

Appendix 2. Lithologic logs and completion details for U.S. Geological Survey and Fort Peck Tribes Office of Environmental Protection monitoring wells drilled in and near the East Poplar oil field, 2006 and 2009

[Site number is described in text. Well ID# same as well name described in text. Well Location: GPS, Global Positioning System. Well Test Data: gpm, gallons per minute. Well Log: Qal, Quaternary alluvium; Qt, Quaternary glacial till; Qw, Quaternary Wiota Gravel; Kb, Upper Cretaceous Bearpaw Shale; %, percent; “, inches; ‘, feet.]

28N 51E 02 CBAB MONTANA WELL LOG REPORT

Form No. 603 R2-04

Well ID# USGS06-11

This log reports the activities of a licensed Montana well driller and serves as the official record of work done within the borehole and casing and describes the amount of water encountered. **This form is to be completed by the driller and filed with Mt. Bureau of Mines & Geology within 60 days of completion of the work.** Acquiring Water Rights is the well owner's responsibility and is not accomplished by the filing of this report.

Well log information is stored in the Groundwater Information Center at the Montana Bureau of Mines and Geology (Butte) and water right information is stored in the Water Rights Bureau records (Helena).

For fields that are not applicable, enter NA. Optional fields have a grayed background. Record additional information in the REMARKS section.

1. WELL OWNER:

Name U.S. Geological Survey
Mailing address 3162 Bozeman Ave
Helena, MT 59601

2. WELL LOCATION:

List ¼ from smallest to largest
NW ¼ NE ¼ NW ¼ SW ¼, Section 02
Township 28 N/S Range 51 E/W County Roosevelt
Lot _____, Tract/Blk _____ Subdivision Name _____
Well Address _____
GPS ☒ Yes ☐ No
Latitude 48 12 27.5 Longitude 105 06 14.7
Error as reported by GPS locator (± feet) _____
Horizontal datum ☒ NAD27 ☐ WGS84

3. PROPOSED USE:

☐ Domestic ☐ Stock ☐ Irrigation
☐ Public water supply ☒ Monitoring Well ☐ Other: _____

4. TYPE OF WORK:

☒ New well ☐ Deepen existing well ☐ Abandon existing well
Method: ☐ Cable ☒ Rotary ☐ Other: _____

5. WELL CONSTRUCTION DETAILS:

Borehole:
Dia. 5 in. from 0 ft. to 80 ft.
Dia. 7 1/8 in. from 0 ft. to 65 ft.
Dia. _____ in. from _____ ft. to _____ ft.

Casing:

Steel: Wall thickness _____ ☐ Threaded ☒ Welded
Dia. 6 in. from +3.1 ft. to 1.5 ft.
Dia. _____ in. from _____ ft. to _____ ft.

Plastic: Pressure Rating _____ lbs. ☒ Threaded ☐ Welded
Dia. 4 in. from 3.1 ft. to 65 ft.

Perforations/Slotted Pipe:

Type of perforator used _____
Size of perforations/slots _____ in. by _____ in.
_____ no. of perforations/slots from _____ ft. to _____ ft.
_____ no. of perforations/slots from _____ ft. to _____ ft.

Screens:

☒ Yes ☐ No
Material PVC
Dia. 4 Slot size 0.02 from 45 ft. to 55 ft.
Dia. _____ Slot size _____ from _____ ft. to _____ ft.

Gravel Packed:

☒ Yes ☐ No
Size of gravel 12-20 sand
Gravel placed from 42 ft. to 65 ft.

Packer:

☐ Yes ☒ No
Type _____ Depth(s) _____

Grout:

Material used Bentonite
Depth from 0 ft. to 42 ft. OR ☐ Continuous feed

6. WELL TEST DATA:

A well test is required for all wells. (See details on well log report cover.)

☒ Static water level 54.43 ft. below top of casing or
☐ Closed-in artesian pressure _____ psi.

How was test flow measured:

bucket/stopwatch, weir, flume, flowmeter, etc _____

Yellowstone Controlled Groundwater Area - Water Temperature _____ °F

☐ AQUIFER TEST DATA FORM ATTACHED

Test - 1 hour minimum

Drawdown is the amount water level is lowered below static level.
All depth measurements shall be from the top of the well casing.
Time of recovery is hours/minutes since pumping stopped.

Air test*

<1 gpm with drill stem set at 64 ft. for 1 hours
Time of recovery _____ hrs/min. Recovery water level _____ ft.

OR Bailer test*

_____ gpm with _____ ft. of drawdown after _____ hours
Time of recovery _____ hrs/min. Recovery water level _____ ft.

OR Pump test*

Depth pump set for test _____ ft.
_____ gpm pump rate with _____ ft. of drawdown after _____ hrs pumping
Time of recovery _____ hrs/min. Recovery water level _____ ft.

OR Flowing Artesian*

_____ gpm for _____ hours

Flow controlled by _____

*During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.

7. WELL LOG:

Depth, Feet		Material:
From	To	color/rock and type/descriptor (example: blue/shale/hard, or brown/gravel/water, or brown/sand/heaving)
0	2	medium brown/topsoil
2	5	medium brown/clay with 10% fine gravels, 1/8-1/4"
5	18	light brown/clay with <10% gravel, 1" size at top to 1/4-1/2" size at bottom of interval
18	39	light brown/clay / more competent than above, with 5% gravel, 1/8-1/2"
39	40	clay/sandy, 5% gravel, 1/8" evidence of petroleum, black, oil sheen and odor
40	55	red + brown / gravel / well rounded 1/8-1 1/2", size increases with depth (QW)
55	80	dark gray / shale / weathered top 5 feet (KB)

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☐ ADDITIONAL SHEETS ATTACHED

8. DATE WELL COMPLETED: 9-7-06 OCT 30 2006

9. REMARKS: _____

M.B.M.G.

10. DRILLER/CONTRACTOR'S CERTIFICATION:

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name, firm, or corporation (print) AGRI Industries

Address Box 1166 Williston ND 58801

Signature Dwight R. Forney

Date 10-7-06 License no. 156



Montana Bureau of Mines & Geology
The University of Montana
1300 West Park Street
Butte, MT 59701

MBMG ID#

230561

28N 51E 03 DISAB MONTANA WELL LOG REPORT

Form No. 603 R2-04

Well ID# USGS06-2

This log reports the activities of a licensed Montana well driller and serves as the official record of work done within the borehole and casing and describes the amount of water encountered. **This form is to be completed by the driller and filed with Mt. Bureau of Mines & Geology within 60 days of completion of the work.** Acquiring Water Rights is the well owner's responsibility and is not accomplished by the filing of this report.

Well log information is stored in the Groundwater Information Center at the Montana Bureau of Mines and Geology (Butte) and water right information is stored in the Water Rights Bureau records (Helena).

For fields that are not applicable, enter NA. Optional fields have a grayed background. Record additional information in the REMARKS section.

1. WELL OWNER:

Name U.S. Geological Survey
Mailing address 3162 Bowman Ave
Helena, MT 59601

2. WELL LOCATION:

List ¼ from smallest to largest
NW ¼ NE ¼ NW ¼ SE ¼, Section 03
Township 28 N Range 51 E County Bozeman
Lot , Tract/Blk Subdivision Name
Well Address
GPS ☒ Yes ☐ No
Latitude 48 12 30.4 Longitude 105 06 43.3
Error as reported by GPS locator (± feet)
Horizontal datum ☒ NAD27 ☐ WGS84

3. PROPOSED USE:

☐ Domestic ☐ Stock ☐ Irrigation
☐ Public water supply ☒ Monitoring Well ☐ Other:

4. TYPE OF WORK:

☒ New well ☐ Deepen existing well ☐ Abandon existing well
Method: ☐ Cable ☒ Rotary ☐ Other:

5. WELL CONSTRUCTION DETAILS:

Borehole:
Dia. 7 1/8 in. from 0 ft. to 60 ft.
Dia. in. from ft. to ft.
Dia. in. from ft. to ft.

Casing:

Steel: Wall thickness ☐ Threaded ☐ Welded
Dia. 8 in. from +2.4 ft. to 2.6 ft.
Dia. in. from ft. to ft.

Plastic: Pressure Rating lbs. ☒ Threaded ☐ Welded
Dia. 4 in. from +1.7 ft. to 58 ft.

Perforations/Slotted Pipe:

Type of perforator used
Size of perforations/slots in. by in.
 no. of perforations/slots from ft. to ft.
 no. of perforations/slots from ft. to ft.

Screens:

☒ Yes ☐ No
Material PVC
Dia. 4 Slot size 0.02 from 38 ft. to 48 ft.
Dia. Slot size from ft. to ft.

Gravel Packed:

☒ Yes ☐ No
Size of gravel 12-20 Sand
Gravel placed from 35 ft. to 60 ft.

Packer:

☐ Yes ☒ No
Type Depth(s)

Grout:

Material used Bedrockite
Depth from 0 ft. to 35 ft. OR ☐ Continuous feed

6. WELL TEST DATA:

A well test is required for all wells. (See details on well log report cover.)

☒ Static water level 48.84 ft. below top of casing or
☐ Closed-in artesian pressure psi.

How was test flow measured:

bucket/stopwatch, weir, flume, flowmeter, etc

Yellowstone Controlled Groundwater Area - Water Temperature °F

☐ AQUIFER TEST DATA FORM ATTACHED

Test - 1 hour minimum

Drawdown is the amount water level is lowered below static level.
All depth measurements shall be from the top of the well casing.
Time of recovery is hours/minutes since pumping stopped.

Air test*

1 gpm with drill stem set at 57 ft. for 1 hours
Time of recovery hrs/min. Recovery water level ft.

OR Bailer test*

 gpm with ft. of drawdown after hours
Time of recovery hrs/min. Recovery water level ft.

OR Pump test*

Depth pump set for test ft.
 gpm pump rate with ft. of drawdown after hrs pumping
Time of recovery hrs/min. Recovery water level ft.

OR Flowing Artesian*

 gpm for hours

Flow controlled by

*During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.

7. WELL LOG:

Depth, Feet		Material:
From	To	color/rock and type/descriptor (example: blue/shale/hard, or brown/gravel/water, or brown/sand/heaving)
0	3	medium brown/topsoil/sandy
3	5	medium brown/clay with 590
		fine gravel, 1/16-1/2" (QF)
5	15	medium brown/clay with 590
		gravel 1/16-1/4" (clay is more
		prominent than above) (QF)
15	25	medium brown/clay with 590
		gravel 1/4-1", larger gravels at
		bottom of interval (QF)
25	33	medium brown/clay, sandy with
		5-1090 gravel, 1/4-3/4" (QF)
33	35	medium brown/sand/fine
35	48	red + brown/gravel/well rounded/
		coarse, 1/4-1" (QW)
48	60	dark gray/shale, no weathering
		at top (Kb)

RECEIVED

OCT 30 2006

☐ ADDITIONAL SHEETS ATTACHED

8. DATE WELL COMPLETED: 9-7-06 M.B.M.G.

9. REMARKS:

10. DRILLER/CONTRACTOR'S CERTIFICATION:

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name, firm, or corporation (print) AGRI Industries

Address Box 1166 W. 11.5 + on rd 58801

Signature Daniel R. Bowring

Date 10-7-06 License no. 156

MBMG ID#

230562



Montana Bureau of Mines & Geology
The University of Montana
1300 West Park Street
Butte, MT 59701

29N 50E 11 DBAB MONTANA WELL LOG REPORT

Form No. 603 R2-04

Well ID# USGS 06-3

This log reports the activities of a licensed Montana well driller and serves as the official record of work done within the borehole and casing and describes the amount of water encountered. **This form is to be completed by the driller and filed with Mt. Bureau of Mines & Geology within 60 days of completion of the work.** Acquiring Water Rights is the well owner's responsibility and is not accomplished by the filing of this report.

