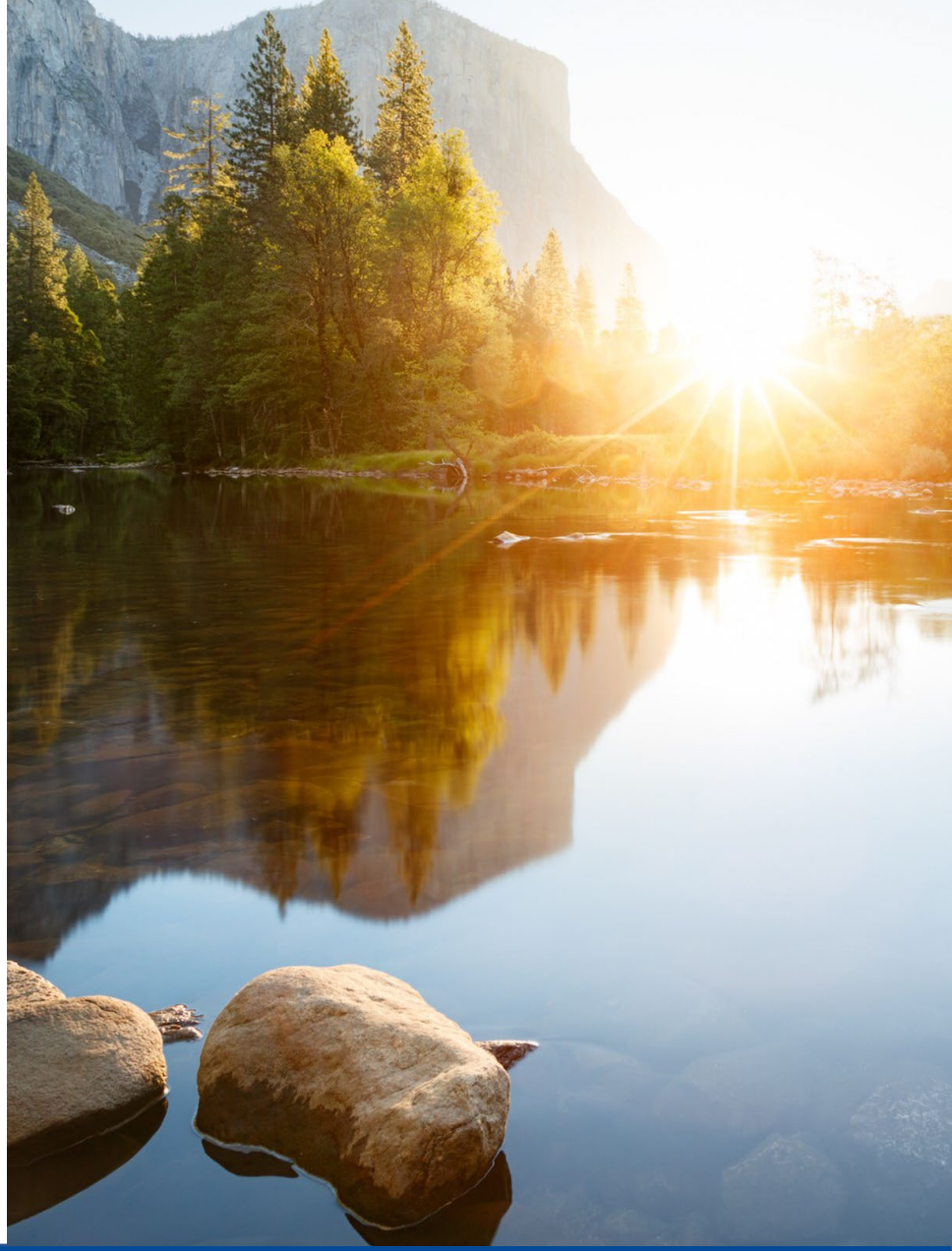
Onsite Water

Individual and Shared Wells

- Quality
- Quantity
- Dependability

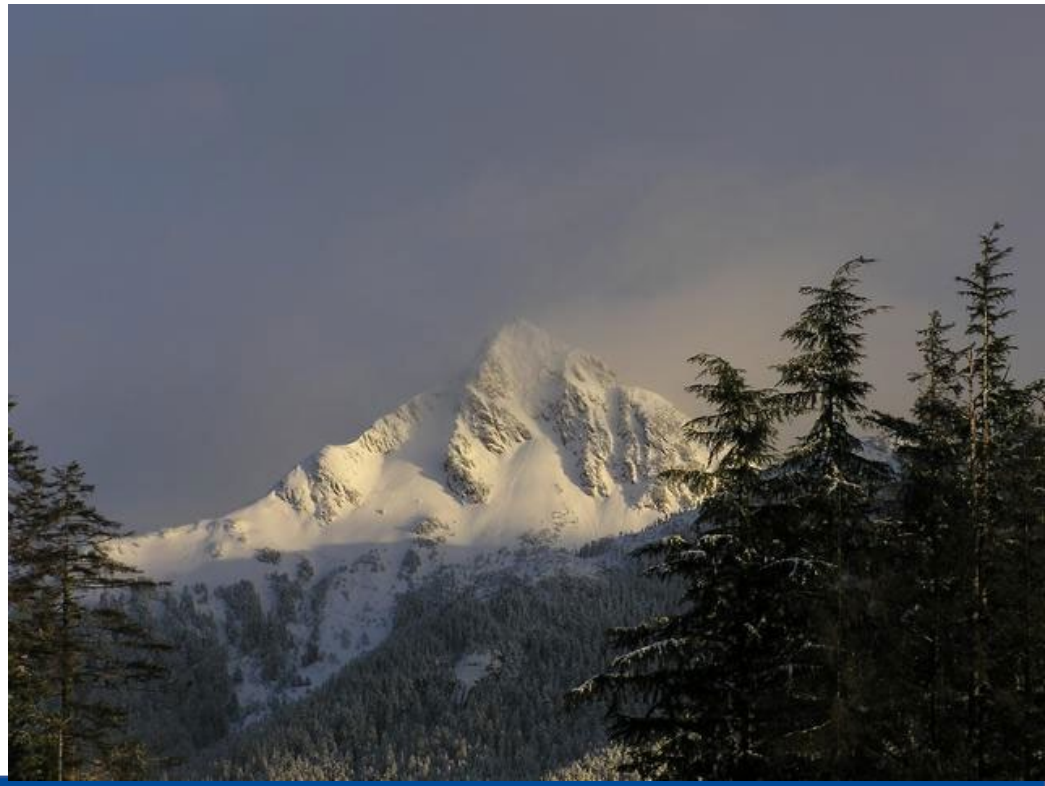


Shawn Sorenson
406-444-6754
shawn.sorenson@mt.gov

GOAL

Approve existing or proposed water supply systems that are sufficient in terms of quality, quantity, and dependability.

1. Complete applications
2. Consistent and timely review



TEAM EFFORT

Agenda

- Resources
- Primary references
- Submittal documents
- Well logs
- Common problem areas
- Deviations and waivers
- Questions

Resources

DEQ engineering programs page

ARM Home search page for Administrative Rules of Montana

GIS Montana DEQ Opencut Mining Web Mapping Application (mtdeq.us)

GWIC Montana's Ground Water Information Center 2023 (mtech.edu)

FEMA FEMA Flood Map Service Center | Welcome!

DNRC Water Rights DNRC Water Right Query System (mt.gov)

Tribal Water Rights – example: Flathead Reservation Water Management Board

MT CADASTRAL Montana Cadastral (mt.gov)

County Regulations

Primary References

- ARM Title 17, chapter 36, subchapters 1, 3, 6, 8
- *Local regulations*
- Circular DEQ 20, April 2023 Edition
- ARM Title 36, chapter 21
- ARM Title 17, chapter 38, subchapters 2, 5

Primary References

ARM 17.36

- 103 – application contents - (1)(c), (d), (e), (n), (o)
- 104 – lot layout
- 108 – local requirements
- 122 – O&M, ownership, easements, agreements (4), (5), (6)
- 323 – setbacks
- 802 – fees
- 918, 922 – setbacks, variances

Primary References

Circular DEQ 20

- 1.2 - deviations
- 1.3 – application materials
- 1.4 – general standards
- 1.6 – existing systems
- 1.7 – alternative systems
- 2.1.1 – quantity
- 2.1.2 – quality
- 2.1.1.2 – sampling
- 2.1.3 – construction
- 5. – cisterns

