9	J	7.6	J	10%		18		21		15%	
Mercury	mg/kg	11	J	4.2		89%	OK	0.025	J	0.021	J	17%		0.23		0.38		49%	
Selenium	mg/kg	<4.2		<3.7		NA		<3.6		<3.8		NA		<4.7		<6.0		NA	
Silver	mg/kg	<2.1		<1.8		NA		<1.8		<1.9		NA		<2.4		<3.0		NA	
SVOCs																			
1,2,4-Trichlorobenzene	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
1,2-Dichlorobenzene	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
1,2-Diphenylhydrazine	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
1,3-Dichlorobenzene	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
1,4-Dichlorobenzene	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
2,4,5-Trichlorophenol	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
2,4,6-Trichlorophenol	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
2,4-Dichlorophenol	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
2,4-Dimethylphenol	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
2,4-Dinitrophenol	ug/kg	<2700000		<2200000		NA		<1900		<2000		NA		<2500		<3200		NA	
2,4-Dinitrotoluene	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
2,6-Dichlorophenol	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
2,6-Dinitrotoluene	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
2-Chloronaphthalene	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
2-Chlorophenol	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
2-Methylnaphthalene	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
2-Methylphenol	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
2-Nitroaniline	ug/kg	<2700000		<2200000		NA		<1900		<2000		NA		<2500		<3200		NA	
2-Nitrophenol	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
3,3-Dichlorobenzidine	ug/kg	<2700000		<2200000		NA		<1900		<2000		NA		<2500		<3200		NA	
3-Methylphenol & 4-Methylphenol	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
3-Nitroaniline	ug/kg	<2700000		<2200000		NA		<1900		<2000		NA		<2500		<3200		NA	
4,6-Dinitro-2-methylphenol	ug/kg	<2700000		<2200000		NA		<1900		<2000		NA		<2500		<3200		NA	
4-Bromophenyl phenyl ether	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
4-Chloro-3-methylphenol	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
4-Chloroaniline	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
4-Chlorophenyl phenyl ether	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
4-Nitroaniline	ug/kg	<2700000		<2200000		NA		<1900		<2000		NA		<2500		<3200		NA	
4-Nitrophenol	ug/kg	<2700000		<2200000		NA		<1900		<2000		NA		<2500		<3200		NA	
Acenaphthene	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
Acenaphthylene	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
Anthracene	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
Benzidine	ug/kg	<6600000		<5500000		NA		<4800		<5000		NA		<6300		<8000		NA	
Benzo(a)anthracene	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
Benzo(a)pyrene	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
Benzo(b)fluoranthene	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
Benzo(ghi)perylene	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
Benzo(k)fluoranthene	ug/kg	<550000		<460000		NA		<390		230	J J	NA		<520		<660		NA	
Benzoic acid	ug/kg	<2700000		<2200000		NA		420	J J	560	J J	29%		570	J J	730	J	25%	
Benzyl alcohol	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
bis(2-Chloroethoxy)methane	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
bis(2-Chloroethyl) ether	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
bis(2-Chloroisopropyl) ether	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
bis(2-Ethylhexyl) phthalate	ug/kg	<550000		<460000		NA		<390		85	J J	NA		110	J J	<660		NA	
Butyl benzyl phthalate	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
Carbazole	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
Chrysene	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
Di-n-butyl phthalate	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
Di-n-octyl phthalate	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
Dibenz(a,h)anthracene	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
Dibenzofuran	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
Diethyl phthalate	ug/kg	<1100000		<920000		NA		<790		<820		NA		<1000		<1300		NA	
Dimethyl phthalate	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
Fluoranthene	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
Fluorene	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
Hexachlorobenzene	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
Hexachlorobutadiene	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
Hexachloroethane	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
Indeno(1,2,3-cd)pyrene	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
Isophorone	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
N-Nitrosodi-n-propylamine	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
N-Nitrosodimethylamine	ug/kg	<860000		<720000		NA		<620		<650		NA		<820		<1000		NA	
N-Nitrosodiphenylamine	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
N-Nitrosopyrrolidine	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
Naphthalene	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
Nitrobenzene	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
Pentachlorophenol	ug/kg	<2700000		<2200000		NA		<1900		<2000		NA		<2500		<3200		NA	
Phenanthrene	ug/kg	<550000		<460000		NA		96	J J	100	J J	4%		120	J J	<660		NA	
Phenol	ug/kg	<550000		<460000		NA		<390		<410		NA		<520		<660		NA	
Pyrene	ug/kg	<660000		<550000		NA		<480		<500		NA		<630		<800		NA	
VOCs																			
1,1,1,2-Tetrachloroethane	ug/kg	<7.3		<7.1		NA		<6.3		<5.5		NA		<7.5		<9.6		NA	
1,1,1-Trichloroethane	ug/kg	<7.3		<7.1		NA		<6.3		<5.5		NA		<7.5		<9.6		NA	
1,1,2,2-Tetrachloroethane	ug/kg	<7.3		<7.1		NA		<6.3		<5.5		NA		<7.5		<9.6		NA	
1,1,2-Trichloroethane	ug/kg	<7.3		<7.1		NA		<6.3		<5.5		NA		<7.5		<9.6		NA	
1,1-Dichloroethane	ug/kg	<7.3		<7.1		NA		<6.3		<5.5		NA		<7.5		<9.6		NA	
1,1-Dichloroethene	ug/kg	<7.3		<7.1		NA		<6.3		<5.5		NA		<7.5		<9.6		NA	
1,1-Dichloropropene	ug/kg	<7.3		<7.1		NA		<6.3		<5.5		NA		<7.5		<9.6		NA	
1,2,3-Trichlorobenzene	ug/kg	3.2	J Q J	<7.1		NA		<6.3		<5.5		NA		<7.5		<9.6		NA	
1,2,3-Trichloropropane	ug/kg	<7.3		<7.1		NA		<6.3		<5.5		NA		<7.5		<9.6		NA	
1,2,4-Trichlorobenzene	ug/kg	2.4	J Q J	<7.1		NA		<6.3		<5.5		NA		<7.5		<9.6		NA	
1,2,4-Trimethylbenzene	ug/kg	1.1	J Q J	<7.1		NA		<6.3		<5.5		NA		<7.5		<9.6		NA	
1,2-Dibromo-3-chloropropane (DBCP)	ug/kg	<15		<14		NA		<13		<11		NA		<15		<19		NA	
1,2-Dibromoethane (EDB)	ug/kg	<7.3		<7.1		NA		<6.3		<5.5		NA		<7.5		<9.6		NA	
1,2-Dichlorobenzene	ug/kg	0.82	J Q J	<7.1		NA		<6.3		<5.5		NA		<7.5		<9.6		NA	
1,2-Dichloroethane	ug/kg	<7.3		<7.1		NA		<6.3		<5.5		NA		<7.5		<9.6		NA	
1,2-Dichloropropane	ug/kg	<7.3		<7.1		NA		<6.3		<5.5		NA		<7.5		<9.6		NA	
1,3,5-Trimethylbenzene	ug/kg	<7.3		<7.1		NA		<6.3		<5.5		NA		<7.5		<9.6		NA	
1,3-Dichlorobenzene	ug/kg	<7.3		<7.1		NA		<6.3		<5.5		NA		<7.5		<9.6		NA	
1,3-Dichloropropane	ug/kg	<7.3		<7.1		NA		<6.3		<5.5		NA		<7.5		<9.6		NA	
1,4-Dichlorobenzene	ug/kg	<7.3		<7.1		NA		<6.3		<5.5		NA		<7.5		<9.6		NA	
2,2-Dichloropropane	ug/kg	<7.3		<7.1		NA		<6.3		<5.5		NA		<7.5		<9.6		NA	
2-Butanone (MEK)	ug/kg	4.4	J Q J	<29		NA		<25		<22		NA		<30		<38		NA	
2-Chlorotoluene	ug/kg	<7.3		<7.1		NA		<6.3		<5.5		NA		<7.5		<9.6		NA	
2-Hexanone	ug/kg	<29		<29		NA		<25		<22		NA		<30		<38		NA	
4-Chlorotoluene	ug/kg	<7.3		<7.1		NA		<6.3		<5.5		NA		<7.5		<9.6		NA	
4-Methyl-2-pentanone	ug/kg	<29		<29		NA		<25		<22		NA		<30		<38		NA	
Acetone	ug/kg	9.1	J Q J	<29		NA		<25		<22		NA		<30		<38		NA	
Benzene	ug/kg	<7.3		<7.1		NA		<6.3		<5.5		NA		<7.5		<9.6		NA	
Bromobenzene	ug/kg	<7.3		<7.1		NA		<6.3		<5.5		NA		<7.5		<9.6		NA	
Bromochloromethane	ug/kg	<7.3		<7.1		NA		<6.3		<5.5		NA		<7.5		<9.6		NA	
Bromodichloromethane	ug/kg	<7.3		<7.1		NA		<6.3		<5.5		NA		<7.5		<9.6		NA	
Bromoform	ug/kg	<7.3		<7.1		NA		<6.3		<5.5		NA		<7.5		<9.6		NA	
Bromomethane	ug/kg	<15		<14		NA		<13		<11		NA		<15		<19		NA	
Carbon disulfide	ug/kg	<7.3		<7.1		NA		<6.3		<5.5		NA		<7.5		<9.6		NA	
Carbon tetrachloride	ug/kg	<7.3		<7.1		NA		<6.3		<5.5		NA		<7.5		<9.6		NA	
Chlorobenzene	ug/kg	<7.3		<7.1		NA		<6.3		<5.5		NA		<7.5		<9.6		NA	
Chloroethane	ug/kg	<15		<14		NA		<13		<11		NA		<15		<19		NA	
Chloroform	ug/kg	<15		<14		NA		<13		<11		NA		<15		<19		NA	
Chloromethane	ug/kg	<15		<14		NA		<13		<11		NA		<15		<19		NA	
cis-1,2-Dichloroethene	ug/kg	<3.7		<3.6		NA		<3.1		<2.8		NA		<3.8		<4.8		NA	
cis-1,3-Dichloropropene	ug/kg	<7.3		<7.1		NA		<6.3		<5.5		NA		<7.5		<9.6		NA	
Dibromochloromethane	ug/kg	<7.3		<7.1		NA		<6.3		<5.5		NA		<7.5		<9.6		NA	
Dibromomethane	ug/kg	<7.3		<7.1		NA		<6.3		<5.5		NA		<7.5		<9.6		NA	
Dichlorodifluoromethane	ug/kg	<15		<14		NA		<13		<11		NA		<15		<19		NA	
Ethylbenzene	ug/kg	<7.3		<7.1		NA		<6.3		<5.5		NA		<7.5		<9.6		NA	
Hexachlorobutadiene	ug/kg	<7.3		<7.1		NA		<6.3		<5.5		NA		<7.5		<9.6		NA	
Isopropylbenzene	ug/kg	<7.3		<7.1		NA		<6.3		<5.5		NA		<7.5		<9.6		NA	
m-Xylene & p-Xylene	ug/kg	<3.7		<3.6		NA		<3.1		<2.8		NA		<3.8		<4.8		NA	
Methyl tert-butyl ether	ug/kg	<29		<29		NA		<25		<22		NA		<30		<38		NA	
Methylene chloride	ug/kg	1.7	J B Q J	1.7	J B Q J	0%		1.4	J B J	1.1	J B J	24%		1.6	J B Q J	2.1	J B	27%	
n-Butylbenzene	ug/kg	<7.3		<7.1		NA		<6.3		<5.5		NA		<7.5		<9.6		NA	
n-Propylbenzene	ug/kg	<7.3		<7.1		NA		<6.3		<5.5		NA		<7.5		<9.6		NA	
Naphthalene	ug/kg	5.6	J Q J	2.3	J Q J	84%	OK	1.2	J J	0.8	J J	40%		<7.5		<9.6		NA	
o-Xylene	ug/kg	<3.7		<3.6		NA		<3.1		<2.8		NA		<3.8		<4.8		NA	
p-Isopropyltoluene	ug/kg	<7.3		<7.1		NA		<6.3		<5.5		NA		<7.5		<9.6		NA	
sec-Butylbenzene	ug/kg	<7.3		<7.1		NA		<6.3		<5.5		NA		<7.5		<9.6		NA	
Styrene	ug/kg	<7.3		<7.1		NA		<6.3		<5.5		NA		<7.5		<9.6		NA	
tert-Butylbenzene	ug/kg	<7.3		<7.1		NA		<6.3		<5.5		NA		<7.5		<9.6		NA	
Tetrachloroethene	ug/kg	<7.3		<7.1		NA		<6.3		<5.5		NA		<7.5		<9.6		NA	
Toluene	ug/kg	1	J Q J	<7.1		NA		<6.3		<5.5		NA		<7.5		<9.6		NA	
trans-1,2-Dichloroethene	ug/kg	<3.7		<3.6		NA		<3.1		<2.8		NA		<3.8		<4.8		NA	
trans-1,3-Dichloropropene	ug/kg	<7.3		<7.1		NA		<6.3		<5.5		NA		<7.5		<9.6		NA	
Trichloroethene	ug/kg	<7.3		<7.1		NA		<6.3		<5.5		NA		<7.5		<9.6		NA	
Trichlorofluoromethane	ug/kg	<15		<14		NA		<13		<11		NA		<15		<19		NA	
Vinyl chloride	ug/kg	<7.3		<7.1		NA		<6.3		<5.5		NA		<7.5		<9.6		NA	
						NA													
Other						NA													
Nitrocellulose	mg/kg	18000	J q	16000	J q	12%		6.3	J	5.2	B J u	19%		51	J	74	J	37%	
Percent Moisture		28		19		38%		16		20		22%		37		50		30%	

Field Duplicate RPD Calculation Table - Former Gopher Ordnance Works
Area AOC1 Water Samples