Well log information is stored in the Groundwater Information Center at the Montana Bureau of Mines and Geology (Butte) and water right information is stored in the Water Rights Bureau records (Helena).

For fields that are not applicable, enter NA. Optional fields have a grayed background. Record additional information in the REMARKS section.

1. WELL OWNER:

Name U.S. Geological Survey

Mailing address 3162 Bozeman Ave

Helena, MT 59601

2. WELL LOCATION:

List ¼ from smallest to largest

NW ¼ NE ¼ NW ¼ SE ¼, Section 11

Township 29 N Range 50 E County Roosevelt

Lot _____, Tract/Blk _____ Subdivision Name _____

Well Address _____

GPS ☒ Yes ☐ No

Latitude 48 16 50.7 Longitude 105 10 33.5

Error as reported by GPS locator (± feet) _____

Horizontal datum ☒ NAD27 ☐ WGS84

3. PROPOSED USE:

☐ Domestic ☐ Stock ☐ Irrigation
☐ Public water supply ☒ Monitoring Well ☐ Other: _____

4. TYPE OF WORK:

☒ New well ☐ Deepen existing well ☐ Abandon existing well
Method: ☐ Cable ☒ Rotary ☐ Other: _____

5. WELL CONSTRUCTION DETAILS:

Borehole:

Dia. 8 3/4 in. from 0 ft. to 49 ft.

Dia. _____ in. from _____ ft. to _____ ft.

Dia. _____ in. from _____ ft. to _____ ft.

Casing:

Steel: Wall thickness _____ ☐ Threaded ☐ Welded

Dia. 8 in. from +3.2 ft. to 1.8 ft.

Dia. _____ in. from _____ ft. to _____ ft.

Plastic: Pressure Rating _____ lbs. ☒ Threaded ☐ Welded

Dia. 5 in. from +2.7 ft. to 47 ft.

Perforations/Slotted Pipe:

Type of perforator used _____

Size of perforations/slots _____ in. by _____ in.

_____ no. of perforations/slots from _____ ft. to _____ ft.

_____ no. of perforations/slots from _____ ft. to _____ ft.

Screens:

☒ Yes ☐ No

Material PVC

Dia. 5 Slot size 0.02 from 32 ft. to 37 ft.

Dia. _____ Slot size _____ from _____ ft. to _____ ft.

Gravel Packed:

☒ Yes ☐ No

Size of gravel 12-20 sand

Gravel placed from 29 ft. to 49 ft.

Packer:

☐ Yes ☒ No

Type _____ Depth(s) _____

Grout:

Material used Bentonite

Depth from 0 ft. to 29 ft. OR ☐ Continuous feed

6. WELL TEST DATA:

A well test is required for all wells. (See details on well log report cover.)

☒ Static water level 37.04 ft. below top of casing or

☐ Closed-in artesian pressure _____ psi.

How was test flow measured:
bucket/stopwatch, weir, flume, flowmeter, etc _____

Yellowstone Controlled Groundwater Area - Water Temperature _____ °F

☐ AQUIFER TEST DATA FORM ATTACHED

Test - 1 hour minimum

Drawdown is the amount water level is lowered below static level.

All depth measurements shall be from the top of the well casing.

Time of recovery is hours/minutes since pumping stopped.

Air test*

41 gpm with drill stem set at 46 ft. for 1 hours

Time of recovery _____ hrs/min. Recovery water level _____ ft.

OR Bailer test*

_____ gpm with _____ ft. of drawdown after _____ hours

Time of recovery _____ hrs/min. Recovery water level _____ ft.

OR Pump test*

Depth pump set for test _____ ft.

_____ gpm pump rate with _____ ft. of drawdown after _____ hrs pumping

Time of recovery _____ hrs/min. Recovery water level _____ ft.

OR Flowing Artesian*

_____ gpm for _____ hours

Flow controlled by _____

*During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.

7. WELL LOG:

Depth, Feet		Material:
From	To	color/rock and type/descriptor (example: blue/shale/hard, or brown/gravel/water, or brown/sand/heaving)
0	1	medium brown/topsoil/fine sand
1	27	yellow brown/clay/sandy with <50% gravel, 1/8-3/4" size increases with depth
27	37	medium brown/clay 5-10% gravel, subangular, 1/16-1", size increases with depth clay is more competent and dry (Q4)
37	49	dark gray/shale/dry + soft, iron staining

RECEIVED

OCT 30 2006

M.B.M.G.

☐ ADDITIONAL SHEETS ATTACHED

8. DATE WELL COMPLETED: 9-4-06

9. REMARKS: _____

10. DRILLER/CONTRACTOR'S CERTIFICATION:

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name, firm, or corporation (print) AGRI Industries

Address Box 1166 Williston ND 58801

Signature Darrell Pomroy

Date 10-7-06 License no. 156



Montana Bureau of Mines & Geology
The University of Montana
1300 West Park Street
Butte, MT 59701

MBMG ID#

230563

MONTANA WELL LOG REPORT

Form No. 603 R2-04

Well ID# USGS064

This log reports the activities of a licensed Montana well driller and serves as the official record of work done within the borehole and casing and describes the amount of water encountered. **This form is to be completed by the driller and filed with Mt. Bureau of Mines & Geology within 60 days of completion of the work.** Acquiring Water Rights is the well owner's responsibility and is not accomplished by the filing of this report.

Well log information is stored in the Groundwater Information Center at the Montana Bureau of Mines and Geology (Butte) and water right information is stored in the Water Rights Bureau records (Helena).

For fields that are not applicable, enter NA. Optional fields have a grayed background. Record additional information in the REMARKS section.

1. WELL OWNER:

Name U.S. Geological Survey
Mailing address 3162 Bozeman Ave
Helena, MT 59601

2. WELL LOCATION:

List 1/4 from smallest to largest
SE 1/4 SE 1/4 SE 1/4 SE 1/4, Section 01
Township 28 N Range 50 W County Roosevelt
Lot _____, Tract/Blk _____ Subdivision Name _____
Well Address _____
GPS ☒ Yes ☐ No
Latitude 48 12 05.0 Longitude 105 11 35.3
Error as reported by GPS locator (± feet) _____
Horizontal datum ☒ NAD27 ☐ WGS84

3. PROPOSED USE:

☐ Domestic ☐ Stock ☐ Irrigation
☐ Public water supply ☒ Monitoring Well ☐ Other: _____

4. TYPE OF WORK:

☒ New well ☐ Deepen existing well ☐ Abandon existing well
Method: ☐ Cable ☒ Rotary ☐ Other: _____

5. WELL CONSTRUCTION DETAILS:

Borehole:

Dia. 7 7/8 in. from 0 ft. to 47 ft.
Dia. _____ in. from _____ ft. to _____ ft.
Dia. _____ in. from _____ ft. to _____ ft.

Casing:

Steel: Wall thickness _____ ☐ Threaded ☐ Welded
Dia. 6 in. from +2.5 ft. to 2.5 ft.
Dia. _____ in. from _____ ft. to _____ ft.

Plastic: Pressure Rating _____ lbs. ☒ Threaded ☐ Welded
Dia. 4 in. from 1.8 ft. to 45 ft.

Perforations/Slotted Pipe:

Type of perforator used _____
Size of perforations/slots _____ in. by _____ in.
_____ no. of perforations/slots from _____ ft. to _____ ft.
_____ no. of perforations/slots from _____ ft. to _____ ft.

Screens:

☒ Yes ☐ No
Material PVC
Dia. 4" Slot size 0.02 from 25 ft. to 35 ft.
Dia. _____ Slot size _____ from _____ ft. to _____ ft.

Gravel Packed:

☒ Yes ☐ No
Size of gravel 12-20 sand
Gravel placed from 21 ft. to 47 ft.

Packer:

☐ Yes ☒ No
Type _____ Depth(s) _____

Grout:

Material used Bentonite
Depth from 0 ft. to 21 ft. OR ☐ Continuous feed

6. WELL TEST DATA:

A well test is required for all wells. (See details on well log report cover.)

☒ Static water level 36.95 ft. below top of casing or
☐ Closed-in artesian pressure _____ psi.

How was test flow measured:

bucket/stopwatch, weir, flume, flowmeter, etc _____

Yellowstone Controlled Groundwater Area - Water Temperature _____ °F

☐ AQUIFER TEST DATA FORM ATTACHED

Test - 1 hour minimum

Drawdown is the amount water level is lowered below static level.
All depth measurements shall be from the top of the well casing.
Time of recovery is hours/minutes since pumping stopped.

Air test*

<1 gpm with drill stem set at 44 ft. for .5 hours
Time of recovery _____ hrs/min. Recovery water level _____ ft.

OR Bailer test*

_____ gpm with _____ ft. of drawdown after _____ hours
Time of recovery _____ hrs/min. Recovery water level _____ ft.

OR Pump test*

Depth pump set for test _____ ft.
_____ gpm pump rate with _____ ft. of drawdown after _____ hrs pumping
Time of recovery _____ hrs/min. Recovery water level _____ ft.

OR Flowing Artesian*

_____ gpm for _____ hours

Flow controlled by _____

*During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.

7. WELL LOG:

Depth, Feet		Material:
From	To	color/rock and type/descriptor (example: blue/shale/hard, or brown/gravel/water, or brown/sand/heaving)
0	4	dark brown/topsoil
4	15	dark brown/clay/silty with 5% gravel/fine/subangular. clay content increases with depth.
15	26	medium brown/clay/dry with 25% gravel/very fine/rounded. Clay more competent than above.
26	30	gravel/subangular 1/8-1/4" / dry (Qtz)
30	35	gravel/well-rounded 1/8-1" with iron staining. Gravel size increases with depth (Qtz)
35	47	dark gray/shale/dry (Kb)

☐ ADDITIONAL SHEETS ATTACHED

8. DATE WELL COMPLETED: 9-1-06

9. REMARKS: _____

10. DRILLER/CONTRACTOR'S CERTIFICATION:

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name, firm, or corporation (print) AGRS Enterprises

Address Box 1166 W. 11350 N RD 59801

Signature Darrell R. Ramsey

Date 10-7-06 License no. 156

MBMG ID#

230560



Montana Bureau of Mines & Geology
The University of Montana
1300 West Park Street
Butte, MT 59701

29N 51E 28 AAAC MONTANA WELL LOG REPORT

Form No. 603 R2-04

Well ID# USG506-5

This log reports the activities of a licensed Montana well driller and serves as the official record of work done within the borehole and casing and describes the amount of water encountered. **This form is to be completed by the driller and filed with Mt. Bureau of Mines & Geology within 60 days of completion of the work.** Acquiring Water Rights is the well owner's responsibility and is not accomplished by the filing of this report.

Well log information is stored in the Groundwater Information Center at the Montana Bureau of Mines and Geology (Butte) and water right information is stored in the Water Rights Bureau records (Helena).

For fields that are not applicable, enter NA. Optional fields have a grayed background. Record additional information in the REMARKS section.

1. WELL OWNER:

Name U.S. Geological Survey

Mailing address 3162 Bozeman Ave

Helena MT 59601

2. WELL LOCATION:

List ¼ from smallest to largest

SW ¼ NE ¼ NE ¼ NE ¼, Section 28

Township 29 N Range 51 E County Roosevelt

Lot _____, Tract/Blk _____ Subdivision Name _____

Well Address _____

GPS ☒ Yes ☐ No

Latitude 48 14 36.1 Longitude 105 05 10.8

Error as reported by GPS locator (± feet) _____

Horizontal datum ☒ NAD27 ☐ WGS84

3. PROPOSED USE:

☐ Domestic ☐ Stock ☐ Irrigation
☐ Public water supply ☒ Monitoring Well ☐ Other: _____

4. TYPE OF WORK:

☒ New well ☐ Deepen existing well ☐ Abandon existing well
Method: ☐ Cable ☒ Rotary ☐ Other: _____

5. WELL CONSTRUCTION DETAILS:

Borehole:

Dia. 5 in. from 0 ft. to 60 ft.