Primary References

ARM 36.21

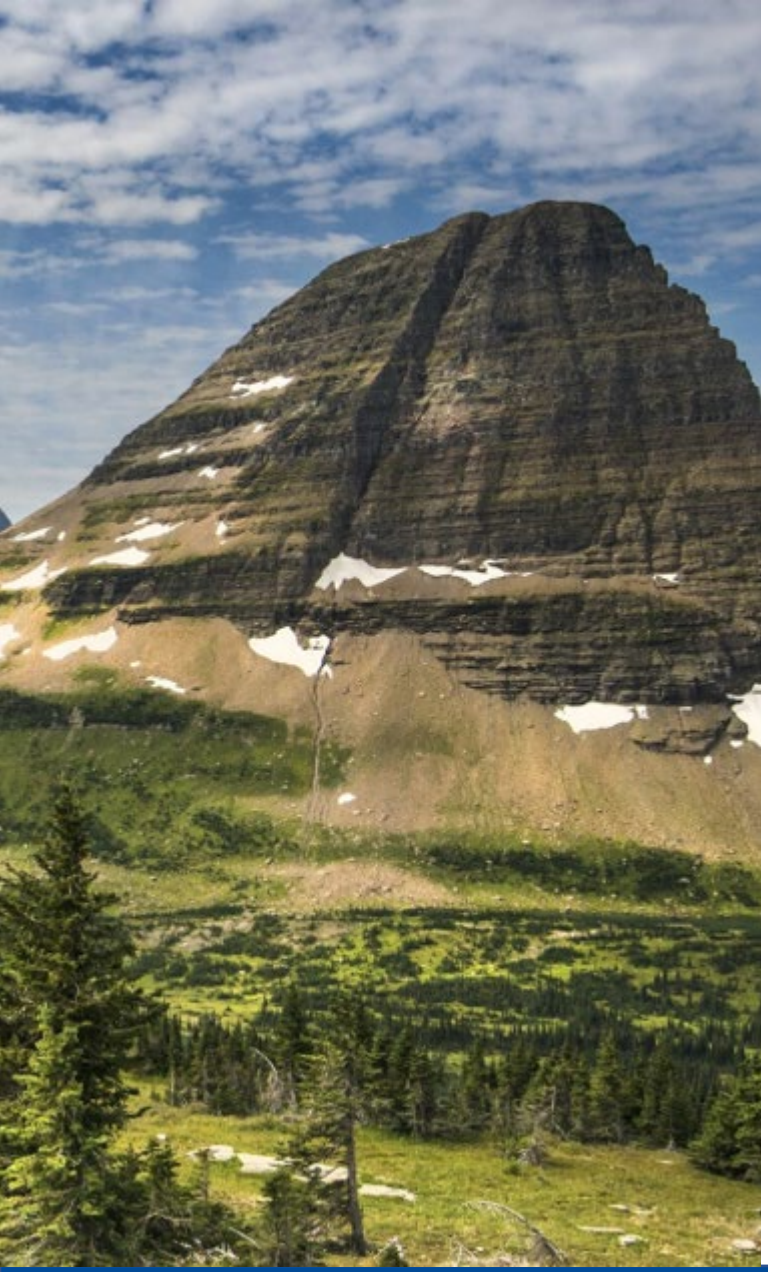
Subchapter 6

- 634 - definitions
- 654 - sealing
- 670 - 678 – abandoning

Primary References

ARM 17.38

- Subchapter 2 – water quality standards
- Subchapter 5 – water hauled for cisterns



Submittal Documents

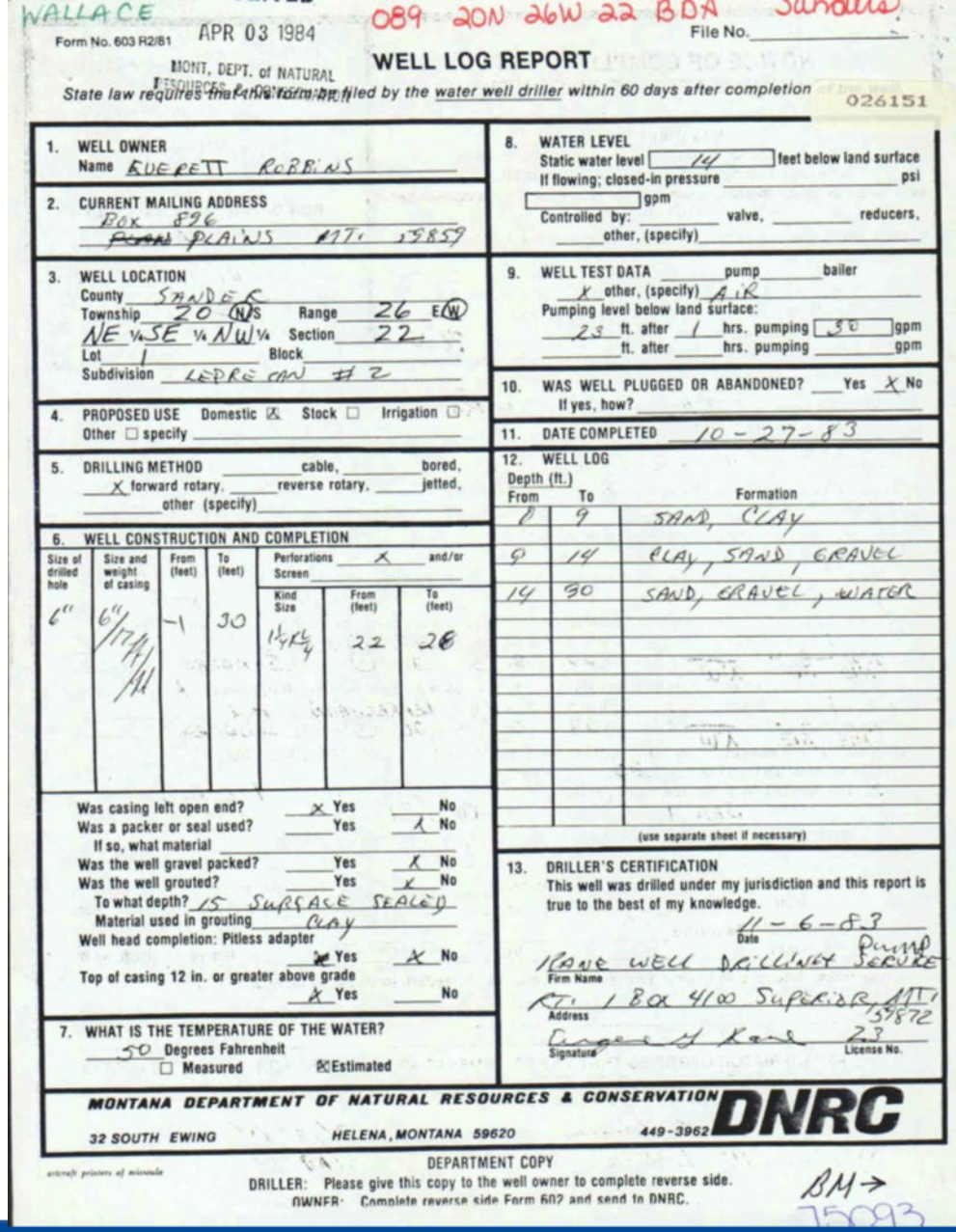
- Cover letter/design report
- Lot layout
- Vicinity maps
- Well logs
- Sampling results
- Water right determination
- Easements
- Deviation requests
- Construction plans
- Well data: pump tests, SWL measurements, etc.

Well Logs

- Where are they?
- Is it the right well log?
- Original vs. transcribed data

Well Logs

- Completion date
- Depth of well and casing
- Casing perforations
- Completion detail
- Grouting
- Static water level
- Yield – test type, duration, drawdown, recovery
- Pumping level
- Lithology



WALLACE 089 20N 26W 22 BDA Surface

Form No. 603 R2/81 APR 03 1984 File No.