Field Sample ID:		FGOW-AOC1N-W-GP1		FGOW-AOC1N-W-GP2			
Lab Sample ID:		D7I200237004		D7I200237005		RPD	Qualification
Sample Matrix:		WATER		WATER			
Analyte:	Units						
Explosives							
2,4-Dinitrotoluene	ug/L	0.26	J	0.18	J	36%	OK
2,6-Dinitrotoluene	ug/L	<0.40		<0.40		NA	
						NA	
Metals						NA	
Arsenic	ug/L	<25		<25		NA	
Barium	ug/L	33		33		0%	
Cadmium	ug/L	<5.0		<5.0		NA	
Chromium	ug/L	2.6	J	<15		NA	
Lead	ug/L	<15		<15		NA	
Mercury	ug/L	<0.20		<0.20		NA	
Selenium	ug/L	<22		<22		NA	
Silver	ug/L	<15		<15		NA	
SVOCs							
1,2,4-Trichlorobenzene	ug/L	<10		<10		NA	
1,2-Dichlorobenzene	ug/L	<10		<10		NA	
1,2-Diphenylhydrazine	ug/L	<10		<10		NA	
1,3-Dichlorobenzene	ug/L	<10		<10		NA	
1,4-Dichlorobenzene	ug/L	<10		<10		NA	
2,4,5-Trichlorophenol	ug/L	<20		<20		NA	
2,4,6-Trichlorophenol	ug/L	<20		<20		NA	
2,4-Dichlorophenol	ug/L	<10		<10		NA	
2,4-Dimethylphenol	ug/L	<10		<10		NA	
2,4-Dinitrophenol	ug/L	<80		<80		NA	
2,4-Dinitrotoluene	ug/L	<20		<20		NA	
2,6-Dichlorophenol	ug/L	<10		<10		NA	
2,6-Dinitrotoluene	ug/L	<20		<20		NA	
2-Chloronaphthalene	ug/L	<10		<10		NA	
2-Chlorophenol	ug/L	<10		<10		NA	
2-Methylnaphthalene	ug/L	<10		<10		NA	
2-Methylphenol	ug/L	<10		<10		NA	
2-Nitroaniline	ug/L	<50		<50		NA	
2-Nitrophenol	ug/L	<20		<20		NA	
3,3-Dichlorobenzidine	ug/L	<50		<50		NA	
3-Methylphenol & 4-Methylphenol	ug/L	<20		<20		NA	
3-Nitroaniline	ug/L	<50		<50		NA	
4,6-Dinitro-2-methylphenol	ug/L	<80		<80		NA	
4-Bromophenyl phenyl ether	ug/L	<10		<10		NA	
4-Chloro-3-methylphenol	ug/L	<20		<20		NA	
4-Chloroaniline	ug/L	<25		<25		NA	
4-Chlorophenyl phenyl ether	ug/L	<10		<10		NA	
4-Nitroaniline	ug/L	<50		<50		NA	
4-Nitrophenol	ug/L	<50		<50		NA	
Acenaphthene	ug/L	<10		<10		NA	
Acenaphthylene	ug/L	<10		<10		NA	
Anthracene	ug/L	<10		<10		NA	
Benzidine	ug/L	<200		<200		NA	
Benzo(a)anthracene	ug/L	<10		<10		NA	
Benzo(a)pyrene	ug/L	<10		<10		NA	
Benzo(b)fluoranthene	ug/L	<10		<10		NA	
Benzo(ghi)perylene	ug/L	<10		<10		NA	
Benzo(k)fluoranthene	ug/L	<10		<10		NA	
Benzoic acid	ug/L	<80		<80		NA	
Benzyl alcohol	ug/L	<25		<25		NA	
bis(2-Chloroethoxy)methane	ug/L	<10		<10		NA	
bis(2-Chloroethyl) ether	ug/L	<20		<20		NA	
bis(2-Chloroisopropyl) ether	ug/L	<10		<10		NA	
bis(2-Ethylhexyl) phthalate	ug/L	**74**	J	11		148%	J
Butyl benzyl phthalate	ug/L	<20		<20		NA	
Carbazole	ug/L	<10		<10		NA	
Chrysene	ug/L	<10		<10		NA	
Di-n-butyl phthalate	ug/L	<20		<20		NA	
Di-n-octyl phthalate	ug/L	<20		<20		NA	
Dibenz(a,h)anthracene	ug/L	<10		<10		NA	
Dibenzofuran	ug/L	<10		<10		NA	
Diethyl phthalate	ug/L	<20		<20		NA	
Dimethyl phthalate	ug/L	<20		<20		NA	
Fluoranthene	ug/L	<20		<20		NA	
Fluorene	ug/L	<10		<10		NA	
Hexachlorobenzene	ug/L	<10		<10		NA	
Hexachlorobutadiene	ug/L	<30		<30		NA	
Hexachloroethane	ug/L	<10		<10		NA	
Indeno(1,2,3-cd)pyrene	ug/L	<10		<10		NA	
Isophorone	ug/L	<10		<10		NA	
N-Nitrosodi-n-propylamine	ug/L	<20		<20		NA	
N-Nitrosodimethylamine	ug/L	<10		<10		NA	
N-Nitrosodiphenylamine	ug/L	<10		<10		NA	
N-Nitrosopyrrolidine	ug/L	<10		<10		NA	
Naphthalene	ug/L	<10		<10		NA	
Nitrobenzene	ug/L	<20		<20		NA	
Pentachlorophenol	ug/L	<80		<80		NA	
Phenanthrene	ug/L	<10		<10		NA	
Phenol	ug/L	<10		<10		NA	

Field Sample ID:		FGOW-AOC1N-W-GP1		FGOW-AOC1N-W-GP2			
Lab Sample ID:		D7I200237004		D7I200237005		RPD	Qualification
Sample Matrix:		WATER		WATER			
Pyrene	ug/L	<10		<10		NA	
VOCs							
1,1,1,2-Tetrachloroethane	ug/L	<1.0		<1.0		NA	
1,1,1-Trichloroethane	ug/L	<1.0		<1.0		NA	
1,1,2,2-Tetrachloroethane	ug/L	<1.0		<1.0		NA	
1,1,2-Trichloroethane	ug/L	<1.0		<1.0		NA	
1,1-Dichloroethane	ug/L	<1.0		<1.0		NA	
1,1-Dichloroethene	ug/L	<1.0		<1.0		NA	
1,1-Dichloropropene	ug/L	<1.0		<1.0		NA	
1,2,3-Trichlorobenzene	ug/L	<1.0		0.42	J	NA	
1,2,3-Trichloropropane	ug/L	<2.0		<2.0		NA	
1,2,4-Trichlorobenzene	ug/L	<1.0		<1.0		NA	
1,2,4-Trimethylbenzene	ug/L	<1.0		<1.0		NA	
1,2-Dibromo-3-chloropropane (DBCP)	ug/L	<5.0		<5.0		NA	
1,2-Dibromoethane (EDB)	ug/L	<1.0		<1.0		NA	
1,2-Dichlorobenzene	ug/L	<1.0		<1.0		NA	
1,2-Dichloroethane	ug/L	<1.0		<1.0		NA	
1,2-Dichloropropane	ug/L	<1.0		<1.0		NA	
1,3,5-Trimethylbenzene	ug/L	<1.0		<1.0		NA	
1,3-Dichlorobenzene	ug/L	<1.0		<1.0		NA	
1,3-Dichloropropane	ug/L	<1.0		<1.0		NA	
1,4-Dichlorobenzene	ug/L	<1.0		<1.0		NA	
2,2-Dichloropropane	ug/L	<1.0		<1.0		NA	
2-Butanone (MEK)	ug/L	<6.0		<6.0		NA	
2-Chlorotoluene	ug/L	<1.0		<1.0		NA	
2-Hexanone	ug/L	<5.0		<5.0		NA	
4-Chlorotoluene	ug/L	<1.0		<1.0		NA	
4-Methyl-2-pentanone	ug/L	<5.0		<5.0		NA	
Acetone	ug/L	<10		<10		NA	
Benzene	ug/L	<1.0		<1.0		NA	
Bromobenzene	ug/L	<1.0		<1.0		NA	
Bromochloromethane	ug/L	<1.0		<1.0		NA	
Bromodichloromethane	ug/L	<1.0		<1.0		NA	
Bromoform	ug/L	<1.0		<1.0		NA	
Bromomethane	ug/L	<2.0		<2.0		NA	
Carbon disulfide	ug/L	<2.0		<2.0		NA	
Carbon tetrachloride	ug/L	<2.0		<2.0		NA	
Chlorobenzene	ug/L	<1.0		<1.0		NA	
Chloroethane	ug/L	<2.0		<2.0		NA	
Chloroform	ug/L	<1.0		<1.0		NA	
Chloromethane	ug/L	<2.0		0.31	J	NA	
cis-1,2-Dichloroethene	ug/L	<1.0		<1.0		NA	
cis-1,3-Dichloropropene	ug/L	<1.0		<1.0		NA	
Dibromochloromethane	ug/L	<1.0		<1.0		NA	
Dibromomethane	ug/L	<1.0		<1.0		NA	
Dichlorodifluoromethane	ug/L	<2.0		<2.0		NA	
Ethylbenzene	ug/L	<1.0		<1.0		NA	
Hexachlorobutadiene	ug/L	<1.0		0.15	J	NA	
Isopropylbenzene	ug/L	<1.0		<1.0		NA	
m-Xylene & p-Xylene	ug/L	<2.0		<2.0		NA	
Methyl tert-butyl ether	ug/L	<5.0		<5.0		NA	
Methylene chloride	ug/L	<5.0		<5.0		NA	
n-Butylbenzene	ug/L	<1.0		<1.0		NA	
n-Propylbenzene	ug/L	<1.0		<1.0		NA	
Naphthalene	ug/L	<1.0		<1.0		NA	
o-Xylene	ug/L	<1.0		<1.0		NA	
p-Isopropyltoluene	ug/L	<1.0		<1.0		NA	
sec-Butylbenzene	ug/L	<1.0		<1.0		NA	
Styrene	ug/L	<1.0		<1.0		NA	
tert-Butylbenzene	ug/L	<1.0		<1.0		NA	
Tetrachloroethene	ug/L	<1.0		<1.0		NA	
Toluene	ug/L	<1.0		<1.0		NA	
trans-1,2-Dichloroethene	ug/L	<1.0		<1.0		NA	
trans-1,3-Dichloropropene	ug/L	<1.0		<1.0		NA	
Trichloroethene	ug/L	<1.0		<1.0		NA	
Trichlorofluoromethane	ug/L	<2.0		<2.0		NA	
Vinyl chloride	ug/L	<1.0		<1.0		NA	
Other							
Nitrocellulose	mg/L					NA	

Field Duplicate RPD Calculation Table - Former Gopher Ordnance Works Area AOC2 Water Samples

Field Sample ID:		FGOW-AOC2-W-GP1		FGOW-AOC2-W-GP3			
Lab Sample ID:		D7I150223010		D7I150223011		RPD	Qualification
Sample Matrix:		WATER		WATER			
Analyte:	Units						
Explosives							
2,4-Dinitrotoluene	ug/L	<0.15		<0.14		NA	
2,6-Dinitrotoluene	ug/L	<0.15		<0.14		NA	
SVOCs							
Diphenylamine	ug/L	<10		<10		NA	
Other							
Nitrocellulose	mg/L	<0.50		<0.50		NA	

Field Duplicate RPD Calculation Table - Former Gopher Ordnance Works Area AOC4 Solid Samples

Field Sample ID:		FGOW-AOC4-SS-GP2(0-6INCHES)		FGOW-AOC4-SS-GP3(0-6INCHES)			
Lab Sample ID:		D7I130251003		D7I130251004		RPD	Qualification
Sample Matrix:		SOLID		SOLID			
Analyte:							
Total Petroleum Hydrocarbons	Unit						
Diesel Range Organics	mg/kg	5.1	J	5.3	J	4%	
Gasoline Range Organics	mg/kg	1.6	J B	2.4	J B	40%	
Metals							
Arsenic	mg/kg	2.4	J	7.3		101%	J
Barium	mg/kg	41		50		20%	
Cadmium	mg/kg	<0.54		0.1	J	NA	
Chromium	mg/kg	10	J	9.2		8%	
Lead	mg/kg	4.9	J	5.9	J	19%	
Mercury	mg/kg	0.011	J	0.011	J	0%	
Selenium	mg/kg	<3.2		<3.2		NA	
Silver	mg/kg	<1.6		<1.6		NA	
PAHs							
2-Methylnaphthalene	ug/kg	<350		<350		NA	
Acenaphthene	ug/kg	<350		<350		NA	
Acenaphthylene	ug/kg	<350		<350		NA	
Anthracene	ug/kg	<350		<350		NA	
Benzo(a)anthracene	ug/kg	<350		<350		NA	
Benzo(a)pyrene	ug/kg	<350		<350		NA	
Benzo(b)fluoranthene	ug/kg	<350		<350		NA	
Benzo(ghi)perylene	ug/kg	<350		<350		NA	
Benzo(k)fluoranthene	ug/kg	<350		<350		NA	
Chrysene	ug/kg	<350		<350		NA	
Dibenz(a,h)anthracene	ug/kg	<350		<350		NA	
Diphenylamine	ug/kg	<350		<350		NA	
Fluoranthene	ug/kg	<350		<350		NA	
Fluorene	ug/kg	<350		<350		NA	
Indeno(1,2,3-cd)pyrene	ug/kg	<350		<350		NA	
Nitrobenzene-d5	ug/kg	<350		<350		NA	
Phenol-d5	ug/kg	<430		<430		NA	
Other							
Percent Moisture	%	6.8		6.5		5%	

Field Duplicate RPD Calculation Table - Former Gopher Ordnance Works
Area AOC5 Solid Samples

Field Sample ID:		FGOW-AOC5-SS-GP6(0-6INCHES)		FGOW-AOC5-SS-GP13(0-6INCHES)				FGOW-AOC5-SS-GP12(0-6INCHES)		FGOW-AOC5-SS-GP14(0-6INCHES)			
Lab Sample ID:		D7I070382006		D7I070382013		RPD	Qualification	D7I070382012		D7I070382014		RPD	Qualification
Sample Matrix:		SOLID		SOLID				SOLID		SOLID			
Analyte:	Unit												
Pesticides													
4,4-DDD	ug/kg	<17		<17		NA		<21		<21		NA	
4,4-DDE	ug/kg	<17		<17		NA		4.1	J	4.7	J	14%	
4,4-DDT	ug/kg	<20		<20		NA		7.6	J	8.8	J	15%	
Aldrin	ug/kg	<17		<17		NA		<21		<21		NA	
alpha-BHC	ug/kg	<17		<17		NA		<21		<21		NA	
alpha-Chlordane	ug/kg	<17		<17		NA		<21		<21		NA	
beta-BHC	ug/kg	<17		<17		NA		<21		<21		NA	
delta-BHC	ug/kg	<17		<17		NA		<21		<21		NA	
Dieldrin	ug/kg	<17		<17		NA		<21		<21		NA	
Endosulfan I	ug/kg	<17		<17		NA		<21		<21		NA	
Endosulfan II	ug/kg	<17		<17		NA		<21		<21		NA	
Endosulfan sulfate	ug/kg	<17		<17		NA		<21		<21		NA	
Endrin	ug/kg	<17		<17		NA		<21		<21		NA	
Endrin aldehyde	ug/kg	<17		<17		NA		<21		<21		NA	
Endrin ketone	ug/kg	<17		<17		NA		<21		<21		NA	
gamma-BHC (Lindane)	ug/kg	<17		<17		NA		<21		<21		NA	
gamma-Chlordane	ug/kg	<17		<17		NA		<21		<21		NA	
Heptachlor	ug/kg	<17		<17		NA		<21		<21		NA	
Heptachlor epoxide	ug/kg	<17		<17		NA		<21		<21		NA	
Methoxychlor	ug/kg	<33		<34		NA		<41		<41		NA	
Toxaphene	ug/kg	<1700		<1700		NA		<2100		<2100		NA	
Total Petroleum Hydrocarbons													
Diesel Range Organics	mg/kg	2	J	15		153%	J	3.5	J	4.8	J	31%	
Gasoline Range Organics	mg/kg	1.6	J B	1.4	J B	13%		1.7	J B	1.5	J B	13%	
Explosives													
2,4-Dinitrotoluene	mg/kg	<0.25		<0.25		NA		<0.25		<0.25		NA	
2,6-Dinitrotoluene	mg/kg	<0.25		<0.25		NA		<0.25		<0.25		NA	
Metals													
Arsenic	mg/kg	1.7	J	1.5	J	13%		**7.8**		**7.9**		1%	
Barium	mg/kg	14		14		0%		160		160		0%	
Cadmium	mg/kg	0.065	J	0.07	J	7%		0.11	J	0.11	J	0%	
Chromium	mg/kg	5.8		6.3		8%		21	J	21		0%	
Lead	mg/kg	3.2	J	3	J	6%		18		18		0%	