Dia. 7 1/8 in. from 0 ft. to 47 ft.

Dia. _____ in. from _____ ft. to _____ ft.

Casing:

Steel: Wall thickness _____ ☐ Threaded ☐ Welded

Dia. 6" in. from +3.3 ft. to 1.7 ft.

Dia. _____ in. from _____ ft. to _____ ft.

Plastic: Pressure Rating _____ lbs. ☒ Threaded ☐ Welded

Dia. 4 in. from +2.8 ft. to 45 ft.

Perforations/Slotted Pipe:

Type of perforator used _____

Size of perforations/slots _____ in. by _____ in.

_____ no. of perforations/slots from _____ ft. to _____ ft.

_____ no. of perforations/slots from _____ ft. to _____ ft.

Screens:

☒ Yes ☐ No

Material PVC

Dia. 4 Slot size 0.02 from 25 ft. to 35 ft.

Dia. _____ Slot size _____ from _____ ft. to _____ ft.

Gravel Packed:

☒ Yes ☐ No

Size of gravel 12-20 sand

Gravel placed from 22 ft. to 45 ft.

Packer:

☐ Yes ☒ No

Type _____ Depth(s) _____

Grout:

Material used Bentonite

Depth from 0 ft. to 22 ft. OR ☐ Continuous feed

6. WELL TEST DATA:

A well test is required for all wells. (See details on well log report cover.)

☒ Static water level 37.28 ft. below top of casing or

☐ Closed-in artesian pressure _____ psi.

How was test flow measured:

bucket/stopwatch, weir, flume, flowmeter, etc _____

Yellowstone Controlled Groundwater Area - Water Temperature _____ °F

☐ AQUIFER TEST DATA FORM ATTACHED

Test - 1 hour minimum

Drawdown is the amount water level is lowered below static level.
All depth measurements shall be from the top of the well casing.
Time of recovery is hours/minutes since pumping stopped.

Air test*

1 gpm with drill stem set at 44 ft. for 1 hours

Time of recovery _____ hrs/min. Recovery water level _____ ft.

OR Bailer test*

_____ gpm with _____ ft. of drawdown after _____ hours

Time of recovery _____ hrs/min. Recovery water level _____ ft.

OR Pump test*

Depth pump set for test _____ ft.

_____ gpm pump rate with _____ ft. of drawdown after _____ hrs pumping

Time of recovery _____ hrs/min. Recovery water level _____ ft.

OR Flowing Artesian*

_____ gpm for _____ hours

Flow controlled by _____

*During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.

7. WELL LOG:

Depth, Feet		Material:
From	To	color/rock and type/descriptor (example: blue/shale/hard, or brown/gravel/water, or brown/sand/heaving)
0	1	topsoil/sand
1	5	light brown/clay/sandy, 45% gravel 1/4-1/2"; iron-staining on clay
5	17	yellow brown/clay, 10% gravel 1/4-1/2"; well rounded; clay becomes more competent with depth
17	25	medium brown/clay/dry and harder with depth, 5% gravel 1/4-1/2"; well rounded
25	35	medium brown/clay/very dry and hard (QT)
35	60	dark gray/shale/dry and hard. Bentonite stringers at 50-60'

RECEIVED

OCT 30 2006

☐ ADDITIONAL SHEETS ATTACHED

8. DATE WELL COMPLETED:

9-3-06

M.B.M.G.

9. REMARKS:

10. DRILLER/CONTRACTOR'S CERTIFICATION:

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name, firm, or corporation (print) AGRI Industries

Address Box 1166 W. Platteau RD 58901

Signature Dwight R. Pomeroy

Date 10-7-06 License no. 156

MBMG ID#

230569



Montana Bureau of Mines & Geology
The University of Montana
1300 West Park Street
Butte, MT 59701

Well log information is stored in the Groundwater Information Center at the Montana Bureau of Mines and Geology (Butte) and water right information is stored in the Water Rights Bureau records (Helena).

230565

27N 51E 06 AB3B- ACCC

MONTANA WELL LOG REPORT

Form No. 603 R2-04

Well ID# USGS 06-7

This log reports the activities of a licensed Montana well driller and serves as the official record of work done within the borehole and casing and describes the amount of water encountered. **This form is to be completed by the driller and filed with Mt. Bureau of Mines & Geology within 60 days of completion of the work.** Acquiring Water Rights is the well owner's responsibility and is not accomplished by the filing of this report. Well log information is stored in the Groundwater Information Center at the Montana Bureau of Mines and Geology (Butte) and water right information is stored in the Water Rights Bureau records (Helena).

For fields that are not applicable, enter NA. Optional fields have a grayed background. Record additional information in the REMARKS section.

1. WELL OWNER:
 Name U.S. Geological Survey
 Mailing address 3162 Bozeman Ave
Helena, MT 59601

2. WELL LOCATION: List ¼ from smallest to largest
SW ¼ SW ¼ NE ¼, Section 06
 Township 27 N Range 51 W County Roosevelt
 Lot _____, Tract/Blk _____ Subdivision Name _____
 Well Address _____
 GPS ☒ Yes ☐ No
 Latitude 48 07 20.1 Longitude 105 10 56.3
 Error as reported by GPS locator (± feet) _____
 Horizontal datum ☒ NAD27 ☐ WGS84

3. PROPOSED USE: ☐ Domestic ☐ Stock ☐ Irrigation
☐ Public water supply ☒ Monitoring Well ☐ Other: _____

4. TYPE OF WORK:
☒ New well ☐ Deepen existing well ☐ Abandon existing well
 Method: ☐ Cable ☒ Rotary ☐ Other: _____

5. WELL CONSTRUCTION DETAILS:

Borehole:
 Dia. 7 7/8 in. from 0 ft. to 126 ft.
 Dia. _____ in. from _____ ft. to _____ ft.
 Dia. _____ in. from _____ ft. to _____ ft.

Casing:
 Steel: Wall thickness _____ ☐ Threaded ☐ Welded
 Dia. 6 in. from +31 ft. to 1.9 ft.
 Dia. _____ in. from _____ ft. to _____ ft.

Plastic: Pressure Rating _____ lbs. ☒ Threaded ☐ Welded
 Dia. 4 in. from +2.8 ft. to 124 ft.

Perforations/Slotted Pipe:

Type of perforator used _____
 Size of perforations/slots _____ in. by _____ in.
 _____ no. of perforations/slots from _____ ft. to _____ ft.
 _____ no. of perforations/slots from _____ ft. to _____ ft.

Screens: ☒ Yes ☐ No
 Material PVC
 Dia. 4" Slot size 0.02 from 94 ft. to 114 ft.
 Dia. _____ Slot size _____ from _____ ft. to _____ ft.

Gravel Packed: ☒ Yes ☐ No
 Size of gravel 12-20 sand
 Gravel placed from 91 ft. to 126 ft.

Packer: ☐ Yes ☒ No
 Type _____ Depth(s) _____

Grout: Material used Bentonite
 Depth from 0 ft. to 91 ft. OR ☐ Continuous feed

6. WELL TEST DATA:

A well test is required for all wells. (See details on well log report cover.)

☒ Static water level 62.92 ft. below top of casing or
☐ Closed-in artesian pressure _____ psi.

How was test flow measured:
 bucket/stopwatch, weir, flume, flowmeter, etc _____

Yellowstone Controlled Groundwater Area - Water Temperature _____ °F

☐ AQUIFER TEST DATA FORM ATTACHED

Test - 1 hour minimum

Drawdown is the amount water level is lowered below static level.
 All depth measurements shall be from the top of the well casing.
 Time of recovery is hours/minutes since pumping stopped.

Air test*

12 gpm with drill stem set at 123 ft. for 1.5 hours
 Time of recovery _____ hrs/min. Recovery water level _____ ft.

OR Bailer test*

_____ gpm with _____ ft. of drawdown after _____ hours
 Time of recovery _____ hrs/min. Recovery water level _____ ft.

OR Pump test*

Depth pump set for test _____ ft.
 _____ gpm pump rate with _____ ft. of drawdown after _____ hrs pumping
 Time of recovery _____ hrs/min. Recovery water level _____ ft.

OR Flowing Artesian*

_____ gpm for _____ hours
 Flow controlled by _____

*During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.

7. WELL LOG:

Depth, Feet		Material:
From	To	color/rock and type/descriptor (example: blue/shale/hard, or brown/gravel/water, or brown/sand/heaving)
0	2	topsoil
2	10	yellow brown/sandy clay with gravel/subsidiary 1/2"
10	30	medium brown/clay with gravel 1/2-3/4"
30	48	medium brown/clay with gravel 3/4-1"
48	84	gray brown/clay with gravel 3/4-1 1/2"
		clay becoming more firm and percentage of gravel decreases with depth.
84	100	brown and red/gravel/well rounded 1/4-3/4", grades from fine to coarse with depth. (Qw)
100	105	gray brown/clay
105	114	brown and red/gravel/well rounded/coarse. (Qw)
114	126	dark gray/shale/dry (Kb)

☐ ADDITIONAL SHEETS ATTACHED

8. DATE WELL COMPLETED: 8-30-06

9. REMARKS: pumping well for aquifer test

10. DRILLER/CONTRACTOR'S CERTIFICATION:

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name, firm or corporation (print) AGRI INDUSTRIES
 Address Box 1166 W. 11st N. ND 58901
 Signature Dwight R. Johnson
 Date 10-7-06 License no. 1156



Montana Bureau of Mines & Geology
 The University of Montana
 1300 West Park Street
 Butte, MT 59701

MBMG ID#

230555

27N 51E 06 ACCL MONTANA WELL LOG REPORT

Well ID# USG506-8

Form No. 603 R2-04

This log reports the activities of a licensed Montana well driller and serves as the official record of work done within the borehole and casing and describes the amount of water encountered. **This form is to be completed by the driller and filed with Mt. Bureau of Mines & Geology within 60 days of completion of the work.** Acquiring Water Rights is the well owner's responsibility and is not accomplished by the filing of this report. Well log information is stored in the Groundwater Information Center at the Montana Bureau of Mines and Geology (Butte) and water right information is stored in the Water Rights Bureau records (Helena).

For fields that are not applicable, enter NA. Optional fields have a grayed background. Record additional information in the REMARKS section.

1. **WELL OWNER:** U.S. Geological Survey
Name U.S. Geological Survey

Mailing address 3162 Bozeman Ave
Helena, MT 59601

2. **WELL LOCATION:** List ¼ from smallest to largest
SW ¼ SW ¼ SW ¼ NE ¼, Section 06

Township 27 N Range 51 E County Roosevelt

Lot , Tract/Blk Subdivision Name

Well Address

GPS ☒ Yes ☐ No

Latitude 48 07 20.2 Longitude 105 10 55.6

Error as reported by GPS locator (± feet)

Horizontal datum ☒ NAD27 ☐ WGS84

3. **PROPOSED USE:** ☐ Domestic ☐ Stock ☐ Irrigation
☐ Public water supply ☒ Monitoring Well ☐ Other:

4. **TYPE OF WORK:**
☒ New well ☐ Deepen existing well ☐ Abandon existing well
Method: ☐ Cable ☒ Rotary ☐ Other:

5. **WELL CONSTRUCTION DETAILS:**

Borehole:
Dia. 7 7/8 in. from 0 ft. to 127 ft.
Dia. in. from ft. to ft.
Dia. in. from ft. to ft.