MONT. DEPT. of NATURAL RESOURCES & CONSERVATION

WELL LOG REPORT

State law requires that this form be filed by the water well driller within 60 days after completion 026151

1. WELL OWNER
Name EVERETT ROBBINS

2. CURRENT MAILING ADDRESS
BOX 896
PLAINS MT. 59859

3. WELL LOCATION
County SANDERS
Township 20 N/S Range 26 E/W
NE ¼ SE ¼ NW ¼ Section 22
Lot 1 Block
Subdivision LEDRE CAN # 2

4. PROPOSED USE Domestic ☒ Stock ☐ Irrigation ☐
Other ☐ specify

5. DRILLING METHOD ___ cable, ___ bored,
X forward rotary, ___ reverse rotary, ___ jetted,
___ other (specify)

6. WELL CONSTRUCTION AND COMPLETION

Size of drilled hole	Size and weight of casing	From (feet)	To (feet)	Perforations X and/or Screen	From (feet)	To (feet)
6"	6"	-1	30	Kind Size 1¼ PVC	22	28

Was casing left open end? X Yes ___ No
Was a packer or seal used? ___ Yes X No
If so, what material
Was the well gravel packed? ___ Yes X No
Was the well grouted? ___ Yes X No
To what depth? 15 SURFACE SEALED
Material used in grouting CLAY
Well head completion: Pitless adapter ___ Yes X No
Top of casing 12 in. or greater above grade X Yes ___ No

7. WHAT IS THE TEMPERATURE OF THE WATER?
50 Degrees Fahrenheit
☐ Measured ☒ Estimated

8. WATER LEVEL
Static water level 14 feet below land surface
If flowing; closed-in pressure ___ psi
___ gpm
Controlled by: ___ valve, ___ reducers,
___ other, (specify)

9. WELL TEST DATA ___ pump ___ bailer
X other, (specify) AIR
Pumping level below land surface:
23 ft. after 1 hrs. pumping 30 gpm
___ ft. after ___ hrs. pumping ___ gpm

10. WAS WELL PLUGGED OR ABANDONED? ___ Yes X No
If yes, how?

11. DATE COMPLETED 10-27-83

12. WELL LOG

Depth (ft.) From	To	Formation
0	9	SAND, CLAY
9	14	CLAY, SAND, GRAVEL
14	30	SAND, GRAVEL, WATER

(use separate sheet if necessary)

13. DRILLER'S CERTIFICATION
This well was drilled under my jurisdiction and this report is true to the best of my knowledge.
11-6-83 Date
PANE WELL DRILLING & PUMP SERVICE Firm Name
RT. 1 BOX 4100 SUPERIOR MT. 59872 Address
Signature 23 License No.

MONTANA DEPARTMENT OF NATURAL RESOURCES & CONSERVATION DNRC
32 SOUTH EWING HELENA, MONTANA 59620 449-3962

DEPARTMENT COPY
DRILLER: Please give this copy to the well owner to complete reverse side.
OWNER: Complete reverse side Form 602 and send to DNRC.

BM→ 7583

Common Problems

- WIZ on or off lot?
- Water right determination – does not fit
- Well log doesn't exist
- Not the right well log(s)
- Not the right aquifer – representative wells
- Not the right aquifer – sampling
- Sampling incomplete or dates not met
- Yield & duration – low yield, deep well
- Grouting/sealing – requirements?
- Construction – requirements?

Well Construction
Drilling Rules – Grouting

- January 1970 – sealing/grouting with cuttings and clay, no required depth.
- 10/17/1986 – grout to a depth of 18 feet.
- 7/16/2010 – grout to a depth of 25 feet.

Well Construction

Drilling Rules – Which Rules?

Approve?
Deviation?
Modify?

Why?

Reference?

Well Construction

DEQ water quality specialist:

- The frost-free drains back into the well and is an indirect cross connection. This has long been an unacceptable method of installation.

- The garden hose, though temporary and removable, is an unknown hazard.

- Well cap is an irrigation style cap that is not vented or sealed, and the electrical conduit is not sealed.

- The items above would be significant deficiencies requiring correction in a routine well inspection.

Well Construction

In accordance with **Circular DEQ 20 Chapter 2.1.3.**, and to conform with **ARM 36.21.661 (1) & (5)**, the frost-free will need to be removed and the existing well cap replaced with a sanitary well cap.

(1) At all times during the progress of the work, the well driller shall protect the well in such a manner as to effectively prevent either tampering with the well or the entrance of foreign matter into it. Upon its completion, the well driller shall provide and set a sanitary well cap or welded cap.

(5) Hydrants, frost-free hydrants, faucets, hose attachments, or discharge hardware that allow siphoning into a well cannot be directly attached to the well casing, pitless adapter, or well cap. Hand pumps, windmills, or other manually operated discharge hardware that have hose connections or attachments and that attach directly to the well casing shall use a vacuum breaker or an anti-siphoning device. Flowing wells shall be capped and sealed to comply with ARM 36.21.658.

Deviations and Waivers

Waivers are from Rules (WAFR)

- If the rule does not specify that it can be waived, a waiver may not be requested

Deviations are from Circulars

- Deviations may be requested from any item in the circular unless it specifically says that a deviation is not allowed.