Field Sample ID:		FGOW-AOC5-SS-GP6(0-6INCHES)		FGOW-AOC5-SS-GP13(0-6INCHES)				FGOW-AOC5-SS-GP12(0-6INCHES)		FGOW-AOC5-SS-GP14(0-6INCHES)			
Lab Sample ID:		D7I070382006		D7I070382013		RPD	Qualification	D7I070382012		D7I070382014		RPD	Qualification
Sample Matrix:		SOLID		SOLID				SOLID		SOLID			
Mercury	mg/kg	<0.033		<0.034		NA		0.05		0.05		0%	
Selenium	mg/kg	<3.0		<3.0		NA		<3.8		<3.7		NA	
Silver	mg/kg	<1.5		<1.5		NA		<1.9		<1.9		NA	
PAHs													
2-Methylnaphthalene	ug/kg	<330		<340		NA		<410		<410		NA	
Acenaphthene	ug/kg	<330		<340		NA		<410		<410		NA	
Acenaphthylene	ug/kg	<330		<340		NA		<410		<410		NA	
Anthracene	ug/kg	<330		<340		NA		<410		<410		NA	
Benzo(a)anthracene	ug/kg	<330		<340		NA		<410		<410		NA	
Benzo(a)pyrene	ug/kg	<330		<340		NA		<410		<410		NA	
Benzo(b)fluoranthene	ug/kg	<330		<340		NA		<410		<410		NA	
Benzo(ghi)perylene	ug/kg	<330		<340		NA		<410		<410		NA	
Benzo(k)fluoranthene	ug/kg	<330		<340		NA		<410		<410		NA	
Chrysene	ug/kg	<330		<340		NA		<410		<410		NA	
Dibenz(a,h)anthracene	ug/kg	<330		<340		NA		<410		<410		NA	
Diphenylamine	ug/kg	<330		<340		NA		<410		<410		NA	
Fluoranthene	ug/kg	<330		<340		NA		<410		<410		NA	
Fluorene	ug/kg	<330		<340		NA		<410		<410		NA	
Indeno(1,2,3-cd)pyrene	ug/kg	<330		<340		NA		<410		<410		NA	
Naphthalene	ug/kg	<330		<340		NA		<410		<410		NA	
Phenanthrene	ug/kg	<330		<340		NA		<410		<410		NA	
Pyrene	ug/kg	<400		<410		NA		<500		<500		NA	
Other													
Nitrocellulose	mg/kg	<5.1		<5.1		NA		2.2	B	2.3	B	4%	
Percent Moisture	%	1.2		1.6		29%		20		20		0%	

Field Duplicate RPD Calculation Table - Former Gopher Ordnance Works
Area AOC6 Solid Samples

Field Sample ID:		FGOW-AOC6-SS-TP1(0-.5FT)		FGOW-AOC6-S-TP7(6FT)			
Lab Sample ID:		D7H090291001		D7H090291013		RPD	Qualification
Sample Matrix:		SOLID		SOLID			
Analyte:	Unit						
Metals							
Arsenic	mg/kg	2.5	J	1.9	J	27%	
Barium	mg/kg	44		39		12%	
Cadmium	mg/kg	<0.53		<0.52		NA	
Chromium	mg/kg	10		8.5		16%	
Lead	mg/kg	12		10		18%	
Mercury	mg/kg	0.038		0.045		17%	
Selenium	mg/kg	<3.2		<3.1		NA	
Silver	mg/kg	<1.6		<1.6		NA	
PAHs							
2-Methylnaphthalene	ug/kg	<350		<340		NA	
Acenaphthene	ug/kg	<350		<340		NA	
Acenaphthylene	ug/kg	<350		<340		NA	
Anthracene	ug/kg	75	J	350		129%	J
Benzo(a)anthracene	ug/kg	250	J	1500		143%	J
Benzo(a)pyrene	ug/kg	230	J	1400		144%	J
Benzo(b)fluoranthene	ug/kg	380	K	2300	K	143%	J
Benzo(ghi)perylene	ug/kg	130	J	760		142%	J
Benzo(k)fluoranthene	ug/kg	<350		<340		NA	
Chrysene	ug/kg	260	J	1500		141%	J
Dibenz(a,h)anthracene	ug/kg	47	J	250	J	137%	OK
Fluoranthene	ug/kg	430		2400		139%	J
Fluorene	ug/kg	<350		43	J	NA	
Indeno(1,2,3-cd)pyrene	ug/kg	130	J	750		141%	J
Naphthalene	ug/kg	<350		<340		NA	
Phenanthrene	ug/kg	240	J	1100		128%	J
Pyrene	ug/kg	400	J	2200		138%	J
Other							
Percent Moisture	%	5.4		4		30%	

Field Duplicate RPD Calculation Table - Former Gopher Ordnance Works
Area AOC7A Solid Samples

Field Sample ID:		FGOW-AOC7A-SS-GP8(0-6INCHES)		FGOW-AOC7A-SS-GP3(0-6INCHES)		RPD	Qualification
Lab Sample ID:		D7H160289004-RE2		D7H160289003		RPD	Qualification
Sample Matrix:		SOLID		SOLID			
Analyte:	Unit						
VOCs						NA	
1,1,1,2-Tetrachloroethane	ug/kg	<4.7		<5.1		NA	
1,1,1-Trichloroethane	ug/kg	<4.7		<5.1		NA	
1,1,2,2-Tetrachloroethane	ug/kg	<4.7		<5.1		NA	
1,1,2-Trichloroethane	ug/kg	<4.7		<5.1		NA	
1,1-Dichloroethane	ug/kg	<4.7		<5.1		NA	
1,1-Dichloroethene	ug/kg	<4.7		<5.1		NA	
1,1-Dichloropropene	ug/kg	<4.7		<5.1		NA	
1,2,3-Trichlorobenzene	ug/kg	<4.7		<5.1		NA	
1,2,3-Trichloropropane	ug/kg	<4.7		<5.1		NA	
1,2,4-Trichlorobenzene	ug/kg	<4.7		<5.1		NA	
1,2,4-Trimethylbenzene	ug/kg	0.72	J J	<5.1		NA	
1,2-Dibromo-3-chloropropane (DBCP)	ug/kg	<9.4		<10		NA	
1,2-Dibromoethane (EDB)	ug/kg	<4.7		<5.1		NA	
1,2-Dichlorobenzene	ug/kg	<4.7		<5.1		NA	
1,2-Dichloroethane	ug/kg	<4.7		<5.1		NA	
1,2-Dichloropropane	ug/kg	<4.7		<5.1		NA	
1,3,5-Trimethylbenzene	ug/kg	<4.7		<5.1		NA	
1,3-Dichlorobenzene	ug/kg	<4.7		<5.1		NA	
1,3-Dichloropropane	ug/kg	<4.7		<5.1		NA	
1,4-Dichlorobenzene	ug/kg	<4.7		<5.1		NA	
2,2-Dichloropropane	ug/kg	<4.7		<5.1		NA	
2-Butanone (MEK)	ug/kg	16	J B J	16	J B	0%	
2-Chlorotoluene	ug/kg	<4.7		<5.1		NA	
2-Hexanone	ug/kg	<19		<20		NA	
4-Chlorotoluene	ug/kg	<4.7		<5.1		NA	
4-Methyl-2-pentanone	ug/kg	<19		<20		NA	
Acetone	ug/kg	75	J	69		8%	
Benzene	ug/kg	0.84	J J	0.89	J	6%	
Bromobenzene	ug/kg	<4.7		<5.1		NA	
Bromochloromethane	ug/kg	<4.7		<5.1		NA	
Bromodichloromethane	ug/kg	<4.7		<5.1		NA	
Bromoform	ug/kg	<4.7		<5.1		NA	
Bromomethane	ug/kg	<9.4		<10		NA	
Carbon disulfide	ug/kg	4.5	J J	3.9	J	14%	
Carbon tetrachloride	ug/kg	<4.7		<5.1		NA	
Chlorobenzene	ug/kg	<4.7		<5.1		NA	
Chloroethane	ug/kg	<9.4		<10		NA	
Chloroform	ug/kg	<9.4		<10		NA	
Chloromethane	ug/kg	<9.4		<10		NA	
cis-1,2-Dichloroethene	ug/kg	<2.4		<2.5		NA	
cis-1,3-Dichloropropene	ug/kg	<4.7		<5.1		NA	
Dibromochloromethane	ug/kg	<4.7		<5.1		NA	
Dibromomethane	ug/kg	<4.7		<5.1		NA	
Dichlorodifluoromethane	ug/kg	<9.4		<10		NA	
Ethylbenzene	ug/kg	<4.7		<5.1		NA	
Hexachlorobutadiene	ug/kg	<4.7		<5.1		NA	
Isopropylbenzene	ug/kg	<4.7		<5.1		NA	
m-Xylene & p-Xylene	ug/kg	<2.4		<2.5		NA	
Methyl tert-butyl ether	ug/kg	<19		<20		NA	
Methylene chloride	ug/kg	<4.7		<5.1		NA	
n-Butylbenzene	ug/kg	<4.7		<5.1		NA	
n-Propylbenzene	ug/kg	<4.7		<5.1		NA	
Naphthalene	ug/kg	<4.7		<5.1		NA	
o-Xylene	ug/kg	<2.4		<2.5		NA	
p-Isopropyltoluene	ug/kg	<4.7		<5.1		NA	
sec-Butylbenzene	ug/kg	<4.7		<5.1		NA	
Styrene	ug/kg	<4.7		<5.1		NA	
tert-Butylbenzene	ug/kg	<4.7		<5.1		NA	
Tetrachloroethene	ug/kg	<4.7		<5.1		NA	
Toluene	ug/kg	1.1	J J	1.1	J	0%	
trans-1,2-Dichloroethene	ug/kg	<2.4		<2.5		NA	
trans-1,3-Dichloropropene	ug/kg	<4.7		<5.1		NA	
Trichloroethene	ug/kg	<4.7		<5.1		NA	
Trichlorofluoromethane	ug/kg	<9.4		<10		NA	
Vinyl chloride	ug/kg	<4.7		<5.1		NA	
Other							
Percent Moisture	%			16		NA	

Field Duplicate RPD Calculation Table - Former Gopher Ordnance Works
Area AOC7C Solid Samples

Field Sample ID:		FGOW-AOC7C-SS-SS10(0-6INCHES)		FGOW-AOC7C-SS-SS5(0-6INCHES)			
Lab Sample ID:		D7H250161015		D7H250161010		RPD	Qualification
Sample Matrix:		SOLID		SOLID			
Analyte:	Unit						
Explosives							
2,4-Dinitrotoluene	mg/kg	<0.25		<0.25		NA	
2,6-Dinitrotoluene	mg/kg	<0.25		<0.25		NA	
						NA	
SVOCs							
Diphenylamine	ug/kg	<520		<480		NA	
Other							
Nitrocellulose		1.7	B J	2.7	B J	45%	
Percent Moisture	%	37		32		14%	

Field Duplicate RPD Calculation Table - Former Gopher Ordnance Works
Area AOC7C Water Samples

Field Sample ID:		FGOW-AOC7C-W-GP8		FGOW-AOC7C-W-GP6			
Lab Sample ID:		D7H230183009		D7H230183010		RPD	Qualification
Sample Matrix:		WATER		WATER			
Analyte:	Unit						
Explosives							
2,4-Dinitrotoluene	ug/L	<0.40		<0.40		NA	
2,6-Dinitrotoluene	ug/L	<0.40		<0.40		NA	
						NA	
Metals						NA	
Arsenic	ug/L	<25		<25		NA	
Barium	ug/L	55		57		4%	
Cadmium	ug/L	<5.0		<5.0		NA	
Chromium	ug/L	<15		<15		NA	
Lead	ug/L	<15		<15		NA	
Mercury	ug/L	<0.20		<0.20		NA	
Selenium	ug/L	<22		<22		NA	
Silver	ug/L	<15		<15		NA	
SVOCs							
1,2,4-Trichlorobenzene	ug/L	<10		<10		NA	
1,2-Dichlorobenzene	ug/L	<10		<10		NA	
1,2-Diphenylhydrazine	ug/L	<10		<10		NA	
1,3-Dichlorobenzene	ug/L	<10		<10		NA	
1,4-Dichlorobenzene	ug/L	<10		<10		NA	
2,4,5-Trichlorophenol	ug/L	<20		<20		NA	
2,4,6-Trichlorophenol	ug/L	<20		<20		NA	
2,4-Dichlorophenol	ug/L	<10		<10		NA	
2,4-Dimethylphenol	ug/L	<10		<10		NA	
2,4-Dinitrophenol	ug/L	<80		<80		NA	
2,4-Dinitrotoluene	ug/L	<20		<20		NA	
2,6-Dichlorophenol	ug/L	<10		<10		NA	
2,6-Dinitrotoluene	ug/L	<20		<20		NA	
2-Chloronaphthalene	ug/L	<10		<10		NA	
2-Chlorophenol	ug/L	<10		<10		NA	
2-Methylnaphthalene	ug/L	<10		<10		NA	
2-Methylphenol	ug/L	<10		<10		NA	
2-Nitroaniline	ug/L	<50		<50		NA	
2-Nitrophenol	ug/L	<20		<20		NA	
3,3-Dichlorobenzidine	ug/L	<50		<50		NA	
3-Methylphenol & 4-Methylphenol	ug/L	<20		<20		NA	
3-Nitroaniline	ug/L	<50		<50		NA	
4,6-Dinitro-2-methylphenol	ug/L	<80		<80		NA	
4-Bromophenyl phenyl ether	ug/L	<10		<10		NA	
4-Chloro-3-methylphenol	ug/L	<20		<20		NA	
4-Chloroaniline	ug/L	<25		<25		NA	
4-Chlorophenyl phenyl ether	ug/L	<10		<10		NA	
4-Nitroaniline	ug/L	<50		<50		NA	
4-Nitrophenol	ug/L	<50		<50		NA	
Acenaphthene	ug/L	<10		<10		NA	
Acenaphthylene	ug/L	<10		<10		NA	
Anthracene	ug/L	<10		<10		NA	
Benzidine	ug/L	<200		<200		NA	
Benzo(a)anthracene	ug/L	<10		<10		NA	
Benzo(a)pyrene	ug/L	<10		<10		NA	
Benzo(b)fluoranthene	ug/L	<10		<10		NA	
Benzo(ghi)perylene	ug/L	<10		<10		NA	
Benzo(k)fluoranthene	ug/L	<10		<10		NA	
Benzoic acid	ug/L	<80		<80		NA	
Benzyl alcohol	ug/L	<25		<25		NA	
bis(2-Chloroethoxy)methane	ug/L	<10		<10		NA	
bis(2-Chloroethyl) ether	ug/L	<20		<20		NA	
bis(2-Chloroisopropyl) ether	ug/L	<10		<10		NA	
bis(2-Ethylhexyl) phthalate	ug/L	2.2	J	2.2	J	0%	
Butyl benzyl phthalate	ug/L	<20		<20		NA	
Carbazole	ug/L	<10		<10		NA	
Chrysene	ug/L	<10		<10		NA	
Di-n-butyl phthalate	ug/L	<20		<20		NA	
Di-n-octyl phthalate	ug/L	<20		<20		NA	
Dibenz(a,h)anthracene	ug/L	<10		<10		NA	
Dibenzofuran	ug/L	<10		<10		NA	
Diethyl phthalate	ug/L	<20		<20		NA	
Dimethyl phthalate	ug/L	<20		<20		NA	
Diphenylamine		<10		<10		NA	
Fluoranthene	ug/L	<20		<20		NA	
Fluorene	ug/L	<10		<10		NA	
Hexachlorobenzene	ug/L	<10		<10		NA	
Hexachlorobutadiene	ug/L	<30		<30		NA	
Hexachloroethane	ug/L	<10		<10		NA	
Indeno(1,2,3-cd)pyrene	ug/L	<10		<10		NA	
Isophorone	ug/L	<10		<10		NA	
N-Nitrosodi-n-propylamine	ug/L	<20		<20		NA	