Casing:
Steel: Wall thickness ☐ Threaded ☒ Welded
Dia. 6 in. from +2.8 ft. to 2.2 ft.
Dia. in. from ft. to ft.

Plastic: Pressure Rating lbs. ☒ Threaded ☐ Welded
Dia. 4 in. from +2.3 ft. to 124 ft.

Perforations/Slotted Pipe:
Type of perforator used
Size of perforations/slots in. by in.
 no. of perforations/slots from ft. to ft.
 no. of perforations/slots from ft. to ft.

Screens: ☒ Yes ☐ No
Material PVC
Dia. 4 Slot size 0.02 from 94 ft. to 114 ft.
Dia. Slot size from ft. to ft.

Gravel Packed: ☒ Yes ☐ No
Size of gravel 12-20 sand
Gravel placed from 91 ft. to 127 ft.

Packer: ☐ Yes ☒ No
Type Depth(s)

Grout: Material used Bentonite
Depth from 0 ft. to 91 ft. OR ☐ Continuous feed

6. **WELL TEST DATA:**

A well test is required for all wells. (See details on well log report cover.)

☒ Static water level 62.52 ft. below top of casing or
☐ Closed-in artesian pressure psi.

How was test flow measured:
bucket/stopwatch, weir, flume, flowmeter, etc

Yellowstone Controlled Groundwater Area - Water Temperature °F

☐ AQUIFER TEST DATA FORM ATTACHED

Test - 1 hour minimum

Drawdown is the amount water level is lowered below static level.
All depth measurements shall be from the top of the well casing.
Time of recovery is hours/minutes since pumping stopped.

Air test*

15 gpm with drill stem set at 123 ft. for 1 hours
Time of recovery hrs/min. Recovery water level ft.

OR Bailer test*

 gpm with ft. of drawdown after hours
Time of recovery hrs/min. Recovery water level ft.

OR Pump test*

Depth pump set for test ft.
 gpm pump rate with ft. of drawdown after hrs pumping
Time of recovery hrs/min. Recovery water level ft.

OR Flowing Artesian*

 gpm for hours

Flow controlled by

*During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.

7. **WELL LOG:**

Depth, Feet		Material:
From	To	color/rock and type/descriptor (example: blue/shale/hard, or brown/gravel/water, or brown/sand/heaving)
0	2	yellow brown/topsoil
2	10	yellow brown/sandy clay with gravel/up to 1/2" subangular
10	30	medium brown/clay with gravel/1/2-3/4" in size
30	48	medium brown/clay with lesser gravel amounts than above/3/4"
48	83	gray brown/clay/becoming more competent. Uppermost clay contains gravel 1/8-1/4" amount of gravel decreases with depth.
83	100	brown + red/gravel/1/4-3/4", grades from fine to coarse with depth/well-rounded (Qw)
100	105	gray brown/clay
105	114	brown + red/gravel/coarse/well-rounded (Qw)
114	127	dark gray/shale/dry (KB)

☐ ADDITIONAL SHEETS ATTACHED

8. **DATE WELL COMPLETED:** 8-31-06

9. **REMARKS:** observation well for aquifer test

10. **DRILLER/CONTRACTOR'S CERTIFICATION:**

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name, firm, or corporation (print) AGES Industries

Address Box 1166 Williston ND 58801

Signature Darrell Robinson

Date 10-7-06 License no. 156

MBMG ID#

230556



Montana Bureau of Mines & Geology
The University of Montana
1300 West Park Street
Butte, MT 59701

27N 51E 06 13CAB MONTANA WELL LOG REPORT

Form No. 603 R2-04

Well ID# USGS06-9

This log reports the activities of a licensed Montana well driller and serves as the official record of work done within the borehole and casing and describes the amount of water encountered. **This form is to be completed by the driller and filed with Mt. Bureau of Mines & Geology within 60 days of completion of the work.** Acquiring Water Rights is the well owner's responsibility and is not accomplished by the filing of this report. Well log information is stored in the Groundwater Information Center at the Montana Bureau of Mines and Geology (Butte) and water right information is stored in the Water Rights Bureau records (Helena).

For fields that are not applicable, enter NA. Optional fields have a grayed background. Record additional information in the REMARKS section.

1. WELL OWNER:

Name U.S. Geological Survey

Mailing address 3162 Bozeman Ave
Helena, MT 59601

2. WELL LOCATION: List 1/4 from smallest to largest

NW 1/4 NE 1/4 SW 1/4 NW 1/4, Section 06

Township 27 N Range 51 E County Roosevelt

Lot _____, Tract/Blk _____ Subdivision Name _____

Well Address _____

GPS ☒ Yes ☐ No

Latitude 480729.1 Longitude 1051123.7

Error as reported by GPS locator (± feet) _____

Horizontal datum ☒ NAD27 ☐ WGS84

3. PROPOSED USE:

☐ Domestic ☐ Stock ☐ Irrigation
☐ Public water supply ☒ Monitoring Well ☐ Other: _____

4. TYPE OF WORK:

☒ New well ☐ Deepen existing well ☐ Abandon existing well
Method: ☐ Cable ☒ Rotary ☐ Other: _____

5. WELL CONSTRUCTION DETAILS:

Borehole:
Dia. 7 7/8 in. from 0 ft. to 80 ft.
Dia. _____ in. from _____ ft. to _____ ft.
Dia. _____ in. from _____ ft. to _____ ft.

Casing:

Steel: Wall thickness _____ ☐ Threaded ☐ Welded
Dia. 6 in. from +2.9 ft. to 2.1 ft.
Dia. _____ in. from _____ ft. to _____ ft.

Plastic: Pressure Rating _____ lbs. ☒ Threaded ☐ Welded
Dia. 4 in. from +2.5 ft. to 73 ft.

Perforations/Slotted Pipe:

Type of perforator used _____
Size of perforations/slots _____ in. by _____ in.
_____ no. of perforations/slots from _____ ft. to _____ ft.
_____ no. of perforations/slots from _____ ft. to _____ ft.

Screens:

☒ Yes ☐ No
Material PVC
Dia. 4" Slot size 0.02 from 43 ft. to 63 ft.
Dia. _____ Slot size _____ from _____ ft. to _____ ft.

Gravel Packed:

☒ Yes ☐ No
Size of gravel 12-20 sand
Gravel placed from 40 ft. to 75 ft.

Packer: ☐ Yes ☒ No Natural cuttings 75-80'
Type _____ Depth(s) _____

Grout: Material used Bentonite
Depth from 0 ft. to 40 ft. OR ☐ Continuous feed

6. WELL TEST DATA:

A well test is required for all wells. (See details on well log report cover.)

☒ Static water level 17.60 ft. below top of casing or
☐ Closed-in artesian pressure _____ psi.

How was test flow measured:
bucket/stopwatch, weir, flume, flowmeter, etc _____

Yellowstone Controlled Groundwater Area - Water Temperature _____ °F

☐ AQUIFER TEST DATA FORM ATTACHED

Test - 1 hour minimum

Drawdown is the amount water level is lowered below static level.
All depth measurements shall be from the top of the well casing.
Time of recovery is hours/minutes since pumping stopped.

Air test*

15 gpm with drill stem set at 72 ft. for 0.75 hours
Time of recovery _____ hrs/min. Recovery water level _____ ft.

OR Bailer test*

_____ gpm with _____ ft. of drawdown after _____ hours
Time of recovery _____ hrs/min. Recovery water level _____ ft.

OR Pump test*

Depth pump set for test _____ ft.
_____ gpm pump rate with _____ ft. of drawdown after _____ hrs pumping
Time of recovery _____ hrs/min. Recovery water level _____ ft.

OR Flowing Artesian*

_____ gpm for _____ hours

Flow controlled by _____

*During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.

7. WELL LOG:

Depth, Feet		Material:
From	To	color/rock and type/descriptor (example: blue/shale/hard, or brown/gravel/water, or brown/sand/heaving)
0	2	brown/topsoil
2	8	brown/sand/ fine-grained
8	20	dark brown/sand with very dark gray/clay and <5% gravel/1/4"
20	36	very dark gray/clay and gravel/1/4-1/2" grading to 1/2-1" with depth. Clay decreases and sand increases with depth.
36	64	gravel/very coarse (2al)
64	80	dark gray/shale. Becomes hard at 75'. (Kb)

RECEIVED

OCT 30 2006

M.B.M.G.

☐ ADDITIONAL SHEETS ATTACHED

8. DATE WELL COMPLETED: 8-29-06

9. REMARKS: observation well for aquifer test

10. DRILLER/CONTRACTOR'S CERTIFICATION:

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name, firm, or corporation (print) AGRI-INDUSTRIES

Address Box 1166 W. A. STON ND

Signature Daniel R. O'Connor

Date 10-7-06 License no. 7156

MBMG ID#

230551



Montana Bureau of Mines & Geology
The University of Montana
1300 West Park Street
Butte, MT 59701

MONTANA WELL LOG REPORT

Form No. 603 R2-04

Well ID# USG506-10

This log reports the activities of a licensed Montana well driller and serves as the official record of work done within the borehole and casing and describes the amount of water encountered. **This form is to be completed by the driller and filed with Mt. Bureau of Mines & Geology within 60 days of completion of the work.** Acquiring Water Rights is the well owner's responsibility and is not accomplished by the filing of this report.

Well log information is stored in the Groundwater Information Center at the Montana Bureau of Mines and Geology (Butte) and water right information is stored in the Water Rights Bureau records (Helena).

For fields that are not applicable, enter NA. Optional fields have a grayed background. Record additional information in the REMARKS section.

1. WELL OWNER:

Name U.S. Geological Survey
Mailing address 3162 Bozeman Ave
Helena, MT 59601

2. WELL LOCATION:

List 1/4 from smallest to largest
NW 1/4 NE 1/4 SW 1/4 NW 1/4, Section 06
Township 27 N Range 51 E County Bonanza
Lot , Tract/Blk Subdivision Name
Well Address
GPS ☒ Yes ☐ No
Latitude 48.0728.9 Longitude 105.1124.5
Error as reported by GPS locator (± feet)
Horizontal datum ☒ NAD27 ☐ WGS84

3. PROPOSED USE:

☐ Domestic ☐ Stock ☐ Irrigation
☐ Public water supply ☒ Monitoring Well ☐ Other:

4. TYPE OF WORK:

☒ New well ☐ Deepen existing well ☐ Abandon existing well
Method: ☐ Cable ☒ Rotary ☐ Other:

5. WELL CONSTRUCTION DETAILS:

Borehole:
Dia. 8 3/4 in. from 0 ft. to 60 ft.
Dia. in. from ft. to ft.
Dia. in. from ft. to ft.

Casing:

Steel: Wall thickness ☐ Threaded ☐ Welded
Dia. 6 in. from +3.1 ft. to 1.9 ft.
Dia. in. from ft. to ft.

Plastic: Pressure Rating lbs. ☒ Threaded ☐ Welded
Dia. 4 in. from +2.5 ft. to 46 ft.

Perforations/Slotted Pipe:

Type of perforator used
Size of perforations/slots in. by in.
 no. of perforations/slots from ft. to ft.
 no. of perforations/slots from ft. to ft.

Screens:

☒ Yes ☐ No
Material PVC
Dia. 4" Slot size 0.02 from 26 ft. to 36 ft.
Dia. Slot size from ft. to ft.

Gravel Packed:

☒ Yes ☐ No
Size of gravel 12-20 sand
Gravel placed from 23 ft. to 60 ft.

Packer:

☐ Yes ☒ No
Type Depth(s)

Grout:

Material used Portlandite
Depth from 0 ft. to 23 ft. OR ☐ Continuous feed

6. WELL TEST DATA:

A well test is required for all wells. (See details on well log report cover.)

☒ Static water level 17.45 ft. below top of casing or
☐ Closed-in artesian pressure psi.