ARM 17.36.601 (3) A request for a waiver or deviation must be in writing and must be accompanied by information substantiating the request and by the appropriate fee. The applicant shall also demonstrate that the waiver or deviation:

(a) would be unlikely to cause pollution of state water in violation of 75-5-605 , MCA;

(b) would protect the quality and potability of water for drinking water supplies and domestic uses and would protect the quality of water for other beneficial uses, including those uses specified in 76-4-101 , MCA; and

(c) would not adversely affect public health, safety, and welfare.

Deviation, Waiver, Variance

Waivers and deviations may require a variance from the local regulatory authority

The DEQ cannot approve waivers from ARM Title 36, chapter 21

Deviations

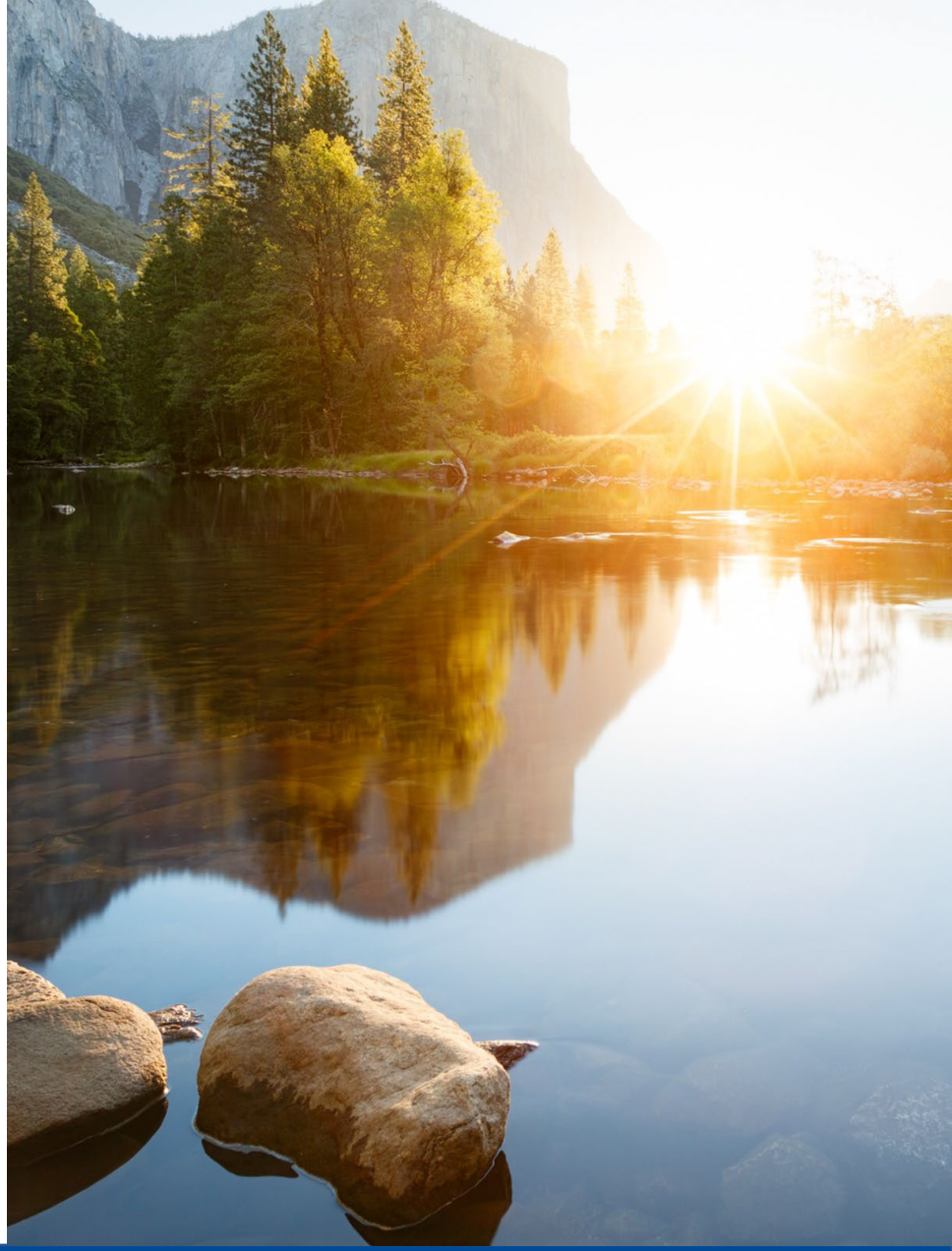
Common conditions not requiring deviation, such as:

- Grouting – some situations will
- Low yield wells –
  - Without storage
  - With storage

Deviations
Grouting

Grouting deviation required?

- No well log = yes
- 1974 well with grouting unspecified = no
- 1984 well with “no” indicated for grouting on scanned well log = yes