Field Sample ID:		FGOW-AOC7C-W-GP8		FGOW-AOC7C-W-GP6			
Lab Sample ID:		D7H230183009		D7H230183010		RPD	Qualification
Sample Matrix:		WATER		WATER			
N-Nitrosodimethylamine	ug/L	<10		<10		NA	
N-Nitrosodiphenylamine	ug/L	<10		<10		NA	
N-Nitrosopyrrolidine	ug/L	<10		<10		NA	
Naphthalene	ug/L	<10		<10		NA	
Nitrobenzene	ug/L	<20		<20		NA	
Pentachlorophenol	ug/L	<80		<80		NA	
Phenanthrene	ug/L	<10		<10		NA	
Phenol	ug/L	<10		<10		NA	
Pyrene	ug/L	<10		<10		NA	
VOCs							
1,1,1,2-Tetrachloroethane	ug/L	<1.0		<1.0		NA	
1,1,1-Trichloroethane	ug/L	<1.0		<1.0		NA	
1,1,2,2-Tetrachloroethane	ug/L	<1.0		<1.0		NA	
1,1,2-Trichloroethane	ug/L	<1.0		<1.0		NA	
1,1-Dichloroethane	ug/L	<1.0		<1.0		NA	
1,1-Dichloroethene	ug/L	<1.0		<1.0		NA	
1,1-Dichloropropene	ug/L	<1.0		<1.0		NA	
1,2,3-Trichlorobenzene	ug/L	<1.0		<1.0		NA	
1,2,3-Trichloropropane	ug/L	<2.0		<2.0		NA	
1,2,4-Trichlorobenzene	ug/L	<1.0		<1.0		NA	
1,2,4-Trimethylbenzene	ug/L	<1.0		<1.0		NA	
1,2-Dibromo-3-chloropropane (DBCP)	ug/L	<5.0		<5.0		NA	
1,2-Dibromoethane (EDB)	ug/L	<1.0		<1.0		NA	
1,2-Dichlorobenzene	ug/L	<1.0		<1.0		NA	
1,2-Dichloroethane	ug/L	<1.0		<1.0		NA	
1,2-Dichloropropane	ug/L	<1.0		<1.0		NA	
1,3,5-Trimethylbenzene	ug/L	<1.0		<1.0		NA	
1,3-Dichlorobenzene	ug/L	<1.0		<1.0		NA	
1,3-Dichloropropane	ug/L	<1.0		<1.0		NA	
1,4-Dichlorobenzene	ug/L	<1.0		<1.0		NA	
2,2-Dichloropropane	ug/L	<1.0		<1.0		NA	
2-Butanone (MEK)	ug/L	<6.0		<6.0		NA	
2-Chlorotoluene	ug/L	<1.0		<1.0		NA	
2-Hexanone	ug/L	<5.0		<5.0		NA	
4-Chlorotoluene	ug/L	<1.0		<1.0		NA	
4-Methyl-2-pentanone	ug/L	<5.0		<5.0		NA	
Acetone	ug/L	<10		<10		NA	
Benzene	ug/L	<1.0		<1.0		NA	
Bromobenzene	ug/L	<1.0		<1.0		NA	
Bromochloromethane	ug/L	<1.0		<1.0		NA	
Bromodichloromethane	ug/L	<1.0		<1.0		NA	
Bromoform	ug/L	<1.0		<1.0		NA	
Bromomethane	ug/L	<2.0		<2.0		NA	
Carbon disulfide	ug/L	<2.0		<2.0		NA	
Carbon tetrachloride	ug/L	<2.0		<2.0		NA	
Chlorobenzene	ug/L	<1.0		<1.0		NA	
Chloroethane	ug/L	<2.0		<2.0		NA	
Chloroform	ug/L	1		0.99	J	1%	
Chloromethane	ug/L	<2.0		<2.0		NA	
cis-1,2-Dichloroethene	ug/L	<1.0		<1.0		NA	
cis-1,3-Dichloropropene	ug/L	<1.0		<1.0		NA	
Dibromochloromethane	ug/L	<1.0		<1.0		NA	
Dibromomethane	ug/L	<1.0		<1.0		NA	
Dichlorodifluoromethane	ug/L	<2.0		<2.0		NA	
Ethylbenzene	ug/L	<1.0		<1.0		NA	
Hexachlorobutadiene	ug/L	<1.0		<1.0		NA	
Isopropylbenzene	ug/L	<1.0		<1.0		NA	
m-Xylene & p-Xylene	ug/L	<2.0		<2.0		NA	
Methyl tert-butyl ether	ug/L	<5.0		<5.0		NA	
Methylene chloride	ug/L	<5.0		<5.0		NA	
n-Butylbenzene	ug/L	<1.0		<1.0		NA	
n-Propylbenzene	ug/L	<1.0		<1.0		NA	
Naphthalene	ug/L	<1.0		<1.0		NA	
o-Xylene	ug/L	<1.0		<1.0		NA	
p-Isopropyltoluene	ug/L	<1.0		<1.0		NA	
sec-Butylbenzene	ug/L	<1.0		<1.0		NA	
Styrene	ug/L	<1.0		<1.0		NA	
tert-Butylbenzene	ug/L	<1.0		<1.0		NA	
Tetrachloroethene	ug/L	<1.0		<1.0		NA	
Toluene	ug/L	<1.0		<1.0		NA	
trans-1,2-Dichloroethene	ug/L	<1.0		<1.0		NA	
trans-1,3-Dichloropropene	ug/L	<1.0		<1.0		NA	
Trichloroethene	ug/L	0.16	J	0.17	J	6%	
Trichlorofluoromethane	ug/L	<2.0		<2.0		NA	
Vinyl chloride	ug/L	<1.0		<1.0		NA	
Other							
Nitrocellulose	mg/L	<0.50		0.87		NA	

Field Duplicate RPD Calculation Table - Former Gopher Ordnance Works
Area AOC7D Solid Samples

Field Sample ID:		FGOW-AOC7D-S-GP9(2-4FT)		FGOW-AOC7D-S-GP11(2-4FT)				FGOW-AOC7D-SS-GP8(0-6INCHES)		FGOW-AOC7D-SS-GP11(0-6INCHES)				FGOW-AOC7D-SS-SS4		FGOW-AOC7D-SS-SS5			
Lab Sample ID:		D7H310262005		D7H310262006		RPD	Qualification	D7H300206006		D7H300206008		RPD	Qualification	D7H310262016-RE2		D7H310262017-RE2		RPD	Qualification
Sample Matrix:		SOLID		SOLID				SOLID		SOLID				SOLID		SOLID			
Analyte:	Unit																		
Total Petroleum Hydrocarbons																			
Diesel Range Organics	mg/kg																		
GCSEMI																			
Aroclor 1016	ug/kg					NA		<36		<36		NA		<82		<42		NA	
Aroclor 1221	ug/kg					NA		<36		<36		NA		<82		<42		NA	
Aroclor 1232	ug/kg					NA		<36		<36		NA		<82		<42		NA	
Aroclor 1242	ug/kg					NA		<36		<36		NA		<82		<42		NA	
Aroclor 1248	ug/kg					NA		<36		<36		NA		<82		<42		NA	
Aroclor 1254	ug/kg					NA		<36		<36		NA		410		410		0%	
Aroclor 1260	ug/kg					NA		36		60		50%		310		350		12%	
Metals																			
Arsenic	mg/kg	5.2		4.8		8%		2.7		3		11%							
Barium	mg/kg	230		230		0%		38		28		30%							
Cadmium	mg/kg	<0.70		<0.68		NA		0.1	J	0.21	J	71%	OK						
Chromium	mg/kg	18		18		0%		15		12		22%							
Lead	mg/kg	9.7	J	11	J	13%		33		52		45%							
Mercury	mg/kg	0.022	J	0.12		138%	J	0.026	J	0.036		32%							
Selenium	mg/kg	<4.2		<4.1		NA		<3.2		<3.3		NA							
Silver	mg/kg	<2.1		<2.0		NA		<1.6		<1.6		NA							
												NA							
SVOCs												NA							
1,2,4-Trichlorobenzene	ug/kg	<460		<450		NA		<360		<360		NA							
1,2-Dichlorobenzene	ug/kg	<460		<450		NA		<360		<360		NA							
1,2-Diphenylhydrazine	ug/kg	<460		<450		NA		<360		<360		NA							
1,3-Dichlorobenzene	ug/kg	<460		<450		NA		<360		<360		NA							
1,4-Dichlorobenzene	ug/kg	<460		<450		NA		<360		<360		NA							
2,4,5-Trichlorophenol	ug/kg	<460		<450		NA		<360		<360		NA							
2,4,6-Trichlorophenol	ug/kg	<460		<450		NA		<360		<360		NA							
2,4-Dichlorophenol	ug/kg	<460		<450		NA		<360		<360		NA							
2,4-Dimethylphenol	ug/kg	<460		<450		NA		<360		<360		NA							
2,4-Dinitrophenol	ug/kg	<2300		<2200		NA		<1700		<1700		NA							
2,4-Dinitrotoluene	ug/kg	<460		<450		NA		<360		<360		NA							
2,6-Dichlorophenol	ug/kg	<460		<450		NA		<360		<360		NA							
2,6-Dinitrotoluene	ug/kg	<460		<450		NA		<360		<360		NA							
2-Chloronaphthalene	ug/kg	<460		<450		NA		<360		<360		NA							
2-Chlorophenol	ug/kg	<460		<450		NA		<360		<360		NA							
2-Methylnaphthalene	ug/kg	<460		<450		NA		<360		<360		NA							
2-Methylphenol	ug/kg	<460		<450		NA		<360		<360		NA							
2-Nitroaniline	ug/kg	<2300		<2200		NA		<1700		<1700		NA							
2-Nitrophenol	ug/kg	<460		<450		NA		<360		<360		NA							
3,3-Dichlorobenzidine	ug/kg	<2300		<2200		NA		<1700		<1700		NA							
3-Methylphenol & 4-Methylphenol	ug/kg	<460		<450		NA		<360		<360		NA							
3-Nitroaniline	ug/kg	<2300		<2200		NA		<1700		<1700		NA							
4,6-Dinitro-2-methylphenol	ug/kg	<2300		<2200		NA		<1700		<1700		NA							
4-Bromophenyl phenyl ether	ug/kg	<460		<450		NA		<360		<360		NA							
4-Chloro-3-methylphenol	ug/kg	<460		<450		NA		<360		<360		NA							
4-Chloroaniline	ug/kg	<460		<450		NA		<360		<360		NA							
4-Chlorophenyl phenyl ether	ug/kg	<460		<450		NA		<360		<360		NA							
4-Nitroaniline	ug/kg	<2300		<2200		NA		<1700		<1700		NA							
4-Nitrophenol	ug/kg	<2300		<2200		NA		<1700		<1700		NA							
Acenaphthene	ug/kg	<460		<450		NA		43	J	66	J	42%							
Acenaphthylene	ug/kg	<460		<450		NA		<360		<360		NA							
Anthracene	ug/kg	<460		<450		NA		100	J	180	J	57%	OK						
Benzidine	ug/kg	<5600		<5400		NA		<4300		<4400		NA							
Benzo(a)anthracene	ug/kg	<460		<450		NA		320	J	520		48%							
Benzo(a)pyrene	ug/kg	<460		<450		NA		270	J	460		52%	OK						
Benzo(b)fluoranthene	ug/kg	<460		<450		NA		460		770	K	50%							
Benzo(ghi)perylene	ug/kg	<460		<450		NA		150	J	250	J	50%							
Benzo(k)fluoranthene	ug/kg	<460		<450		NA		<360		<360		NA							
Benzoic acid	ug/kg	<2300		<2200		NA		<1700		<1700		NA							
Benzyl alcohol	ug/kg	<460		<450		NA		<360		<360		NA							
bis(2-Chloroethoxy)methane	ug/kg	<460		<450		NA		<360		<360		NA							
bis(2-Chloroethyl) ether	ug/kg	<460		<450		NA		<360		<360		NA							
bis(2-Chloroisopropyl) ether	ug/kg	<460		<450		NA		<360		<360		NA							
bis(2-Ethylhexyl) phthalate	ug/kg	<460		<450		NA		<360		<360		NA							
Butyl benzyl phthalate	ug/kg	<460		<450		NA		<360		<360		NA							
Carbazole	ug/kg	<460		<450		NA		61	J	110	J	57%	OK						
Chrysene	ug/kg	<460		<450		NA		310	J	560		57%	OK						
Di-n-butyl phthalate	ug/kg	<460		<450		NA		<360		<360		NA							
Di-n-octyl phthalate	ug/kg	<460		<450		NA		<360		<360		NA							
Dibenz(a,h)anthracene	ug/kg	<460		<450		NA		43	J	75	J	54%	OK						
Dibenzofuran	ug/kg	<460		<450		NA		<360		<360		NA							
Diethyl phthalate	ug/kg	<930		<890		NA		<710		<720		NA							
Dimethyl phthalate	ug/kg	<460		<450		NA		<360		<360		NA							
Diphenylamine												NA							
Fluoranthene	ug/kg	<460		<450		NA		710		1300		59%	J						
Fluorene	ug/kg	<460		<450		NA		44	J	66	J	40%							
Hexachlorobenzene	ug/kg	<460		<450		NA		<360		<360		NA							
Hexachlorobutadiene	ug/kg	<460		<450		NA		<360		<360		NA							
Hexachloroethane	ug/kg	<460		<450		NA		<360		<360		NA							
Indeno(1,2,3-cd)pyrene	ug/kg	<460		<450		NA		140	J	230	J	49%							
Isophorone	ug/kg	<460		<450		NA		<360		<360		NA							
N-Nitrosodi-n-propylamine	ug/kg	<460		<450		NA		<360		<360		NA							
N-Nitrosodimethylamine	ug/kg	<730		<700		NA		<560		<570		NA							
N-Nitrosodiphenylamine	ug/kg	<460		<450		NA		<360		<360		NA							
N-Nitrosopyrrolidine	ug/kg	<460		<450		NA		<360		<360		NA							
Naphthalene	ug/kg	<460		<450		NA		<360		<360		NA							
Nitrobenzene	ug/kg	<460		<450		NA		<360		<360		NA							
Pentachlorophenol	ug/kg	<2300		<2200		NA		<1700		<1700		NA							
Phenanthrene	ug/kg	<460		<450		NA		430		770		57%	J						
Phenol	ug/kg	<460		<450		NA		<360		<360		NA							
Pyrene	ug/kg	<560		<540		NA		590		1000		52%	J						
VOCs																			
1,1,1,2-Tetrachloroethane	ug/kg	<7.0		<7.0		NA		<13		<4.9		NA							
1,1,1-Trichloroethane	ug/kg	<7.0		<7.0		NA		<13		<4.9		NA							
1,1,2,2-Tetrachloroethane	ug/kg	<7.0		<7.0		NA		<13		<4.9		NA							
1,1,2-Trichloroethane	ug/kg	<7.0		<7.0		NA		<13		<4.9		NA							
1,1-Dichloroethane	ug/kg	<7.0		<7.0		NA		<13		<4.9		NA							
1,1-Dichloroethene	ug/kg	<7.0		<7.0		NA		<13		<4.9		NA							
1,1-Dichloropropene	ug/kg	<7.0		<7.0		NA		<13		<4.9		NA							
1,2,3-Trichlorobenzene	ug/kg	<7.0		<7.0		NA		<13		<4.9		NA							
1,2,3-Trichloropropane	ug/kg	<7.0		<7.0		NA		<13		<4.9		NA							
1,2,4-Trichlorobenzene	ug/kg	<7.0		<7.0		NA		<13		<4.9		NA							
1,2,4-Trimethylbenzene	ug/kg	0.97	J	<7.0		NA		<13		<4.9		NA							
1,2-Dibromo-3-chloropropane (DBCP)	ug/kg	<14		<14		NA		<25		<9.8		NA							
1,2-Dibromoethane (EDB)	ug/kg	<7.0		<7.0		NA		<13		<4.9		NA							
1,2-Dichlorobenzene	ug/kg	<7.0		<7.0		NA		<13		<4.9		NA							
1,2-Dichloroethane	ug/kg	<7.0		<7.0		NA		<13		<4.9		NA							
1,2-Dichloropropane	ug/kg	<7.0		<7.0		NA		<13		<4.9		NA							
1,3,5-Trimethylbenzene	ug/kg	<7.0		<7.0		NA		<13		<4.9		NA							
1,3-Dichlorobenzene	ug/kg	<7.0		<7.0		NA		<13		<4.9		NA							
1,3-Dichloropropane	ug/kg	<7.0		<7.0		NA		<13		<4.9		NA							
1,4-Dichlorobenzene	ug/kg	<7.0		<7.0		NA		<13		<4.9		NA							
2,2-Dichloropropane	ug/kg	<7.0		<7.0		NA		<13		<4.9		NA							
2-Butanone (MEK)	ug/kg	<28		<28		NA		<50		<20		NA							
2-Chlorotoluene	ug/kg	<7.0		<7.0		NA		<13		<4.9		NA							
2-Hexanone	ug/kg	<28		<28		NA		<50		<20		NA							
4-Chlorotoluene	ug/kg	<7.0		<7.0		NA		<13		<4.9		NA							
4-Methyl-2-pentanone	ug/kg	<28		<28		NA		<50		<20		NA							
Acetone	ug/kg	8.5	J	<28		NA		<50		<20		NA							
Benzene	ug/kg	<7.0		<7.0		NA		<13		<4.9		NA							
Bromobenzene	ug/kg	<7.0		<7.0		NA		<13		<4.9		NA							
Bromochloromethane	ug/kg	<7.0		<7.0		NA		<13		<4.9		NA							
Bromodichloromethane	ug/kg	<7.0		<7.0		NA		<13		<4.9		NA							
Bromoform	ug/kg	<7.0		<7.0		NA		<13		<4.9		NA							
Bromomethane	ug/kg	<14		<14		NA		<25		<9.8		NA							
Carbon disulfide	ug/kg	<7.0		<7.0		NA		<13		<4.9		NA							
Carbon tetrachloride	ug/kg	<7.0		<7.0		NA		<13		<4.9		NA							
Chlorobenzene	ug/kg	<7.0		<7.0		NA		<13		<4.9		NA							
Chloroethane	ug/kg	<14		<14		NA		<25		<9.8		NA							
Chloroform	ug/kg	<14		<14		NA		<25		<9.8		NA							
Chloromethane	ug/kg	<14		<14		NA		<25		<9.8		NA							
cis-1,2-Dichloroethene	ug/kg	<3.5		<3.5		NA		<6.3		<2.5		NA							
cis-1,3-Dichloropropene	ug/kg	<7.0		<7.0		NA		<13		<4.9		NA							
Dibromochloromethane	ug/kg	<7.0		<7.0		NA		<13		<4.9		NA							
Dibromomethane	ug/kg	<7.0		<7.0		NA		<13		<4.9		NA							
Dichlorodifluoromethane	ug/kg	<14		<14		NA		<25		<9.8		NA							
Ethylbenzene	ug/kg	<7.0		<7.0		NA		<13		<4.9		NA							
Hexachlorobutadiene	ug/kg	<7.0		<7.0		NA		<13		<4.9		NA							
Isopropylbenzene	ug/kg	<7.0		<7.0		NA		<13		<4.9		NA							
m-Xylene & p-Xylene	ug/kg	<3.5		<3.5		NA		<6.3		<2.5		NA							
Methyl tert-butyl ether	ug/kg	<28		<28		NA		<50		<20		NA							
Methylene chloride	ug/kg	1.1	J B	1.1	J B	0%		2	J B u	0.84	J B u	82%	OK						
n-Butylbenzene	ug/kg	<7.0		<7.0		NA		<13		<4.9		NA							
n-Propylbenzene	ug/kg	<7.0		<7.0		NA		<13		<4.9		NA							
Naphthalene	ug/kg	1.1	J	0.93	J	17%		4.7	J	1.4	J	108%	OK						
o-Xylene	ug/kg	<3.5		<3.5		NA		<6.3		<2.5		NA							
p-Isopropyltoluene	ug/kg	<7.0		<7.0		NA		<13		<4.9		NA							
sec-Butylbenzene	ug/kg	<7.0		<7.0		NA		<13		<4.9		NA							
Styrene	ug/kg	<7.0		<7.0		NA		<13		<4.9		NA							
tert-Butylbenzene	ug/kg	<7.0		<7.0		NA		<13		<4.9		NA							
Tetrachloroethene	ug/kg	<7.0		<7.0		NA		<13		<4.9		NA							
Toluene	ug/kg	2.4	J	2	J	18%		<13		<4.9		NA							
trans-1,2-Dichloroethene	ug/kg	<3.5		<3.5		NA		<6.3		<2.5		NA							
trans-1,3-Dichloropropene	ug/kg	<7.0		<7.0		NA		<13		<4.9		NA							
Trichloroethene	ug/kg	<7.0		<7.0		NA		<13		<4.9		NA							
Trichlorofluoromethane	ug/kg	<14		<14		NA		<25		<9.8		NA							
Vinyl chloride	ug/kg	<7.0		<7.0		NA		<13		<4.9		NA							
Other																			