How was test flow measured:
bucket/stopwatch, weir, flume, flowmeter, etc

Yellowstone Controlled Groundwater Area - Water Temperature °F

☐ AQUIFER TEST DATA FORM ATTACHED

Test - 1 hour minimum

Drawdown is the amount water level is lowered below static level.
All depth measurements shall be from the top of the well casing.
Time of recovery is hours/minutes since pumping stopped.

Air test*

10 gpm with drill stem set at 46 ft. for 1 hours
Time of recovery hrs/min. Recovery water level ft.

OR Bailer test*

 gpm with ft. of drawdown after hours
Time of recovery hrs/min. Recovery water level ft.

OR Pump test*

Depth pump set for test ft.
 gpm pump rate with ft. of drawdown after hrs pumping
Time of recovery hrs/min. Recovery water level ft.

OR Flowing Artesian*

 gpm for hours

Flow controlled by

*During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.

7. WELL LOG:

Depth, Feet		Material:
From	To	color/rock and type/descriptor (example: blue/shale/hard, or brown/gravel/water, or brown/sand/heaving)
0	4	brown/topsoil
4	21	gray/clay/ with dark gray/ sand/ fine. Lignite fragments between 10-11"
21	26	dark gray/sand/ fine grained with some clay
26	35	sand/ fine grained with gravel/ 1/2" (Qa)
35	36	dark gray/gravel/ coarse (1/2-1") (Qa)
36	60	dark gray/clay/ hard (Kb)

RECEIVED

OCT 31 2006

M.B.M.G.

☐ ADDITIONAL SHEETS ATTACHED

8. DATE WELL COMPLETED:

8-28-06

9. REMARKS:

observation well for aquifer test

10. DRILLER/CONTRACTOR'S CERTIFICATION:

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name, firm, or corporation (print) ACRE Industries
Address Box 1166 Williston ND 58801
Signature Darrell Robinson
Date 10-7-06 License no. 156

MBMG ID#

230558



Montana Bureau of Mines & Geology
The University of Montana
1300 West Park Street
Butte, MT 59701

27N 51E 06 BCAB MONTANA WELL LOG REPORT

Form No. 603 R2-04

Well ID# USGS06-11

This log reports the activities of a licensed Montana well driller and serves as the official record of work done within the borehole and casing and describes the amount of water encountered. **This form is to be completed by the driller and filed with Mt. Bureau of Mines & Geology within 60 days of completion of the work.** Acquiring Water Rights is the well owner's responsibility and is not accomplished by the filing of this report.

Well log information is stored in the Groundwater Information Center at the Montana Bureau of Mines and Geology (Butte) and water right information is stored in the Water Rights Bureau records (Helena).

For fields that are not applicable, enter NA. Optional fields have a grayed background. Record additional information in the REMARKS section.

1. WELL OWNER:

Name U.S. Geological Survey
Mailing address 3162 Bozeman Ave
Helena, MT 59601

2. WELL LOCATION:

List 1/4 from smallest to largest
NW 1/4 NE 1/4 SW 1/4 NW 1/4, Section 06
Township 21 N Range 51 E County Roosvelt
Lot _____, Tract/Blk _____ Subdivision Name _____
Well Address _____
GPS ☒ Yes ☐ No
Latitude 48 07 29.522 Longitude 105 11 24.081
Error as reported by GPS locator (± feet) _____
Horizontal datum ☒ NAD27 ☐ WGS84

3. PROPOSED USE:

☐ Domestic ☐ Stock ☐ Irrigation
☐ Public water supply ☒ Monitoring Well ☐ Other: _____

4. TYPE OF WORK:

☒ New well ☐ Deepen existing well ☐ Abandon existing well
Method: ☐ Cable ☒ Rotary ☐ Other: _____

5. WELL CONSTRUCTION DETAILS:

Borehole:
Dia. 8 3/4 in. from 0 ft. to 83 ft.
Dia. _____ in. from _____ ft. to _____ ft.
Dia. _____ in. from _____ ft. to _____ ft.

Casing:
Steel: Wall thickness _____ ☐ Threaded ☐ Welded
Dia. 8 in. from +3.0 ft. to 2.0 ft.
Dia. _____ in. from _____ ft. to _____ ft.

Plastic: Pressure Rating _____ lbs. ☒ Threaded ☐ Welded
Dia. 5 in. from +2.6 ft. to 81 ft.

Perforations/Slotted Pipe:

Type of perforator used _____
Size of perforations/slots _____ in. by _____ in.
_____ no. of perforations/slots from _____ ft. to _____ ft.
_____ no. of perforations/slots from _____ ft. to _____ ft.

Screens:

☒ Yes ☐ No
Material PVC-wrapped
Dia. 5" Slot size 0.02 from 43 ft. to 68 ft.
Dia. _____ Slot size _____ from _____ ft. to _____ ft.

Gravel Packed:

☒ Yes ☐ No
Size of gravel 12-20 sand + natural gravel
Gravel placed from 35 ft. to 83 ft.

Packer:

☐ Yes ☒ No
Type _____ Depth(s) _____

Grout:

Material used Bentonite
Depth from 0 ft. to 35 ft. OR ☐ Continuous feed

6. WELL TEST DATA:

A well test is required for all wells. (See details on well log report cover.)

☒ Static water level 17.11 ft. below top of casing or
☐ Closed-in artesian pressure _____ psi.

How was test flow measured:

bucket/stopwatch, weir, flume, flowmeter, etc _____

Yellowstone Controlled Groundwater Area - Water Temperature _____ °F

☐ AQUIFER TEST DATA FORM ATTACHED

Test - 1 hour minimum

Drawdown is the amount water level is lowered below static level.
All depth measurements shall be from the top of the well casing.
Time of recovery is hours/minutes since pumping stopped.

Air test*

60 gpm with drill stem set at 80 ft. for 1 hours
Time of recovery _____ hrs/min. Recovery water level _____ ft.

OR Bailer test*

_____ gpm with _____ ft. of drawdown after _____ hours
Time of recovery _____ hrs/min. Recovery water level _____ ft.

OR Pump test*

Depth pump set for test _____ ft.
_____ gpm pump rate with _____ ft. of drawdown after _____ hrs pumping
Time of recovery _____ hrs/min. Recovery water level _____ ft.

OR Flowing Artesian*

_____ gpm for _____ hours

Flow controlled by _____

*During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.

7. WELL LOG:

Depth, Feet		Material:
From	To	color/rock and type/descriptor (example: blue/shale/hard, or brown/gravel/water, or brown/sand/heaving)
0	2	topsoil
2	5	medium brown/sand/fine grained
5	34	dark gray/clay with 5-10% gravel 1/16-3/8" at top to 1/4-1/2" at bottom.
34	38	gravel 1/16-1/2"
38	43	gray brown/sandy clay/soft
43	56	gravel 1/16-1/8" with sand and soft clay (Qal)
56	63	gravel 1/8-1" size/well rounded with petrified wood (Qal)
63	71	sand/very fine grained and loose. lignite seam in sand. (Qal)
71	83	dark gray/shale/dry/soft (Kb)

RECEIVED

☐ ADDITIONAL SHEETS ATTACHED

OCT 30 2006

8. DATE WELL COMPLETED:

9-6-06

9. REMARKS:

pumping well for aquifer test.

10. DRILLER/CONTRACTOR'S CERTIFICATION:

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name, firm, or corporation (print) AGRE Industries

Address Box 1166 Williston ND 58861

Signature Dwight R. Ramsey

Date 10-7-06 License no. 156

MBMG ID#

230559



Montana Bureau of Mines & Geology
The University of Montana
1300 West Park Street
Butte, MT 59701

MONTANA WELL LOG REPORT

Form No. 603 R2-04

Well ID# UG6509-1

This log reports the activities of a licensed Montana well driller and serves as the official record of work done within the borehole and casing and describes the amount of water encountered. This form is to be completed by the driller and filed with Mt. Bureau of Mines & Geology within 60 days of completion of the work. Acquiring Water Rights is the well owner's responsibility and is not accomplished by the filing of this report. Well log information is stored in the Groundwater Information Center at the Montana Bureau of Mines and Geology (Butte) and water right information is stored in the Water Rights Bureau records (Helena).

For fields that are not applicable, enter NA. Optional fields have a grayed background. Record additional information in the REMARKS section.

1. WELL OWNER:

Name FORT PECK TRIBES OEP
Mailing address P.O. BOX 1027
POPLAR, MONTANA 59255

2. WELL LOCATION:

List ¼ from smallest to largest

¼ SW ¼ SW ¼ SW ¼, Section 33
Township 28 N S Range 51 E W County ROOSEVELT
Lot _____, Tract/Blk _____ Subdivision Name _____
Well Address _____
GPS ☒ Yes ☐ No
Latitude 48° 07' 44.0772" N Longitude 105° 09' 02.58094 W
Error as reported by GPS locator (± feet) _____
Horizontal datum ☐ NAD27 ☐ WGS84 NAD83

3. PROPOSED USE:

☐ Domestic ☐ Stock ☐ Irrigation
☐ Public water supply ☒ Monitoring Well ☐ Other: _____

4. TYPE OF WORK:

☒ New well ☐ Deepen existing well ☐ Abandon existing well
Method: ☐ Cable ☒ Rotary ☐ Other: _____

5. WELL CONSTRUCTION DETAILS:

Borehole:

Dia. 11 in. from 0 ft. to 100 ft.
Dia. 8 in. from 100 ft. to 148 ft.
Dia. _____ in. from _____ ft. to _____ ft.

Casing:

Steel: Wall thickness _____ ☐ Threaded ☐ Welded
Dia. 8 in. from 0.0 ft. to +2.0 ft.
Dia. _____ in. from _____ ft. to _____ ft.

Plastic: Pressure Rating _____ lbs. ☐ Threaded ☐ Welded
Dia. 4 in. from +1.0 ft. to 148 ft.

Perforations/Slotted Pipe:

Type of perforator used _____
Size of perforations/slots _____ in. by _____ in.
_____ no. of perforations/slots from _____ ft. to _____ ft.
_____ no. of perforations/slots from _____ ft. to _____ ft.

Screens: ☒ Yes ☐ No

Material PVC
Dia. 4" Slot size 0.02 from 129 ft. to 139 ft.
Dia. _____ Slot size _____ from _____ ft. to _____ ft.

Gravel Packed: ☒ Yes ☐ No

Size of gravel 12-20 SAND
Gravel placed from 107 ft. to 148 ft.

Packer: ☐ Yes ☐ No NATURAL CUTTINGS
Type _____ Depth(s) 78 FT. TO 107 FT.

Grout: Material used BENTONITE CHIPS
Depth from 78 ft. to 0 ft. OR ☐ Continuous feed

6. WELL TEST DATA:

A well test is required for all wells. (See details on well log report cover.)

☒ Static water level 87.31 ft. below top of casing or
☐ Closed-in artesian pressure _____ psi.

How was test flow measured:
bucket/stopwatch, weir, flume, flowmeter, etc. _____

Yellowstone Controlled Groundwater Area - Water Temperature _____ °F

☐ AQUIFER TEST DATA FORM ATTACHED

Test - 1 hour minimum

Drawdown is the amount water level is lowered below static level.
All depth measurements shall be from the top of the well casing.
Time of recovery is hours/minutes since pumping stopped.

Air test*

3 gpm with drill stem set at 145 ft. for 0.5 hours
Time of recovery _____ hrs/min. Recovery water level _____ ft.

OR Bailer test*

7 gpm with _____ ft. of drawdown after 0.25 hours
Time of recovery _____ hrs/min. Recovery water level _____ ft.

OR Pump test*

Depth pump set for test _____ ft.
_____ gpm pump rate with _____ ft. of drawdown after _____ hrs pumping
Time of recovery _____ hrs/min. Recovery water level _____ ft.