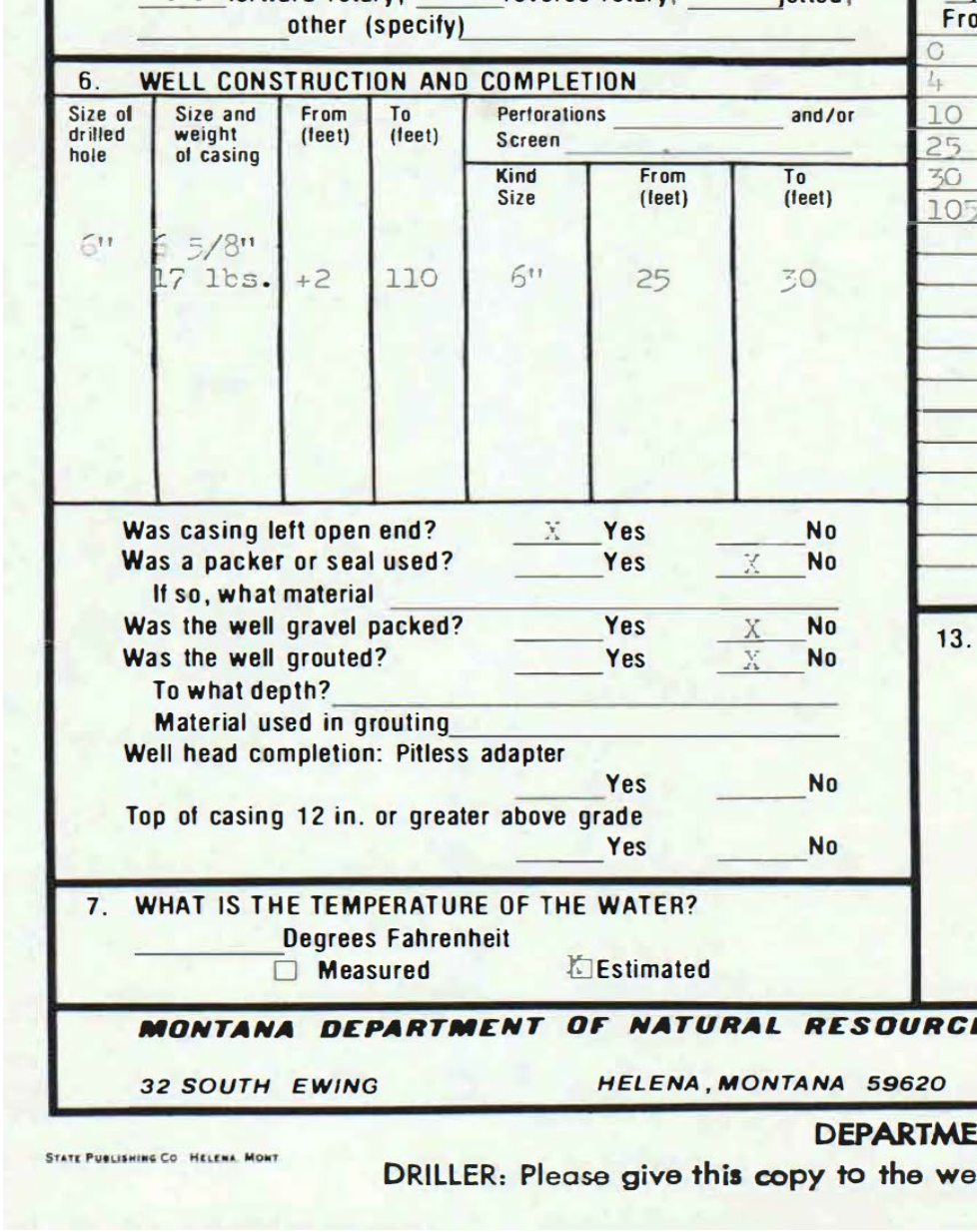


Well Grouting
Drilled October 29, 1984

Approve?

Deviation?

Why?



other (specify)

6. WELL CONSTRUCTION AND COMPLETION

Size of drilled hole	Size and weight of casing	From (feet)	To (feet)	Perforations / Screen — Kind Size	From (feet)	To (feet)
6"	5 5/8" 17 lbs.	+2	110	6"	25	30

Was casing left open end? X Yes ____ No
Was a packer or seal used? ____ Yes X No
If so, what material ____
Was the well gravel packed? ____ Yes X No
Was the well grouted? ____ Yes X No
To what depth? ____
Material used in grouting ____
Well head completion: Pitless adapter ____ Yes ____ No
Top of casing 12 in. or greater above grade ____ Yes ____ No