Field Duplicate RPD Calculation Table - Former Gopher Ordnance Works
Area AOC7D Solid Samples

Field Sample ID:		FGOW-AOC7D-S-GP9(2-4FT)		FGOW-AOC7D-S-GP11(2-4FT)				FGOW-AOC7D-SS-GP8(0-6INCHES)		FGOW-AOC7D-SS-GP11(0-6INCHES)				FGOW-AOC7D-SS-SS4		FGOW-AOC7D-SS-SS5			
Lab Sample ID:		D7H310262005		D7H310262006		RPD	Qualification	D7H300206006		D7H300206008		RPD	Qualification	D7H310262016-RE2		D7H310262017-RE2		RPD	Qualification
Sample Matrix:		SOLID		SOLID				SOLID		SOLID				SOLID		SOLID			
Nitrocellulose						NA													
Percent Moisture	%	29		26		11%		7.6		8.2		8%							

Well Abandonment Records

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MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING SEALING RECORD
Minnesota Statutes, Chapter 1031

Minnesota Well and Boring Sealing No. / Minnesota Unique Well No. or W-series No. (Leave blank if not known): **H 264902**

WELL OR BORING LOCATION

County Name: Dakota

Township Name	Township No.	Range No.	Section No.	Fraction (sm. → lg.)
Rosemount	115N	19W	36	SE¼ SE¼ NW¼

GPS LOCATION: Latitude ___ degrees ___ minutes ___ seconds; Longitude ___ degrees ___ minutes ___ seconds

Numerical Street Address or Fire Number and City of Well or Boring Location: 15324 Babcock Ave Rosemount

Show exact location of well or boring in section grid with "X." (N, W, E, S, ½ Mile, 1 Mile)

Sketch map of well or boring location, showing property lines, roads, and buildings.

PROPERTY OWNER'S NAME/COMPANY NAME: UofM / Gordon Gutz

Property owner's mailing address if different from well location address indicated above: 15325 BABCOCK Ave Rosemount, MN 55068

WELL OWNER'S NAME/COMPANY NAME: USACE

Well owner's mailing address if different from property owner's address indicated above: 106 S 15th St Omaha NE. 68102

GEOLOGICAL MATERIAL	COLOR	HARDNESS OR FORMATION	FROM	TO
If not known, indicate estimated formation log from nearby well or boring.				
Sand/Gravel	Brown	Hard	0	60

REMARKS, SOURCE OF DATA, DIFFICULTIES IN SEALING: AOC 7A 7470-11

MINN. DEPT OF HEALTH COPY: H 264902

Date Sealed: 8-15-07

Date Well or Boring Constructed: 8-15-07

Depth Before Sealing: 60 ft. Original Depth: 60 ft.

AQUIFER(S): ☐ Single Aquifer ☐ Multiaquifer N/A

WELL/BORING: ☐ Water-Supply Well ☐ Monit. Well ☒ Env. Bore Hole ☐ Other ___

STATIC WATER LEVEL: ☐ Measured ☐ Estimated Date Measured N/A ___ ft. ☐ below ☐ above land surface

CASING TYPE(S): N/A ☐ Steel ☐ Plastic ☐ Tile ☐ Other ___

WELLHEAD COMPLETION: N/A
Outside: ☐ Well House ☐ At Grade ☐ Pitless Adapter/Unit ☐ Buried ☐ Well Pit ☐ Other ___
Inside: ☐ Basement Offset ☐ Well Pit ☐ Buried ☐ Other ___

CASING(S): N/A

Diameter	Depth	Set in oversize hole?	Annular space initially grouted?
___ in. from ___	to ___ ft.	☐ Yes ☐ No	☐ Yes ☐ No ☐ Unknown
___ in. from ___	to ___ ft.	☐ Yes ☐ No	☐ Yes ☐ No ☐ Unknown
___ in. from ___	to ___ ft.	☐ Yes ☐ No	☐ Yes ☐ No ☐ Unknown

SCREEN/OPEN HOLE: N/A Screen from ___ to ___ ft. Open Hole from 0 to 60 ft.

OBSTRUCTIONS: ☐ Rods/Drop Pipe ☐ Check Valve(s) ☐ Debris ☐ Fill ☒ No Obstruction
Type of Obstructions (Describe): ___
Obstructions removed? ☐ Yes ☐ No Describe: ___

PUMP: Type ___ ☐ Removed ☒ Not Present ☐ Other ___

METHOD USED TO SEAL ANNULAR SPACE BETWEEN 2 CASINGS, OR CASING AND BORE HOLE:
☒ No Annular Space Exists ☐ Annular Space Grouted with Tremie Pipe ☐ Casing Perforation/Removal
___ in. from ___ to ___ ft. ☐ Perforated ☐ Removed
___ in. from ___ to ___ ft. ☐ Perforated ☐ Removed
Type of Perforator: ___
☐ Other ___

GROUTING MATERIAL(S) (One bag of cement = 94 lbs., one bag of bentonite = 50 lbs.)
Grouting Material: Bentonite from 0 to 60 ft. ___ yards 1 bags
___ from ___ to ___ ft. ___ yards ___ bags
___ from ___ to ___ ft. ___ yards ___ bags

OTHER WELLS AND BORINGS: Other unsealed and unused well or boring on property? ☐ Yes ☒ No How many? ___

LICENSED OR REGISTERED CONTRACTOR CERTIFICATION
This well or boring was sealed in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

NTS — License Business Name
1635 — License or Registration No.
Certified Representative Signature
1635 — Certified Rep. No.
10-15-07 — Date
Scott Skraba — Name of Person Sealing Well or Boring

HE-01434-10 IC# 140-0423 6/07R

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING SEALING RECORD
Minnesota Statutes, Chapter 103I

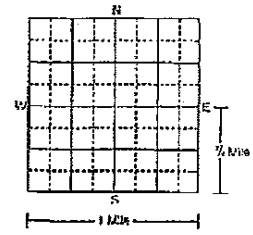
Minnesota Well and Boring Sealing No. H 264904
Minnesota Unique Well No. or W-series No.

WELL OR BORING LOCATION
County Name: DAKOTA
Township Name | Township No. 115 | Range No. 19 | Section No. 30 | Fraction (sm., lg.) W 1/2

GPS LOCATION: Latitude ____ degrees ____ minutes ____ seconds; Longitude ____ degrees ____ minutes ____ seconds

Numerical Street Address or Flat Number and City of Well or Boring Location: 15324 BABCOCK AVE

Show exact location of well or boring in section grid with "X." Sketch map of well or boring location, showing property lines, roads, and buildings.



PROPERTY OWNER'S NAME/COMPANY NAME: DORAN / GORDON GIRTZ
Property owner's mailing address if different from well location address indicated above: 15325 BABCOCK AVE ROSEMOUNT, MN

WELL OWNER'S NAME/COMPANY NAME: USACE
Well owner's mailing address if different than property owner's address indicated above: 106 S 15TH STREET OMAHA, NE 68102

GEOLOGICAL MATERIAL	COLOR	HARDNESS OR FORMATION	FROM	TO
If not known, indicate estimated formation log from nearby well or boring.				
FILL/GRAVEL/BENT		HARD	0	66

REMARKS, SOURCE OF DATA, DIFFICULTIES IN SEALING

MINN. DEPT OF HEALTH COPY | H 264904

Date Sealed: 8-17-08
Date Well or Boring Constructed: 8-17-08
Depth Before Sealing: 66 ft. Original Depth: 66 ft.

AQUIFER(S): [X] Single Aquifer [ ] Multiaquifer
WELL/BORING: [ ] Water-Supply Well [ ] Monit. Well [X] Env. Bore Hole [ ] Other
STATIC WATER LEVEL: [ ] Measured [X] Estimated Date Measured ____ 60 ft. [X] below [ ] above land surface

CASING TYPE(S): [X] Steel [ ] Plastic [ ] Tile [ ] Other
WELLHEAD COMPLETION: Outside: [ ] Well House [ ] At Grade [ ] Pitless Adapter/Unit [ ] Buried [ ] Well Pit [ ] Other. Inside: NA [ ] Basement Offset [ ] Well Pit [ ] Buried [ ] Other

CASING(S): Diameter NA Depth

		Set in oversize hole?	Annular space initially grouted?
____ in. from ____ to ____ ft.		[ ] Yes [ ] No	[ ] Yes [ ] No [ ] Unknown
____ in. from ____ to ____ ft.		[ ] Yes [ ] No	[ ] Yes [ ] No [ ] Unknown
____ in. from ____ to ____ ft.		[ ] Yes [ ] No	[ ] Yes [ ] No [ ] Unknown

SCREEN/OPEN HOLE: Screen from NA to ____ ft. Open Hole from 0 to 66 ft.