OR Flowing Artesian*

_____ gpm for _____ hours

Flow controlled by _____

*During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.

7. WELL LOG:

Depth, Feet		Material:
From	To	color/rock and type/descriptor (example: blue/shale/hard, or brown/gravel/water, or brown/sand/heaving)
0	1	TOPSOIL
1	25	CLAY WITH SAND, OLIVE BROWN
		OCCL. GRAVEL 1"-2"
25	58	CLAY WITH SAND OLIVE BROWN
		MORE COMPETENT THAN ABOVE/5"
		GRAVEL 3/4"-1 1/2"
58	101	CLAY, GRAY BROWN/OCCL. GRAVEL 2 1/4"-3 1/2"
		COMMON! SILTY SAND LENSES
101	115	GRAVEL, RED BROWN, 3/4"-2" SUBANGULAR
		SURROUNDED/COAL FRAGMENTS (QW)
115	116	SAND, GRAY, FINE GRAINED
116	121	GRAVEL, RED BROWN, 3/4"-2" SUBANGULAR
		SURROUNDED/OCCL. COBBLES 3"-5" (QW)
121	126	CLAY, BLUE GRAY, COMPETENT
126	138	GRAVEL, RED BROWN, 1/4"-3"
		SUBANGULAR - SURROUNDED (QW)
138	148	SHALE, DARK GRAY, DRY (K)

☐ ADDITIONAL SHEETS ATTACHED

8. DATE WELL COMPLETED: 10/06/2009

9. REMARKS: _____

10. DRILLER/CONTRACTOR'S CERTIFICATION:

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name, firm, or corporation (print) _____

Address _____

Signature _____

Date _____ License no. _____



Montana Bureau of Mines & Geology
The University of Montana
1300 West Park Street
Butte, MT 59701

MBMG ID#

252465

Form No. 603 R2-04

MONTANA WELL LOG REPORTWell ID# VE66009-2

This log reports the activities of a licensed Montana well driller and serves as the official record of work done within the borehole and casing and describes the amount of water encountered. This form is to be completed by the driller and filed with Mt. Bureau of Mines & Geology within 60 days of completion of the work. Acquiring Water Rights is the well owner's responsibility and is not accomplished by the filing of this report. Well log information is stored in the Groundwater Information Center at the Montana Bureau of Mines and Geology (Butte) and water right information is stored in the Water Rights Bureau records (Helena).

For fields that are not applicable, enter NA. Optional fields have a grayed background. Record additional information in the REMARKS section.

1. WELL OWNER:

Name FORT PECK TRIBES OEP
Mailing address BOX 1027
POPLAR, MT 59255

2. WELL LOCATION: List ¼ from smallest to largest

¼ NW ¼ SW ¼ SW ¼, Section 6
Township 27 N Range 51 E County ROOSEVELT
Lot , Tract/Blk Subdivision Name
Well Address
GPS ☒ Yes ☐ No
Latitude 48°07'01.88406"N Longitude 105°11'32.41714"W
Error as reported by GPS locator (± feet)
Horizontal datum ☐ NAD27 ☐ WGS84 NAD83

3. PROPOSED USE: ☐ Domestic ☐ Stock ☐ Irrigation
☐ Public water supply ☒ Monitoring Well ☐ Other: **4. TYPE OF WORK:**

☒ New well ☐ Deepen existing well ☐ Abandon existing well
Method: ☐ Cable ☒ Rotary ☐ Other:

5. WELL CONSTRUCTION DETAILS:**Borehole:**

Dia. 11 in. from 0 ft. to 20 ft.
Dia. 8 in. from 20 ft. to 85 ft.
Dia. in. from ft. to ft.

Casing:

Steel: Wall thickness ☐ Threaded ☐ Welded
Dia. 8 in. from 7.5 ft. to +2.5 ft.
Dia. in. from ft. to ft.

Plastic: Pressure Rating lbs. ☐ Threaded ☐ Welded
Dia. 4 in. from +2.3 ft. to 85 ft.

Perforations/Slotted Pipe:

Type of perforator used
Size of perforations/slots in. by in.
 no. of perforations/slots from ft. to ft.
 no. of perforations/slots from ft. to ft.

Screens: ☒ Yes ☐ No

Material PVC
Dia. 4" Slot size 002 from 35 ft. to 75 ft.
Dia. Slot size from ft. to ft.

Gravel Packed: ☒ Yes ☐ No

Size of gravel 12-20 SAND
Gravel placed from 27 ft. to 85 ft.

Packer: ☐ Yes ☐ No

Type Depth(s)

Grout: Material used BENTONITE CHIPS

Depth from 27 ft. to 0 ft. OR ☐ Continuous feed

6. WELL TEST DATA:

A well test is required for all wells. (See details on well log report cover.)

☒ Static water level 16.44 ft. below top of casing or
☐ Closed-in artesian pressure psi.

How was test flow measured:

bucket/stopwatch, weir, flume, flowmeter, etc.

Yellowstone Controlled Groundwater Area - Water Temperature °F

☐ AQUIFER TEST DATA FORM ATTACHED

Test - 1 hour minimum

Drawdown is the amount water level is lowered below static level.
All depth measurements shall be from the top of the well casing.
Time of recovery is hours/minutes since pumping stopped.

Air test*

3 gpm with drill stem set at 82 ft. for 0.75 hours
Time of recovery hrs/min. Recovery water level ft.

OR Bailer test*

 gpm with ft. of drawdown after hours
Time of recovery hrs/min. Recovery water level ft.

OR Pump test*

Depth pump set for test ft.
 gpm pump rate with ft. of drawdown after hrs pumping
Time of recovery hrs/min. Recovery water level ft.

OR Flowing Artesian*

 gpm for hours

Flow controlled by

*During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.

7. WELL LOG:

Depth, Feet		Material:
From	To	color/rock and type/descriptor (example: blue/shale/hard, or brown/gravel/water, or brown/sand/heaving)
0	1	TOPSOIL, LIGHT BROWN
1	10	SAND, LIGHT BROWN, FINE GRAINED, WELL SORTED, DRY
10	14	SAND, MEDIUM BROWN, FINE GRAINED, SLIGHTLY COARSER THAN ABOVE
14	17	SAND, DARK GRAY, MOIST
17	21	GRAVEL AND SAND, RED AND BROWN, 50% GRAVEL 3/4" - 1" SUBANGULAR - SUBROUNDED (Q21)
21	36	CLAY, DARK GRAY, COMPETENT/OCC. GRAVEL < 1/4", COAL FRAGMENTS
36	55	GRAVEL, RED AND BROWN, 3/4" - 3", SUBANGULAR - SUBROUNDED/COAL FRAGMENTS AND PETRIFIED WOOD (Q21)
55	61	SAND, GRAY, MEDIUM GRAINED
61	74	GRAVEL, RED AND BROWN, 1/4" - 4", SUBANGULAR - SUBROUNDED, COAL FRAGMENTS (Q21)
74	85	SHALE, DARK GRAY, HARD, DRY (K4)

☐ ADDITIONAL SHEETS ATTACHED

8. DATE WELL COMPLETED: 10/7/2009

9. REMARKS:

10. DRILLER/CONTRACTOR'S CERTIFICATION:

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name, firm, or corporation (print)

Address

Signature

Date License no.



Montana Bureau of Mines & Geology
The University of Montana
1300 West Park Street
Butte, MT 59701

MBMG ID#

252468

Form No. 603 R2-04

MONTANA WELL LOG REPORTWell ID# US6509-3

This log reports the activities of a licensed Montana well driller and serves as the official record of work done within the borehole and casing and describes the amount of water encountered. This form is to be completed by the driller and filed with Mt. Bureau of Mines & Geology within 60 days of completion of the work. Acquiring Water Rights is the well owner's responsibility and is not accomplished by the filing of this report. Well log information is stored in the Groundwater Information Center at the Montana Bureau of Mines and Geology (Butte) and water right information is stored in the Water Rights Bureau records (Helena).

For fields that are not applicable, enter NA. Optional fields have a grayed background. Record additional information in the REMARKS section.

1. WELL OWNER:

Name FORT PECK TRIBES OEP
Mailing address P.O. BOX 1027
POPLAR, MT 59255

2. WELL LOCATION: List 1/4 from smallest to largest

1/4 NE 1/4 NE 1/4 SW 1/4, Section 32
Township 28N Range 51E County ROOSEVELT
Lot , Tract/Blk Subdivision Name
Well Address
GPS ☐ Yes ☐ No
Latitude 48°08'09.6370"N Longitude 105°09'42.6230"W
Error as reported by GPS locator (± feet)
Horizontal datum ☐ NAD27 ☐ WGS84 NAD83

3. PROPOSED USE: ☐ Domestic ☐ Stock ☐ Irrigation
☐ Public water supply ☒ Monitoring Well ☐ Other: **4. TYPE OF WORK:**

☒ New well ☐ Deepen existing well ☐ Abandon existing well
Method: ☐ Cable ☒ Rotary ☐ Other:

5. WELL CONSTRUCTION DETAILS:**Borehole:**

Dia. 10 in. from 0 ft. to 100 ft.
Dia. 8 in. from 100 ft. to 149 ft.
Dia. in. from ft. to ft.

Casing:

Steel: Wall thickness ☐ Threaded ☐ Welded
Dia. 8 in. from 10.9 ft. to +2.1 ft.
Dia. in. from ft. to ft.

Plastic: Pressure Rating lbs. ☐ Threaded ☐ Welded
Dia. 4 in. from +1.8 ft. to 149 ft.

Perforations/Slotted Pipe:

Type of perforator used
Size of perforations/slots in. by in.
 no. of perforations/slots from ft. to ft.
 no. of perforations/slots from ft. to ft.

Screens: ☒ Yes ☐ No

Material PVC
Dia. 4" Slot size 0.02 from 129 ft. to 139 ft.
Dia. Slot size from ft. to ft.

Gravel Packed: ☒ Yes ☐ No

Size of gravel 12-20 SAND
Gravel placed from 124 ft. to 149 ft.

Packer: ☐ Yes ☐ No NATURAL CUTTINGS
Type Depth(s) 92'-124'

Grout: Material used BENTONITE CLIPS
Depth from 0 ft. to 92 ft. OR ☐ Continuous feed

6. WELL TEST DATA:

A well test is required for all wells. (See details on well log report cover.)

☒ Static water level 93.66 ft. below top of casing or
☐ Closed-in artesian pressure psi.

How was test flow measured:
bucket/stopwatch, weir, flume, flowmeter, etc

Yellowstone Controlled Groundwater Area - Water Temperature °F

☐ AQUIFER TEST DATA FORM ATTACHED

Test - 1 hour minimum

Drawdown is the amount water level is lowered below static level.
All depth measurements shall be from the top of the well casing.
Time of recovery is hours/minutes since pumping stopped.

Air test*

3 gpm with drill stem set at 146 ft. for 0.75 hours
Time of recovery hrs/min. Recovery water level ft.

OR Bailer test*

 gpm with ft. of drawdown after hours
Time of recovery hrs/min. Recovery water level ft.

OR Pump test*

Depth pump set for test ft.
 gpm pump rate with ft. of drawdown after hrs pumping
Time of recovery hrs/min. Recovery water level ft.

OR Flowing Artesian*

 gpm for hours

Flow controlled by

*During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.