7. WHAT IS THE TEMPERATURE OF THE WATER?
____ Degrees Fahrenheit
☐ Measured ☒ Estimated

MONTANA DEPARTMENT OF NATURAL RESOURCE
32 SOUTH EWING HELENA, MONTANA 59620

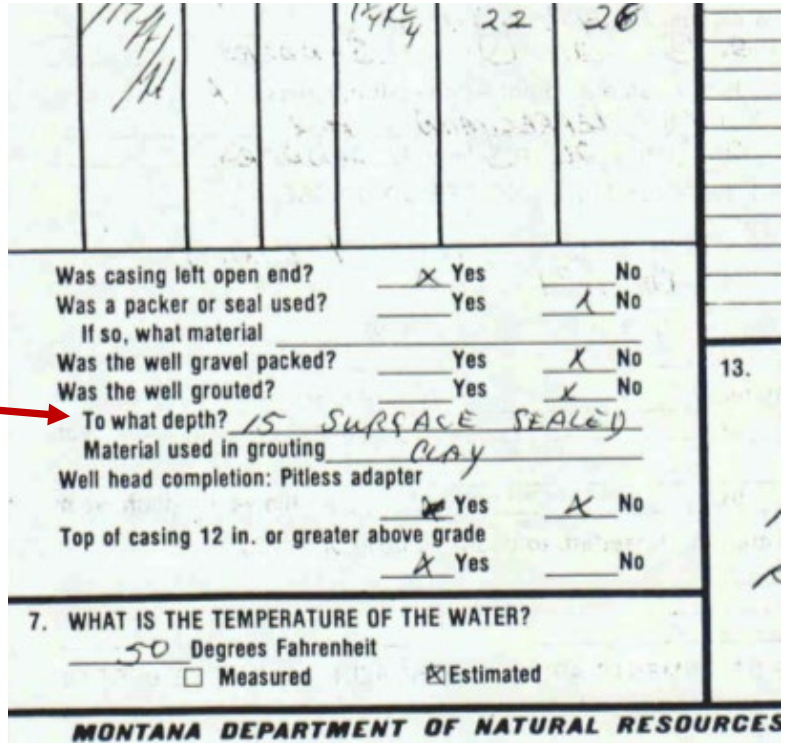
STATE PUBLISHING CO HELENA, MONT

DEPARTME

DRILLER: Please give this copy to the we

Well Grouting
Drilled October 27, 1983

What do we do with this information?



Was casing left open end? X Yes ___ No
Was a packer or seal used? ___ Yes X No
If so, what material ___
Was the well gravel packed? ___ Yes X No
Was the well grouted? ___ Yes X No
To what depth? 15 SURFACE SEALED
Material used in grouting CLAY
Well head completion: Pitless adapter
___ Yes X No
Top of casing 12 in. or greater above grade
X Yes ___ No

7. WHAT IS THE TEMPERATURE OF THE WATER?
50 Degrees Fahrenheit
☐ Measured ☒ Estimated

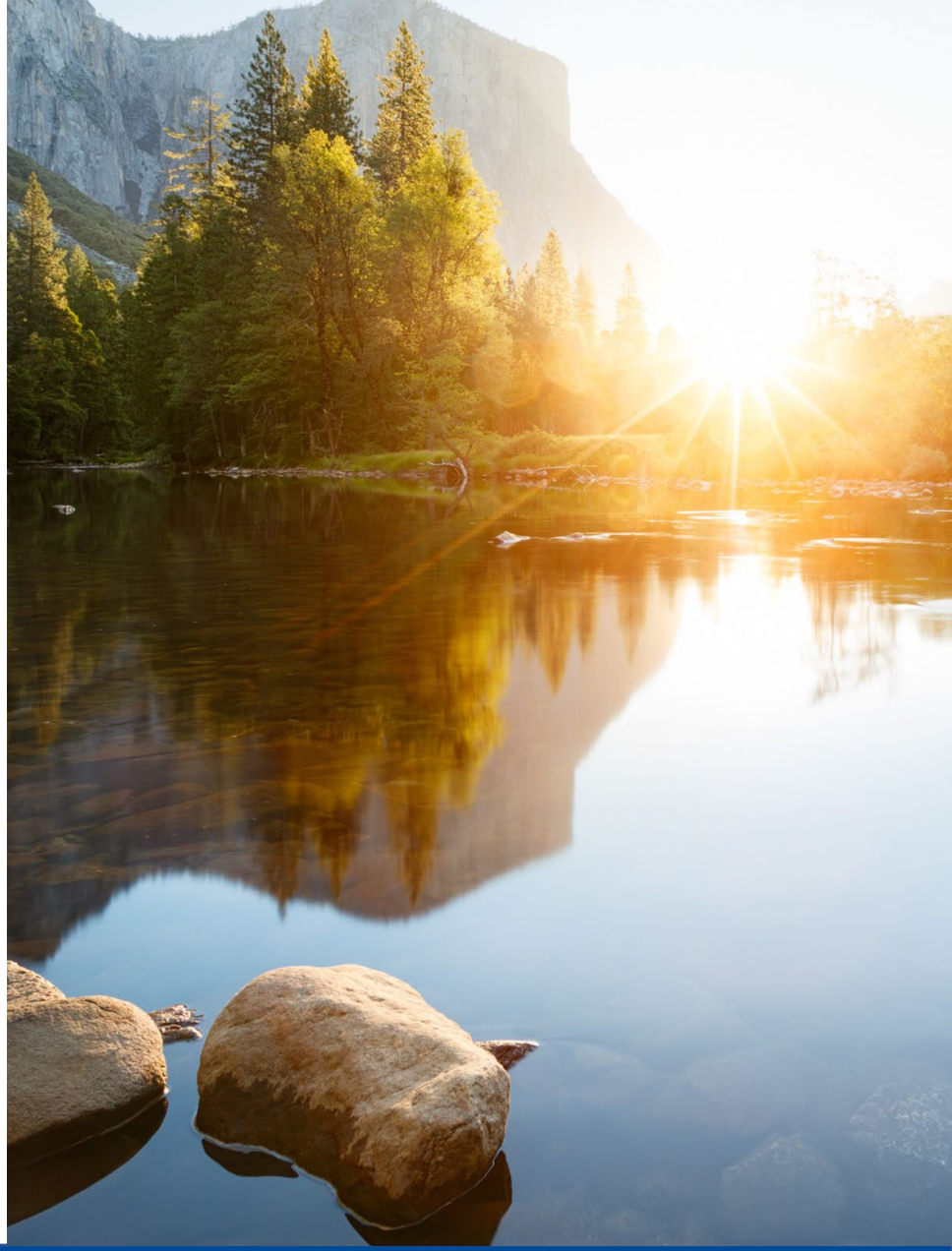
13.