OBSTRUCTIONS: [ ] Rods/Drop Pipe [ ] Check Valve(s) [ ] Debris [ ] Fill [X] No Obstruction
Type of Obstructions (Describe): ____
Obstructions removed? [ ] Yes [ ] No Describe: ____

PUMP: Type ____ [X] Removed [X] Not Present [ ] Other

METHOD USED TO SEAL ANNULAR SPACE BETWEEN 2 CASINGS, OR CASING AND BORE HOLE: [X] No Annular Space Exists [ ] Annular Space Grouted with Tremie Pipe [ ] Casing Perforation/Removal

____ in. from ____ to ____ ft.	[ ] Perforated	[ ] Removed
____ in. from ____ to ____ ft.	[ ] Perforated	[ ] Removed

Type of Perforator: ____
[ ] Other: ____

GROUTING MATERIAL(S) (One bag of cement = 94 lbs., one bag of bentonite = 50 lbs.)
Grouting Material BENTONITE from 0 to 66 ft. ____ yards 1 bags
____ from ____ to ____ ft. ____ yards ____ bags
____ from ____ to ____ ft. ____ yards ____ bags

OTHER WELLS AND BORINGS
Other unsealed and unused well or boring on property? [ ] Yes [X] No How many? ____

LICENSED OR REGISTERED CONTRACTOR CERTIFICATION
This well or boring was sealed in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Northeast Technical Services — 1635
Licensee Business Name — License or Registration No.

Certified Representative Signature — 1635 — 4-29-08
Certified Rep. No. — Date

Scott Skrabo
Name of Person Sealing Well or Boring

HE-01434-10 IC# 140-0423 5/07R

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING SEALING RECORD
Minnesota Statutes, Chapter 103I

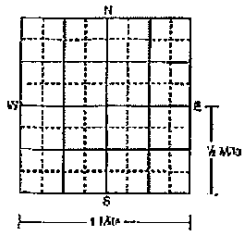
Minnesota Well and Boring Sealing No.
Minnesota Unique Well No. or W-series No.
H 264905

WELL OR BORING LOCATION
County: DAKOTA
Township Name | Township No. 115 | Range No. 19 | Section No. 36 | Fraction (sm. than 10 ac.) W 1/2

GPS LOCATION: Latitude ____ degrees ____ minutes ____ seconds; Longitude ____ degrees ____ minutes ____ seconds

Numerical Street Address or Fire Number and City of Well or Boring Location
15324 BABCOCK AVE

Show exact location of well or boring in section grid with "X." Sketch map of well or boring location, showing property lines, roads, and buildings.



Date Sealed: 8-20-08
Date Well or Boring Constructed: 8-20-08
Depth Before Sealing: 66 ft.
Original Depth: 66 ft.

AQUIFER(S): ☐ Single Aquifer ☐ Multiaquifer
WELL/BORING: ☐ Water-Supply Well ☐ Monit. Well ☒ Env. Bore Hole ☐ Other ____
STATIC WATER LEVEL: ☐ Measured ☒ Estimated Date Measured ____ 60 ft. ☐ below ☐ above land surface
CASING TYPE(S): ☒ Steel ☐ Plastic ☐ Tile ☐ Other ____
WELLHEAD COMPLETION: NA
Outside: ☐ Well House ☐ At Grade ☐ Pitless Adapter/Unit ☐ Buried ☐ Well Pit ☐ Other ____
Inside: ☐ Basement Offset ☐ Well Pit ☐ Buried ☐ Other ____

PROPERTY OWNER'S NAME/COMPANY NAME: W of M / Gordon Gritz
Property owner's mailing address if different than well location address indicated above:
15325 BABCOCK AVE
ROSEMOUNT, MN
55068

CASING(S): NA
Diameter ____ in. from ____ to ____ ft. Set in oversize hole? ☐ Yes ☐ No Annular space initially grouted? ☐ Yes ☐ No ☐ Unknown
(repeat for additional casings)

WELL OWNER'S NAME/COMPANY NAME: USACE
Well owner's mailing address if different than property owner's address indicated above:
106 S 15TH ST.
OMAHA, NE 68102

SCREEN/OPEN HOLE: NA
Screen from ____ to ____ ft. Open Hole from 0 to 66 ft.

OBSTRUCTIONS: ☐ Rods/Drop Pipe ☐ Check Valve(s) ☐ Debris ☐ Fill ☒ No Obstruction
Type of Obstructions (Describe) ____
Obstructions removed? ☐ Yes ☐ No Describe ____

PUMP: Type ____ ☐ Removed ☒ Not Present ☐ Other ____

GEOLOGICAL MATERIAL	COLOR	HARDNESS OR FORMATION	FROM	TO
If not known, indicate estimated formation log from nearby well or boring.				
SAND/GRAVEL	BRN	HARD	0	66

METHOD USED TO SEAL ANNULAR SPACE BETWEEN 2 CASINGS, OR CASING AND BORE HOLE:
☒ No Annular Space Exists ☐ Annular Space Grouted with Tremie Pipe ☐ Casing Perforation/Removal
____ in. from ____ to ____ ft. ☐ Perforated ☐ Removed
____ in. from ____ to ____ ft. ☐ Perforated ☐ Removed
Type of Perforator ____
☐ Other ____

GROUTING MATERIAL(S) (One bag of cement = 94 lbs., one bag of bentonite = 50 lbs.)
Grouting Material: BENTONITE from 0 to 66 ft. ____ yards 1 bags
____ from ____ to ____ ft. ____ yards ____ bags
____ from ____ to ____ ft. ____ yards ____ bags

OTHER WELLS AND BORINGS
Other unsealed and unused well or boring on property? ☐ Yes ☒ No How many? ____

REMARKS, SOURCE OF DATA, DIFFICULTIES IN SEALING

LICENSED OR REGISTERED CONTRACTOR CERTIFICATION
This well or boring was sealed in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Northeast Technical Services — Licensee Business Name — License or Registration No. 1635
Certified Representative Signature — Certified Rep. No. 1635 — Date 4-29-08
Scott Skrabo — Name of Person Sealing Well or Boring

MINN. DEPT. OF HEALTH COPY H 264905

HE-01434-10 IC# 140-0423 S/07R

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING SEALING RECORD
Minnesota Statutes, Chapter 1031

Minnesota Well and Boring Sealing No. / Minnesota Unique Well No. or W-series No. (Leave blank if not known): **H 264906**

WELL OR BORING LOCATION

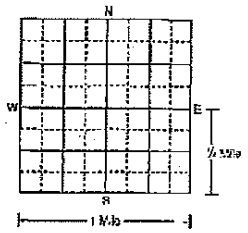
County Name: DAKOTA

Township Name	Township No.	Range No.	Section No.	Fraction (sm. = sq.)
	115	19	36	W1/2

GPS LOCATION: Latitude ____ degrees ____ minutes ____ seconds; Longitude ____ degrees ____ minutes ____ seconds

Numerical Street Address or Fire Number and City of Well or Boring Location: 15324 BABCOCK Ave

Show exact location of well or boring in section grid with "X". Sketch map of well or boring location, showing property lines, roads, and buildings.



PROPERTY OWNER'S NAME/COMPANY NAME: Doug Jordan Gintz

Property owner's mailing address if different than well location address indicated above: 15325 BABCOCK AVE, ROSEMOUNT, MN 55068

WELL OWNER'S NAME/COMPANY NAME: USACE

Well owner's mailing address if different than property owner's address indicated above: 106 S 15th ST, OMAHA, NE 68102

GEOLOGICAL MATERIAL	COLOR	HARDNESS OR FORMATION	FROM	TO
If not known, indicate estimated formation log from nearby well or boring.				
SAND/GRAVEL	BRN	HARD	0	60

REMARKS, SOURCE OF DATA, DIFFICULTIES IN SEALING

MINN. DEPT OF HEALTH COPY: H 264906

Date Sealed: 8-21-07

Date Well or Boring Constructed: 8-21-07

Depth Before Sealing: 66 ft.

Original Depth: 66 ft.

AQUIFER(S): ☐ Single Aquifer ☐ Multiaquifer

STATIC WATER LEVEL: ☐ Measured ☑ Estimated Date Measured ____

WELL/BORING: ☐ Water-Supply Well ☐ Monit. Well ☑ Env. Bore Hole ☐ Other ____

60 ft. ☑ below ☐ above land surface

CASING TYPE(S): ☑ Steel ☐ Plastic ☐ Tile ☐ Other ____

WELLHEAD COMPLETION

Outside: ☐ Well House ☑ At Grade ☐ Pitless Adapter/Unit ☐ Buried ☐ Well Pit ☐ Other ____

Inside: ☐ Basement Offset ☐ Well Pit ☐ Buried ☐ Other ____

CASING(S)

Diameter	Depth	Set in oversize hole?	Annular space initially grouted?
____ in. from ____ to ____ ft.	N/A	☐ Yes ☐ No	☐ Yes ☐ No ☐ Unknown
____ in. from ____ to ____ ft.		☐ Yes ☐ No	☐ Yes ☐ No ☐ Unknown
____ in. from ____ to ____ ft.		☐ Yes ☐ No	☐ Yes ☐ No ☐ Unknown

SCREEN/OPEN HOLE: Screen from N/A ft. to ____ ft. Open Hole from 0 to 66 ft.

OBSTRUCTIONS: ☐ Rods/Drop Pipe ☐ Check Valve(s) ☐ Debris ☐ Fill ☒ No Obstruction

Type of Obstructions (Describe): ____

Obstructions removed? ☐ Yes ☐ No Describe ____

PUMP: Type ____ ☐ Removed ☒ Not Present ☐ Other ____

METHOD USED TO SEAL ANNULAR SPACE BETWEEN 2 CASINGS, OR CASING AND BORE HOLE:

☒ No Annular Space Exists ☐ Annular Space Grouted with Tremie Pipe ☐ Casing Perforation/Removal

____ in. from ____ to ____ ft. ☐ Perforated ☐ Removed

____ in. from ____ to ____ ft. ☐ Perforated ☐ Removed

Type of Perforator ____

☐ Other ____

GROUTING MATERIAL(S) (One bag of cement = 94 lbs., one bag of bentonite = 50 lbs.)

Grouting Material: BENTONITE from 0 to 66 ft. ____ yards 1 bags

____ from ____ to ____ ft. ____ yards ____ bags

____ from ____ to ____ ft. ____ yards ____ bags

OTHER WELLS AND BORINGS: Other unsealed and unused well or boring on property? ☐ Yes ☒ No How many? ____

LICENSED OR REGISTERED CONTRACTOR CERTIFICATION

This well or boring was sealed in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Northeast Technical Services — 1635
Licensee Business Name — *License or Registration No.*

Certified Representative Signature — 1635 *Certified Rep. No.* — 4-29-08 *Date*

Scott Skrabo
Name of Person Sealing Well or Boring

HE-01434-10 IC# 140-8423 5078

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING SEALING RECORD
Minnesota Statutes, Chapter 103I

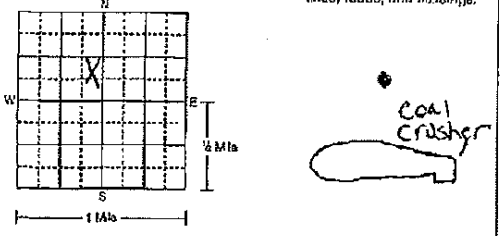
Minnesota Well and Boring Sealing No. / Minnesota Unique Well No. or W-series No. (Leave blank if not known): **H 264907**

WELL OR BORING LOCATION
County Name: Dakota
Township Name: Rosemount | Township No.: 115N | Range No.: 19W | Section No.: 36 | Fraction (sm. → lg.): NW SE NW

GPS LOCATION: Latitude ____ degrees ____ minutes ____ seconds; Longitude ____ degrees ____ minutes ____ seconds

Numerical Street Address or Fire Number and City of Well or Boring Location: 15325 Babcock Ave Rosemount MN

Show exact location of well or boring in section grid with "X." Sketch map of well or boring location, showing property lines, roads, and buildings.



Date Sealed: 8-22-07
Date Well or Boring Constructed: 8-21-07
Depth Before Sealing: 68 ft. | Original Depth: 68 ft.

AQUIFER(S): ☐ Single Aquifer ☐ Multiaquifer
WELL/BORING: ☐ Water-Supply Well ☐ Monit. Well ☒ Env. Bore Hole ☐ Other
STATIC WATER LEVEL: ☐ Measured ☒ Estimated Date Measured ____ .. 60 ft. ☐ below ☐ above land surface

CASING TYPE(S): ☒ Steel ☐ Plastic ☐ Tile ☐ Other

WELLHEAD COMPLETION: N/A
Outside: ☐ Well House ☐ At Grade ☐ Flitless Adapter/Unit ☐ Buried ☐ Well Pit ☐ Other
Inside: ☐ Basement Offset ☐ Well Pit ☐ Buried ☐ Other

PROPERTY OWNER'S NAME/COMPANY NAME: Olson / Gordon Girtz
Property owner's mailing address if different than well location address indicated above:
15325 Babcock Ave.
Rosemount, MN
55068

CASING(S)

Diameter	Depth	Set in oversize hole?	Annular space initially grouted?
15 in. from 0	to 64 ft.	☐ Yes ☐ No	☐ Yes ☐ No ☐ Unknown
___ in. from ___	to ___ ft.	☐ Yes ☐ No	☐ Yes ☐ No ☐ Unknown
___ in. from ___	to ___ ft.	☐ Yes ☐ No	☐ Yes ☐ No ☐ Unknown

WELL OWNER'S NAME/COMPANY NAME: USACE
Well owner's mailing address if different than property owner's address indicated above:
1026 S. 15th St
Omaha NE 68102

SCREEN/OPEN HOLE: Screen from 64 to 68 ft. Open Hole from ____ to ____ ft.