7. WELL LOG:

Depth, Feet		Material:
From	To	color/rock and type/descriptor (example: blue/shale/hard, or brown/gravel/water, or brown/sand/heaving)
0	1	TOPSOIL
1	2	SAND, SILTY, LIGHT BROWN, FINE GRAINED, OCC. GRAVEL 3"
2	9	CLAY, MEDIUM BROWN, OCC. GRAVEL 1/2"
9	55	CLAY, OLIVE BROWN, MORE COMPETENT THAN ABOVE, IRON STAINING, OCC. GRAVEL 3/4"-1", COAL FRAGMENTS PRESENT
55	95	CLAY, DARK GRAY BROWN, SAME AS ABOVE, FINE GRAINED SAND LENS AT 61'
95	111	GRAVEL, RED AND BROWN, 1/4"-6"
111	113	SUBANGULAR - WELL ROUNDED (QW)
113	136	CLAY, GRAY, COMPETENT
136	139	GRAVEL, RED AND BROWN, 1/4"-6"
139	149	SAME AS ABOVE (QW)
136	139	SHALE, GRAY, WEATHERED (KH)
139	149	SHALE, DARK GRAY, HARD (KH)

☐ ADDITIONAL SHEETS ATTACHED

8. DATE WELL COMPLETED: 10/09/2009

9. REMARKS:

10. DRILLER/CONTRACTOR'S CERTIFICATION:

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name, firm, or corporation (print)

Address

Signature

Date License no.



Montana Bureau of Mines & Geology
The University of Montana
1300 West Park Street
Butte, MT 59701

MBMG ID#

252592

MONTANA WELL LOG REPORT

Form No. 603 R2-04

Well ID# UGG509-4

This log reports the activities of a licensed Montana well driller and serves as the official record of work done within the borehole and casing and describes the amount of water encountered. This form is to be completed by the driller and filed with Mt. Bureau of Mines & Geology within 60 days of completion of the work. Acquiring Water Rights is the well owner's responsibility and is not accomplished by the filing of this report.

Well log information is stored in the Groundwater Information Center at the Montana Bureau of Mines and Geology (Butte) and water right information is stored in the Water Rights Bureau records (Helena).

For fields that are not applicable, enter NA. Optional fields have a grayed background. Record additional information in the REMARKS section.

1. WELL OWNER:

Name FORT PECK TRIBES OEPMailing address P.O. BOX 1027POPLAR, MONTANA 59255

2. WELL LOCATION: List ¼ from smallest to largest

¼ SW ¼ SW ¼ SW ¼, Section 4Township 27N Range 51E County ROOSEVELTLot , Tract/Blk Subdivision Name Well Address GPS ☐ Yes ☐ NoLatitude 48°06'55.82608"N Longitude 105°09'02.55274"WError as reported by GPS locator (± feet) Horizontal datum ☐ NAD27 ☐ WGS84 NAD83

3. PROPOSED USE:

☐ Domestic ☐ Stock ☐ Irrigation
☐ Public water supply ☒ Monitoring Well ☐ Other:

4. TYPE OF WORK:

☒ New well ☐ Deepen existing well ☐ Abandon existing wellMethod: ☐ Cable ☐ Rotary ☐ Other:

5. WELL CONSTRUCTION DETAILS:

Borehole:

Dia. 10 in. from 0 ft. to 95 ft.Dia. 8 in. from 95 ft. to 126 ft.Dia. in. from ft. to ft.

Casing:

Steel: Wall thickness ☐ Threaded ☐ WeldedDia. 8 in. from +1.9 ft. to 5.1 ft.Dia. in. from ft. to ft.Plastic: Pressure Rating lbs. ☐ Threaded ☐ WeldedDia. 4" in. from +1.5 ft. to 126 ft.

Perforations/Slotted Pipe:

Type of perforator used Size of perforations/slots in. by in. no. of perforations/slots from ft. to ft. no. of perforations/slots from ft. to ft.Screens: ☒ Yes ☐ NoMaterial PVCDia. 4" Slot size 0.02 from 106 ft. to 116 ft.Dia. Slot size from ft. to ft.Gravel Packed: ☒ Yes ☐ NoSize of gravel 12-20 SANDGravel placed from 103 ft. to 126 ft.Packer: ☐ Yes ☐ No NATURAL CUTTINGSType Depth(s) 60'-103'Grout: Material used BENTONITE CHIPSDepth from 0 ft. to 60 ft. OR ☐ Continuous feed

6. WELL TEST DATA:

A well test is required for all wells. (See details on well log report cover.)

☒ Static water level 52.51 ft. below top of casing or☐ Closed-in artesian pressure psi.

How was test flow measured:

bucket/stopwatch, weir, flume, flowmeter, etc Yellowstone Controlled Groundwater Area - Water Temperature °F☐ AQUIFER TEST DATA FORM ATTACHED

Test - 1 hour minimum

Drawdown is the amount water level is lowered below static level.

All depth measurements shall be from the top of the well casing.

Time of recovery is hours/minutes since pumping stopped.

Air test*

75 gpm with drill stem set at 98 ft. for 0.5 hoursTime of recovery hrs/min. Recovery water level ft.

OR Bailer test*

 gpm with ft. of drawdown after hoursTime of recovery hrs/min. Recovery water level ft.

OR Pump test*

Depth pump set for test ft. gpm pump rate with ft. of drawdown after hrs pumpingTime of recovery hrs/min. Recovery water level ft.

OR Flowing Artesian*

 gpm for hoursFlow controlled by

*During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.

7. WELL LOG:

Depth, Feet		Material:
From	To	color/rock and type/descriptor (example: blue/shale/hard, or brown/gravel/water, or brown/sand/heaving)
0	2	TOPSOIL
2	15	CLAY, MEDIUM BROWN, OCC. GRAVEL 3/4"-3"
		INCREASING MOISTURE W/ DEPTH, STIFF
15	25	CLAY, GRAY BROWN, OCC. GRAVEL 3/4"-6"
		IRON STAINING, STIFF
25	47	CLAY, YELLOW BROWN, OCC. GRAVEL 3/4"-6"
		IRON STAINING, COAL FRAGMENTS, STIFF
47	76	CLAY, GRAY, OCC. GRAVEL 3/8"-3", COAL
		FRAGMENTS 1/8"-3"
76	90	GRAVEL AND SAND, RED, BROWN AND WHITE, 1/4"-4", SUBANGULAR-SUBROUND
90	95	GRAVEL, RED AND BROWN, 3/4"-4", SUBANGULAR
		WELL ROUNDED, 40% COAL FRAGMENTS 3/8"-4"
95	100	GRAVEL, RED AND BROWN, 1/4"-4", SUBANGULAR
		WELL ROUNDED, SM. COAL FRAGMENTS
100	101	CLAY, LIGHT GRAY, VERY STIFF, COAL FRAGMENTS
101	115	GRAVEL AND SAND, RED AND BROWN GRAVEL 1/4"-3", SUBANGULAR, WELL ROUNDED/DK GRAY SAND, FINE
115	126	SHALE, DARK GRAY, HARD, THIN

☐ ADDITIONAL SHEETS ATTACHED BENTONITE SEAM 123' WEATHERED8. DATE WELL COMPLETED: 10/14/2009 115-116

9. REMARKS:

10. DRILLER/CONTRACTOR'S CERTIFICATION:

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name, firm, or corporation (print) Address Signature Date License no. 

Montana Bureau of Mines & Geology
The University of Montana
1300 West Park Street
Butte, MT 59701

MBMG ID#

252593

Form No. 603 R2-04

MONTANA WELL LOG REPORT

Well ID# UGG609-5

This log reports the activities of a licensed Montana well driller and serves as the official record of work done within the borehole and casing and describes the amount of water encountered. This form is to be completed by the driller and filed with Mt. Bureau of Mines & Geology within 60 days of completion of the work. Acquiring Water Rights is the well owner's responsibility and is not accomplished by the filing of this report.

Well log information is stored in the Groundwater Information Center at the Montana Bureau of Mines and Geology (Butte) and water right information is stored in the Water Rights Bureau records (Helena).

For fields that are not applicable, enter NA. Optional fields have a grayed background. Record additional information in the REMARKS section.

1. WELL OWNER:

Name FORT PECK TRIBES OGPMailing address P.O. BOX 1027POPLAR, MT 59201

2. WELL LOCATION:

List ¼ from smallest to largest

¼ NW ¼ NW ¼ NW ¼, Section 9Township 27N Range 51E County ROOSEVELTLot , Tract/Blk Subdivision Name Well Address GPS ☐ Yes ☐ NoLatitude 48°06'48.43373"N Longitude 105°09'02.55646"WError as reported by GPS locator (± feet) Horizontal datum ☐ NAD27 ☐ WGS84 NAD83

3. PROPOSED USE:

☐ Domestic ☐ Stock ☐ Irrigation
☐ Public water supply ☒ Monitoring Well ☐ Other:

4. TYPE OF WORK:

☒ New well ☐ Deepen existing well ☐ Abandon existing wellMethod: ☐ Cable ☒ Rotary ☐ Other:

5. WELL CONSTRUCTION DETAILS:

Borehole:

Dia. 10 in. from 0 ft. to 78 ft.Dia. in. from ft. to ft.Dia. in. from ft. to ft.

Casing:

Steel: Wall thickness ☐ Threaded ☐ WeldedDia. 8 in. from 8.2 ft. to +1.8 ft.Dia. in. from ft. to ft.Plastic: Pressure Rating lbs. ☐ Threaded ☐ WeldedDia. 4 in. from +1.4 ft. to 78 ft.

Perforations/Slotted Pipe:

Type of perforator used Size of perforations/slots in. by in. no. of perforations/slots from ft. to ft. no. of perforations/slots from ft. to ft.Screens: ☒ Yes ☐ NoMaterial PVCDia. 4" Slot size 0.02 from 58 ft. to 68 ft.Dia. Slot size from ft. to ft.Gravel Packed: ☒ Yes ☐ NoSize of gravel 12-20 SANDGravel placed from 55 ft. to 78 ft.Packer: ☐ Yes ☐ No NATURAL CUTTINGSType Depth(s) 34'-55'Grout: Material used PENTONITE CHIPSDepth from 0 ft. to 34 ft. OR ☐ Continuous feed

6. WELL TEST DATA:

A well test is required for all wells. (See details on well log report cover.)

☒ Static water level 11.28 ft. below top of casing or☐ Closed-in artesian pressure psi.

How was test flow measured:

bucket/stopwatch, weir, flume, flowmeter, etc Yellowstone Controlled Groundwater Area - Water Temperature °F☐ AQUIFER TEST DATA FORM ATTACHED

Test - 1 hour minimum

Drawdown is the amount water level is lowered below static level.

All depth measurements shall be from the top of the well casing.

Time of recovery is hours/minutes since pumping stopped.

Air test*

30 gpm with drill stem set at ft. for 0.5 hoursTime of recovery hrs/min. Recovery water level ft.

OR Bailer test*

 gpm with ft. of drawdown after hoursTime of recovery hrs/min. Recovery water level ft.

OR Pump test*

Depth pump set for test ft. gpm pump rate with ft. of drawdown after hrs pumpingTime of recovery hrs/min. Recovery water level ft.

OR Flowing Artesian*

 gpm for hoursFlow controlled by

*During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.

7. WELL LOG:

Depth, Feet		Material:
From	To	color/rock and type/descriptor (example: blue/shale/hard, or brown/gravel/water, or brown/sand/heaving)
0	2	TOPSOIL, MEDIUM BROWN
2	15	CLAY, OLIVE BROWN, IRON STAINING, COC.
		GRAVEL 2 1/8"
15	32	SAND, DARK GRAY, FINE GRAINED, LOOSE
32	55	GRAVEL AND SAND, BROWN AND WHITE, 1/4"-1", SUBANGULAR, METAMORPHIC ROCKS PRESENT (Qs1)
55	56	CLAY, GRAY, SOFT
56	59	GRAVEL AND SAND, BROWN AND WHITE, 1/4"-1", SUBANGULAR, COAL FRAGMENTS
		UP TO 2", METAMORPHIC ROCKS PRESENT (Qs1)
59	62	CLAY, GRAY, VERY STIFF
62	63	SAND, DARK GRAY, FINE GRAINED
63	67	GRAVEL AND SAND, RED AND BROWN
		GRAVEL 1/4"-1", SUBANGULAR TO
		WELL BOUNDED, QUARTZITE PRESENT, LACK OF METAMORPHIC ROCKS (Qs1)
67	78	SHALE, DARK GRAY, THIN PENTONITE
		SEAM FROM 72'-74' (Kb)

☐ ADDITIONAL SHEETS ATTACHED8. DATE WELL COMPLETED: 10/12/2009

9. REMARKS:

10. DRILLER/CONTRACTOR'S CERTIFICATION:

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name, firm, or corporation (print) Address Signature Date License no. 