MONTANA DEPARTMENT OF NATURAL RESOURCES

Deviations
Construction

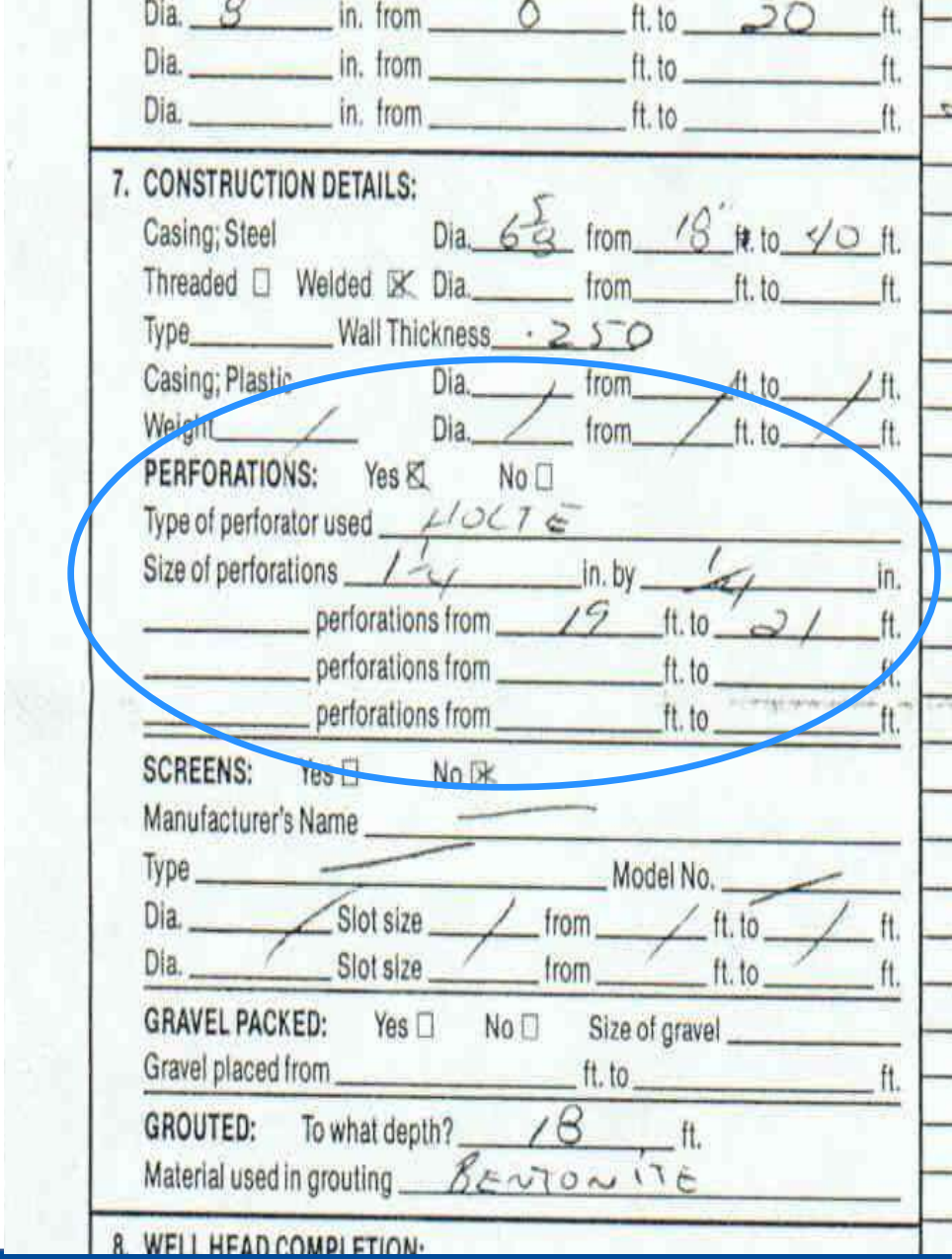
Construction deviation required?

- No well log = no, if required data is submitted
- Casing perforated 19-21 feet BGS = yes, but approval depends largely on the aquifer



Well Construction
Drilled about 1991

Deviation may be difficult to approved due to susceptibility of the shallow aquifer, coupled with elevated sodium and nitrate in adjacent well samples.



Dia. 8 in. from 0 ft. to 20 ft.
Dia. _____ in. from _____ ft. to _____ ft.
Dia. _____ in. from _____ ft. to _____ ft.

7. CONSTRUCTION DETAILS:
Casing; Steel Dia. 6 5/8 from 18 ft. to 40 ft.
Threaded ☐ Welded ☒ Dia. _____ from _____ ft. to _____ ft.
Type _____ Wall Thickness .250
Casing; Plastic Dia. / from / ft. to / ft.
Weight / Dia. / from / ft. to / ft.
PERFORATIONS: Yes ☒ No ☐
Type of perforator used SLOTTED
Size of perforations 1/4 in. by 1/4 in.
_____ perforations from 19 ft. to 21 ft.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.
SCREENS: Yes ☐ No ☒
Manufacturer's Name _____
Type _____ Model No. _____
Dia. _____ Slot size _____ from _____ ft. to _____ ft.
Dia. _____ Slot size _____ from _____ ft. to _____ ft.
GRAVEL PACKED: Yes ☐ No ☐ Size of gravel _____
Gravel placed from _____ ft. to _____ ft.
GROUTED: To what depth? 18 ft.
Material used in grouting BENTONITE

8. WELL HEAD COMPLETION:

- Resources
- Primary references
- Submittal documents
- Well logs
- Common problem areas
- Deviations and waivers
- Questions


Thank you!
Questions?