OBSTRUCTIONS: ☐ Rods/Drop Pipe ☐ Check Valve(s) ☐ Debris ☐ Fill ☐ No Obstruction
Type of Obstructions (Describe): NA
Obstructions removed? ☐ Yes ☐ No Describe

PUMP: Type ____ ☐ Removed ☒ Not Present ☐ Other

METHOD USED TO SEAL ANNULAR SPACE BETWEEN 2 CASINGS, OR CASING AND BORE HOLE:
☒ No Annular Space Exists ☐ Annular Space Grouted with Tremie Pipe ☐ Casing Perforation/Removal
___ in. from ___ to ___ ft. ☐ Perforated ☐ Removed
___ in. from ___ to ___ ft. ☐ Perforated ☐ Removed
Type of Perforator
☐ Other

GROUTING MATERIAL(S) (One bag of cement = 94 lbs., one bag of bentonite = 50 lbs.)
Grouting Material: Bentonite from 0 to 68 ft. ___ yards 1 bags
___ from ___ to ___ ft. ___ yards ___ bags
___ from ___ to ___ ft. ___ yards ___ bags

GEOLOGICAL MATERIAL	COLOR	HARDNESS OR FORMATION	FROM	TO
If not known, indicate estimated formation log from nearby well or boring.				
Sand & Gravel	BRN	Hard	0	68

OTHER WELLS AND BORINGS: Other unsealed and unused well or boring on property? ☐ Yes ☒ No How many? ____

REMARKS, SOURCE OF DATA, DIFFICULTIES IN SEALING

LICENSED OR REGISTERED CONTRACTOR CERTIFICATION
This well or boring was sealed in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Licensee Business Name: 1635 — License or Registration No.
Certified Representative Signature: 1635 — Certified Rep. No. — Date: 10-15-07
Name of Person Sealing Well or Boring: Scott S. Kraba

MINN. DEPT OF HEALTH COPY | H 264907

HE-01434-10 ICH 140-0423 5078

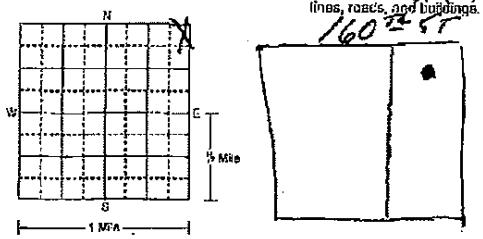
MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING SEALING RECORD
Minnesota Statutes, Chapter 103I

Minnesota Well and Boring Sealing No. H 264915
Minnesota Unique Well No. or W-series No.

WELL OR BORING LOCATION
County Name: Dakota
Township Name: ~~Rosemount~~ EMPIRE | Township No.: 114 N | Range No.: 19 W | Section No.: 4 | Fraction (sm. → lg.): NE NE NE
GPS LOCATION: Latitude ____ degrees ____ minutes ____ seconds; Longitude ____ degrees ____ minutes ____ seconds

Numerical Street Address or Fire Number and City of Well or Boring Location: 15325 Babcock Ave

Show exact location of well or boring in section grid with "X." Sketch map of well or boring location, showing property lines, roads, and buildings.



Date Sealed: 9-6-07
Date Well or Boring Constructed: 9-5-07
Depth Before Sealing: 44 ft.
Original Depth: 44 ft.

AQUIFER(S): ☐ Single Aquifer ☐ Multiaquifer
WELL/BORING: ☐ Water-Supply Well ☐ Monit. Well ☒ Env. Bore Hole ☐ Other ____

STATIC WATER LEVEL: ☒ Measured ☐ Estimated Date Measured ____
42 ft. ☒ below ☐ above land surface

CASING TYPE(S): ☐ Steel ☒ Plastic ☐ Tile ☐ Other ____

WELLHEAD COMPLETION
Outside: ☐ Well House N/A ☐ At Grade ☐ Pitless Adapter/Unit ☐ Buried ☐ Well Pit ☐ Other ____
Inside: ☐ Basement Offset ☐ Well Pit ☐ Buried ☐ Other ____

PROPERTY OWNER'S NAME/COMPANY NAME: Wolfm / Gordon Gritz
Property owner's mailing address if different than well location address indicated above: 15325 BABCOCK Ave, Rosemount, MN 55068

CASING(S)

Diameter	Depth	Set in overalze hole?	Annu'ar space initially grouted?
1.5 in. from 0	to 34 ft.	☐ Yes ☐ No	☐ Yes ☐ No ☐ Unknown
____ in. from ____	to ____ ft.	☐ Yes ☐ No	☐ Yes ☐ No ☐ Unknown
____ in. from ____	to ____ ft.	☐ Yes ☐ No	☐ Yes ☐ No ☐ Unknown

WELL OWNER'S NAME/COMPANY NAME: DSAKE
Well owner's mailing address if different than property owner's address indicated above: 106 S. 15th St, Omaha, NE 68102

SCREEN/OPEN HOLE: Screen from 34 to 44 ft. Open Hole from N/A to ____ ft.

OBSTRUCTIONS: ☐ Rods/Drop Pipe ☐ Check Valve(s) ☐ Debris ☐ Fill ☒ No Obstruction
Type of Obstructions (Describe): ____
Obstructions removed? ☐ Yes ☐ No Describe ____

PUMP: Type ____ ☐ Removed ☒ Not Present ☐ Other ____

METHOD USED TO SEAL ANNULAR SPACE BETWEEN 2 CASINGS, OR CASING AND BORE HOLE:
☐ No Annular Space Exists ☐ Annular Space Grouted with Tremie Pipe ☐ Casing Perforation/Removal
____ in. from ____ to ____ ft. ☐ Perforated ☐ Removed
____ in. from ____ to ____ ft. ☐ Perforated ☐ Removed
Type of Perforator: ____
☐ Other ____

GEOLOGICAL MATERIAL	COLOR	HARDNESS OR FORMATION	FROM	TO
If not known, indicate estimated formation log from nearby well or boring.				
Sand & Gravel	Brown	Hard	0	44

GROUTING MATERIAL(S) (One bag of cement = 94 lbs., one bag of bentonite = 50 lbs.)
Grouting Material: Bentonite from 0 to 44 ft. ____ yards 1 bags
____ from ____ to ____ ft. ____ yards ____ bags
____ from ____ to ____ ft. ____ yards ____ bags

OTHER WELLS AND BORINGS: Other unsealed and unused well or boring on property? ☐ Yes ☒ No How many? ____

REMARKS, SOURCE OF DATA, DIFFICULTIES IN SEALING: 7470

LICENSED OR REGISTERED CONTRACTOR CERTIFICATION
This well or boring was sealed in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

NTS — Licensed Business Name
1635 — License or Registration No.
Certified Representative Signature
1635 — Certified Rep. No.
10-15-07 — Date
Scott Skraba — Name of Person Sealing Well or Boring

MINN. DEPT OF HEALTH COPY | H 264915

HE-01434-10 ICs 1-10-3423 5078

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING SEALING RECORD
Minnesota Statutes, Chapter 103I

Minnesota Well and Boring Sealing No. / Minnesota Unique Well No. or W-series No. (If none, leave blank.): H 264916

WELL OR BORING LOCATION

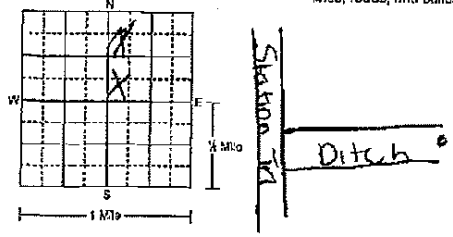
County Name: Dakota

Township Name	Township No.	Range No.	Section No.	Fraction (sm. = lg.)
~~Rosemount~~ Empire	114N	19W	4	NE ¼ SW ¼ NE ¼

GPS LOCATION: Latitude ____ degrees ____ minutes ____ seconds; Longitude ____ degrees ____ minutes ____ seconds

Numerical Street Address or Fire Number and City of Well or Boring Location: 15325 Babcock Ave Rosemount MN 55068

Show exact location of well or boring in section grid with "X"



Sketch map of well or boring location, showing property lines, roads, and buildings.

Date Sealed: 9-14-07

Date Well or Boring Constructed: 9-14-07

Depth Before Sealing: 66 ft.

Original Depth: 66 ft.

AQUIFER(S): ☐ Single Aquifer ☐ Multiaquifer

WELL/BORING: ☐ Water-Supply Well ☐ Monit. Well ☒ Env. Bore Hole ☐ Other ____

STATIC WATER LEVEL: ☐ Measured ☒ Estimated Date Measured ____ 65 ft. ☐ below ☐ above land surface

CASING TYPE(S): ☒ Steel ☐ Plastic ☐ Tile ☐ Other ____

WELLHEAD COMPLETION

Outside: ☐ Well House ~~NA~~ ☐ At Grade ☐ Pitless Adapter/Unit ☐ Buried ☐ Well Pit ☐ Other ____

Inside: ☐ Basement Offset ☐ Well Pit ☐ Buried ☐ Other ____

PROPERTY OWNER'S NAME/COMPANY NAME: U of M / Gordon Girtz

Property owner's mailing address if different than well location address indicated above: 15325 Babcock Ave Rosemount, MN 55068

WELL OWNER'S NAME/COMPANY NAME: USACE

Well owner's mailing address if different than property owner's address indicated above: 106 South 15th St Omaha NE 68102

CASING(S)

Diameter	Depth	Set in oversize hole?	Annular space initially grouted?
1 in. from 0	to 62 ft.	☐ Yes ☐ No	☐ Yes ☐ No ☐ Unknown
____ in. from ____	to ____ ft.	☐ Yes ☐ No	☐ Yes ☐ No ☐ Unknown
____ in. from ____	to ____ ft.	☐ Yes ☐ No	☐ Yes ☐ No ☐ Unknown

SCREEN/OPEN HOLE: Screen from 62 to 66 ft. Open Hole from ____ to ____ ft.

OBSTRUCTIONS: ☐ Rods/Drop Pipe ☐ Check Valve(s) ☐ Debris ☐ Fill ☒ No Obstruction

Type of Obstructions (Describe): ____

Obstructions removed? ☐ Yes ☐ No Describe ____

PUMP: Type ____ ☐ Removed ☒ Not Present ☐ Other ____

METHOD USED TO SEAL ANNULAR SPACE BETWEEN 2 CASINGS, OR CASING AND BORE HOLE:

☒ No Annular Space Exists ☐ Annular Space Grouted with Tremie Pipe ☐ Casing Perforation/Removal

____ in. from ____ to ____ ft. ☐ Perforated ☐ Removed

____ in. from ____ to ____ ft. ☐ Perforated ☐ Removed

Type of Perforator ____

☐ Other ____

GROUTING MATERIAL(S) (One bag of cement = 94 lbs., one bag of bentonite = 50 lbs.)

Grouting Material: Bentonite from 0 to 66 ft. ____ yards 1 bags

____ from ____ to ____ ft. ____ yards ____ bags

____ from ____ to ____ ft. ____ yards ____ bags

GEOLOGICAL MATERIAL	COLOR	HARDNESS OR FORMATION	FROM	TO
If not known, indicate estimated formation log from nearby well or boring.				
Sand & gravel	BRN	Hard	0	20
Coarse Sand & gravel	BRN	Hard	20	66

OTHER WELLS AND BORINGS: Other unsealed and unused well or boring on property? ☐ Yes ☒ No How many? ____

REMARKS, SOURCE OF DATA, DIFFICULTIES IN SEALING

7470.11

LICENSED OR REGISTERED CONTRACTOR CERTIFICATION

This well or boring was sealed in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

NTS — Licensee Business Name

1635 — License or Registration No.

Certified Representative Signature

1635 10-15-07 — Certified Rep. No. / Date

Scott Skrabal — Name of Person Sealing Well or Boring

MINN. DEPT. OF HEALTH COPY: H 264916

HE-01434-10 IC# 140-0423

5078

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING SEALING RECORD
Minnesota Statutes, Chapter 103I

Minnesota Well and Boring Sealing No. H 264917
Minnesota Unique Well No. or W-series No.

WELL OR BORING LOCATION

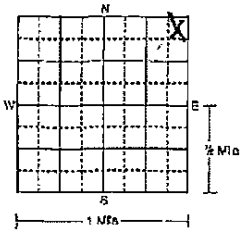
County Name: Dakota

Township Name: ~~Rosemount~~ EMPIRE | Township No.: 114N | Range No.: 19W | Section No.: 10 | Fraction (sm. → lg.): NW¼ NE¼

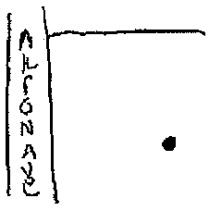
GPS LOCATION: Latitude ____ degrees ____ minutes ____ seconds; Longitude ____ degrees ____ minutes ____ seconds

Numerical Street Address or Fire Number and City of Well or Boring Location: 15325 Babcock Ave Rosemount MN

Show exact location of well or boring in section grid with "X"



Sketch map of well or boring location, showing property lines, roads, and buildings.



PROPERTY OWNER'S NAME/COMPANY NAME: USACE / Gordon Gurtz

Property owner's mailing address if different than well location address indicated above: 15325 BABCOCK AVE ROSEMOUNT, MN 55068

WELL OWNER'S NAME/COMPANY NAME: USACE

Well owner's mailing address if different than property owner's address indicated above: 106 S. 15th St Omaha, NE 68102

GEOLOGICAL MATERIAL	COLOR	HARDNESS OR FORMATION	FROM	TO
If not known, indicate estimated formation log from nearby well or boring.				
Sand & gravel	tan	Hard	0	66

REMARKS, SOURCE OF DATA, DIFFICULTIES IN SEALING: 7470.11

MINN. DEPT OF HEALTH COPY: H 264917

Date Sealed: 9-14-07

Date Well or Boring Constructed: 9-14-07

Depth Before Sealing: 66 ft. | Original Depth: 66 ft.

AQUIFER(S): ☐ Single Aquifer ☐ Multiaquifer

WELL/BORING: ☐ Water-Supply Well ☐ Monit. Well ☒ Env. Bore Hole ☐ Other ____

STATIC WATER LEVEL: ☐ Measured ☒ Estimated Date Measured ____ 60 ft. ☐ below ☐ above land surface

CASING TYPE(S): ☒ Steel ☐ Plastic ☐ Tile ☐ Other ____

WELLHEAD COMPLETION

Outside: ☐ Well House ☐ At Grade ☐ Pitless Adapter/Unit ☐ Buried ☐ Well Pit ☐ Other ____

Inside: ☐ Basement Offset ☐ Well Pit ☐ Buried ☐ Other ____

CASING(S)

Diameter	Depth	Set in oversize hole?	Annular space initially grouted?
1 in. from 0	to 62 ft.	☐ Yes ☒ No	☐ Yes ☐ No ☐ Unknown
____ in. from ____	to ____ ft.	☐ Yes ☐ No	☐ Yes ☐ No ☐ Unknown
____ in. from ____	to ____ ft.	☐ Yes ☐ No	☐ Yes ☐ No ☐ Unknown

SCREEN/OPEN HOLE: Screen from 62 to 66 ft. Open Hole from ____ to ____ ft.

OBSTRUCTIONS: ☐ Hole/Drop Pipe ☐ Check Valve(s) ☐ Debris ☐ Fill ☒ No Obstruction

Type of Obstructions (Describe) ____

Obstructions removed? ☐ Yes ☐ No Describe ____

PUMP: Type ____ ☐ Removed ☒ Not Present ☐ Other ____

METHOD USED TO SEAL ANNULAR SPACE BETWEEN 2 CASINGS, OR CASING AND BORE HOLE:

☒ No Annular Space Exists ☐ Annular Space Grouted with Tremie Pipe ☐ Casing Perforation/Removal

____ in. from ____ to ____ ft. ☐ Perforated ☐ Removed

____ in. from ____ to ____ ft. ☐ Perforated ☐ Removed

Type of Perforator ____

☐ Other ____

GROUTING MATERIAL(S) (One bag of cement = 94 lbs., one bag of bentonite = 50 lbs.)

Grouting Material: Bentonite from 0 to 66 ft. ____ yards 1 bags

____ from ____ to ____ ft. ____ yards ____ bags

____ from ____ to ____ ft. ____ yards ____ bags

OTHER WELLS AND BORINGS: Other unsealed and unused well or boring on property? ☐ Yes ☒ No How many? ____

LICENSED OR REGISTERED CONTRACTOR CERTIFICATION

This well or boring was sealed in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

NTS — Licensed Business Name

1635 — License or Registration No.