Montana Bureau of Mines & Geology
The University of Montana
1300 West Park Street
Butte, MT 59701

MBMG ID#

252594

Form No. 603 R2-04

MONTANA WELL LOG REPORT

Well ID# UG509-6

This log reports the activities of a licensed Montana well driller and serves as the official record of work done within the borehole and casing and describes the amount of water encountered. This form is to be completed by the driller and filed with Mt. Bureau of Mines & Geology within 60 days of completion of the work. Acquiring Water Rights is the well owner's responsibility and is not accomplished by the filing of this report.

Well log information is stored in the Groundwater Information Center at the Montana Bureau of Mines and Geology (Butte) and water right information is stored in the Water Rights Bureau records (Helena).

For fields that are not applicable, enter NA. Optional fields have a grayed background. Record additional information in the REMARKS section.

1. WELL OWNER:

Name FORT PECK TRIBES OF
Mailing address P.O. BOX 1027
POPLAR, MONTANA 59255

2. WELL LOCATION:

List ¼ from smallest to largest

¼ SW ¼ SE ¼ SW ¼, Section 17
Township 22N Range 51E County ROOSEVELT
Lot , Tract/Blk Subdivision Name
Well Address
GPS ☐ Yes ☐ No
Latitude 48°10'19.78284" N Longitude 105°10'01.70009" W
Error as reported by GPS locator (± feet)
Horizontal datum ☐ NAD27 ☐ WGS84 NAD83

3. PROPOSED USE:

☐ Domestic ☐ Stock ☐ Irrigation
☐ Public water supply ☒ Monitoring Well ☐ Other:

4. TYPE OF WORK:

☒ New well ☐ Deepen existing well ☐ Abandon existing well
Method: ☐ Cable ☒ Rotary ☐ Other:

5. WELL CONSTRUCTION DETAILS:

Borehole:

Dia. 8 in. from 0 ft. to 58 ft.
Dia. 8 in. from ft. to ft.
Dia. in. from ft. to ft.

Casing:

Steel: Wall thickness ☐ Threaded ☐ Welded
Dia. 8 in. from 11.8 ft. to 11.2 ft.
Dia. in. from ft. to ft.

Plastic: Pressure Rating lbs. ☐ Threaded ☐ Welded
Dia. 4 in. from 1.6 ft. to 58 ft.

Perforations/Slotted Pipe:

Type of perforator used
Size of perforations/slots in. by in.
 no. of perforations/slots from ft. to ft.
 no. of perforations/slots from ft. to ft.

Screens: ☒ Yes ☐ No

Material PVC
Dia. 4 Slot size 0.02 from 38 ft. to 48 ft.
Dia. Slot size from ft. to ft.

Gravel Packed: ☒ Yes ☐ No

Size of gravel 12-20 SAND
Gravel placed from 33 ft. to 58 ft.

Packer: ☐ Yes ☐ No NATURAL CUTTINGS
Type Depth(s) 26-33'

Grout: Material used BENTONITE CHIPS
Depth from 0 ft. to 26 ft. OR ☐ Continuous feed

6. WELL TEST DATA:

A well test is required for all wells. (See details on well log report cover.)

☒ Static water level 15.73 ft. below top of casing or
☐ Closed-in artesian pressure psi.

How was test flow measured:
bucket/stopwatch, weir, flume, flowmeter, etc

Yellowstone Controlled Groundwater Area - Water Temperature °F

☐ AQUIFER TEST DATA FORM ATTACHED

Test - 1 hour minimum

Drawdown is the amount water level is lowered below static level.
All depth measurements shall be from the top of the well casing.
Time of recovery is hours/minutes since pumping stopped.

Air test*

50 gpm with drill stem set at ft. for 0.5 hours
Time of recovery hrs/min. Recovery water level ft.

OR Bailer test*

 gpm with ft. of drawdown after hours
Time of recovery hrs/min. Recovery water level ft.

OR Pump test*

Depth pump set for test ft.
 gpm pump rate with ft. of drawdown after hrs pumping
Time of recovery hrs/min. Recovery water level ft.

OR Flowing Artesian*

 gpm for hours

Flow controlled by

*During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.

7. WELL LOG:

Depth, Feet		Material:
From	To	color/rock and type/descriptor (example: blue/shale/hard, or brown/gravel/water, or brown/sand/heaving)
0	2	TOP SOIL
2	5	CLAY, SILTY, LIGHT BROWN, MOIST, VERY SOFT
5	15	CLAY, MEDIUM BROWN, MORE COMPETENT THAN ABOVE, PERCENT SILT DECREASES WITH DEPTH, MOIST
15	16	CLAY, GRAY BROWN, SOFT, MORE COMPETENT THAN ABOVE, WET
16	25	GRAVEL, RED AND BROWN, 3/4"-6", SUBANGULAR - WELL ROUNDED, QUARTZITE PRESENT (QAL)
25	35	GRAVEL, BROWN AND WHITE, 3/4"-6", SUBANGULAR - SUBROUND, METAMORPHIC ROCKS PRESENT (QAL)
35	47	GRAVEL AND SAND, RED AND BROWN, GRAVEL, 3/4"-6", SUBANGULAR - WELL ROUNDED, QUARTZITE/FINE GRAINED GRAY SAND (QAL)
47	48	SHALE, GRAY WEATHERED, STIFF (Kb)

☐ ADDITIONAL SHEETS ATTACHED

8. DATE WELL COMPLETED: 10/13/2009

9. REMARKS:

10. DRILLER/CONTRACTOR'S CERTIFICATION:

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name, firm, or corporation (print)

Address

Signature

Date License no.

Montana Bureau of Mines & Geology
The University of Montana
1300 West Park Street
Butte, MT 59701

MBMG ID#

252597

MONTANA WELL LOG REPORT

Form No. 603 R2-04

Well ID# UGG509-7

This log reports the activities of a licensed Montana well driller and serves as the official record of work done within the borehole and casing and describes the amount of water encountered. This form is to be completed by the driller and filed with Mt. Bureau of Mines & Geology within 60 days of completion of the work. Acquiring Water Rights is the well owner's responsibility and is not accomplished by the filing of this report.

Well log information is stored in the Groundwater Information Center at the Montana Bureau of Mines and Geology (Butte) and water right information is stored in the Water Rights Bureau records (Helena).

For fields that are not applicable, enter NA. Optional fields have a grayed background. Record additional information in the REMARKS section.

1. WELL OWNER:

Name FORT PECK TRIBES CDPMailing address P.O. BOX 1027
POPLAR, MONTANA 59255

2. WELL LOCATION:

List 1/4 from smallest to largest

1/4 NW 1/4 SW 1/4 SW 1/4, Section 21Township 20 N Range 51 E County ROOSEVELTLot , Tract/Blk Subdivision Name Well Address GPS ☐ Yes ☐ NoLatitude 48° 09' 58.2088" N Longitude 105° 09' 03.1902" WError as reported by GPS locator (± feet) Horizontal datum ☐ NAD27 ☐ WGS84 NAD83

3. PROPOSED USE:

☐ Domestic ☐ Stock ☐ Irrigation
☐ Public water supply ☒ Monitoring Well ☐ Other:

4. TYPE OF WORK:

☐ New well ☐ Deepen existing well ☐ Abandon existing wellMethod: ☐ Cable ☒ Rotary ☐ Other:

5. WELL CONSTRUCTION DETAILS:

Borehole:

Dia. 10 in. from 0 ft. to 61 ft.Dia. 8 in. from 61 ft. to 111 ft.Dia. in. from ft. to ft.

Casing:

Steel: Wall thickness ☐ Threaded ☐ WeldedDia. 8 in. from ft. to ft.Dia. in. from ft. to ft.Plastic: Pressure Rating lbs. ☐ Threaded ☐ WeldedDia. 4 in. from ft. to 111 ft.

Perforations/Slotted Pipe:

Type of perforator used Size of perforations/slots in. by in. no. of perforations/slots from ft. to ft. no. of perforations/slots from ft. to ft.Screens: ☒ Yes ☐ NoMaterial PVCDia. 4" Slot size 0.02 from 91 ft. to 101 ft.Dia. Slot size from ft. to ft.Gravel Packed: ☒ Yes ☐ NoSize of gravel 12-20 SANDGravel placed from 88 ft. to 111 ft.Packer: ☐ Yes ☐ NoType NATURAL CUTTINGS Depth(s) 74'-88'Grout: Material used BENTONITE CHIPSDepth from 0 ft. to 74 ft. OR ☐ Continuous feed

6. WELL TEST DATA:

A well test is required for all wells. (See details on well log report cover.)

☒ Static water level 54.70 ft. below top of casing or☐ Closed-in artesian pressure psi.

How was test flow measured:

bucket/stopwatch, weir, flume, flowmeter, etc Yellowstone Controlled Groundwater Area - Water Temperature °F☐ AQUIFER TEST DATA FORM ATTACHED

Test - 1 hour minimum

Drawdown is the amount water level is lowered below static level.

All depth measurements shall be from the top of the well casing.

Time of recovery is hours/minutes since pumping stopped.

Air test*

35 gpm with drill stem set at 98 ft. for 0.5 hoursTime of recovery hrs/min. Recovery water level ft.

OR Bailer test*

 gpm with ft. of drawdown after hoursTime of recovery hrs/min. Recovery water level ft.

OR Pump test*

Depth pump set for test ft. gpm pump rate with ft. of drawdown after hrs pumpingTime of recovery hrs/min. Recovery water level ft.

OR Flowing Artesian*

 gpm for hoursFlow controlled by

*During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.

7. WELL LOG:

Depth, Feet		Material:
From	To	color/rock and type/descriptor (example: blue/shale/hard, or brown/gravel/water, or brown/sand/heaving)
0	1	TOP SOIL
2	11	SAND, LIGHT BROWN, VERY FINE GRAINED, MOIST AT 10', OCC 1/4"
		GRAVEL FROM 10'-11'
11	20	CLAY, MEDIUM BROWN, OCC. GRAVEL 1/4"-1", IRON STAINING, MEDIUM STIFF
20	61	CLAY, OLIVE GRAY, OCC. GRAVEL 1/4"-1", IRON STAINING, VERY STIFF
61	76	GRAVEL, RED AND BROWN, 1/4"-4", SUBANGULAR-WELL BOUNDED, COAL FRAGMENTS UP TO 3"
76	77	CLAY, GRAY, VERY STIFF
77	100	GRAVEL, RED AND BROWN, 1/4"-1/2", SUBANGULAR-WELL BOUNDED, GRAVEL 2"-4" FROM 97'-100'
100	101	SLATE, DARK GRAY, SOFT, WEATHERED
101	111	SLATE, DARK GRAY, HARD

☐ ADDITIONAL SHEETS ATTACHED8. DATE WELL COMPLETED: 10/15/20099. REMARKS:

10. DRILLER/CONTRACTOR'S CERTIFICATION:

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name, firm, or corporation (print) Address Signature Date License no. 

Montana Bureau of Mines & Geology
The University of Montana
1300 West Park Street
Butte, MT 59701

MBMG ID#

252598