Certified Representative Signature

1635 — Certified Rep No

10-15-07 — Date

SCOTT SKRAMSTA — Name of Person Sealing Well or Boring

HE-01434-10 IC# 140-0123 5/07R

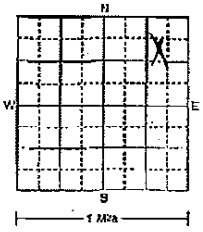
MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING SEALING RECORD
Minnesota Statutes, Chapter 1031

Minnesota Well and Boring Sealing No. H 264918
Minnesota Unique Well No. or W-series No. (Leave from 1 inch blank)

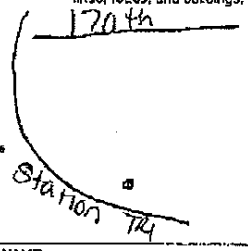
WELL OR BORING LOCATION
County Name: DAKOTA
Township Name: ~~Rosemount~~ EMPIRE | Township No.: 114 | Range No.: 19 | Section No.: 10 | Fraction (sm. = lg.): ~~NE/SW/NE/NE~~ SW/NE/NE
GPS LOCATION: Latitude ___ degrees ___ minutes ___ seconds; Longitude ___ degrees ___ minutes ___ seconds

Numerical Street Address or Fire Number and City of Well or Boring Location
15325 Babcock Ave.

Show exact location of well or boring in section grid with "X."



Sketch map of well or boring location, showing property lines, roads, and buildings.



PROPERTY OWNER'S NAME/COMPANY NAME: ROEM / Gordon Gietz
Property owner's mailing address if different than well location address indicated above:
15325 BABCOCK Ave
ROSEMOUNT, MN 55068

WELL OWNER'S NAME/COMPANY NAME: USACE
Well owner's mailing address if different than property owner's address indicated above:
106 515th St
Omaha NE 68102

GEOLOGICAL MATERIAL	COLOR	HARDNESS OR FORMATION	FROM	TO
If not known, indicate estimated formation log from nearby well or boring.				
Sand + gravel	BRN	Hard	0	66

REMARKS, SOURCE OF DATA, DIFFICULTIES IN SEALING
7470.11

MINN. DEPT OF HEALTH COPY H 264918

Date Sealed: 9-14-07
Date Well or Boring Constructed: 9-13-07
Depth Before Sealing: 66 ft. Original Depth: 66 ft.

AQUIFER(S): ☐ Single Aquifer ☐ Multiaquifer
WELL/BORING: ☐ Water-Supply Well ☐ Monit. Well ☒ Env. Boro Hole ☐ Other
STATIC WATER LEVEL: ☐ Measured ☒ Estimated Date Measured ___ 60 ft. ☐ below ☐ above land surface

CASING TYPE(S): ☒ Steel ☐ Plastic ☐ Tile ☐ Other

WELLHEAD COMPLETION: N/A
Outside: ☐ Well House ☐ At Grade ☐ Pitless Adapter/Unit ☐ Buried ☐ Well Pit ☐ Other
Inside: ☐ Basement Offset ☐ Well Pit ☐ Buried ☐ Other

CASING(S)

Diameter	Depth	Set in oversize hole?	Annular space initially grouted?
1 in. from 0 to 62 ft.		☐ Yes ☐ No	☐ Yes ☐ No ☐ Unknown
___ in. from ___ to ___ ft.		☐ Yes ☐ No	☐ Yes ☐ No ☐ Unknown
___ in. from ___ to ___ ft.		☐ Yes ☐ No	☐ Yes ☐ No ☐ Unknown

SCREEN/OPEN HOLE: Screen from 62 to 66 ft. Open Hole from ___ to ___ ft.

OBSTRUCTIONS: ☐ Rods/Drop Pipe ☐ Check Valve(s) ☐ Debris ☐ Fill ☒ No Obstruction
Type of Obstructions (Describe): ___
Obstructions removed? ☐ Yes ☐ No Describe: ___

PUMP: Type ___ ☐ Removed ☒ Not Present ☐ Other ___

METHOD USED TO SEAL ANNULAR SPACE BETWEEN 2 CASINGS, OR CASING AND BORE HOLE:
☒ No Annular Space Exists ☐ Annular Space Grouted with Tremie Pipe ☐ Casing Perforation/Removal
___ in. from ___ to ___ ft. ☐ Perforated ☐ Removed
___ in. from ___ to ___ ft. ☐ Perforated ☐ Removed
Type of Perforator ___
☐ Other ___

GROUTING MATERIAL(S) (One bag of cement = 94 lbs., one bag of bentonite = 50 lbs.)
Grouting Material: Bentonite from 0 to 66 ft. ___ yards 1 bags
___ from ___ to ___ ft. ___ yards ___ bags
___ from ___ to ___ ft. ___ yards ___ bags

OTHER WELLS AND BORINGS
Other unsealed and unused well or boring on property? ☐ Yes ☒ No How many? ___

LICENSED OR REGISTERED CONTRACTOR CERTIFICATION
This well or boring was sealed in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

NTS — Licensee Business Name
1635 — License or Registration No.
Certified Representative Signature
1635 — Certified Rep. No.
10-15-07 — Date
Scott Skraba — Name of Person Sealing Well or Boring

HE-01434-10 IC# 140-0423 5/07R

WELL OR BORING LOCATION

County Name: Dakota

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING SEALING RECORD
Minnesota Statutes, Chapter 103I

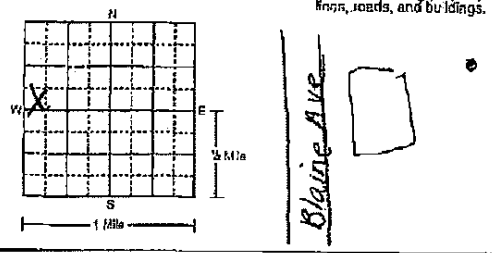
Minnesota Well and Boring Sealing No. H 264903
Minnesota Unique Well No. or W-series No.

Township Name	Township No.	Range No.	Section No.	Fraction (sm. — lg.)
Rose mount	115N	19W	36	SWSWNW

GPS LOCATION: Latitude ____ degrees ____ minutes ____ seconds; Longitude ____ degrees ____ minutes ____ seconds

Numerical Street Address or Fire Number and City of Well or Boring Location: 15325 Babcock Ave Rosemount MN

Show exact location of well or boring in section grid with "X." Sketch map of well or boring location, showing property lines, roads, and buildings.



PROPERTY OWNER'S NAME/COMPANY NAME: U of M / Gordon Gitz

Property owner's mailing address if different than well location address indicated above: 15325 Babcock Ave Rosemount, MN 55068

WELL OWNER'S NAME/COMPANY NAME: US ACE

Well owner's mailing address if different than property owner's address indicated above: 106 S 15th St Omaha NE 68102

GEOLOGICAL MATERIAL	COLOR	HARDNESS OR FORMATION	FROM	TO
If not known, indicate estimated formation log from nearby well or boring.				
Sand/Gravel	Brown	Hard	0	72

REMARKS, SOURCE OF DATA, DIFFICULTIES IN SEALING: ROC TB 7470

MINN. DEPT OF HEALTH COPY: H 264903

Date Sealed: 8-16-07

Date Well or Boring Constructed: 8-16-07

Depth Before Sealing: 72 ft. Original Depth: 72 ft.

ADUIFER(S): [X] Single Aquifer [ ] Multiaquifer

WELL/BORING: [ ] Water-Supply Well [ ] Monit. Well [X] Env. Bore Hole [ ] Other

STATIC WATER LEVEL: [ ] Measured [X] Estimated Date Measured ____ 64 ft. [ ] below [ ] above land surface

CASING TYPE(S): [X] Steel [ ] Plastic [ ] Tile [ ] Other

WELLHEAD COMPLETION

Outside: [ ] Well House [ ] At Grade [ ] Pitless Adapter/Unit [ ] Buried [ ] Well Pit [ ] Other

Inside: [ ] Basement Offset [ ] Well Pit [ ] Buried [ ] Other

CASING(S)

Diameter	Depth	Set in oversize hole?	Annular space initially grouted?
1.5 in. from 0	to 68 ft.	[ ] Yes [ ] No	[ ] Yes [ ] No [ ] Unknown
____ in. from ____	to ____ ft.	[ ] Yes [ ] No	[ ] Yes [ ] No [ ] Unknown
____ in. from ____	to ____ ft.	[ ] Yes [ ] No	[ ] Yes [ ] No [ ] Unknown

SCREEN/OPEN HOLE: Screen from 68 to 72 ft. Open Hole from N/A to ____ ft.

OBSTRUCTIONS: [ ] Rods/Drop Pipe [ ] Check Valve(s) [ ] Debris [ ] Fill [X] No Obstruction

Type of Obstructions (Describe): ____

Obstructions removed? [ ] Yes [ ] No Describe: ____

PUMP: Type ____ [ ] Removed [X] Not Present [ ] Other ____

METHOD USED TO SEAL ANNULAR SPACE BETWEEN 2 CASINGS, OR CASING AND BORE HOLE:

[X] No Annular Space Exists [ ] Annular Space Grouted with Tremie Pipe [ ] Casing Perforation/Removal

____ in. from ____ to ____ ft. [ ] Perforated [ ] Removed

____ in. from ____ to ____ ft. [ ] Perforated [ ] Removed

Type of Perforator: ____

[ ] Other ____

GROUTING MATERIAL(S) (One bag of cement = 94 lbs., one bag of bentonite = 50 lbs.)

Grouting Material: Bentonite from 0 to 72 ft. ____ yards 1 bags

____ from ____ to ____ ft. ____ yards ____ bags

____ from ____ to ____ ft. ____ yards ____ bags

OTHER WELLS AND BORINGS: Other unsealed and unused well or boring on property? [ ] Yes [X] No How many? ____

LICENSED OR REGISTERED CONTRACTOR CERTIFICATION

This well or boring was sealed in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Licensed Business Name	License or Registration No.
NTS	1635

Certified Representative Signature	Certified Rep. No.	Date
	1635	10-15-07

Name of Person Sealing Well or Boring: Scott Skraba

HE-01434-10 ICS 140-0423 5/07R

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING SEALING RECORD
Minnesota Statutes, Chapter 103I

Minnesota Well and Boring Sealing No., Minnesota Unique Well No. or W-series No. (If any shown if not known): **H 264920**

WELL OR BORING LOCATION

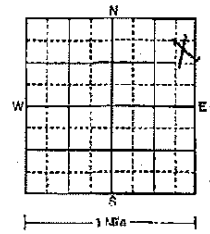
County Name: Dakota

Township Name	Township No.	Range No.	Section No.	Fraction (sm. → lg.)
~~Empire~~ Eagan	114N	19W	10	~~SE~~ ¼ NE¼ NE¼

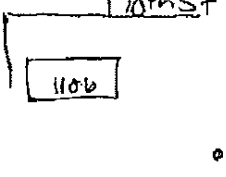
GPS LOCATION: Latitude ___ degrees ___ minutes ___ seconds; Longitude ___ degrees ___ minutes ___ seconds

Numerical Street Address or Fire Number and City of Well or Boring Location: 1106 170th St W Farmington

Show exact location of well or boring in section grid with "X".



Sketch map of well or boring location, showing property lines, roads, and buildings.



Date Sealed: 9-18-07

Date Well or Boring Constructed: 9-18-07

Depth Before Sealing: 53 ft.

Original Depth: 53 ft.

AQUIFER(S): ☐ Single Aquifer ☐ Multiaquifer

STATIC WATER LEVEL: ☐ Measured ☒ Estimated Date Measured ___ 50 ft. ☐ below ☐ above land surface

WELL/BORING: ☐ Water-Supply Well ☐ Monit. Well ☒ Env. Bore Hole ☐ Other ___

CASING TYPE(S): ☒ Steel ☐ Plastic ☐ Tile ☐ Other ___

WELLHEAD COMPLETION

Outside: ☐ Well House NK ☐ At Grade ☐ Buried ☐ Pitless Adapter/Unit ☐ Well Pit ☐ Other ___

Inside: ☐ Basement Offset ☐ Well Pit ☐ Buried ☐ Other ___

PROPERTY OWNER'S NAME/COMPANY NAME: Mark & Susan Theorin

Property owner's mailing address if different than well location address indicated above:
1106 170th St W
Farmington, MN 55024

WELL OWNER'S NAME/COMPANY NAME: Mark & Susan Theorin

Well owner's mailing address if different than property owner's address indicated above:
1106 170th St W
Farmington MN

CASING(S)

Diameter	Depth	Set in oversize hole?	Annular space initially grouted?
___ in. from 0	to 53 ft.	☐ Yes ☐ No	☐ Yes ☐ No ☐ Unknown
___ in. from ___	to ___ ft.	☐ Yes ☐ No	☐ Yes ☐ No ☐ Unknown
___ in. from ___	to ___ ft.	☐ Yes ☐ No	☐ Yes ☐ No ☐ Unknown

SCREEN/OPEN HOLE: Screen from N/A to ___ ft. Open Hole from ___ to ___ ft.

OBSTRUCTIONS: ☐ Rods/Drop Pipe ☐ Check Valve(s) ☐ Debris ☐ Fill ☒ No Obstruction

Type of Obstructions (Describe): ___

Obstructions removed? ☐ Yes ☐ No Describe ___

PUMP: Type ___ ☐ Removed ☒ Not Present ☐ Other ___

METHOD USED TO SEAL ANNULAR SPACE BETWEEN 2 CASINGS, OR CASING AND BORE HOLE:

☒ No Annular Space Exists ☐ Annular Space Grouted with Tremie Pipe ☐ Casing Perforation/Removal

___ in. from ___ to ___ ft. ☐ Perforated ☐ Removed

___ in. from ___ to ___ ft. ☐ Perforated ☐ Removed

Type of Perforator ___

☐ Other ___

GROUTING MATERIAL(S) (One bag of cement = 94 lbs., one bag of bentonite = 50 lbs.)

Grouting Material: Bentonite from 0 to 53 ft. ___ yards 1 bags

___ from ___ to ___ ft. ___ yards ___ bags

___ from ___ to ___ ft. ___ yards ___ bags

OTHER WELLS AND BORINGS: Other unsealed and unused well or boring on property? ☐ Yes ☒ No How many? ___

GEOLOGICAL MATERIAL	COLOR	HARDNESS OR FORMATION	FROM	TO
If not known, indicate estimated formation log from nearby well or boring.				
Sandy gravel	BRN	Hard	0	52
St Peter Sandstone	BRN	Hard	52	53

REMARKS, SOURCE OF DATA, DIFFICULTIES IN SEALING

7470.11

LICENSED OR REGISTERED CONTRACTOR CERTIFICATION

This well or boring was sealed in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

NTS — *Licensee Business Name*

1635 — *License or Registration No.*

Certified Representative Signature

1635 — *Certified Rep. No.*

10-15-07 — *Date*

Scott Strabo — *Name of Person Sealing Well or Boring*

MINN. DEPT. OF HEALTH COPY H 264920

HE-01404-10 IC# 140-0423

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